

ON THE SYSTEMATIC AND STRATIGRAPHICAL SIGNIFICANCE OF THE GENERA *PSEUDOCRIOCERAS* SPATH *AUDOULICERAS* THOMEL AND *KUTATISSITES* KAKABADZE

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The representatives of the family *Ancyloceratidae* Meek are characterized by narrow vertical (Hauterivian - Aptian) and world-wide distribution. The Ancyloceratids attained the peak of flourishing in the Barremian and Aptian seas of the Mediterranean province. However, it is in most parts of this area that they have, unfortunately, been investigated scantily. In this respect the Caucasus forms no exception. Early studies of some of the Ancyloceratid groups of this region are inadequate in the systematic respect as well as in terms of their detailed stratigraphic significance.

The first evidence and descriptions of the Ancyloceratids of the Caucasus under different generic names occur in 19th century studies. A comparatively complete description of the representatives of the family in question is given by I.M. Rouchadze (1933, 1938). Subsequently, very important information (mainly, description of species) on the Ancyloceratids found in Georgia and in North Caucasus appeared in the works of N.P. Luppov, 1952, M.S. Eristavi, 1955, V.L. Egojan, 1959, V.V. Druzczic, 1960 and others. Despite a large number of contribution questions of the systematics of this group were elucidated insufficiently. Hence, many species of different genera were described as representatives of the genus *Ancyloceras* d'Orbigny.

Apart from the description of the genera *Pseudocrioceras* Spath, 1924, *Audouliceras* Thomel, 1964 and *Kutatissites* Kakabadze, 1970, the question of the stratigraphical significance of all the representatives of this genera known in the Caucasus is discussed in present paper.

The genus *Pseudocrioceras* Spath has not been specially studied by anyone and, therefore, in the works of F. Anderson (1938), F. Romann (1938), V. Druzczic, M. Eristavi (1958) and others only short - and at the time, inaccurate - generic characterization is given. The genera *Audouliceras* Thomel and *Kutatissites* Kakabadze were identified recently, hence, it is but natural that new data on them from the stratigraphic and paleontologic point of view are of considerable value.

The specimens, discovered and studied by the author, are preserved at the Institute of Geology, Academy of Sciences of the Georgian SSR (coll. N 90).

Family *Ancyloceratidae* Meek, 1876

Genus *Pseudocrioceras* Spath, 1924

Pseudocrioceras : Spath, 1924, p. 78;

Anderson, 1938, p. 205

Romann, 1938, p. 353

Crioceras (*Pseudocrioceras*) : Jenne, 1949, p. 623 (pars.)

Pedioceras : Arkell et al., 1957, p. L208 (pars.)

Type-species - *Scaphites abichi* Bacevitsch et Simonovitsch, Western Georgia, Lower Aptian. 104

Generic characters. The initial whorls are planospiral, then follows a straightened shaft ended by a moderately recurved crossier. The initial whorls of the planospiral part have crioceratid coiling, the last whorls remaining in contact. SPATH, 1924

Sculpture on the early whorls consists of simple, dense, narrow, equal ribs, without tubercles. Then appear low ventral tubercles, and slightly later occur umbilical and upper lateral tubercles. Besides simple trituberculated ribs there are thin intermediary and rarely bifurcate ribs which branch from the umbilical tubercles. Up to the last whorl of the plane spiral the main trituberculate ribs are dominant, but on the last whorl thin intermediary ribs, without tubercles, alternate between almost each of them. The number of the intermediary ribs between the principal trituberculate ribs varies from 1 to 5-6. Between the ventral tubercles the ribs are interrupted, but on the dorsum all the ribs are thinned and bent forward. Ventral and upper lateral tubercles are more prominent than the umbilical ones, and in some cases, beginning with about the middle of the shaft, the umbilical tubercles disappear.

The suture line is of the ancyloceratid type.

Comparison. By the ancyloceratid uncoiling the genus *Pseudocrioceras* Spath approaches *Ancyloceras* d'Orbigny, but differs from it by the character of whorl coiling and sculpture in the planospiral stage : the last planospiral whorls of *Pseudocrioceras* are in contact, whereas the genus *Ancyloceras* has crioceratid coiling. Approximately up to the last whorl the representatives of *Pseudocrioceras* have simple, equal ribs, on which ventral, umbilical and upper lateral tubercles appear consecutively. Intermediary ribs, which are so characteristic of the planospiral stage of *Ancyloceras*, appear only on the last whorl in *Pseudocrioceras*.

Remarks. The genus *Pseudocrioceras* was identified by L. Spath (1924), who, without describing the genus, indicated only a type-species, *Scaphites abichi* Bacevitsch et Simonovitsch, 1873. Later, F. Anderson (1938) on the basis of the figure and description of "*Crioceras*" *abichi* bacevitsch et Simonovitsch, adduced in D. Anthula's paper (1900, p. 124, pl. XII, fig. 1), naturally gave an imperfect characterization of this genus. A brief, incomplete diagnosis is also to be found in the paper by F. Romann (1938).

Later, I. Royo y Gomez (1945) observed that *Crioceras* (*Pseudocrioceras*) and the genus *Pedioceras* Gerhardt, 1897 were evidently synonyms and that they should be sub-

sumed under the name of *Crioceras* (*Pseudocrioceras*) Spath, 1924.

K. Jenne (1949) devoted a separate paper to the study of this problem. Having rather poor data at his disposal, K. Jenne came to the same conclusion, as I. Royo y Gomez did. In the papers of I. Piveteau (1952), W. Arkell et al. (1957) these genera are represented as synonyms of *Pedioceras*. On the Principles of Palaeontology by V.V. Druzcic and M.S. Eristavi (1958) the genus *Pedioceras* is not mentioned at all, and the genus *Pseudocrioceras* is considered separately.

Thus, there are two opposing views on one and same question. After acquaintance with the papers of I. Royo y Gomez (1945), K. Jenne (1949) and with all the authors referred to above and as a result of studying more than a hundred specimens (in addition to the material of the author's own collection, he has had the opportunity to examine the collections of I.M. Rouchadze, M.S. Eristavi and others) the author has come to the conclusion, that there is no ground to consider the genus *Pseudocrioceras* Spath as a synonym of the genus *Pedioceras* Gerhardt.

K. Gerhardt (1897), establishing the genus *Pedioceras*, also gave the delineation of three species (without indicating the type-species) from the Neocomian of Columbia — 1) *P. ubaquense* (Karsten, 1858) ; — 2) *P. caquensensis* (Karsten, 1858) and — 3) *P. cundinamarcae* Gerhardt, 1897.

The specimens of the former two species, the figures of which are reproduced in the papers by I. Royo y Gomez (1945) and F. Romani (1938), are rather well preserved, being represented by feebly involute whorls of subquadrate section. The whorls are ornamented with simple ribs, with ventral and upper lateral tubercles. The outer side is flattened and smoothed out between the ribs. Umbilical tubercles are missing. As to the third species of K. Gerhardt, only one fragment (1/4 of the whorl) of the planospiral part was described under the name of *Pedioceras cundinamarcae*. Morphological signs similar to the above mentioned are discernible on this fragment. Thus, according to K. Gerhardt the diagnosis of the genus *Pedioceras* is precisely formulated thanks to the abovementioned perfectly preserved specimens. According to the investigations of K. Jenne (1949) the three species should be united under the single species of *Pedioceras ubaquense* (Karsten) ; thus, *Ammonitoceras ubaquense* Karsten, 1858 (Barremian, Columbia) should be considered type-species. It is notable that neither I. Royo y Gomez, nor K. Jenne had more complete specimens at their disposal than K. Gerhardt. The specimen represented by I. Royo y Gomez (1945) in pl. LXXIII, fig. a, b stands quite close to the *abichi* group and actually this is a fragment of the planospiral part of the mature stage of ammonite ; proceeding from this there is no reason to conclude that the initial whorls of this specimen had signs characteristic of the genus *Pedioceras*. We have also no reason to think that in the elder stage this form was characterized by the type of uncoiling that the "*abichi* group" had.

An almost analogous picture is observed when considering the data of K. Jenne (1949). The collection of this author is also poor, 5 specimens in all ; among them there are only two shells (pl. 102, fig. 2, 4) with planospiral part in satisfactory preservation. They are characterized by weakly involuted whorls of an earlier stage, as in the *Pedioceras* (a sign not characteristic of the "*abichi* group" !) and involution disappears only later (pl. 102, fig. 2). These specimens lack the umbilical tubercles, which are so characteristic of the "*abichi* group". As seen from the figure given by K. Jenne (pl. 102, fig. 8), unlike the *Pseudocrioceras* (the figures of the suture line of the "*abichi* group" representatives are given in the papers by I.M. Rouchadze, 1933, 1938) the suture line in the *Pedioceras* at this stage is characterized by comparatively low and broader saddles and comparatively broad and

more symmetric trifold lateral lobe. As to the remaining three specimens of K. Jenne (pl. 102, fig. 1, 5, 6), they do not make any definite contribution to the solution of given question ; the specimens, illustrated on pl. 102, fig. 5 and 6 represent 1/5 of the whorl of the planospiral part. The sculpture is mainly represented by ribs with ventral and upper lateral tubercle thickenings, some ribs also have umbilical thickenings. Between the main ribs thin (3-6) intermediary ribs without tubercles are developed. Jenne's third specimen (pl. 102, fig. 1), which represents the uncoiled fragmental part of the ammonite, is - in contrast to fig. 5 and 6 - ornamented with stronger three-tuberculated ribs, alternated by 3-5 thinner ribs with no tubercles. It is clear that there is no ground for relating these fragments to the genus *Pedioceras* (i. e. to a genus, whose later ontogenic stages are unknown). moreover, this specimen could be referred to the "*abichi* group" and to the genus *Ancyloceras*, as well as to the Lower Barremian genera *Crioceratites* or *Emericeras* (all the specimens of I. Royo y Gomez and K. Jenne were found in the beds with *Pulchellia* and *Nicklesia*). It should be reiterated, however, that solution would be incorrect. Consequently, Jenne's assumption that the later three fragments (pl. 102, fig. 1, 5, 6) constitute an adult stage of the species *Pedioceras ubaquense* (karsten) is groundless.

It should also be added here that the above listed authors were not familiar with the properties of the "*abichi* group" representatives. They were acquainted only with the figure of *Pseudocrioceras abichi* Bac., Sim. from D. Anthula's (1900, pl. XII, fig. 1) paper. This incomplete specimen is represented by the shaft and the last whorl of the planospiral part. The description of a more perfect specimen, "*Scaphites*" *abichi* (considered to be a holotype) is given in the paper by L.F. Bacevitch and S.E. Simonovitch (1873), but a drawing of this specimen is given in a later paper (Simonovitch, Sorokin, Bracevitch, 1874, pl. I, fig. a, b). They write : "The embryonal whorl, and for that matter, the whole of that part in which the whorls overlap each other, being in contact, represent an ammonite highly compressed laterally, with a completely open umbilicus. On the surface this part of the shell has simple, slightly curved, rather sharp ribs, forming small tubercles on each edge of the ventral flank... The ribs also have tubercles on the dorsal margins fully corresponding in form and disposition with those of ventral ones. With the process of development, between the tubercles described above there also emerged lateral tubercles, located on the margins, close to the ventral side of the shell (1873, p. 29 - 30).

Thus, it becomes evident that there is no ground for considering the genera *Pseudocrioceras* Spath and *Pedioceras* Gerhardt synonymus. The method used by Royo y Gomez and Jenne is by no means suitable in solving controversial systematic problems. This is particularly obvious in studying systematic questions of the *Heteromorph* Ammonites.

Of interest is also the question of the systematic position of *Pseudocrioceras* Spath. L. Spath (1924) and after him K. Wright (1952), W. Arkell et al. (1957), V.V. Druzcic and M.S. Eristavi (1958) refer this genus to the Crioceratids. According to F. Anderson (1938), this genus is a member of the family *hemihoplitidae*, but I. Royo y Gomez (1945) refers it to the family *Palaehoplitidae*. Unfortunately none of these authors contain substantiation or explanation the systematic position of this genus.

In the author's view, reference of the genus *Pseudocrioceras* to crioceratids, as well as the other families mentioned above, has no grounds. It is obvious from the diagnostics of the *Pseudocrioceras* that not a single of the signs essential to crioceratids is characteristic of the genus *Pseudocrioceras*. On the other hand, the general shape of the shell (presence of the plane spiral, shaft and hook) and the sculpture type, beginning with the last whorl of the plane spiral and the features of the suture line of this genus are of

the ancyloceratitid type. Hence, the genus *Pseudocrioceras* Spath must be placed in the *Ancyloceratidae*. It should be recalled here that W. Kilian (1913) recorded the affinity of "*Scaphites*" *abichi* Bas., Sim. with *Ancyloceras matheronianum* d'Orb. and I.M. Rouchadze (1933, 1938) and M.S. Eristavi (1955) have described all the species of the "*abichi* group" as representatives of the genus *Ancyloceras* d'Orb.

In Caucasus the following species of *Pseudocrioceras* are found :

- 1) *P. abichi* (Bacevitsch et Simonovitsch, 1873) ;
- 2) *P. phasiensis* (Rouchadze, 1933) ;
- 3) *P. waageni* (Anthula, 1900) ;
- 4) *P. waageni sapitshkiensis* (Rouchadze, 1933) ;
- 5) *P. waagenoides* (Rouchadze, 1938) ;
- 6) *P. sahariense* (Rouchadze, 1933) ;
- 7) *P. kutatitsiense* (Rouchadze, 1933) ;
- 8) *P. coquandi iverica* (Rouchadze, 1933) ;
- 9) *P. sparcicostatus* (Eristavi, 1955) ;
- 10) *P. orbignyianum* (Matheron, 1842) ;
- 11) *P. anthulai* (Rouchadze, 1955) ;
- 12) *P. steinmanni* (Bacevitsch et Simonovitsch, 1873) ;
- 13) *P. dichotomum* (Rouchadze, 1933).

Distribution. Upper Barremian (?) - Lower Aptian and Middle (?) Aptian. Caucasus, Western Europe.

Genus *Audouliceras* Thomel, 1964

Ancyloceras (*Audouliceras*) : Thomel, 1964, p. 55 ;
Audouliceras : Avram, 1976, p. 76

Type-species - *Ancyloceras audouli* Astier, 1851, Barremian-Aptian, France.

Generic characters. Typically crioceratitid coiling on the planospiral part, followed by the straight shaft and terminal hook. The sculpture is very changeable during the ontogeny ; the early whorls are ornamented with dense, quite similar fine ribs, on which ventral, upper lateral and umbilical tubercles are developed here and there. They are situated simultaneously on two or three consecutive ribs. There also are intermediary ribs, which have only ventral tubercles. A more or less sudden change of the sculpture may occur from the beginning of the late planospiral stage, when tubercles disappear and ornamentation is represented by narrow simple and bifurcate ribs. Sometimes the tubercles persist on the early part of the shaft and only later disappear. Prior to crozier fine and dense ribbing is in evidence without tubercles. On the upper part of the shaft and on the hook there are simple, distant and high ribs, with large ventral, upper lateral and umbilical tubercles. Between the trituberculated ribs thinner non-tuberculated ribs are developed. On the final part of the hook the tubercles are usually levelled off.

The suture line is of the ancyloceratitid type.

Comparison. By the morphology of the whorls and type of sculpture on the planospiral part the present genus resembles the Lower Barremian genus *Joubertites* Sarkar, 1955, but differs from it by the presence of the shaft and hook. By the form of the shell and disappearance of the tubercles in the middle ontogenic stage *Audouliceras* resembles the genus *Australiceras* (group *A. gigas*), but differs from it by the type of sculpture on the planospiral part of the shell.

Remarks. G. Thomel (1964), identifying the subgenus *Ancyloceras* (*Audouliceras*), indicated the distinctive features between *Ancyloceras* (*Ancyloceras*) and *Ancyloceras* (*Audouliceras*) and described some species of this new subgenus. The phylogenetic views of G. Thomel deserve special attention. He directly derived *Ancyloceras* (*Audouliceras*) from the Lower Barremian group "*Joubertites*" *dubius* Sarkar, whereas he looked for the ancestors of *Ancyloceras* (*Ancyloceras*) among the representatives of the group *Crioceras* (*Emericeras*) *emerici* Lev. Taking into account this remarkable phylogenetic evidence and the

rather sharp morphological differences between these two groups, the author agrees with N. Dimitrova (1975) and E. Avram (1976), who considered these groups to be independent genera.

Establishing the genus *Joubertites*, S. Sarkar (1955) also gave the description of - *J. dubius*, *J. dubius tuberculata* and *J. collignoni*. Then, G. Thomel (1964), establishing the subgenus *Ancyloceras* (*Audouliceras*), noted that the initial whorls of the representatives of *Ancyloceras* (*Audouliceras*) and *Joubertites* are very similar, the only difference between them being the presence of an uncoiled part (shaft, hook) of the shell in *Ancyloceras* (*Audouliceras*). Thus, this two groups are closely interrelated. According to G. Thomel the composition of the genus *Joubertites* should be reduced by including only representatives of the group *J. Dubius*, for "*J.*" *collignoni* is also characterized by planospiral and uncoiled (shaft, hook) parts of the shell. It is clearly very difficult to establish the limit between these two genera without having well-preserved material. Therefore, one can understand G. Thomel's (1964, p. 55) observation that the genus *Joubertites*, established on very fragmentary material, is inadequately characterized to be substantiated. It must be noted, however, that if in future it proves feasible to ascertain that all the species attributed by S. Sarkar to *Joubertites* have a similar uncoiled ontogenic stage, they will clearly constitute synonyms and according to the International Code of Zoological Nomenclature, the older name, *Joubertites* Sarkar, 1955 will have to be retained.

The following representatives of *Audouliceras* are found in the Caucasus :

- 1) *A. tzotnei* (Rouchadze, 1933) ;
- 2) *A. tsaltsithelense* (Rouchadze, 1933) ;
- 3) *A. collignoni* (Sarkar, 1955) ;
- 4) *A. renauxianum caucasica* (Egojan, 1959) ;
- 5) *A. aff. renauxianum* (Rouchadze, 1933) ;
- 6) *A. georgicum kakabadze*, sp. nov. and
- 7) *A. (?) colchidense* (Rouchadze, 1933).

Distribution. Barremian - Lower Aptian. France, Romania, Czechoslovakia, Bulgaria, Caucasus.

Audouliceras georgicum kakabadze, sp. nov. Pl. 1, fig. 1

Holotype - N 112/90, Museum of the Polytechnical Institute of Tbilisi, Western Georgia, Kutaisi, Lower Aptian.

Material. Only one, holotype is known, represented by the last planospiral whorls and earlier part of the shaft.

Description. Coiling of the plane spiral of the crioceratitid, with the whorls expanding moderately. The shaft is straight. On the early part of the last planospiral whorl the section is elliptic (drawn out in width), then it gradually becomes circular, being elliptical on the last part of the plane spiral whorl and on the shaft (drawn out in height).

On the planisprial whorl the sculpture is represented by the tubercle ribs of two order and by intermediary ribs without tubercles ; the number of the latter between the tuberculate ribs on the commencement part are 1-2, then increasing to 4. The tuberculate ribs of the first order consist of large ventral, upper lateral and umbilical tubercles, arranged simultaneously on two or three ribs. The upper lateral tubercles are larger than the others and the umbilical ones are weaker. The tuberculated ribs of the second order are characterized by small tubercles (ventral, upper lateral, umbilical), arranged only on the principal ribs. On the final part of the plane spiral there are represented only tuberculated ribs of the first order, between which 4-5 fine intermediate ribs are developed. With the beginning of the shaft the tuberculation gradually disappears and then only narrow, dense ribs, without tubercles develop. The suture line is not preserved.

Measurements, mm :

| N | D | H | E | O |
|--------|----|--------------|----------------|--------------|
| 112/90 | 81 | 30 (0,37) | 25,5 (0,31) | 41 (0,50) |

Comparison. As to the type of costation the present species approaches *Audouliceras collignoni* (Sarkar), but differs from it by the presence of larger tubercles and comparatively small number of intermediary ribs between the principal triberculated ribs.

Occurrence. Western Georgia, Kutaisi, Lower Aptian marly limestones (collection of Prof. G. Kharatishvili).

Genus *Kutatissites* kakabadze, 1970

Kutatissites : 1970, p. 734 ;

Simionescites : Avram, 1976, p. 77.

Type-species : *Kutatissites bifurcatus* Kakabadze, Western Georgia, Kutaisi, Lower Aptian (zone of *Deshayesites weissi* - *Procheloniceras albrechti-austriae*).

Generic characters. The initial whorls are helically coiled, surrounded by more or less tightly coiled or crioceratitid planospiral whorls. There are no trustworthy data on presence of the uncoiled part (shaft, hook).

The ornamentation on the helicoidal part is represented by rather strong trituberculate asymmetrical ribs. On the plane spiral there are also trituberculate ribs, with intercalations of thin untuberculated ribs. In some cases there are also bifurcated ribs, which branch from the umbilical tubercles - rarely, from the upperlateral ones. With an increase in diameter the umbilical tubercles grow larger, whereas upper lateral and ventral tubercles become weaker ; sometimes they even disappear but, as a rule, soon become modified by the reappearance of coarse trituberculate costae. The ribs are interrupted between the ventral tubercles, but continue across the dorsum, where they are thinned and bent forward. The suture line is of the ancyloceratitid type. In the planospiral stage the suture line has the following features : the first lateral saddle is narrower than the second one and the lateral lobe is very deep and wide.

Comparison. As to the coiling and costation of the helicoidal part the present genus approaches the genus *Helicanicylus*, but differs from it by the existence of interrupted ribs on the ventral side, by the narrow umbilic of the helix and by its mode of coiling : the whorls of *Helicanicylus* are but slightly removed from the symmetric plane, thus being discoidal in shape. Besides, the planospiral stage of *Helicanicylus* is unknown. By the presence of trituberculate ribs and the shape of the whorl-section in the planospiral stage *Kutatissites* resembles *Pseudocrioceras* Spath, but differs from it by the peculiar succession of the ontogenic stages (helicoidal - planospiral). Furthermore, the uncoiled stage (shaft, hook) of *Kutatissites* is unknown.

Remarks. In the recently published article by E. Avram (1976) on the new *Heteromorph* Ammonites from the Lower Bedulian of the Dimbovicioara Couloir, apart from other questions, a group of uncoiled ammonites, identified by that author as a new genus - *Simionescites* and two new species of this group - *S. princeps* and *S. simionescui* - are also described. Acquaintance with the descriptions of the mentioned species indicates that they undoubtedly belong to the genus *Kutatissites*, and that the generic features of *Simionescites* Avram, 1976 is a minor synonym of the genus *Kutatissites* kakabadze, 1970 established earlier.

The following species of *Kutatissites* are found in the Caucasus :

- 1) *K. bifurcatus* Kakabadze, 1970 ;
- 2) *K. recticostatus* (Eristavi, 1955) ;
- 3) *K. helicoceroides* (Rouchadze, 1938) ;

- 4) *K. rionensis* (Rouchadze, 1933) ;
- 5) *K. helicoides* (Rouchadze, 1933) ;
- 6) *K. helicoides robusta* (Eristavi, 1955) ; and
- 7) *K. princeps* (Avram, 1976).

Distribution. Western Georgia, Dagestan, Checheno-Ingushetia and Romania. Lower Aptian.

In conclusion, let us briefly discuss the question of the stratigraphic significance of all (known in the Caucasus) the species of the three genera characterized above.

The genus *Pseudocrioceras* Spath, 1924

The genus *Pseudocrioceras* is represented by the most numerous species among the caucasian *Ancyloceratidae*.

The type-species *P. abichi* Bac., Sim. has wide distribution in Georgia, occurring in the Lower Aptian deposits. It is notable that M.S. Eristavi (1955, p. 113) mentioned Lower and Middle (Gargasian) Aptian, but in his table of distribution of the species only Lower Aptian is indicated. According to the observations of the present author, as well as those of others, in the territory of the Caucasus *P. abichi* has not been identified anywhere above to the Lower Aptian level. Therefore, Eristavi's date are accepted with reservations. In the Lesser Caucasus this species was also met (Chalilov, 1965, p. 180) in the Lower Aptian deposits (zone *Deshayesites deshayesi*).

P. waageni (Anthula) in Georgia and in North Caucasus characterises the Lower Aptian. In North Caucasus a more exact stratigraphical distribution of the species is not feasible, but in Georgia all the specimens were found by the present writer at the level of the zone *Deshayesites weissi* - *Procheloniceras albrechti-austriae*.

Representatives of *P. orbignianum* (Matheron) were found in fairly large number in the Lower Aptian deposits of Georgia and North Caucasus. It is remarkable that outside the Caucasus (France, Switzerland) the species in question also occurs in the Lower Aptian deposits.

The species *P. sahoriensis* (Rouchadze), *P. phasiensis* (Rouchadze), *P. sapitskiensis* (Rouchadze), *P. kutatissiensis* (Rouchadze), *P. coquandi imerica* (Rouchadze), *P. sparcicostatus* (Eristavi), *P. steinmanni* (Bacevitsch, Simonovitsch), *P. dichotomum* (Rouchadze) and *P. godoganensis* (Rouchadze) have local distribution : Lower Aptian of Georgia. Unfortunately, a more exact stratigraphic occurrence of the holotypes of these species is unknown ; it must be noted, however, that all the other specimens of these species, except *P. dichotomum* (Rouch.), were taken only from the zone *Deshayesites weissi* - *Procheloniceras albrechti-austriae*.

The genus *Audouliceras* Thomel, 1964

Representatives of this genus occur in the Upper Barremian and Lower Aptian deposits. 6 representatives have been established in Caucasus. The species : *A. tzotnei* (Rouchadze), *A. tsaltsithelense* (Rouchadze), *A. (?) colchidense* (Rouchadze) and *A. aff. renauxianum* (Rouchadze) are found only in Western Georgia (Lower Aptian) and *A. renauxianum caucasica* (Egojan) in the upper part of the Lower Aptian of North-Western Caucasus.

A. collignoni (Sarkar) occurs - both in France and in Georgia - in the Upper Barremian deposits.

The genus *Kutatissites* Kakabadze, 1970

Apart from the Caucasus representatives of *Kutatissites* are known only in Romania. It is remarkable that on the territory of the Caucasus, especially in Georgia, they have rather wide distribution.

The species *K. recticostatus* (Eristavi), *K. rionensis* (Rouchadze), *K. helicoides* (Rouchadze), *K. helicoides robusta* (Eristavi) are local ones: they were found only in

Georgia in the Lower Aptian deposits. It must be noted that the stratigraphical occurrence of the holotypes of *K.recticostatus* (Erist.) and *K.rionensis* (Rouch.) is unknown; unfortunately, it is only in general outline indicated as Aptian by I.M. Rouchadze (1933) and M.S.Eristavi (1955).

K.bifurcatus Kakab. is distributed in the Lower Aptian deposits of Georgia (zone *Deshayesites weissi* - *Procheloniceras albrechti-austriae*) and Dagestan, but *K.helicoceroides* (Rouch.) in the Lower Aptian of Georgia, Dagestan and Checheno-Ingushetia.

Representatives of *K.princeps* (Avram) in Romania were

found in the Lower part of Bedulian, and in Georgia this species was also met in the lower part of Bedulian (zone *Deshayesites weissi-Procheloniceras albrechti-austriae*).

Finally, it should be noted that in most stratigraphical sections of the Lower Cretaceous deposits of Georgia the Lowermost Aptian zone - *Deshayesites weissi* - *Procheloniceras albrechti-austriae* - is poorly characterized by the zonal species (especially *Deshayesites weissi* N. et Uhl. !), whereas the above mentioned Lower Aptian representatives of the genera *Kutatissites*, *Audouliceras* and especially *Pseudocrioceras* are abundantly represented and the Barremian-Aptian boundary is easily established between these and Upper Barremian Colchidites beds.

STRATIGRAPHICAL DIVISION OF THE BARREMIAN AND APTIAN DEPOSITS OF GEORGIA
(the data by M.S. Eristavi and E.V. Kotetishvili)

| STAGES | SUBSTAGES | ZONES AND BEDS |
|--|-----------------------|--|
| APTIAN | Upper (Clanseian) | <i>Hypacanthoplites jacobi</i> |
| | | <i>Acanthohoplites nolani</i> |
| | Middle (Gargasian) | <i>Colombiceras tobleri</i> |
| | | <i>Epicheloniceras subnodocostatum</i> |
| | Lower (Bedulian) | Beds with <i>Dufrenoya furcata</i> |
| | | <i>Deshayesites deshayesi</i> |
| <i>Deshayesites weissi</i> - <i>Procheloniceras albrechti-austriae</i> | | |
| BARREMIAN | Upper | <i>Colchidites securiformis</i> |
| | | <i>Imerites giraudi</i> |
| | | Beds with <i>Matheronites</i> |
| | Lower | Beds with <i>Pulchelliidae</i> |
| | | <i>Holcodiscus caillaudi</i> - <i>Emericiceras emerici</i> |

- ANDERSON F.M. Lower Cretaceous deposits in California and Oregon. Spec. papers Geol. Soc. of America, 16, 1938.
- ANTHULA D.I. Über die Kreidefossilien des Kaukasus. Beitrage Pal. und Geol. Ost.-Ung. und Orients. Bd XII, H. 2-3, 1900.
- ARKELL W.I., KUMMEL B., WRIGHT C.W. Mesozoic Ammonoidea. Treatise on Invertebrate Paleontology. Part L, Mollusca 4, Cephalopoda, Ammonoidea, 1957.
- AVRAM E. Nouvelles Ammonites Heteromorphes Bédouliennes du Couloir de la Dimbovicioara. Inst. de Geol. et Geophys. Mem. v. XXIV, Bucharest, 1976.
- BACEVITSCH L.F., SIMONOVITSCH S.E. — Geologitscheskoe opisanie tschasti kutaisskogo uezda, Kutaisskoi gubernii, izvestnoi pod imenom Okriba. Mat. geol. Kavkaza, 1873.
- BASSE E. Quelques Ammonites nouvelles du Crétacé de Colombia (Am.-Sud). Bull. Soc. Geol. France, t. XVIII, 8-9, 1948.
- CASEY R.A. A monograph of the Ammonoidea of Lower Greensand. Paleontographical Society, part 1, 1960-1961.
- CHALILOV A.G. — Stratigrafia nijnemelovich otlojenii iugo-vostotschnogo okontschania Bolschogo Kavkaza. Izd. AN Az. SSR, Inst. geol., Baku, 1965.
- DIMITROVA N. — Cheteromorfi amoniti ot Dolna Kreda v Bolgaria (taksonomia, filogenia i stratigrafesca stoikost). Avtoreferat na dissertacia, Sofia, 1975.
- DRUZCZIC V.V. — Ammoniti (I tsch.). V kn. : "Atlas nijnemelovoi fauni Severnogo Kavkaza i Krima." Gostoptechizdat, 1960.
- DRUZCZIC V.V., ERISTAVI M.S. — Nadsemeistvo *Ancyclocerataceae*. V kn. : "Osnovi paleontologii, Molluski-Golonovogie", II, 1958.
- EGOJAN V.L. — *Ancycloceras renauxianus* d'Orb. var. *Caucasica* var. nov. iz nijnemelovich "brachiopodovich" pestschanikov dolini r. Pschechi (Severo-zapadnii Kavkaz). Izv. vuzov. Geol. i. razvedka, N 2, 1959.
- ERISTAVI M.S. — Nijnemelovaia fauna Gruzii. Inst. Geologii i Mineralologii AN GSSR, Monografii, 6, 1955.
- GERHARDT K. Beitrage zur Kenntniss der Kreide Formation in Columbien. Neues Jahr. fur Miner., Paleont., XI, Beiligi-Band. 1897.
- JENNE K.A. *Pedioceras*, a synonym of *Crioceras* (*Pseudocrioceras*). Journ. of Paleontology, v. 23, 6, 1949.
- KAKABADZE M.V. — Novi rod *Kutatissites* gen. nov. iz nijnemelovich otlojenii Zapadnoi Gruzii. Soob. AN GSSR, 58, N 3, 1970.
- KILIAN W. Unterkreide (Paleocretacicum). *Lethea geognostica*, t. II, Mesosoicum, Band 3 (Kreide), abt. Lief. 1-3, 1907-1913.
- LUPPOV N.P. — Nijnemelovie otlojenia Severo-Zapadnogo Kavkaza i ich fauna. Tr. VNIGRI, nov. ser., vip. 65, 1952.
- PIVETEAU I. *Traité de Paléontologie*, t. II, Paris, 1952.
- ROYO y GOMEZ, I. Fossiles Barremiense Colombiano. *Conpil. Estud. Geol. Ofic. Colombia*, t. VI, 1938.
- ROMANN F. Les Ammonites Jurassiques et Cretaces, 2. Essai de genera. Masson et Cie, editeurs, 1938.
- ROUCHADZE I.M. Les Ammonites aptiennes de la Géorgie Occidentale. Bull. de l'Inst. geol. de Géorgie. Vol. 1, fasc. 3, 1933.
- ROUCHADZE I.M. — Nekotorie novie ili maloizvestnie aptskie cefalopodi Gruzii. *Vestn. Geol. Inst.*, t. III, 2, 1938.
- ROUCHADZE I.M. — Aptskie ammoniti Severnogo Kavkaza. *Tr. Geol. Inst. Grusii*, t. III, 3, 1938.
- SARKAR S.S. Revision des ammonites deroules du Cretace inferieur du Sud-Est de la France. *Mem. Soc. Geol. de France*, nouv. ser., t. XXXIV, fasc. 1-3, 1955.
- SIMONOVITSCH S.E., SOROKIN A., BACEVITSCH L.F. — Geologitscheskoe opisanie teshastei kutaisskogo, Letschchumskogo, Senakskogo i Zugdidskogo uezdov Kutaisskoi gubernii. *Mat. dlia geol. Kavkaza*, ser. I, kn. 4, 1874.
- THOMEL G. Contribution à la connaissance des Cephalopodes crétacés du sud-est de la France. Note sur les ammonites déroulées du crétacé inférieur Vocontien. *Mem. Soc. Geol. de France (Nouvelle série)*, 101, Paris, 1964.
- WRIGHT C.W. A classification of the Cretaceous ammonites. *Journ. of Paleontology*, v. 26, 2, 1952.

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PLATE I

Fig. 1.— *Audouliceras georgicum* Kakabadze, sp. nov.
Holotype, West Georgia, t. Kutaisi, Lower Aptian. $\times 1$.

Fig. 2ab b.— *Kutatissites princeps* (Avram 1976)
N 19/20, West Georgia, v. Lashe, Lower Aptian (zone *Deshayesites weissi-Procheloniceras albrechti-austriae*). $\times 1$.

PLATE II

Fig. 1.— *Pseudocrioceras abichi* (Bacevitsch, Simonivitsch, 1873)
N 41/90, West Georgia, t. Kutaisi, Lower Aptian (zone *Deshayesites weissi-Procheloniceras albrechti-austriae*). $\times 3/4$.

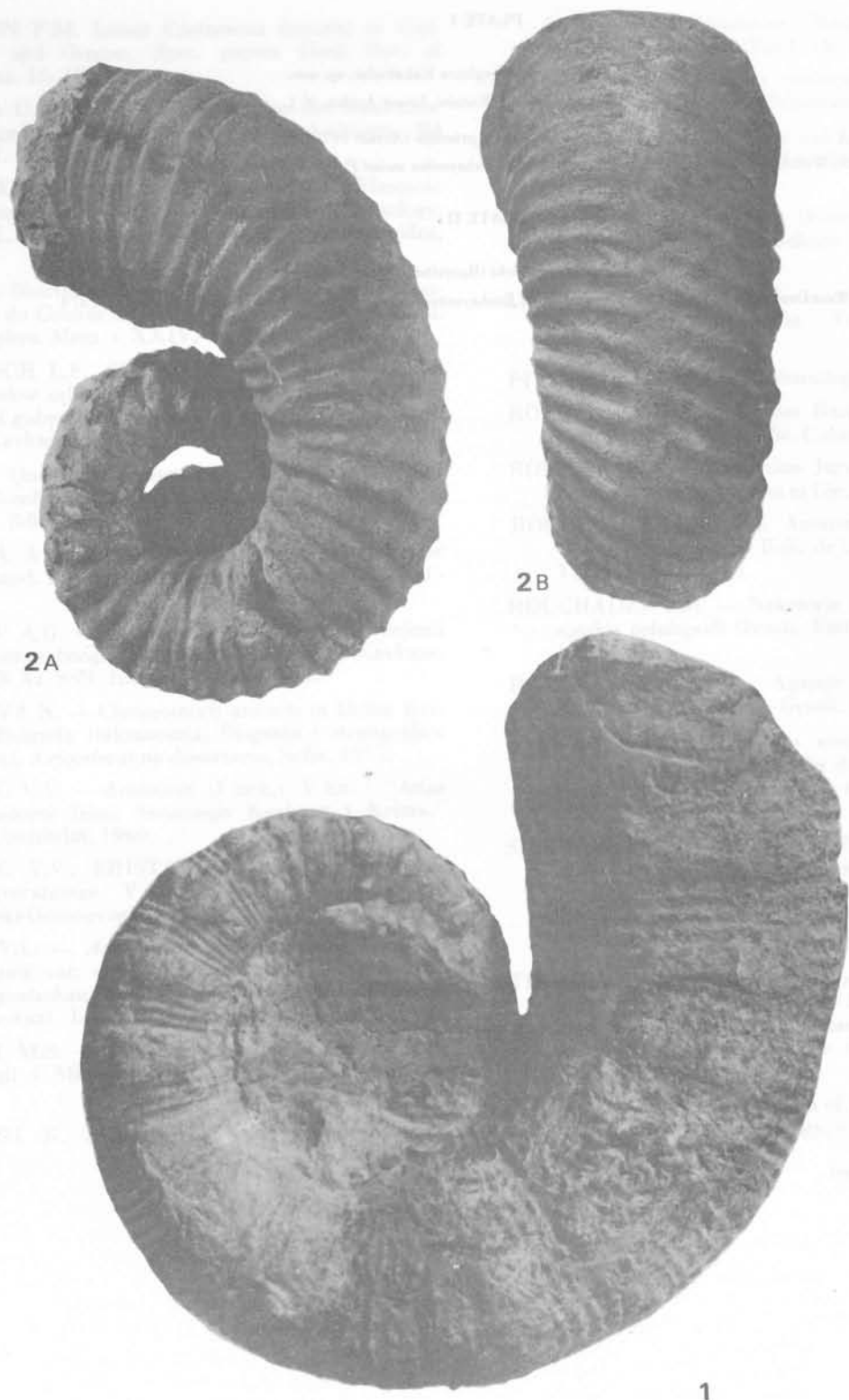


Plate 1

ON THE VALUE OF THE GEOGRAPHIC
EVIDENCES FOR THE
PALEOANTHROPOLOGY OF THE
MEDITERRANEAN



Plate 2