Mid-Albian Ammonites From Northern Western Cordillera, Colombia, S.A.

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RESUMEN

La asociación de amonites del Albiano medio, PTYCHOCERAS sp. y METAHAMITES sp., fué coleccionada de cherts que alternan con shales, e intercalados (?) en una secuencia volcánica máfica. Este es el primer registro de amonites pre-Turonianos, del margen oriental de la parte septentrional de la Cordillera Occidental de Colombia, al oeste de Medellín. Dataciones K-Ar de rocas intrusivas que cortan la secuencia volcánico-sedimentaria son congruentes con la edad paleontológica.

ABSTRACT

PTYCHOCERAS sp., and METAHAMITES sp., a middle Albian heteromorph ammonite association, were recovered from bedded chert and shale included apparently (?) in a mafic volcanic sequence. This is the first record of pre-Turonian ammonites from the eastern margin of northern Western Cordillera, west of Medellín. K-Ar age determinations on intrusive tonalite rocks that cut the volcanic-sedimentary section are congruent with the paleontological dating.

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A CONTRIBUTION TO MID–CRETACEOUS EVENTS

INTRODUCTION.–

Ammonite records in the Western Cordillera in Colombia are relatively rare, and they have not been previously described from beds dated older than Turonian (Ordoñez, in litt., 1980).

In the course of their work for the "Inventario Minero Nacional", in 1964, geologists N. Castro, A. Andrade, and T. Feininger collected two dozen fossil fragments, from cherts cropping out near Buriticá, west of Medellín. This collection was previously examined and it was believed that some of the several fragments were those of **Ptychoceras** sp., and **Hamites** or **Hamiticeras** sp. Relying on those preliminary determinations, a range in age from Barrenian to Aptian was assigned to the fossiliferous cherts (Preliminary report of identification for the Inventario Minero Nacional, Etayo Serna, February 1965).

FOSSILIFEROUS OUTCROPS

"Fossils come from a sequence of dark rocks; black shales, chert, basaltic volcanics, and black limestone. . . the fossils are not abundant. . . the fossils were collected within a hundred meters of the contact with a quartzdiorite stock" (= tonalite). (T. Feininger, written commun., November 1964). The chert beds sampled crop out at Quebrada del Oso, 3.5 K south of the Village of Buriticá, Department of Antioquia (Fig. 1), near the intersection of the geographical coordinates referred to the North and to the West, and centered in Bogotá: X: 1'231.640, Y= 1'128.720; Map 130-I-A, scale 1:25.000, published as "Carta Preliminar" by the Instituto Geográfico Agustín Codazzi, Bogotá 1961.

GEOLOGIC SETTING AND STRATIGRAPHY

In the Buriticá-Pinguro area (Fig. Ib), five major types of rock have been mapped: 1) a large stock of Tonalite (which appears in the Geological map of Ingeominas, sheet I-7 as a quartzdiorite), 2) a minor pheno-andesite porphyry intrusive (which appears in the Geological map of Ingeominas, sheet I-7, as a hornblendic andesite), 3) mafic igneous flows and dykes, 4) interbedded fossiliferous chert and shale, 5) gabbro.

At quebrada del Oso (Fig. 1b), the tonalite stock "is clearly intrusive into the fossiliferous rocks; a baked zone is well-developped, and inclusions of dark host rock are abundant in the contact zone" (T. Feininger, written commun, Nov. 7, 1964). One K-Ar radiometric analysis on a sample of the tonalite collected near Buriticá, gave an age of 91.1 ± 6.4 m.y. (Gobel and Stibane, 1979). Another K-Ar radiometric analysis on a sample collected at Quebrada Honda, east margin of the Cauca river, from a similar tonalite type of rock gave on age of 97 ± 10 m.y. (González et al., 1979). The tonalite is intruded by the pheno-andesite porphyry, which in addition cuts the mafic igneous flows and dykes (Fig. 1b), (Alvarez and González, 1979, p. 162).

The stratigraphic relationships between the mafic igneous flows and dykes and the fossiliferous chert and shale are, even today, rather uncertain, consequently only on the basis of theorethical considerations they have been included in the same volcanic-sedimentary complex (Alvarez and González, 1979; Ingeominas Geological map. 1-7).

One gabbro sample collected in the Altamira region 50 km. S of Quebrada del Oso, gave K-Ar ages of: 1) 77.4 ± 7.7 m.y. (Restrepo and Toussaint, 1975, tab. 1) and, 2) 92.5 ± 4.2 m.y. (Toussaint and Restrepo, 1976, tab. 1). At Altamira, the position of the gabbro in relation to the other types of rocks remains controversial (Restrepo and Toussaint, 1975, p. 10). Authors of the geologic map 1-7 of Ingeominas have considered the young age obtained for the gabbro of Altamira, as the age of the gabbro that cuts the interbedded fossiliferous chert and shales in the area of Quebrada del Oso. In this report it is the second, or old age, obtained for the same gabbro of Altamira that is asigned to the gabbro in Quebrada del Oso (see fig. 3).

Two thin sections of the chert (samples B. 33, B. 39) studied by the late Dr. Pedro Bermúdez (U. de Venezuela), contained **Globigerinella escheri** (Kauffman) and **Rugoglobigerina** sp.; the age of these forams was judged Aptian-Albian (Bermúdez, written commun., 1965). According to Masters (1977, p. 401, tab. 1), Kauffman's species - now included in **Globigerinelloides** - would be upper Albian in age, with an Aptian-Maestrichtian range for the genus. **Rugoglobigerina** according to Masters, ranges from Santonian to Maestrichtian (Masters, p. 618, 1977). The record of the latter genus seems in disagreement with the rest of the paleontological and radiometrical data, and consequently is considered anomalous, subject to taxonomic re-study and additional colecting.

The two ammonite genera recovered from the bedded chert and shale at quebrada del Oso most probably indicate a middle Albian age.

FIGURE 1 A
Location of Buriticá in northern Western Cordillera, Colombia, S.A.

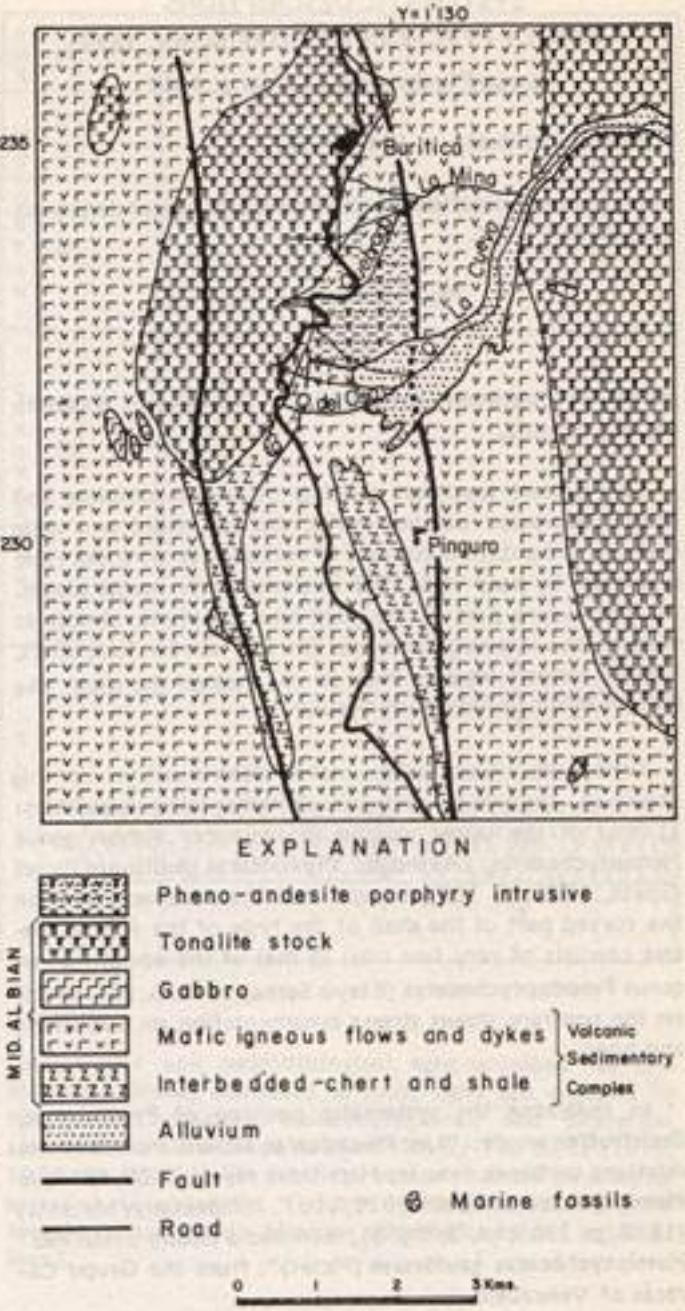

FIGURE 1 B
Geologic map along of Buriticá-Pinguro road and vicinity. Modified from: "Mapa Geológico del Cuadrángulo I -7, Urrao", by E. Alvarez G, H. González I, et al, 1978, Bogotá, Unpublished. Rock names acording to IUGSSSIR recommendations.

SYSTEMATIC DESCRIPTIONS

FAMILY PTYCHOCERATIDAE MEEK, 1876

Genus **Ptychoceras** d'Orbigny, 1842

Ptychoceras d'Orbigny, 1842, p. 554.

Type species. **P. emericianus** d'Orbigny, subsequent denomination, Diener, 1925.

Ptychoceras ? sp. inc.

Fig. 2a

Reference Specimen. Sample B-36. Repository: Ingeominas (?) Bogotá.

The figured specimen consists of two incomplete and closely adpressed parallel shafts. On the short and wide shaft, ornamentation consists of rursiradiate wire-like ribs, separated by very wide, flat bottomed intercostal spaces. On the curved part of the shell ribs are blunt, almost as wide as the intercostal spaces. On the narrow long shaft, ribbing appears weaker than on the rest of the shell. The section seems to have been circular.

Comments. Preservation makes determination of this specimen somewhat difficult. Ornamentation resembles: 1) that of the upper middle Albian-upper Albian genus **Hemiptychoceras**, created for **Ptychoceras gaultinum** Pictet (Spath, 1925, p. 189), except that the ornamentation on the curved part of the shell of the type of the Alpine species consists of very fine ribs; 2) that of the upper Aptian genus **Pseudoptychoceras** (Etayo Serna, 1979, p. 21), which on the contrary shows strong ornamentation on both shaft and hook.

In reviewing the systematic position of **Ptychoceras**, Breistroffer wrote: "Les Ptychoceras albiens montrent des relations certaines avec les Hamitidae Hyatt 1900, tels que **Hemiptychoceras** Spath 1925, . . . ". Incidentally, Macsotay (1972, p. 1708, pl. 3, fig. 1), recorded a poorly preserved" **Hemiptychoceras gaultinum** (Pictet)", from the Grupo Caracas of Venezuela.

FAMILY ANISOCERATIDAE Hyatt, 1900

Genus **Metahamites** Spath, 1930

Metahamietes Spath, 1930, p. 57

Type species: **Hamites sablieri** d'Orbigny, original designation.

Metahamites sp. ind

Fig. 2b

Reference specimen: Sample B-36. Repository, Ingeominas (?) Bogotá.

Coiling hamitid; the limbs are parallel and slightly apart; early whorls seem to commence with a small helix (?). Phragmocone ornamentation insufficiently preserved, rather finely costulated. Body chamber hook sculptured with sharp ribs; some of the ribs bear a small ventrolateral tubercle. No lateral tubercles are observed.

Comments. Interpretation of Spath's genus **Metahamites** (1930, p. 57), so far one can judge from the restoration of the holotype (?) of the type species **Hamites sablieri** d'Orbigny (1842, pl. 133, fig. 6), and on the other dubious species assignated to that genus by Spath (1930, p. 61; 1939; p. 577): **Metahamites** (?) **elegans** d'Orbigny (1842, pl. 133, figs. 1, 5). On these species no lateral tubercles are depicted; ventrolateral tubercles are distributed from narrowly to widely-spaced; besides, on the body chamber the spacing of the ribs apparently increases, and the ribs apper stronger, because of the reduction of looping fine ribs. This view seems in agreement with Casey's own interpretation of **Metahamites** (1961, p. 99). Spath (1939, p. 565), stated: **"Metahamites** occurs only in the Lower Gault", that is middle Albian. According to Casey (1961, p. 99), **M. gignouxi** Collignon is another valid species of the genus;

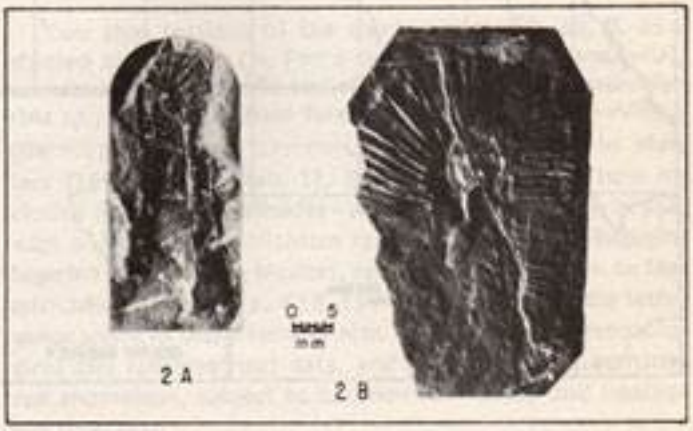

FIGURE 2A
Lateral view of **Ptychoceras** sp. unc. x 1

FIGURE 2B
Lateral view of **Metahamites** sp. ind. x 1

this species comes from the zone of **Douvilleiceras inaequinodum**, upper lower Albian, Madagascar (Collignon, 1963, p. 43; 1978, tab. II). Wiedmann and Dieni (1968, p. 60) described **Metahamites dalpiazi** W. & D., as a subgenus of **Hamites**, from upper Albian beds, in the Orosei area of Eastern Sardinia, Italy.

In Central Colombia, the asociation **Metahamites** sp. ind., and **Eubrancoceras** sp. juv., has been recovered from black shale, NW of Otanche, (Sample IGM 659767). The only previous record of **Metahamites** from South America, known to us is by C.W. Wright (In Guillaume et al., 1972, p. 1652), from the Serranía del Interior, Eastern Venezuela; according to the associated, or better listed fauna, this specimen would belong to the upper lower Albian in the sense of Etayo Serna (1979).

RESULTS AND DISCUSSION

Even though mineral separates commonly yield young potassium-argon ages (Mc Dougall, 1978: 122), we conclude that radiometric and paleontological ages previously referred to are compatible on the ground of geological relationships. The radiometric ages are interpreted to represent a minimum date for the plutonic events that affected the volcanic-sedimentary complex. We infer upper Albian age as the possible upper limit to the age of the interbedded chert and shale, dated middle Albian by ammonites.

The presence of **Ptychoceras?** sp. and **Metahamites** sp.-indet. in the Western Cordillera in Colombia, forms one more link in the chain of developing evidence concerning the distribution of the Tethyan province ammonite faunas in Albian time (see also Kennedy and Kollmann, 1979).

Additional paleontological and radiometric researches are needed in this interesting geologic section.

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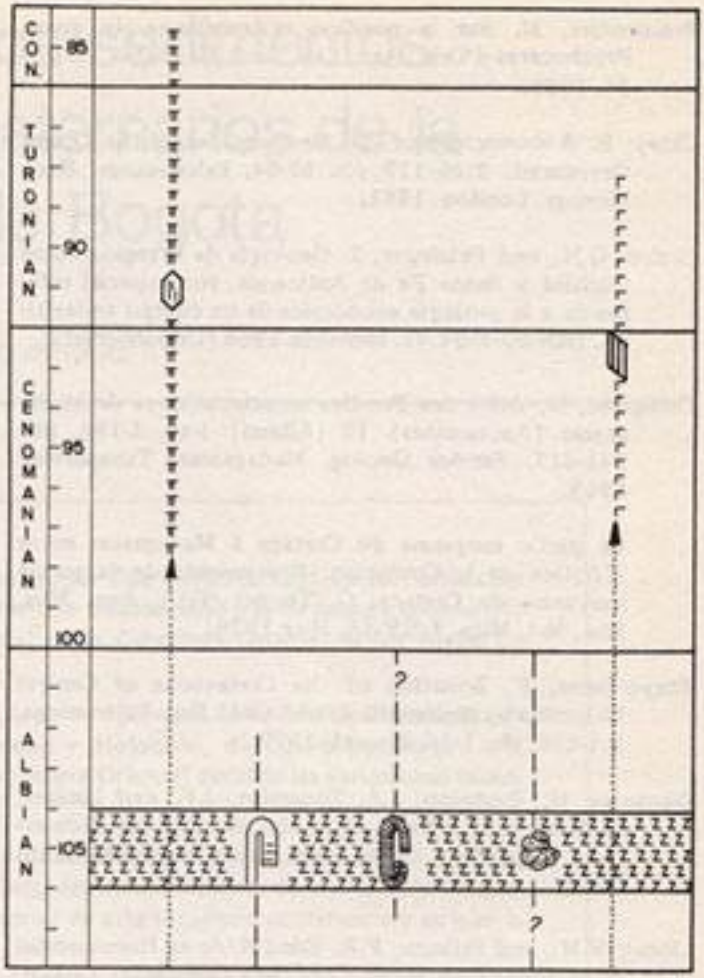

FIGURE 3

Radiometric and paleontological ages obtained for the lithologic bodies discussed in text. Ages are referred to the geochronological, biostratigraphical, and numerical scales for the Cretaceous, as assembled by Van Hinte (1976, 1978, fig. 2). Tonalite K-Ar age values obtained on samples regarded as cogenetic. Gabbro age value obtained on a sample coming from Altamira (Symbols are self explanatory).

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