The Albian, Cenomanian and Turonian Stages in their type-regions

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Robaszynski, Francis: The Albian, Cenomanian and Turonian Stages and their type-regions. *Bull. geol. Soc. Denmark,* vol. 33 pp. 191–198, Copenhagen, September, 11th, 1984.
https://doi.org/10.37570/bgsd-1984-33-17

In recent years, several contributions have led to a better knowledge of the Mid-Cretaceous stages which type-regions are in France: Aube for the Albian (Rat et al., 1975), Sarthe for the Cenomanian (Juignet 1980), Saumurois and Touraine for the Turonian (Robaszynski et al. 1982). Some results of these recent investigations are summarized on three charts, where a synthetic lithological sequence for each area is related to the vertical distribution of the main ammonites.

The present paper includes data from F. Amédro, P. Juignet and F. Magniez-Jannin.

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Aptian-Albian boundary

In the Aube area, the base of the "Argiles tégulines" contains *Hypacanthoplites* aff. *milletianus,* which represents the older ammonite-zone of the Paris Basin but is not the oldest of the Lower Albian. No ammonites were recorded from the "sables glauconieux" below the "Argiles tégulines". *Proleymeriella schrammeni* which is considered to mark the base of the Albian is absent in the Aube.

Note: If the substage boundaries proposed during the Copenhagen Symposium were to be accepted (with first appearance of *Lyelliceras lyelli* for the base of Middle Albian and *Dipoloceras cristatum* for the base of Upper Albian, cf. fig. 4), then fig. 1 would have to be modified as follows: the Middle Albian should be placed at the base of *Hoplites benettianus* Zone and the Upper Albian at the base of *Dimorphoplites silenus* Zone.

Albian-Cenomanian boundary

In the Sarthe area, it seems that there is a lithological transition between Upper Albian and Lower Cenomanian detected in borings. However, at present there are no exposures available as reference sections to produce a sequence of ammonites or planktonic microfossils.

Cenomanian-Turonian boundary

In the Saumurois-Touraine area, the Lower Turonian *Watinoceras coloradoense* zone has been found but with no evidence of the Upper Cenomanian *Neocardioceras juddii* zone.

Dansk sammendrag

Resultater af nye stratigrafiske undersøgelser af de franske typeområder for albien, cenomanien og turonien er syntetiseret i et antal oversigtsfigurer.

Selected references

Colloque sur le Cénomanien 1978: *Géol. Médit.,* 5, 1, 1–224.

Colloque sur le Turonien 1983: *Mém. Mus. Nat. Hist. Nat. Paris,* 49, 241 pp.

Juignet, P. 1980: Cénomanien. *In* Les étages français et leurs stratotypes, Cavelier et Roger (*eds*). *Mém. B.R.G.M.,* 109, 130–138, 6 figs.

Rat, P. et al. 1979: L'Albien de l'Aube. Les stratotypes français. *Ed. C.N.R.S.,* Paris, 5, 446 pp.

Robaszynski, F. et al. 1982: Le Turonien de la région-type: Saumurois et Touraine. Stratigraphie, biozonations, sédimentologie. *Bull. Centres Rech. Explor. Prod. Elf. Aquitaine,* 6, 119–225, 24 figs., 18 pls.

Robaszynski, F., Amédro, F. et al. 1980: Synthèse biostratigraphique de l'Aptien au Santonien du Boulonnais à partir de sept groupes paléontologiques. *Rev. Micropal.,* 22, 195–321, 28 figs., 20 pls.

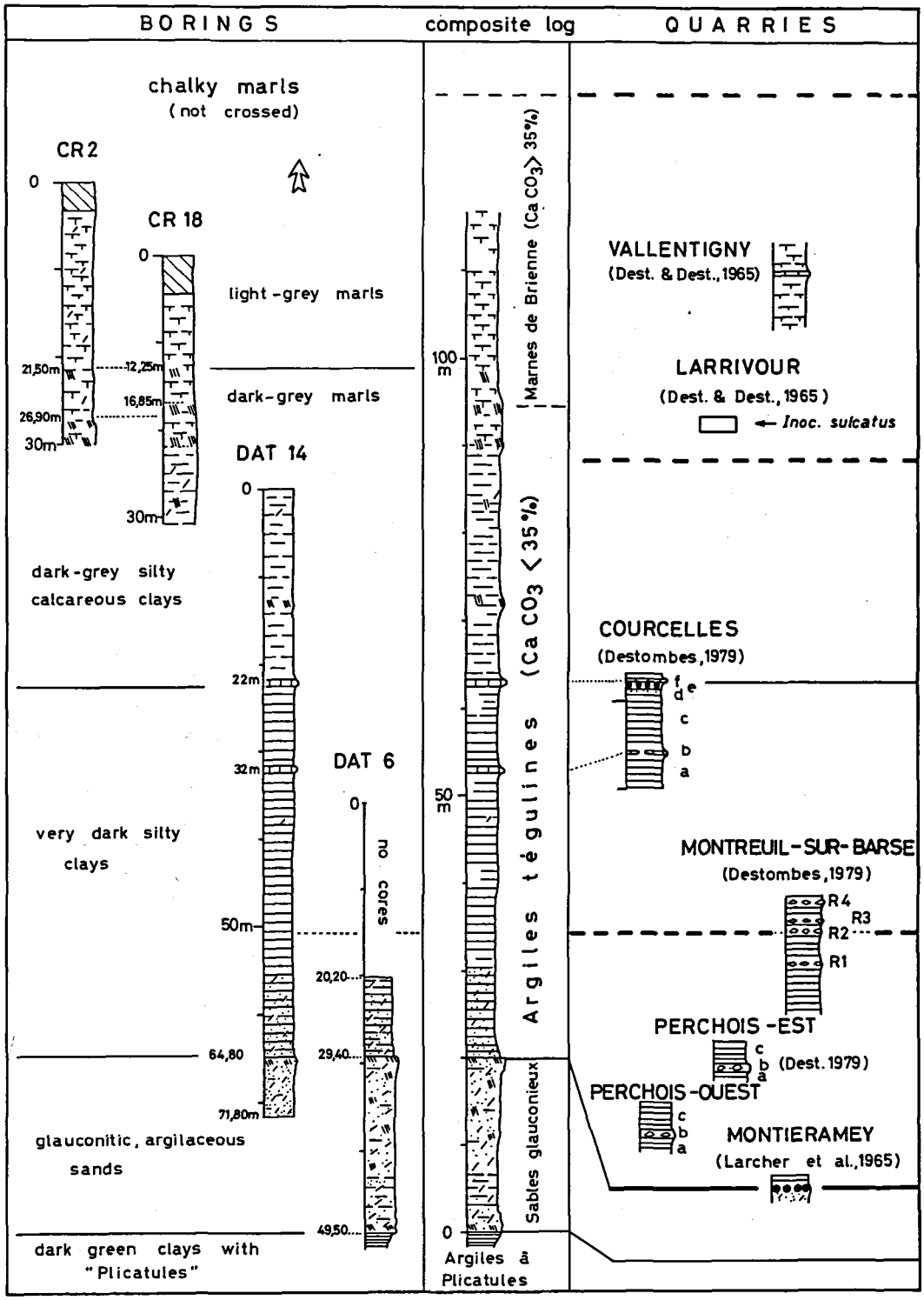
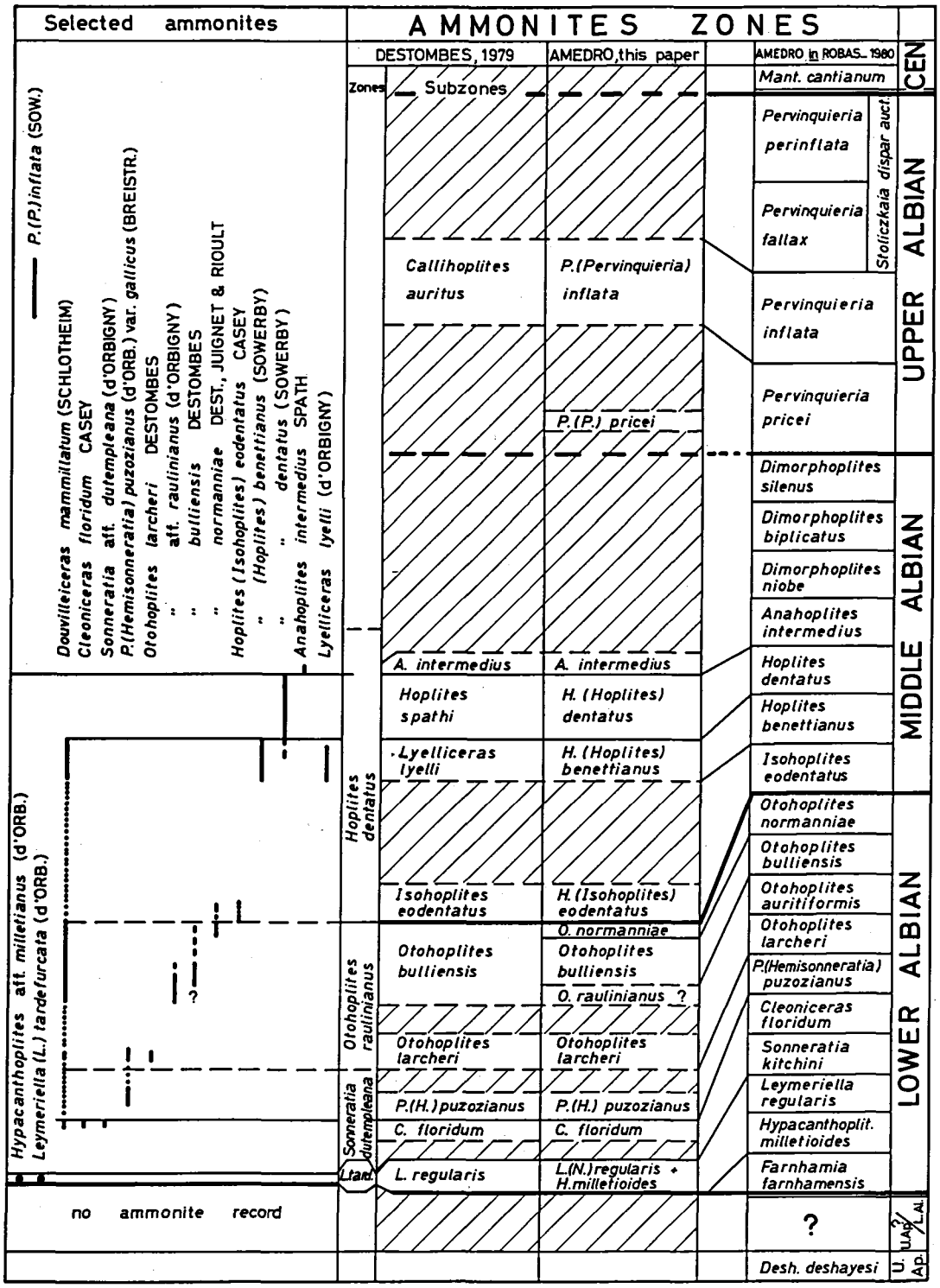


Fig. 1. Lithology and vertical distribution of some ammonites for the type Albian Stage (data from F. Amédro and F. Magniez-Jannin).


Selected ammonites
AMMONITES ZONES
DESTOMBES, 1979
AMEDRO, this paper
AMEDRO in ROBAS. 1980
Zones
Subzones
P.(P.) inflata (SOW.)
Douvilleiceras mammillatum (SCHLOTHEIM)
Cleoniceras floridum CASEY
Sonneratia aff. dutempleana (d'ORBIGNY)
P.(Hemisonneratia) puzozianus (d'ORB.) var. gallicus (BREISTR.)
Otohoplites larcheri DESTOMBES
" aff. raulinianus (d'ORBIGNY)
" bulliensis DESTOMBES
" normanniae DEST., JUIGNET & RIOULT
Hoplites (Isohoplites) eodentatus CASEY
" (Hoplites) benettianus (SOWERBY)
" dentatus (SOWERBY)
Anahoplites intermedius SPATH
Lyelliceras lyelli (d'ORBIGNY)
Hypacanthoplites aff. milletianus (d'ORB.)
Leymeriella (L.) tardefurcata (d'ORB.)
no ammonite record
Callihoplites auritus
P.(Pervinquieria) inflata
P.(P.) pricei
A. intermedius
Hoplites spathi
Lyelliceras lyelli
H. (Hoplites) dentatus
H. (Hoplites) benettianus
Isohoplites eodentatus
H. (Isohoplites) eodentatus
O. normanniae
Otohoplites bulliensis
O. raulinianus ?
Otohoplites larcheri
P.(H.) puzozianus
C. floridum
L. regularis
L.(N.) regularis + H. milletioides
Hoplites dentatus
Otohoplites raulinianus
Sonneratia dutempleana
Ltan.
Mant. cantianum
Pervinquieria perinflata
Pervinquieria fallax
Stoliczkaia dispar auct.
Pervinquieria inflata
Pervinquieria pricei
Dimorphoplites silenus
Dimorphoplites biplicatus
Dimorphoplites niobe
Anahoplites intermedius
Hoplites dentatus
Hoplites benettianus
Isohoplites eodentatus
Otohoplites normanniae
Otohoplites bulliensis
Otohoplites auritiformis
Otohoplites larcheri
P.(Hemisonneratia) puzozianus
Cleoniceras floridum
Sonneratia kitchini
Leymeriella regularis
Hypacanthoplit. milletioides
Farnhamia farnhamensis
?
Desh. deshayesi
CEN
UPPER ALBIAN
MIDDLE ALBIAN
LOWER ALBIAN
U. Ap.
U.Ap?/L.Al

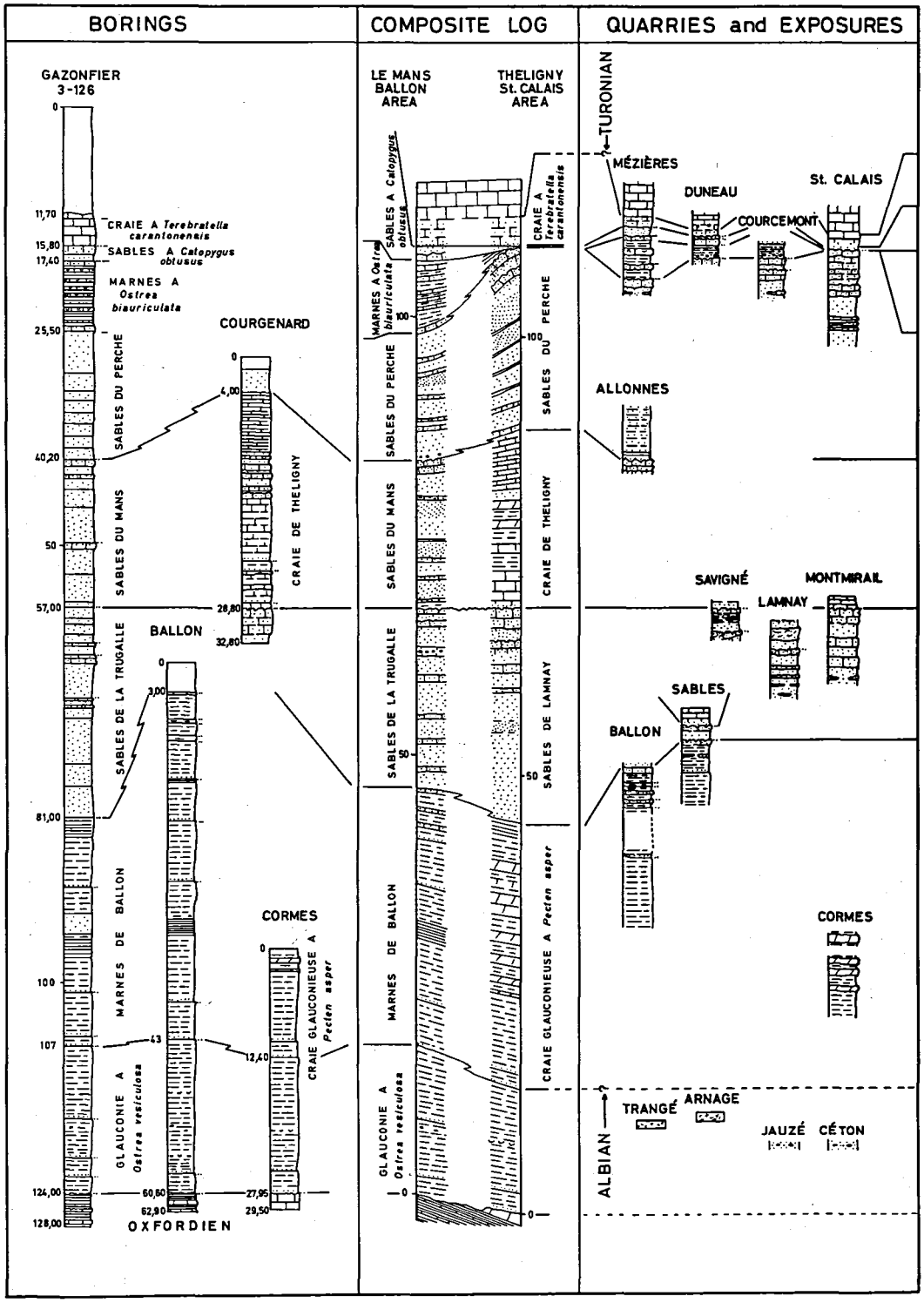
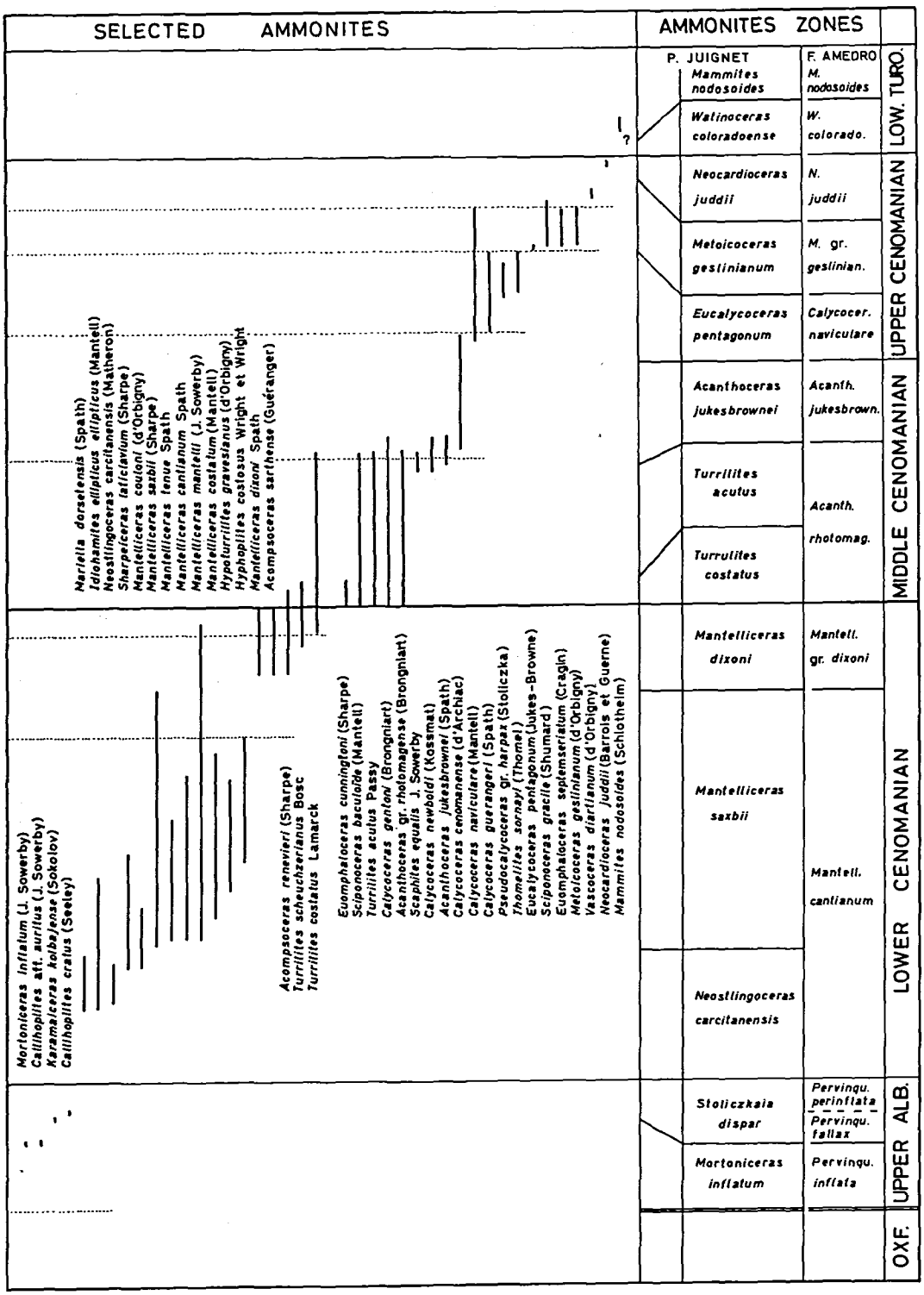


Fig. 2. Lithology and vertical distribution of some ammonites for the type Cenomanian Stage (data from P. Juignet).


SELECTED AMMONITES
AMMONITES ZONES
P. JUIGNET
F. AMEDRO
Mammites nodosoides
M. nodosoides
Watinoceras coloradoense
W. colorado.
Neocardioceras juddii
N. juddii
Metoicoceras geslinianum
M. gr. geslinian.
Eucalycoceras pentagonum
Calycocer. naviculare
Acanthoceras jukesbrownei
Acanth. jukesbrown.
Turrilites acutus
Turrulites costatus
Acanth. rhotomag.
Mantelliceras dixoni
Mantell. gr. dixoni
Mantelliceras saxbii
Mantell. cantianum
Neostlingoceras carcitanensis
Stoliczkaia dispar
Pervinqu. perinflata
Pervinqu. fallax
Mortoniceras inflatum
Pervinqu. inflata
Marielia dorselensis (Spath)
Idiohamites ellipticus ellipticus (Mantell)
Neostlingoceras carcitanensis (Matheron)
Sharpeiceras laticlavium (Sharpe)
Mantelliceras coutoni (d'Orbigny)
Mantelliceras saxbii (Sharpe)
Mantelliceras tenue Spath
Mantelliceras cantianum Spath
Mantelliceras mantelli (J. Sowerby)
Mantelliceras costatum (Mantell)
Hypoturrilites gravesianus (d'Orbigny)
Hyphoplites costosus Wright et Wright
Mantelliceras dixoni Spath
Acompsoceras sarthense (Guéranger)
Euomphaloceras cunningtoni (Sharpe)
Sciponoceras baculoide (Mantell)
Turrilites acutus Passy
Calycoceras gentoni (Brongniart)
Acanthoceras gr. rhotomagense (Brongniart)
Scaphites equalis J. Sowerby
Calycoceras newboldi (Kossmat)
Acanthoceras jukesbrownei (Spath)
Calycoceras cenomanense (d'Archiac)
Calycoceras naviculare (Mantell)
Calycoceras guerangeri (Spath)
Pseudocalycoceras gr. harpax (Stoliczka)
Thomelites sornayi (Thomel)
Eucalycoceras pentagonum (Jukes-Browne)
Sciponoceras gracile (Shumard)
Euomphaloceras septemseriatum (Cragin)
Metoicoceras geslinianum (d'Orbigny)
Vascoceras diartianum (d'Orbigny)
Neocardioceras juddii (Barrois et Guerne)
Mammites nodosoides (Schlotheim)
Acompsoceras renevieri (Sharpe)
Turrilites scheuchzerianus Bosc
Turrilites costatus Lamarck
Mortoniceras inflatum (J. Sowerby)
Callihoplites aff. auritus (J. Sowerby)
Karamaiceras kolbajense (Sokolov)
Callihoplites crotus (Seeley)
OXF.
UPPER ALB.
LOWER CENOMANIAN
MIDDLE CENOMANIAN
UPPER CENOMANIAN
LOW. TURO.

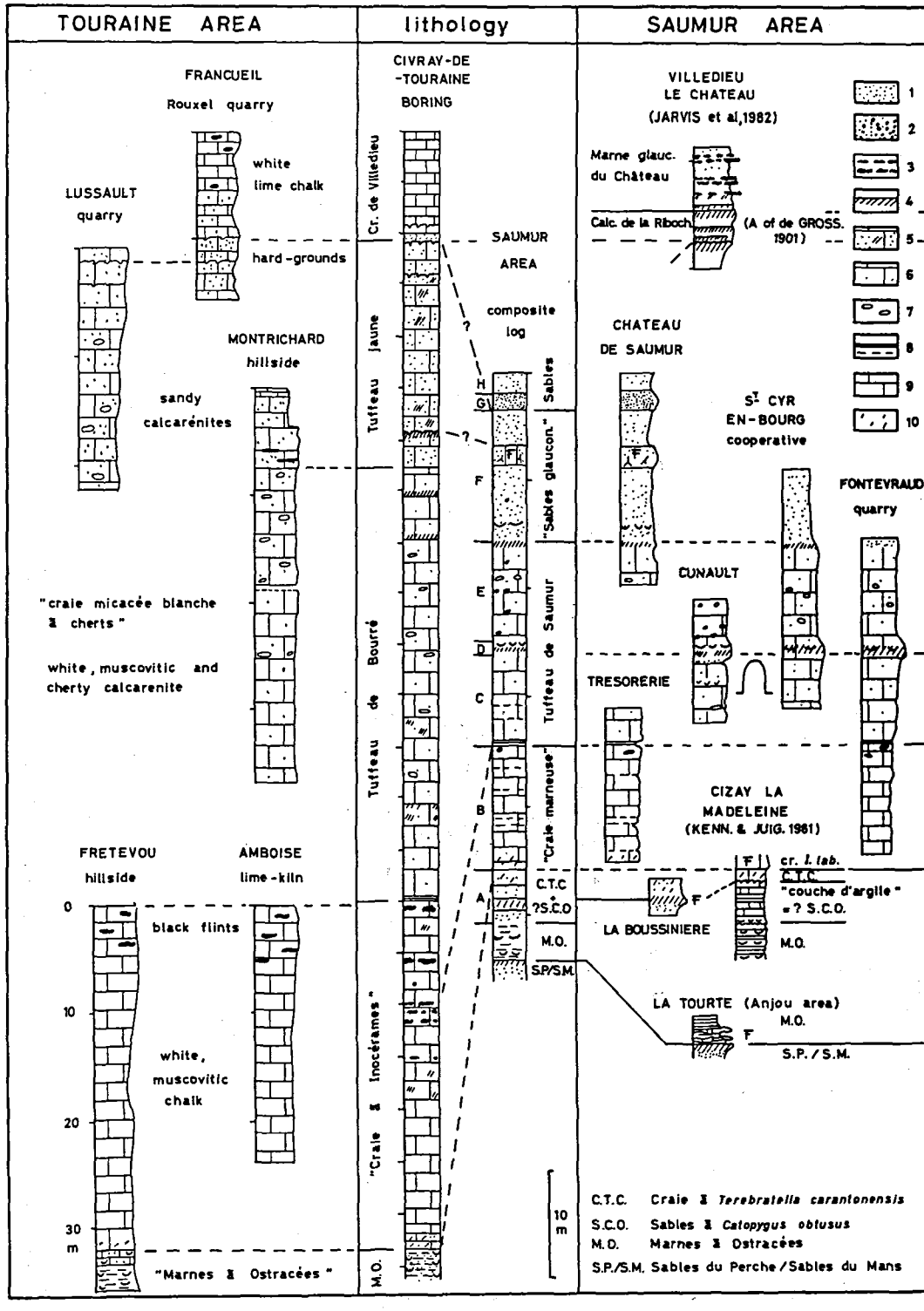
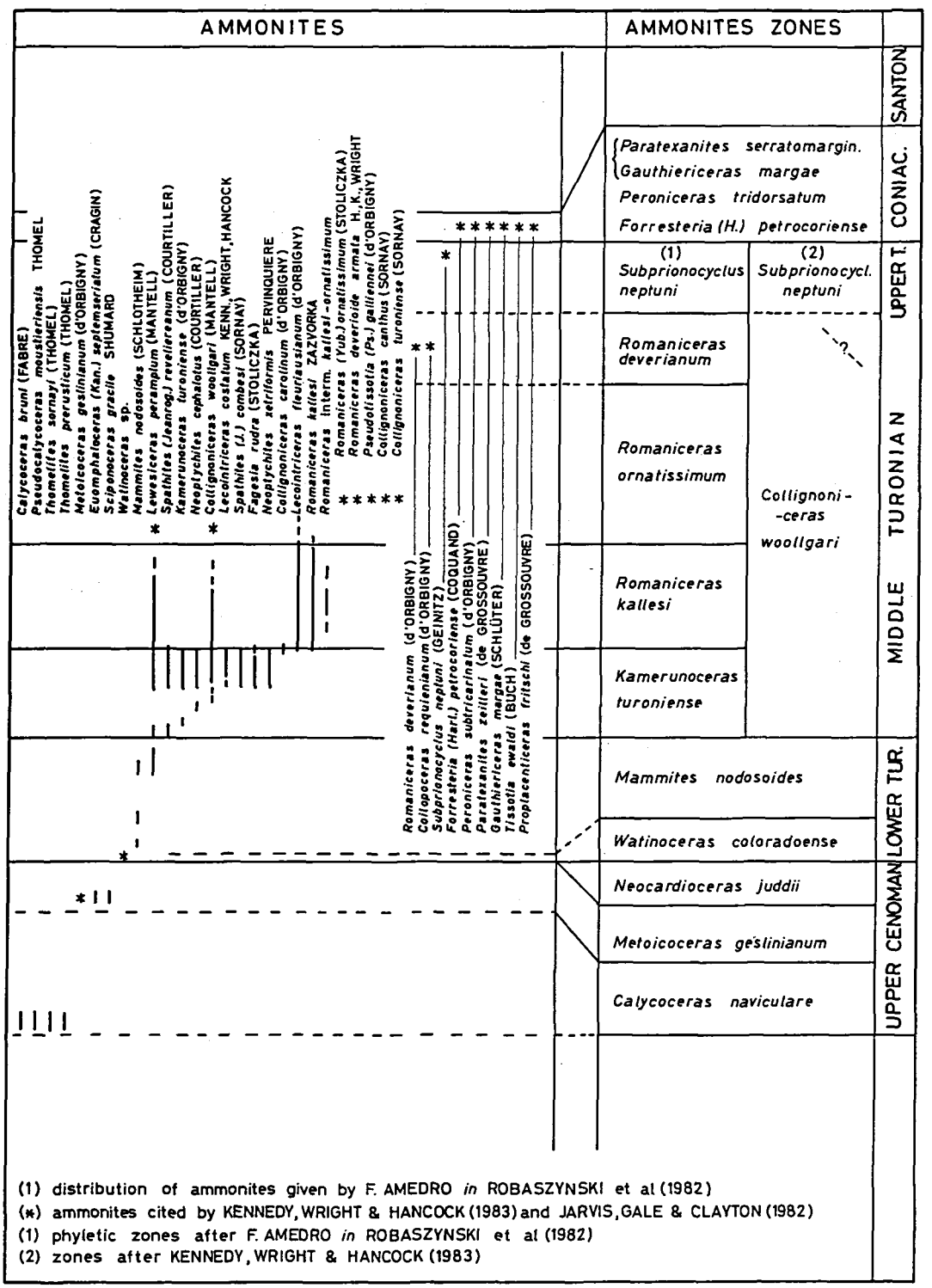


Fig. 3. Lithology and vertical distribution of some ammonites for the type Turonian Stage (data from F. Robaszynski et al. 1982).



(1) distribution of ammonites given by F. AMEDRO *in* ROBASZYNSKI et al (1982)
(*) ammonites cited by KENNEDY, WRIGHT & HANCOCK (1983) and JARVIS, GALE & CLAYTON (1982)
(1) phyletic zones after F. AMEDRO *in* ROBASZYNSKI et al (1982)
(2) zones after KENNEDY, WRIGHT & HANCOCK (1983)

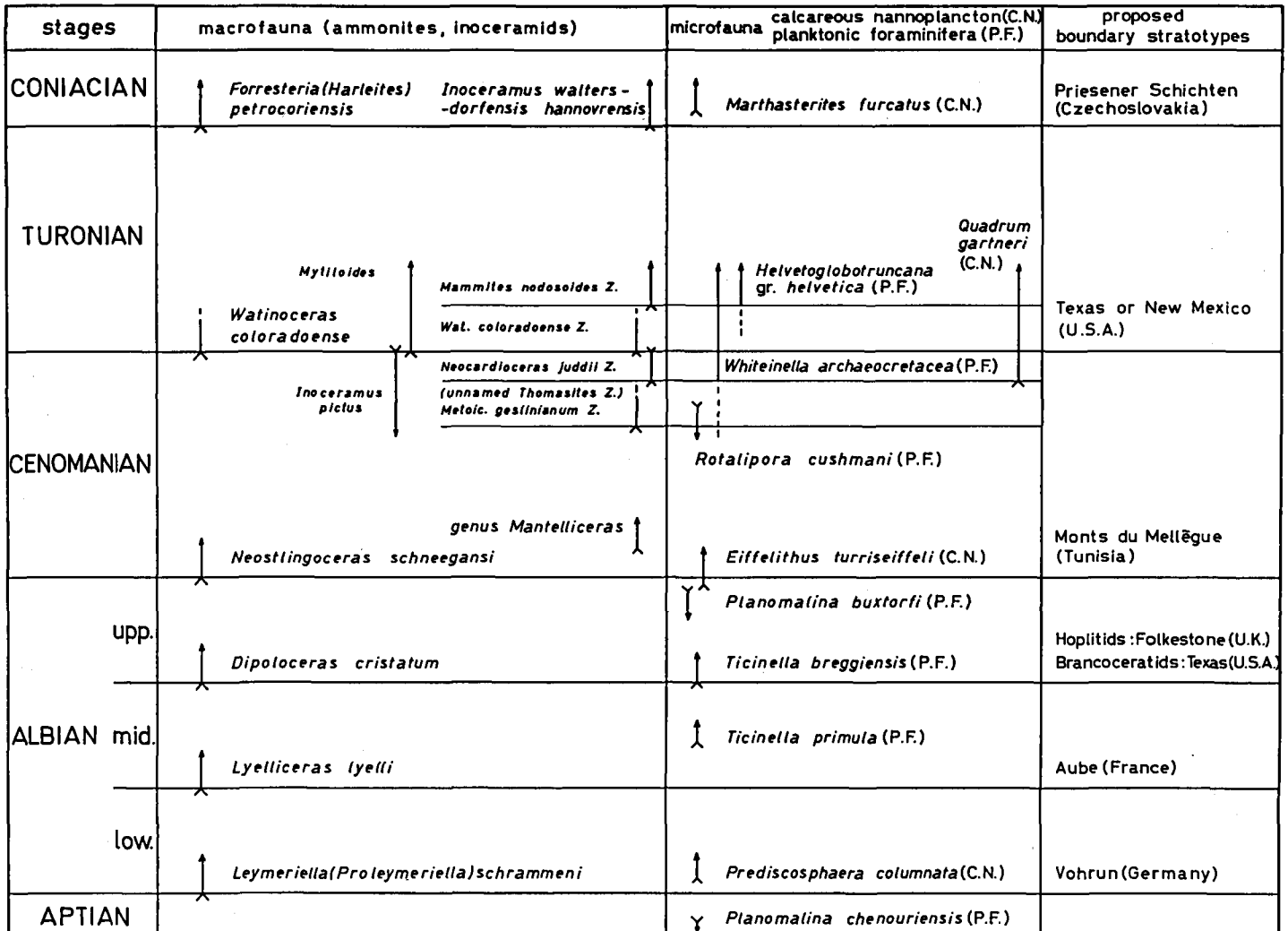


Fig. 4. Mid Cretaceous stage boundaries defined by index fossils as proposed during the Cretaceous Stage Boundaries Symposium in Copenhagen.