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AMMONITE ZONATION AND CORRELATION OF THE UPPERMOST CENOMANIAN AND TURONIAN OF SOUTHERN ENGLAND AND THE TYPE AREAS OF SARTHE AND TOURAINE IN FRANCE

PAR

W. J. KENNEDY * C. W. WRIGHT * et J. M. HANCOCK **

Abstract

The predominantly boreal ammonite faunas of the highest Cenomanian of the Anglo-Paris Basin allow a division into Zones of *Metoicoceras geslinianum* below and *Neocardioceras juddii* above. The Turonian can be subdivided into Zones of *Watinoceras coloradoense* (oldest), *Mammites nodosoides*, *Collignoniceras woollgari* and *Subprionocyclus neptuni* (youngest). The base of the Coniacian should be drawn at the base of the Zone of *Reesideoceras petrocoriensis*.

The *M. geslinianum* and *N. juddii* Zones can both be recognised in the type area of the Cenomanian, and all but the *juddii* Zone are proven by ammonites in the stratotype Turonian between Saumur and Montrichard. The occurrence of the Tethyan genera *Nigericeras, Vascoceras* and *Thomasites* in an unnamed interval between the *geslinianum* and *juddii* Zones indicates that " Lower Turonian " beds of some Tethyan sequences are synchronous with the Upper Cenomanian of the stratotype areas.

ZONATIONS ET CORRÉLATIONS PAR LES AMMONITES DU CÉNOMANIEN TERMINAL ET DU TURONIEN DU SUD DE L'ANGLETERRE ET DES RÉGIONS STRATOTYPIQUES (SARTHE ET TOURAINE — FRANCE)

Résumé :

Les faunes d'ammonites boréales du Cénomanien terminal du Bassin anglo-parisien permettent une division en Zones à *Metoicoceras geslinianum* et *Neocardioceras juddii*. Dans le Turonien, on reconnaît les Zones à *Watinoceras coloradoense, Mammites nodosoides, Collignoniceras woollgari* et *Subprionocyclus neptuni*. Le Coniacien débute à la base de la Zone à *Reesideoceras petrocoriensis*.

Les Zones à *geslinianum* et *juddii* sont reconnues dans la région-type du Cénomanien et toutes les autres zones, à l'exception de celle à *juddii*, sont démontrées par les ammonites dans le stratotype du Turonien entre Saumur et Montrichard. La présence des genres mésogéens — *Nigericeras, Vascoceras* et *Thomasites* — dans un intervalle non-nommé entre les Zones à *geslinianum* et *juddii* indiquerait que les lits du « Turonien inférieur » de quelques séquences mésogéennes sont synchrones du Cénomanien supérieur des régions stratotypiques.

* University Museum, Oxford, OX1 3PW, England.
** King's College, London, WC2R 2LS, England.

INTRODUCTION

Development of an ammonite-based zonation of the uppermost Cenomanian and Turonian chalk facies of the Anglo-Paris Basin has been hampered for many years because of our poor understanding of many of the classic species described by Mantell, Sharpe, d'Orbigny, Schlüter and others, as well as a lack of carefully collected specimens placed firmly in stratigraphic order. As a result of revision of all the classic taxa of the region by WRIGHT and KENNEDY (1981) including material from the type areas of both stages (Cenomanian — KENNEDY and JUIGNET in press ; Turonian — KENNEDY and WRIGHT, 1979a, b, 1981 ; KENNEDY, COOPER and WRIGHT, 1979 ; KENNEDY, WRIGHT and HANCOCK, 1980a, b, c), the taxonomic base is now much improved, whilst our own new collections and those of Amedro, Badillet, Juignet, Woodroof and others have permitted new stratigraphic precision.

The zonation proposed here is, as with all zonations, a compromise between ease of recognition, area over which the zone can be recognised and precision of correlation.

Several of the divisions recognised here are at the limit of precision, even locally. Others can be subdivided further on a local basis, but cannot easily be correlated over wide areas, either because the key species are rare, are of limited geographic distribution, or show different local ranges. Zones are defined below on the basis of the appearance of key taxa, generally the index species. We define the *bases* of zones, and it is thus possible that if further work shows that additional zones can be recognised, they can be inserted into this framework.

THE ZONAL SEQUENCE

UPPER CENOMANIAN.

Metoicoceras geslinianum Zone.

The base of this zone is marked by the appearance of the index species. The following are restricted to the zone as a whole or to part of it : *Puzosia (Anapuzosia) dibleyi* (SPATH), *Pseudocalycoceras dentonense* (MOREMAN), *Tarrantoceras (Sumitomoceras) cautisalbae* WRIGHT and KENNEDY, *Euomphaloceras (Kanabiceras) septemseriatum* (CRAGIN), *Metoicoceras geslinianum* (D'ORBIGNY), *Vascoceras diartianum* (D'ORBIGNY), *Allocrioceras annulatum* (SHUMARD), *Sciponoceras gracile* (SHUMARD).

The following range from below : *Parapuzosia (Austiniceras) austeni* (SHARPE), *Calycoceras (Calycoceras) naviculare* (MANTELL), *Hamites* cf. *simplex* D'ORBIGNY, *Scaphites (Scaphites) equalis* J. SOWERBY.

This is equivalent to the previously proposed zones or subzones of *Metoicoceras pontieri, whitei* and *gourdoni* of authors, and to the lower part of the *Sciponoceras gracile* Zone of KENNEDY and HANCOCK (1978), RAWSON *et al.* (1978) and KENNEDY, JUIGNET and HANCOCK (1981).

This zone is well represented in the Plenus Marls, the *Actinocamax plenus* Zone of the Anglo-Paris Basin as this term is used by JEFFERIES (1962, 1963), and the unphosphatised fauna in Bed C of Devon (England).

Unnamed Zone.

Above the *geslinianum* Zone but below the *Neocardioceras juddii* Zone there occurs, at Shapwick Grange, Devon, a faunule of Tethyan affinities : *Puzosia (Puzosia) odiensis* KOSSMAT, *Kamerunoceras* aff. *puebloense* (COBBAN and SCOTT), *Nigericeras* cf. *gignouxi* SCHNEEGANS, *Thomasites gongilensis tectiformis* (BARBER) and *Thomasites gongilensis lautus* (BARBER).

This has not yet been found elsewhere in the Anglo-Paris Basin and therefore we hesitate to name it formally at this time.

Neocardioceras juddii Zone.

The base of this zone is marked by the appearance of *Neocardioceras juddii* (BARROIS and GUERNE) and subspecies, plus *Neocardioceras tenue* WRIGHT and KENNEDY, *Thomelites serotinus* WRIGHT and KENNEDY, and *Sciponoceras bohemicum anterius* WRIGHT and KENNEDY. Also present are *Thomasites gongilensis lautus* (BARBER), *Allocrioceras annulatum* (SHUMARD), *Spathites (Jeanrogeiceras)* cf. *subconciliatus* (CHOFFAT) and *Thomasites* cf. *rollandi* (PERON).

The fauna of this zone is well represented at the base of the Middle Chalk in Devon, England, and the index species was originally described fron northern France. The zone can be recognised widely at or just above the base of the Middle Chalk in England and its correlatives in the Boulonnais and Normandy on the basis of the occurrence of floods of *Sciponoceras bohemicum anterius*.

TURONIAN.

Watinoceras coloradoense Zone.

The base of the zone is marked by the appearance of diverse *Watinoceras* species : *W. amudariense* (ARKHANGUELSKY), *W. depressum* WRIGHT and KENNEDY, *W. devonense* WRIGHT and KENNEDY, *W. coloradoense praecursor* WRIGHT and KENNEDY, *Watinoceras* cf. *jackeli* (SOLGER) and *Mammites* sp. juv.

The zone is represented by rich faunas from the lower parts of the Middle Chalk above the *juddii* Zone in Devon, England, and sparingly in the same unit in south-east England. Museum specimens point to its presence in the Craie Marneuse of the southern and western Paris Basin.

Mammites nodosoides Zone.

The base of the zone is marked by the appearance of *Mammites nodosoides* (SCHLÜTER), accompanied by *Lewesiceras peramplum* (MANTELL), *Mammites wingi wingi* MORROW, *Metasigaloceras rusticum* (J. SOWERBY), *Pseudaspidoceras* cf. *footeanum* (STOLICZKA), *Fagesia catinus* (MANTELL) and *Fagesia pachydiscoides* (SPATH).

Large ammonites of this assemblage are frequent in the lower part of the English Middle Chalk and its correlatives thoughout the whole of southern England, the Boulonnais, Haute Normandie and the Pays de Caux, but collecting difficulties mean that the relative order of appearance of these taxa is not precisely documented. Rare specimens of *Kamerunoceras turoniense* (D'ORBIGNY) and *Lecointriceras fleuriausianum* (D'ORBIGNY) may be from this zone, or from the zone above.

Collignoniceras woollgari Zone.

The base of this zone is marked by the appearance of *Collignoniceras woollgari* (MANTELL). The only other common ammonite in the Chalk of the Anglo-Paris Basin is *Lewesiceras peramplum* (MANTELL), which ranges from below. Because other ammonites are so rare in chalk facies (unlike the situation in Sarthe and Touraine discussed below), it is not possible to be certain of the relative position of *Collignoniceras carolinum* (D'ORBIGNY), *Didymoceras* sp. and *Scaphites* cf. *geinitzi* (D'ORBIGNY), although *Romaniceras ornatissimum* (STOLICZKA) occurs high in the zone.

It is our view that the most useful subdivision of this zone on a regional basis will prove to be on the change in ornament of the index species, from the early form with intercalated ventral ribs and siphonal tubercles more numerous than ventrolateral in middle and late growth — *C. woollgari woollgari* — to the late form with equal numbers of siphonal and ventrolateral tubercles — *C. woollgari regulare* HAAS (see COBBAN and HOOK, 1979 for details).

This zone is widely recognisable in the upper parts of the English Middle Chalk and their correlatives throughout the Anglo-Paris Basin.

Subprionocyclus neptuni Zone.

The base of the zone is marked by the appearance of *Subprionocyclus neptuni* (GEINITZ) and *Lewesiceras mantelli* WRIGHT and WRIGHT. Whereas small ammonites are rare in the *nodosoides* and *woollgari* Zones, they become locally abundant in the English Chalk Rock (WRIGHT, 1979), although many, no doubt evolved somewhat earlier : *Puzosia (Puzosia) curvatisulcata* CHATWIN and WITHERS, *Lewesiceras woodi* WRIGHT, *Pseudojacobites farmeryi* (CRICK), *Tongoboryceras rhodanicum* (ROMAN and MAZERIN), *Subprionocyclus hitchinensis* (BILLINGHURST), *S. branneri* (ANDERSON), *S. normalis* (ANDERSON), *Metaptychoceras smithi* (WOODS), *Sciponoceras bohemicum* (FRITSCH), *Baculites undulatus* (D'ORBIGNY), *Anisoceras reidi* (WRIGHT), *Allocrioceras angustum* (J. de C. SOWERBY), *A. strangulatum* WRIGHT, *A. billinghursti* KLINGER, *A.* cf. *cuvieri* (SCHLÜTER), *Neocrioceras (Schlueterella) multinodosum* (SCHLÜTER), *Didymoceras saxonicum* (SCHLÜTER), *Hyphantoceras reussianum* (D'ORBIGNY), *Scaphites (Scaphites) geinitzii* D'ORBIGNY and subspecies, *S. kieslingwaldensis* LANGENHAN and GRUNDEY, *S. lamberti* GROSSOUVRE and subspecies, *S. diana* WRIGHT, *S. pseudoequalis* YABE, *Otoscaphites bladenensis* (SCHLÜTER) and *O. reidi* WRIGHT.

The few specimens of *Romaniceras (Romaniceras) deverianum* (D'ORBIGNY) known from Chalk sequences — seven from England, and none to our knowledge from France — are nowhere associated with other ammonites, and we do not know if it is a *woollgari* or *neptuni* Zone species, nor if it is limited to a distinct horizon. Because it is so rare it would be misleading to re-introduce a *deverianum* Zone into the Anglo-Paris Basin succession.

CONIACIAN.

Coniacian ammonites are so rare in the chalk facies of the Anglo-Paris Basin that it would be foolish to try to form a zonation based on records from this area. The lowest ammonites in the Coniacian of the Cognac area, and also present in the Craie de Villedieu of Touraine, are specimens of *Reesideoceras petrocoriensis* (COQUAND) (= *R. gallicum* BASSE), and as we have discussed elsewhere (HANCOCK and KENNEDY 1981) the basal zone of the Coniacian should be called the *Reesideoceras petrocoriensis* Zone. This is the *Barroisiceras haberfellneri* Zone of de Grossouvre and many other authors, but it should be noted that none of de Grossouvre's specimens of *B. haberfellneri* actually belong to Hauer's species ; true *B. haberfellneri* has not yet been found in France, and is not demonstrably Coniacian at this time.

In 1977 there was a gap in the ammonite record in western Europe between the *neptuni* and *petrocoriensis* Zones that might be equivalent to the *Reesidites minimus* Zone of Japanese authors. We can now show that *S. neptuni* extends to the top of the local Turonian in Touraine (see below).

Use of a *Peroniceras tridorsatum* Zone for the base of the Coniacian in the Anglo-Paris Basin chalk sequences (e.g. AMEDRO and ROBASZYNSKI, 1978) is highly misleading. Not only are ammonites too rare to provide a basis for zonation, but evidence available elsewhere in the world suggests that *Peroniceras* appears some way above the base of the stage.

CORRELATION WITH THE STRATOTYPES

The environs of Le Mans, Sarthe, are the type area of the Cenomanian stage. The *M. geslinianum* Zone is well represented in the Sables à *Catopygus obtusus* and the Sables de Bousse by the index species and other forms such as *C. (Calycoceras) naviculare, Pseudocalycoceras dentonense, Eucalycoceras pentagonum, Euomphaloceras (Kanabiceras) septemseriatum, Metengonoceras* cf. *dumbli* (CRAGIN), *Proplacenticeras* cf. *memoriaschloenbachi* (LAUBE and BRUDER), *Sumitomoceras* sp. and *Sciponoceras gracile*. In south-eastern Sarthe the Sables à *Catopygus obtusus* have been reworked and derived cobbles and remanié phosphatic ammonites occur in the succeeding Craie à *Terebratella caran-*

tonensis. This unit has also yielded a specimen of *Neocardioceras juddii juddii* from a short distance above the base at St. Calais.

There are few ammonites from the Craie Marneuse, but *nodosoides* Zone forms are recorded in the literature.

The type area of the Turonian stage, insofar as this is limited by d'Orbigny, is the stretch between Saumur (on the Loire) and Montrichard (on the Cher). This geographical limitation on the type area has been ignored by most subsequent geologists.

In the true type area, the Marnes à Ostracées in the environs of Saumur have yielded a range of taxa, as described by AMEDRO, BADILLET and ROBASZYNSKI (1981). KENNEDY and JUIGNET (1981) have inferred that the correlatives of this unit are the source of the type specimen of *Neolobites vibrayeanus* (D'ORBIGNY), plus specimens including *C. (C.) naviculare* and *Pseudocalycoceras* species. The *geslinianum* Zone is represented in the area in the correlative of the Sables à *Catopygus obtusus* at Gennes (called Craie à *Terebratella carantonensis* by AMEDRO and BADILLET, 1978), with *Metoicoceras geslinianum, E. (Kanabiceras) septemseriatum* and *Sciponoceras gracile* ; and in a clay facies at Saumur itself (KENNEDY and JUIGNET, 1981). The *juddii* Zone is not yet recognised in the area, but we have found *Watinoceras* indicative of the *coloradoense* Zone near Cizay-la-Madeleine low in the Craie Marneuse. *Mammites nodosoides* occurs in the transition up into the Tuffeau Blanc at the same locality. We have also recognised the *geslinianum* and *coloradoense* Zones on the basis of new finds of ammonites along the Canal du Berry beyond the stratotype.

We were clearly wrong when we stated that ammonites in the Tuffeau Blanc near Saumur were restricted to the St. Cyr-en-Bourg Fossil Bed (HANCOCK, KENNEDY and WRIGHT, 1977), a name with priority over Couche à *Exogyra columba* of AMEDRO and BADILLET (1978). These authors record below the Fossil Bed an assemblage Zone of *Spathites (Jeanrogericeras) reveliereanus* (COURTILLER) that includes *Neoptychites cephalotus* (COURTILLER), *Kamerunoceras turoniense* (D'ORBIGNY) and *Collignoceras woollgari*. All these species occur alongside *Lecointriceras fleuriausianum* (D'ORBIGNY) and *Romaniceras kallesi* (ZAZVORKA) in the St. Cyr-en-Bourg Fossil Bed, but according to Amedro and Badillet the *Neoptychites, Spathites* and *Kamerunoceras* do not range above the Fossil Bed in The Saumur district. The *nodosoides-woollgari* Zone boundary must lie close to the transition from Craie Marneuse to Tuffeau Blanc. All specimens of *C. woollgari* that we have seen from the Saumur region belong to the early form of the species, and therefore the locally recognised *Romaniceras kallesi* Zone/Subzone is equivalent to the lower (but not lowest) part of the *woollgari* Zone.

Higher ammonite faunas are not well known from the area between Saumur and Montrichard. At Bourré, which is beyond Montrichard and thus outside the type region, the upper part of the Tuffeau de Bourré yielded ammonites in the last century, when the formation was worked by hand. We ourselves have seen no ammonites at all in this area, and even DE GROSSOUVRE (1901, p. 335) noted that scarcely a couple of ammonites a year were found by the workmen. The list includes (revised determinations) : *Pseudotissotia (Pseudotissotia) gallienni* (D'ORBIGNY), *Romaniceras (Yubariceras) ornatissimum* (STOLICZKA) (= *R. deverioides* (DE GROSSOUVRE) and *R. d. armata* of HANCOCK, KENNEDY and WRIGHT, 1977), *Collignoniceras canthus* (SORNAY), *C. turoniense* (SORNAY) *Lewesiceras peramplum*. Poncé in Sarthe is also famous for its ammonites, including *Lewesiceras peramplum, R. (Y.) ornatissimum* (= *R. deverioide inerme* and *armata* and var. 3 of HANCOCK, KENNEDY and WRIGHT) and *P. (Pseudotissotia) gallienni*. The late form of *C. woollgari* occurs at both these localities

De Grossouvre thought that this fauna was younger than that at Bourré, but we have no evidence either way and can only say that they both fall within the *ornatissimum* Zone/Subzone, and are equivalent to the upper Subzone of the *woollgari* Zone.

Ammonites are very rare above this. We have seen *R. (Romaniceras) deverianum* from the zone à *Callianassa archiaciana* of St. Georges (Hébert Coll. no. 61-624, now in the Sorbonne Collections) ; *Coilopoceras requienianum* (D'ORBIGNY) from Courtinot (also Hébert Collection), and a series of poor *Romaniceras* and *Lewesiceras* in the Lecointre Collection from the Tuffeau Jaune of various localities. DE GROSSOUVRE recorded *Ammonites deveriai* and *A. requieni* from St. Georges-sur-Cher (1889, pp. 495-499), *Gauthiericeras bravaisi* from Clion (1901, p. 336) and *Sphenodiscus requieni* (rena-

med *Coilopoceras grossouvrei* by HYATT, 1903, p. 100, pl. 12, fig. 7) from Usseau (DE GROSSOUVRE, 1894, p. 141).

In his description of the occurrence at Clion, he records the ammonites as coming from the upper part of the Pierre de Clion, which itself forms the bottom of the Tuffeau Jaune de Touraine. We now have *Coilopoceras requienianum* at Vreigne near Francueil in the Cher Valley, also well below the top of this unit, and a *Subprionocyclus* sp. intermediate between *S. neptuni* and *S. hitchinensis* from the Tuffeau Jaune of La Chartre-sur-Loir, Sarthe (OUM K25092) collected by P. Woodroof ; sadly, this specimen cannot be used to date the *R. deverianum-C. requienianum* fauna from the other localities.

A specimen of *Subprionocyclus neptuni*, from no more than 45 cm below the base of the Craie de Villedieu at Villedieu-Trehet, shows that the *neptuni* Zone extends to the top of the Turonian there.

BIBLIOGRAPHICAL REFERENCES

AMEDRO, F. & BADILLET, G. (1978). — Répartition des ammonites dans quelques coupes du Turonien des environs de Saumur (Maine-et-Loire). — *C. r. Acad. Sci. Paris*, (D.) 286, 323-325.

AMEDRO, F. BADILLET, G. & ROBASZYNSKI, F. (1981). — Un horizon à *Pseudocalycoceras* (Ammonoidea) dans les Marnes à Ostracées de l'Anjou (Cénomanien supérieur). — *Annls. Soc. géol. N.*, 99, 491-498, pls. 17-18.

AMEDRO, F. & ROBASZYNSKI, F. (1978). — *Peroniceras*, faunes et microfaunes associées dans le Nord de la France. Comparaison de quelques sections dans le Turonien-Coniacien. — *Annls Soc. géol. N.*, 98, 35-50, 5 pls.

COBBAN, W. A. & HOOK, S. C. (1979). — *Collignoniceras woollgari woollgari* (Mantell) ammonite fauna from Upper Cretaceous of Western Interior, United States. — *Mem. Inst. Min. Technol. New Mex.*, 37, 51 pp.

GROSSOUVRE, A. de (1889). — Sur le terrain crétacé dans le Sud-Ouest du bassin de Paris. — *Bull. Soc. Géol. Fr.*, (3) 17, 475-525, pls. 11-12.

GROSSOUVRE, A. de (1894). — Recherches sur la craie supérieure 2 : paléontologie. Les ammonites de la craie supérieure. — *Mém. Serv. Carte géol. dét. Fr.*, 264 pp., 39 pls. (mis-dated 1893).

GROSSOUVRE, A. de (1901). — Recherches sur la craie supérieure 1 : stratigraphie générale. — *Mém. Serv. Carte géol. dét. Fr.*, 1013 + VII pp.

HANCOCK, J. M. & KENNEDY, W. J. (1981). — Upper Cretaceous ammonite stratigraphy : some current problems. — *In* House, M. R. & Senior, J. R. (eds) The Ammonoidea, — *Spec. Vol. Syst. Ass.*, 18, 531-553.

HANCOCK, J. M., KENNEDY, W. J. & WRIGHT, C. W. (1977). — Towards a correlation of the Turonian sequences of Japan with those of north-west Europe. — *Spec. Pap. palaeont. Soc. Japan*, 21, 151-168.

HYATT, A. (1903). — Pseudoceratites of the Cretaceous. — *Monogr. U. S. geol. Surv.*, 44, 351 pp., 47 pls.

JEFFERIES, R. P. S. (1962). — The palaeoecology of the Actinocamax plenus Subzone (Lowest Turonian) in the Anglo-Paris Basin. — *Palaeontology*, 4, 609-647.

JEFFERIES, R. P. S. (1963). — The stratigraphy of the *Actinocamax plenus* Subzone (Turonian) in the Anglo-Paris Basin. — *Proc. Geol. Ass.*, 74, 1-33, pls. 1-2.

KENNEDY, W. J. & HANCOCK, J. M. (1978). — The mid-Cretaceous of the United Kingdom. *In* Reyment, R. A. & Thomel, G. (eds) Événements de la Partie moyenne du Crétacé. — *Annls Mus. Hist. nat. Nice*, 4, V-72 pp.

KENNEDY, W. J. & JUIGNET, P. (1981). — Upper Cenomanian ammonites from the environs of Saumur, and the provenance of the types of *Ammonites vibrayeanus* and *Ammonites geslinianus*. — *Cretaceous Research*, 2, 19-49.

KENNEDY, W. J. & JUIGNET, P. (in press). — A revision of the ammonite fauna of the type Cenomanian 1 : introduction, Ancycloceratina. — *Cretaceous Research*.

KENNEDY, W. J., JUIGNET, P. & HANCOCK, J. M. (1981). — Upper Cenomanian ammonites from Anjou and the Vendée, western France. — *Palaeontology*, 24, 25-84, pls. 3-17.

KENNEDY, W. J. & WRIGHT, C. W. (1979a). — On *Kamerunoceras* Reyment, 1954 (Cretaceous : Ammonoidea). — *J. Paleont.*, 53, 1165-1178, 4 pls.

KENNEDY, W. J. & WRIGHT, C. W. (1979b). — Vascoceratid ammonites from the type Turonian. — *Palaeontology*, 22, 665-683, pls. 82-86.

KENNEDY, W. J., WRIGHT, C. W. & COOPER, M. R. (1979). — On *Ammonites galliennei* d'Orbigny, 1850. — *Bull. geol. Inst. Uppsala*, N.F. 8, 5-15.

KENNEDY, W. J., WRIGHT, C. W. & HANCOCK, J. M. (1980a). — The European species of the Cretaceous ammonite *Romaniceras* with a revision of the genus. — *Palaeontology*, 23, 325-362, pls. 39-50.

KENNEDY, W. J., WRIGHT, C. W. & HANCOCK, J. M. (1980b). — Collignoniceratid ammonites from the mid-Turonian of England and northern France. — *Palaeontology*, 23, 557-603, pls. 62-77.

KENNEDY, W. J., WRIGHT, C. W. & HANCOCK, J. M. (1980c). — Origin, evolution and systematics of the Cretaceous ammonite *Spathites*. — *Palaeontology*, 23, 821-837, pls. 104-106.

RAWSON, P. F. *et al.* (1978).— A correlation of Cretaceous rocks in the British Isles. — *Spec. Rep. geol. Soc. Lond.*, 9, 70 pp.

WRIGHT, C. W. (1979). — The ammonites of the English Chalk Rock (Upper Turonian). — *Bull. Brit. Mus. nat. Hist. (Geol.)*, 31, 281-332, pls. 1-7.