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Artikel: A Middle Jurassic-Early Cretaceous low-latitude radiolarian zonation based on unitary sssociations and age of Tethyan radiolarites
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Plate explanations

The illustrations are in accordance with the alphabetic listing of genera and species arranged in alphabetical order, where space on the plates permitted.

Each illustrated specimen is designated with two numbers of the following format: Sample number/year/SEM-negative number, C-number. The sample number refers to locality descriptions and Plate 12. Year and SEM-number refer to the collection of negatives stored at the *Labor für Raster-Elektronenmikroskopie,* Geological Institute, University of Basel. Negative numbers larger than 81/9000 and 82/9000 refer to negatives taken at the Scripps Institution of Oceanography and are stored in the author's collection.

C-numbers refer to the collection of all illustrated material deposited at the *Naturhistorisches Museum Basel, Switzerland.*

Magnifications are indicated for each illustration, they are standardized where possible to allow visual comparisons.

Plate 1

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1205, 1330, 1341), Romania (MO, V), Greece (POB 899) and Japan (IN 7) (see locality descriptions).

Fig. 1–2 *Acaeniotyle diaphorogona* FOREMAN, s.l.
(data 59, range 77, pob 90, rk –), 1: 534A-106-1-29/81/9028, C 35739, py, ×100. 2: 534A-106-1-29/81/9002, C 35740, py, ×100.

Fig. 3–4 *Acaeniotyle diaphorogona dentata* BAUMGARTNER, n. subsp.
(data 94, range 99, pob 281, rk –), 3: holotype POB 1205/79/5254, C 35741, si, ×100; 4: paratype MO 22/79/4112, C 35742, broken specimen, note triradiate base of internal beam connecting to (lacking) medullary shell; external spines have no inward continuation as for all *Acaeniotyle*. py, ×100.

Fig. 5 *Acaeniotyle umbilicata* (RÜST)
(data 80, range 88, pob 92, rk 18), MO 46/79/4161, C 35743, py, ×100.

Fig. 6 *Acanthocircus suboblongus* (YAO)
(data 24, range 22, pob 85, rk 41), POB 899/78/6123, C 35744, si, ×75.

Fig. 7 *Acanthocircus dicranacanthos* (SQUINABOL)
(data 82, range 86, pob 87, rk 17), MO 46/79/3095, C 35745, py, ×75.

Fig. 8–10 *Alievum helenae* SCHAAF
(data 104, range 103, pob 228, rk 20), 8, 10: V 34/80/2798, C 35746, py, 8, ×100, 10, ×165; 9: POB 1330/81/9086, C 35747, si, ×100.

Fig. 11–12 *Andromeda podbielensis* (OZVOLDOVA)
(data 16, range 43, pob 8, rk 87), 10: 534A-126-2-125/81/9142, C 35748, py, ×100; 11: 534A-125-5-111/81/9141, C 35749, py, ×100.

Fig. 13–15 *Andromeda praepodbielensis* BAUMGARTNER n. sp.
(data 3, range 2, pob 6, rk –), 13, 15: holotype POB 1341/81/2978, C 35750, si, ×100; 14: paratype IN 7/79/4431, C 35751, si, ×100.

Fig. 16–18 *Andromeda praecrassa* BAUMGARTNER n. sp.
(data 10, range 5, pob 7, rk –), 16: paratype POB 1341/81/2880, si, × 100; 17: holotype POB 1341/81/2975, C 35752, si, ×100; 18: paratype 534A-126-2-125/81/9143, C 35753, segmental divisions are marked with arrows, py, ×100.

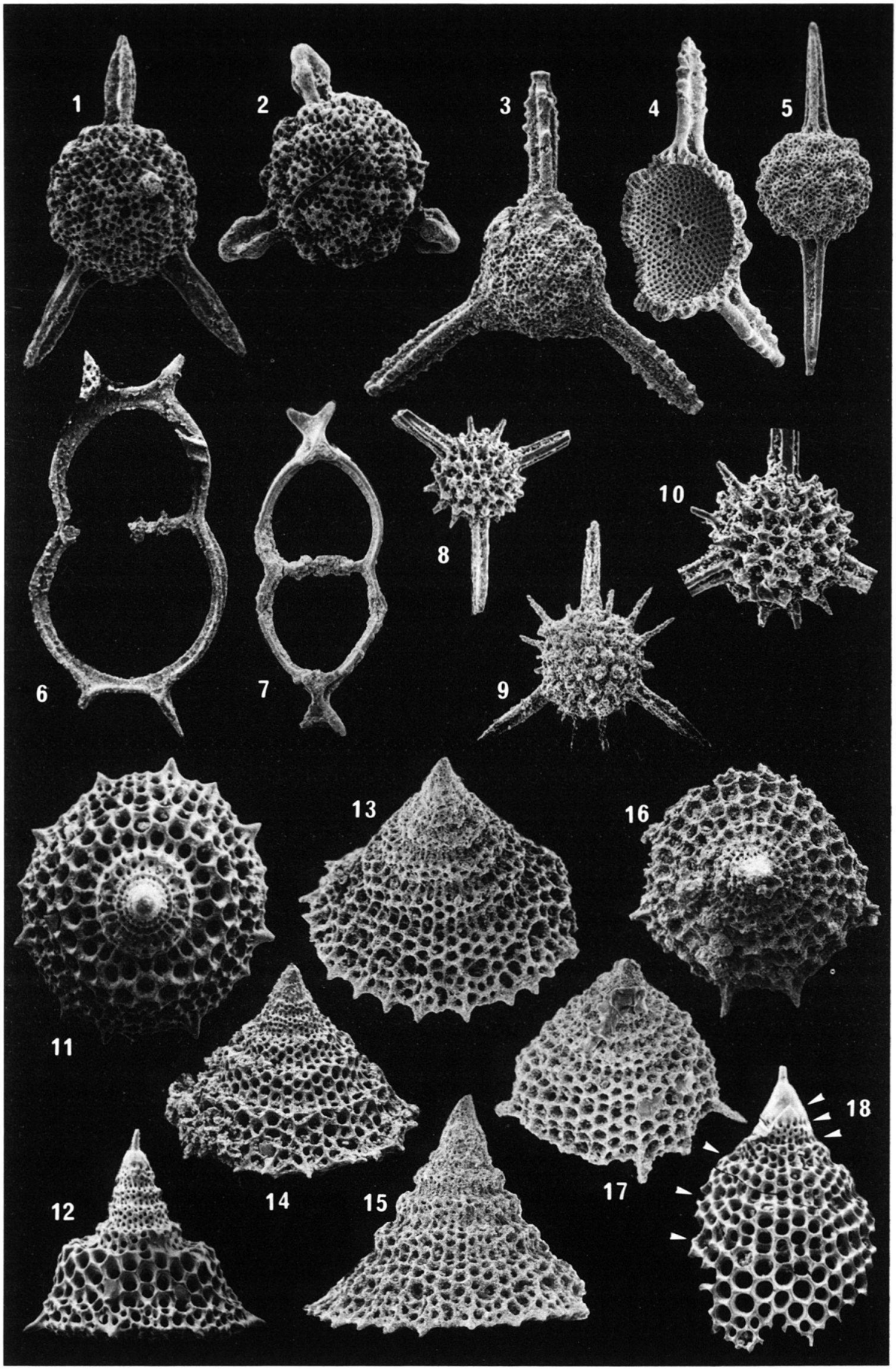
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Plate 2

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1205, 1330, 1341), Romania (MO, V), Greece (POB 28, 1262) and western Switzerland (POB 1134) (see locality descriptions).

Fig. 1–3 *Angulobracchia* (?) *portmanni* BAUMGARTNER n. sp.
(data 98, range 97, pob 285, rk –), 1: holotype POB 1330/81/9091, C 35754, si, ×100; 2: paratype MO 46/79/3121, C 35755, py, ×100; 3: paratype POB 1205/79/5741, C 35756, si, ×100.

Fig. 4 *Angulobracchia purisimaensis* (PESSAGNO)
(data 67, range 57, pob 144, rk 42), POB 28/78/3762, C 34809, si, ×75.

Fig. 5–6 *Archaeodictyomitra apiara* (RÜST)
(data 75, range 82, pob 263, rk 14), 5: MO 22/79/4101, C 35757, py, ×150; 6: 534A-81-2-64/81/9118, C 35758, py, ×150.

Fig. 7–8 *Archaeodictyomitra excellens* (TAN SIN HOK)
(data 100, range 102, pob 287, rk –), 7: MO 46/79/4292, C 35759, py, ×150; B: 534A-81-2-3/81/9101, C 35760, py, ×150.

Fig. 9–13 *Archaeohagiastrum munitum* BAUMGARTNER n. gen. n. sp.
(data 92, range 40, pob 271, rk –), 9: holotype 534A-125-5-111/81/9140, C 35761, py, ×150; 10, 13: paratype 534A-126-2-125/81/9175, C 35762, py, 10: ×150, 13: ×500; 11–12: 534A-126-2-125/81/9151, C 35763, lateral view of a specimen with broken spine showing three primary canals arranged around primary beam and six external beams, note also highly raised nodes of central area, typical for this species; py, 11: ×150, 12: ×500.

Fig. 14–15 *Bernoullius cristatus* BAUMGARTNER n. gen. n. sp.
(data 39, range 39, pob 221, rk 109), 14: holotype 534A-125-5-72/82/9197, C 35764, py, ×100; 15: paratype 534A-125-5-72/81/9198, C 35765, py, ×100.

Fig. 16 *Bernoullius dicera* (BAUMGARTNER)
(data 35, range 56, pob 223, rk 69), 534A-125-5-72/81/9200, C 35766, py, ×100.

Fig. 17–18 *Cecrops septemporatus* (PARONA)
(data 110, range 108, pob 229, rk 24), 17: POB 1134/80/2168, C 35767, py, ×100; 18: MO 46/79/4278, C 35768, py, ×100.

Fig. 19 *Diboloachras chandrika* KOCHER
(data 55, range 75, pob 265, rk 43), 534A-106-1-29/81/9039, C 35769, py, ×100.

Fig. 20 *Diacanthocapsa normalis* YAO
(data 34, range 10, pob 54, rk –), POB 1262/80/3961, C 35770, si, ×250.

Fig. 21 *Ditrabs sansalvadorensis* (PESSAGNO)
(data 103, range 96, pob 227, rk 21), MO 46a'/81/0962, C 35771, py, ×100.

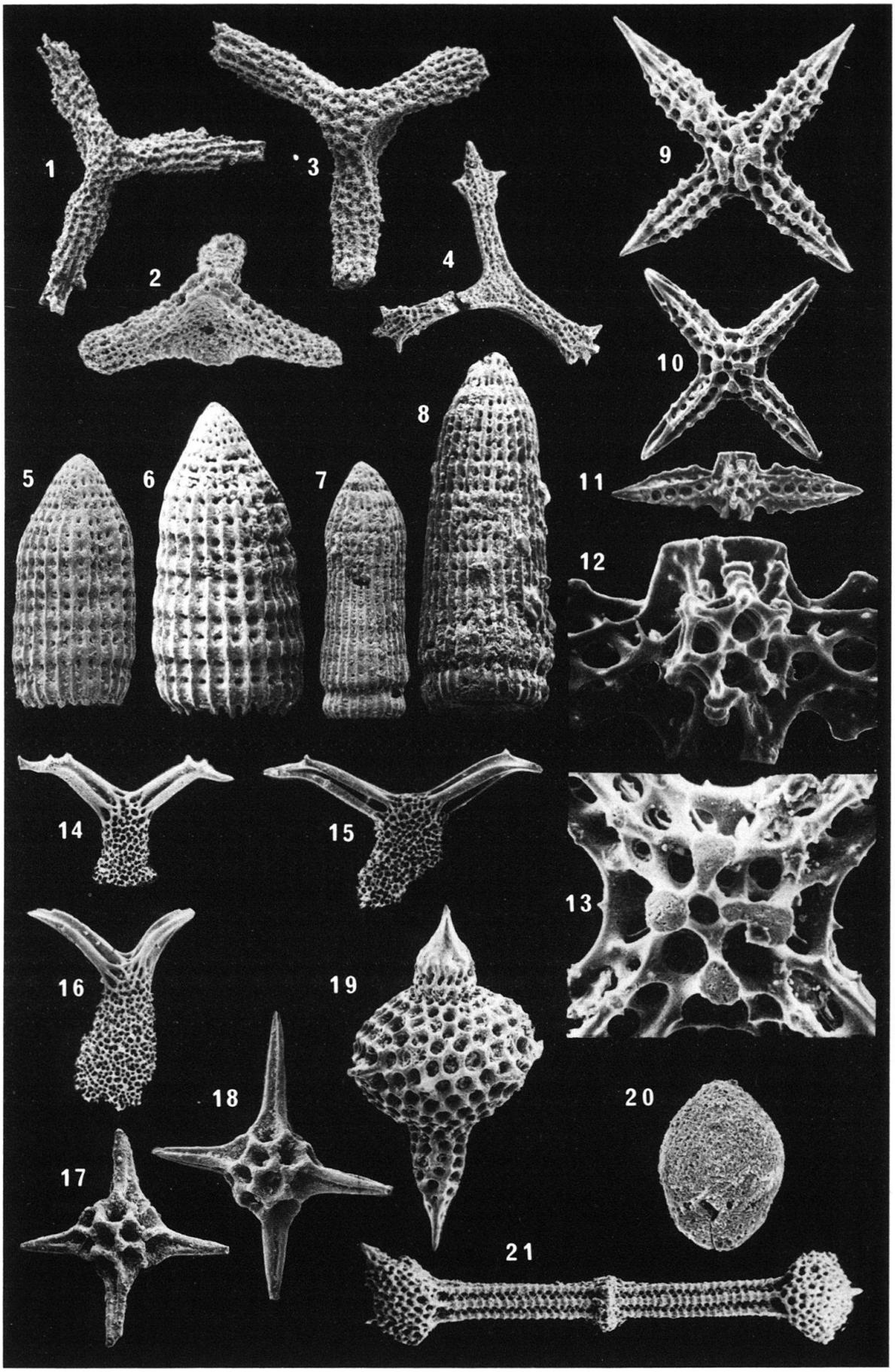
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Plate 3

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1341), Greece (POB 899, 986, 1262) (see locality descriptions)

Fig. 1 *Emiluvia hopsoni* PESSAGNO
(data 74, range 69, pob 225), POB 899/79/1656, C 35772, si, ×100.

Fig. 2 *Emiluvia sedecimporata elegans* (WISNIOWSKI)
(data 40, range 18, pob 216, rk –), POB 986/78/8107, C 35773, si, ×100.

Fig. 3 *Emiluvia pessagnoi* FOREMAN s.l.
(data 71, range 71, pob 226, rk 36), POB 986/78/8201, C 35774, si, ×100.

Fig. 4, 7 *Emiluvia sedecimporata salensis* PESSAGNO
(data 33, range 50, pob 215, rk 44 & 45), 4: 534A-126-2-125/81/9167, C 35775, py, ×100; 7: POB 899/78/8204, C 35776, si, ×100.

Fig. 5 *Emiluvia orea* BAUMGARTNER
(data 60, range 81, pob 224, rk 63), topotype POB 899/78/6106, C 35777, si, ×75.

Fig. 6, 8–9, 11, 12 *Emiluvia premyogii* BAUMGARTNER n. sp.
(data 19, range 14, pob 210, rk 88), 6: paratype 534A-124-1-52/81/2423, C 35778, py, ×100; 8, 11–12: holotype 534A-124-1-52/81/2424, C 35779, py, note perfect preservation in pyrite, showing the smooth surface of bars and spines and the knobby surface of nodes known from recent opaline polycystins, 8: ×100, 11: ×250, 12: ×1000; 9: paratype POB 899/79/1654, C 35780, si, ×100.

Fig. 10 *Emiluvia* (?) sp. P.
(data 41, range 59, pob 219, rk 90), 534A-125-2-36/81/1397, C 35781, py, ×150.

Fig. 13–16 Eucyrtid gen. et sp. indet.
(data 63, range 7, pob 74, rk –), 13–14: POB 1341/81/2958, C 35782, si, 13: ×250, 14: ×100; 15: POB 1263/80/3787, C 35783, si, ×100, 16: POB 1341/81/2960, C 35784, si, ×100.

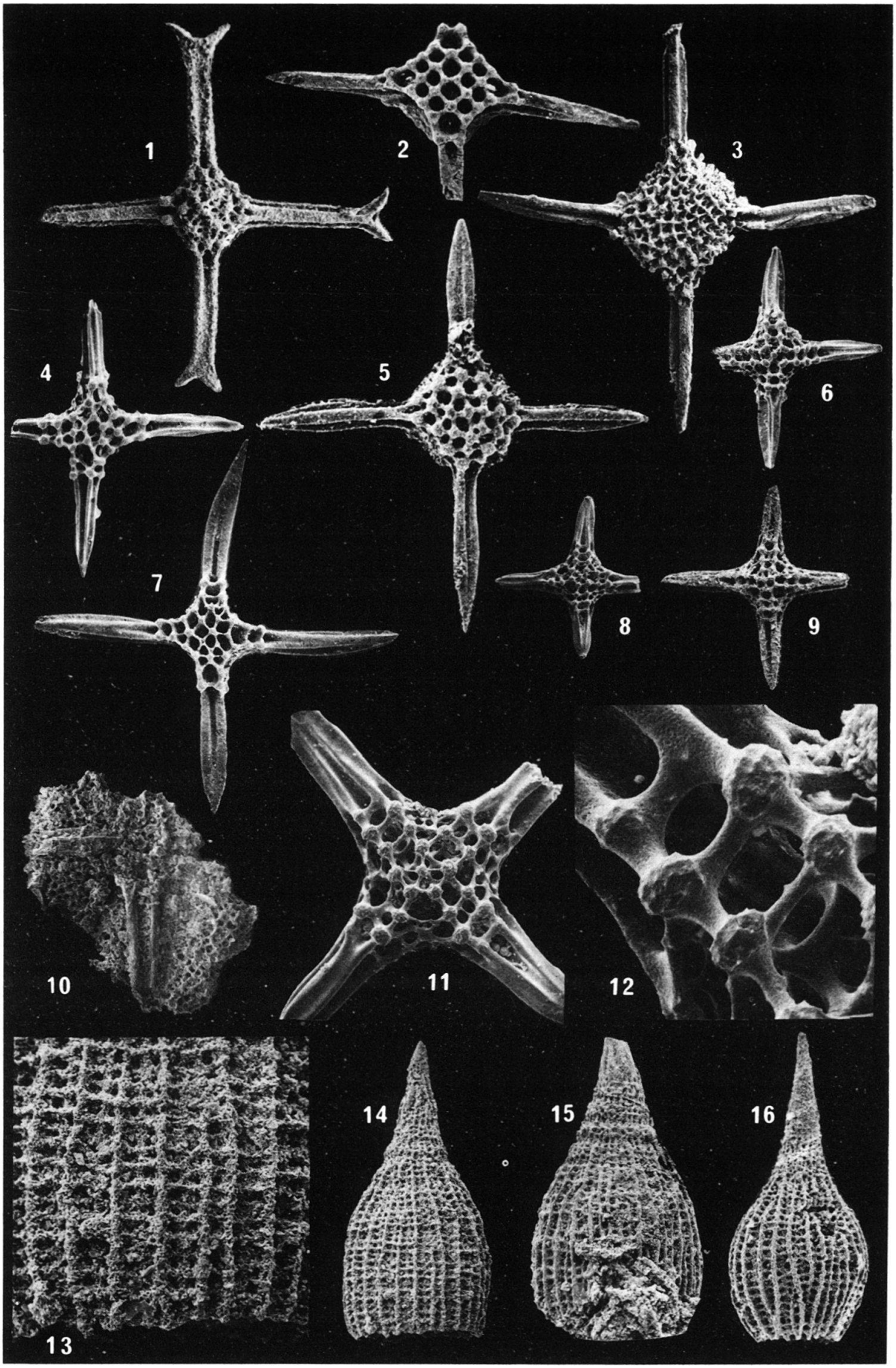
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Plate 4

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534) and Greece (POB 325, 899) (see locality descriptions).

Fig. 1–3 *Eucyrtidiellum ptyctum* (RIEDEL & SANFILIPPO)
(data 56, range 66, pob 27, rk 46 [pars]), 1: POB 325/80/3798, C 35785, si, ×250; 2: 534A-122-1-43/81/2217, C 35786, py, ×250; 3: 534A-122-1-43/81/2212, C 35787, py, ×250.

Fig. 4–5 *Eucyrtidiellum pustulatum* BAUMGARTNER n. gen. n. sp.
(data 91, range 44, pob 13, rk –), 4: holotype 534A-124-1-52/81/2428, C 35788, py, ×250; 5: paratype 534A-124-1-52/81/2429, C 35789, py, ×250.

Fig. 6 *Eucyrtidiellum unumaensis* (YAO)
(data 17, range 12, pob 12, rk 89), 534A-126-2-125/81/9144, C 35790, py, ×250.

Fig. 7 *Gorgansium pulchrum* (KOCHER)
(data 11, range 28, pob 76, rk 105), 534A-125-2-36/81/1393, C 35791, py, ×250.

Fig. 8–9 Hagiastrid sp. A.
(data 8, range 41, pob 153, rk 107 and 108), 534A-124-1-52/81/2795, C 35792, py, fragment! 8: × 500, 9: × 150.

Fig. 10–11 *Haliodictya* (?) *hojnosi* RIEDEL & SANFILIPPO
(data 86, range –, pob 254, rk 3), 10: 534A-124-1-52/81/2672, C 35793, py, ×150; 11: POB 899/78/6147, C 35794, si, ×200.

Fig. 12 *Higumastra* sp. aff. *H. inflata* BAUMGARTNER
(data 66, range 15, pob 107, rk 47), 534A-126-2-125/81/9183, C 35795, py, ×150.

Fig. 13 *Higumastra imbricata* (OZVOLDOVA)
(data 13, range 29, pob 110, rk 92), 534A-125-5-72/81/9210, C 35796, py, ×150.

Fig. 14 *Holocryptocanium barbui* DUMITRICA
(data 108, range 106, pob 292, rk –), 534A-81-2-64/81/9119, C 35797, py, ×150.

Fig. 15 *Homoeoparonaella argolidensis* BAUMGARTNER
(data 43, range 37, pob 103, rk 30), topotype POB 899/78/6201, C 35798, si, ×75.

Fig. 16 *Homoeoparonaella elegans* (PESSAGNO)
(data 65, range 63, pob 104, rk 48), 534A-124-1-52/81/2417, C 35799, py, ×75.

Fig. 17 *Homoeoparonaella giganthea* BAUMGARTNER
(data 70, range 68, pob 105, rk 37), topotype POB 899/78/6216, C 35800, si, ×75.

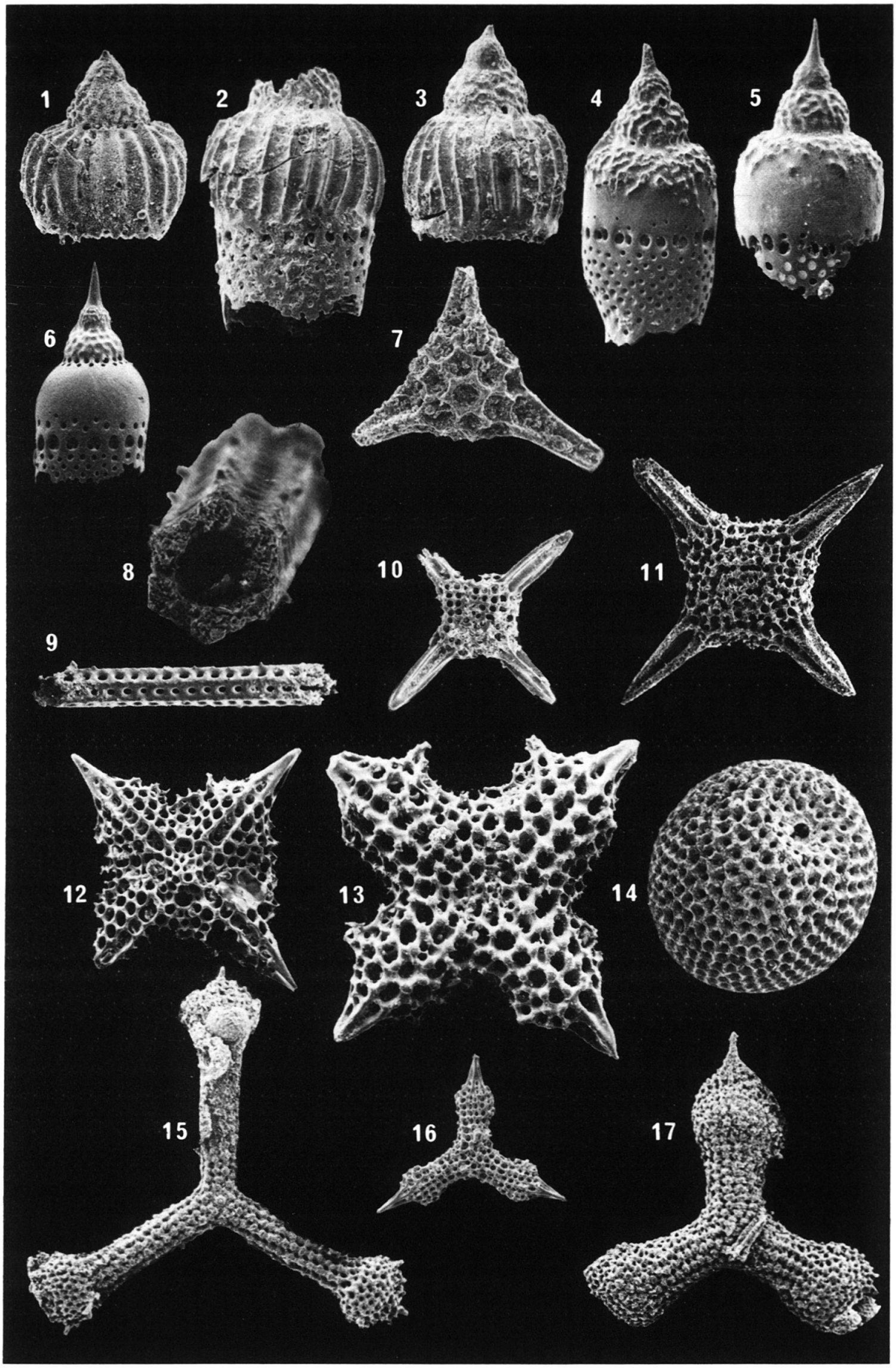
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Plate 5

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1205), Greece (POB 28, 899, 986), western Switzerland (POB 1134) and Japan (IN 7) (see locality descriptions).

Fig. 1–2 *Hsuum brevicostatum* (OZVOLDOVA)
(data 23, range , pob 181, rk 49), 1: 534A--125-3-29/81/2440, C 35801, py, ×150 2: POB 28/79/0360 C 35802, si, × 150.

Fig. 3–4 *Hsuum maxwelli* PESSAGNO group.
(data 47, range 42, pob 180, rk 93), 3: POB 28/78/3413, C 35803, si, ×150; 4: 534A-122-1-43/81/2274, C 35804, py, ×150.

Fig. 5–7 *Guexella nudata* (KOCHER)
(data 7, range 27, pob 61, rk 106), 534A-124-1-52/81/2667, C 35805, py, 5: ×300, 6: ×150, 7: ×450.

Fig. 8, 22 *Mirifusus guadalupensis* PESSAGNO
(data 37, range 55, pob 160, rk 50), 8: POB 28 /78/3587, C 35806, si, ×75; 22: POB 899/78/6261, C 35807, detail of inflated median part of test showing irregular outer layer, si, ×250.

Fig. 9, 15 *Mirifusus chenodes* (RENZ)
(data 77, range 80, pob 162, rk –), POB 899/79/1642, C 35808, si, note irregular outer layer of branching diagonal bars covering inner layer of small uniform pores in 4–5 rows per segment, 9: ×75, 15: ×250.

Fig. 10, 18 *Mirifusus mediodilatatus baileyi* PESSAGNO
(data 76, range 67, pob 161, rk 4 [pars]), 10: 534A-106-1-29/81/9053, C 35809, py, note slender conical proximal portion of test (above arrow) with several, well-defined segmental divisions, ×75; 18: POB 986/78/8183, C 34867, si, detail of inflated median portion of test with regular triangular pore frames, two rows of pores per segment and no covering outer layer, ×250.

Fig. 11, 14 *Mirifusus mediodilatatus minor* BAUMGARTNER n. subsp.
(data 99, range 90, pob 286, rk 4 [pars]), 11: holotype POB 1205/79/5038, C 35810, si, note short, blunt proximal conical portion of test (above arrow) with only one externally visible segmental division, ×75; 14: POB 1134/80/2182, C 35811, py, proximal conical portion of test shows outer layer entirely covering segmental divisions, ×75.

Fig. 12, 16–17, 20–21 *Mirifusus fragilis* BAUMGARTNER n. sp.
(data 14, range 9, pob 159, rk –), 12, 17, 20: holotype IN 7/79/4419, C 35812, si, note almost complete absence of outer layer, 12: ×75, 17: ×225, 20: ×250; 16: paratype 534A-126-2-125/81/9158, C 35813, py, note well-developed outer layer of diagonal bars, thin circumferential ridges, well visible inner layer of three rows of circular pores per segment, ×250; 21: 534A-125-3-29, C 35814, py, fragment of median inflated portion with weakly developed outer layer, thin circumferential ridges, ×250.

Fig. 13, 19 *Mirifusus mediodilatatus mediodilatatus* (RÜST)
(data 76, range 67, pob 161, rk 4 [pars]), 13: POB 28/78/3443, C 35815, si; 19: POB 899/78/6696, C 34866, si, detail of inflated median portion of test showing regular circular pore frames in two rows per segment and disappearing outer layer in upper part of Figure, ×250.

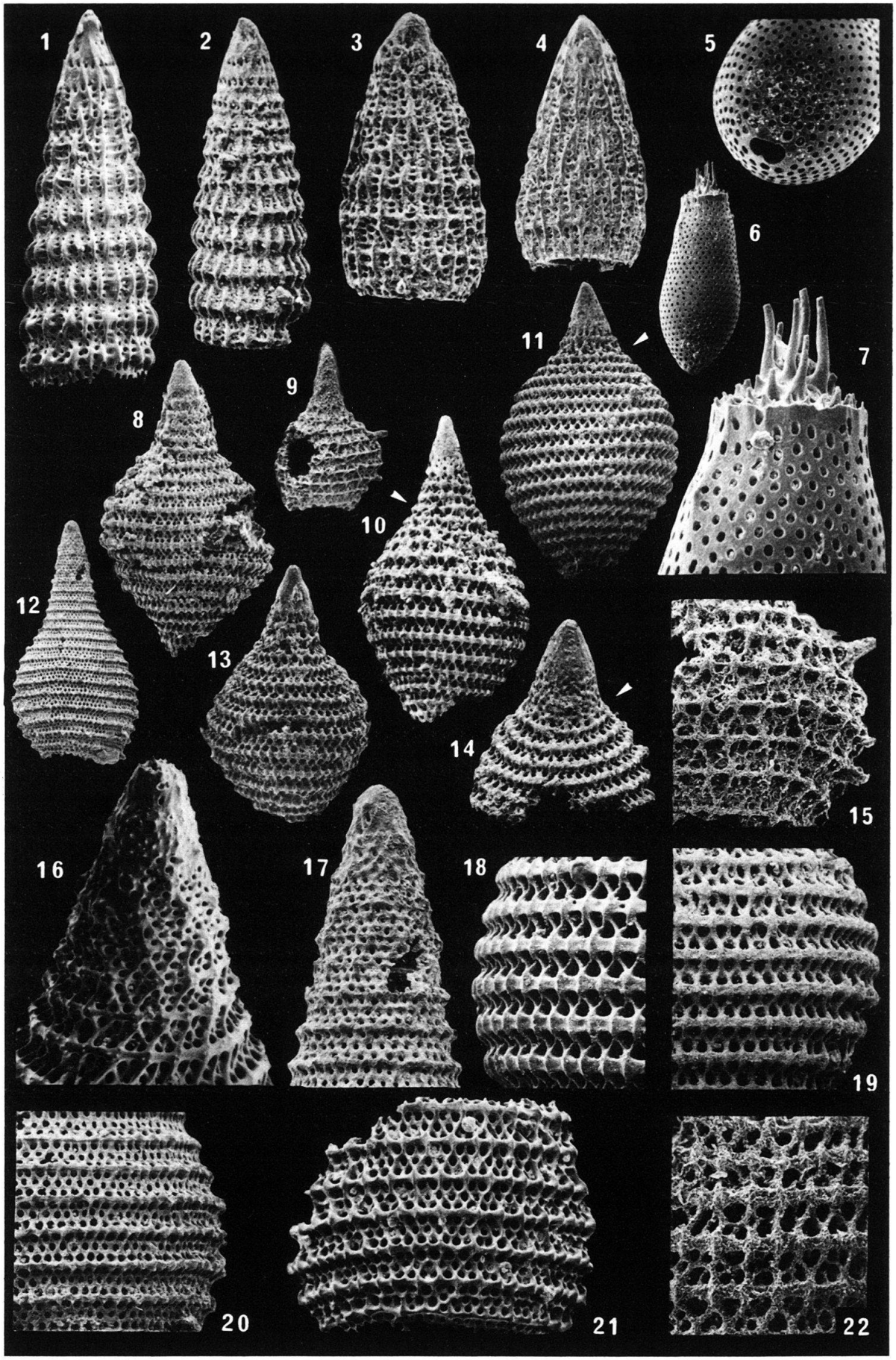
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Plate 6

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Sites 5, 534), Lombardy (POB 1205, 1330) and Greece (POB 28, 783, 899, 986) (see locality descriptions)

Fig. 1–2, 5 *Monotrabs plenoides* BAUMGARTNER n. gen. n. sp.
(data 42, range 54, pob 152, rk 91), holotype 534A-124-1-52/81/2686, C 35816, py; 2, 5: note long lateral spines and possible hagiastrid structure composed of beams and bars; 1: ×150, 2: ×250, 5: ×500.

Fig. 3 *Napora deweveri* BAUMGARTNER
(data 46, range 62, pob 35, rk 95), topotype POB 899/78/6462, C 35817, si, ×150.

Fig. 4 *Napora bukryi* PESSAGNO
(data 73, range 61, pob 34, rk 31), POB 899/78/6456, C 35818, si, ×150.

Fig. 6 *Napora lospensis* PESSAGNO
(data 72, range 76, pob 36, rk 32), POB 783/79/0105, C 35819, si, ×150.

Fig. 7–9 *Obesacapsula rusconensis* BAUMGARTNER n. sp.
(data 95, range 100, pob 282, rk –), 7: paratype POB 1205/79/5039, C 35820, si, ×75; 8: holotype POB 1205/80/2996, C 35821, si, ×75; 9: paratype 534A-89-2-47/81/9060, C 35822, si, ×75.

Fig. 11–12 *Napora pyramidalis* BAUMGARTNER n. sp.
(data 12, range 11, pob 33, rk 104), 11: holotype 534A-124-1-52/81/2704, C 35823, py, ×250; 12: paratype 534A-124-1-52/81/2656, C 35824, py, ×250.

Fig. 13 *Obesacapsula rotunda* (HINDE)
(data 83, range 95, pob 202, rk 16), 5A-7-1/79/4232, C 35825, si, ×75.

Fig. 14–15 *Pantanellium* (?) *berriasianum* BAUMGARTNER n. sp.
(data 93, range 92, pob 280, rk –), 14: holotype POB 1205/79/5265, C 35826, si, ×150; 15: paratype POB 1330/81/9085, C 35827, si, ×150.

Fig. 16 *Paronaella bandyi* PESSAGNO
(data 58, range 21, pob 135, rk 51), POB 899/78/6218, C 35828, si, ×75.

Fig. 17 *Paronaella broennimanni* PESSAGNO
(data 53, range 73, pob 137, rk 71), POB 28/78/3773, C 34792, si, ×75.

Fig. 18 *Formanella diamphidia* (FOREMAN)
(data 79, range 85, pob 112, rk 13), POB 28/78/3811, C 35829, si, ×75.

Fig. 19 *Formanella hipposidericus* (FOREMAN)
(data 78, range 83, pob 111, rk 12), POB 986/78/8152, C 34726, si, ×75.

Fig. 20 *Paronaella kotura* BAUMGARTNER
(data 48, range 64, pob 140, rk 85), topotype POB 899/79/6217, C 35830, si, ×75.

Fig. 21 *Paronaella mulleri* PESSAGNO
(data 38, range 32, pob 139, rk 96), POB 899/78/6229, C 35831, si, ×75.

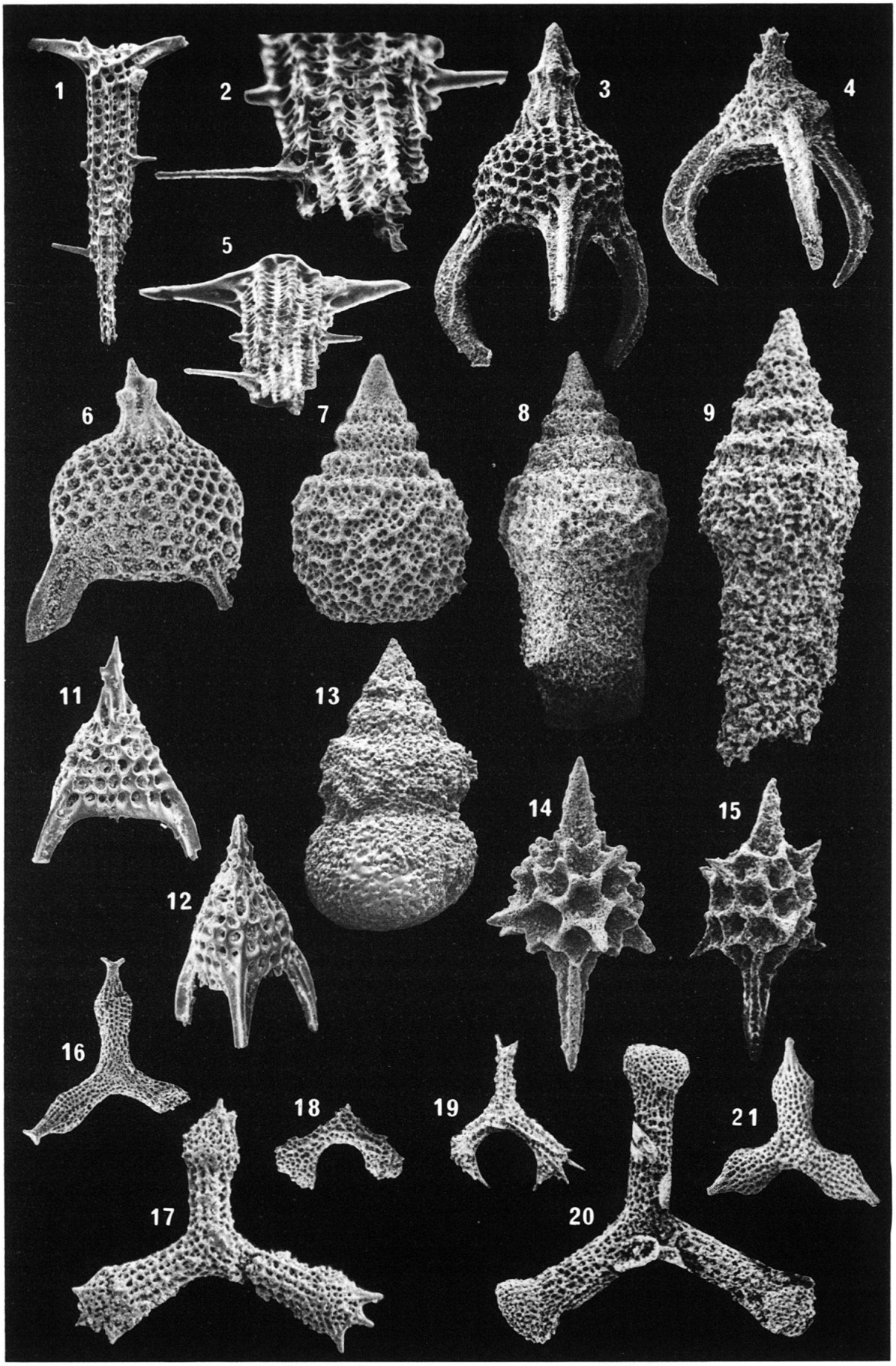
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Plate 7

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1205) Greece (POB 28, 284, 899, 986), Sicily (S 4) and California (NSF 907) (see locality descriptions)

Fig. 1 *Parvicingula cosmoconica* (FOREMAN)
(data 102, range 94, pob 255, rk 22), 534A-81-2-64/81/9111, C 35831, py, ×150.

Fig. 2–4 *Parvicingula dhimenaensis* BAUMGARTNER n. sp.
(data 90, range 33, pob 197, rk –), 2–3: holotype POB 284/79/0079, C 35833, si, 2: ×150, 3: ×250; 4: A-125-5-72/81/9214, C 35834, py, ×150.

Fig. 5–6 *Perispyridium ordinarium* (PESSAGNO)
(data 31, range 48, pob 100, rk 53), 5: POB 986/78/8147, C 35835, si, ×100; 6: 534A-124-1-52-81/2430, C 35836, py, ×100.

Fig. 7 *Podobursa helvetica* (RÜST)
(data 18, range 13, pob 169, rk 98), POB 28/78/3551, C 35837, si, ×100.

Fig. 8 *Podobursa spinosa* (OZVOLDOVA)
(data 64, range 78, pob 230, rk 54), S 4/79/4721, C 35838, si, ×100.

Fig. 9–10 *Podocapsa amphitreptera* FOREMAN
(data 69, range 84, pob 171, rk 38), 9: 534A-106-1-29/81/9009, C 35839, py, ×100; 10: POB 1205/80/2868, C 35840, si, ×100.

Fig. 11–14 *Praeconocaryomma* (?) *hexacubica* BAUMGARTNER n. sp.
(data 87, range 31, pob 244, rk –), 11: holotype 534A-126-2-125/81/9154, C 35841, py, ×150; 12: paratype 534A-126-2-125/81/9153, C 35842, py, spines supporting medullary shell are attached in center of squares of cortical shell, ×150; 13: 534A-126-2-125/81/9203, C 35843, py, note characteristic hexagonal pore arrangement, ×265; 14: paratype 534A-125-3-60/81/2451, C 35844, py, morphotype without spines, ×150.

Fig. 15 *Protunuma costata* (HEITZER)
(data 21, range 35, pob 232, rk 67), 534A-106-1-29, C 35845, py, ×150.

Fig. 16 *Pseudocrucella adriani* BAUMGARTNER
(data 52, range 34, pob 129, rk 72), topotype POB 899/78/6206, C 35846, si, ×75.

Fig. 17 *Pseudocrucella sanfilippoae* (PESSAGNO)
(data 51, range 58, pob 126, rk 73), topotype NSF 907/79/1695, C 35847, si, ×75.

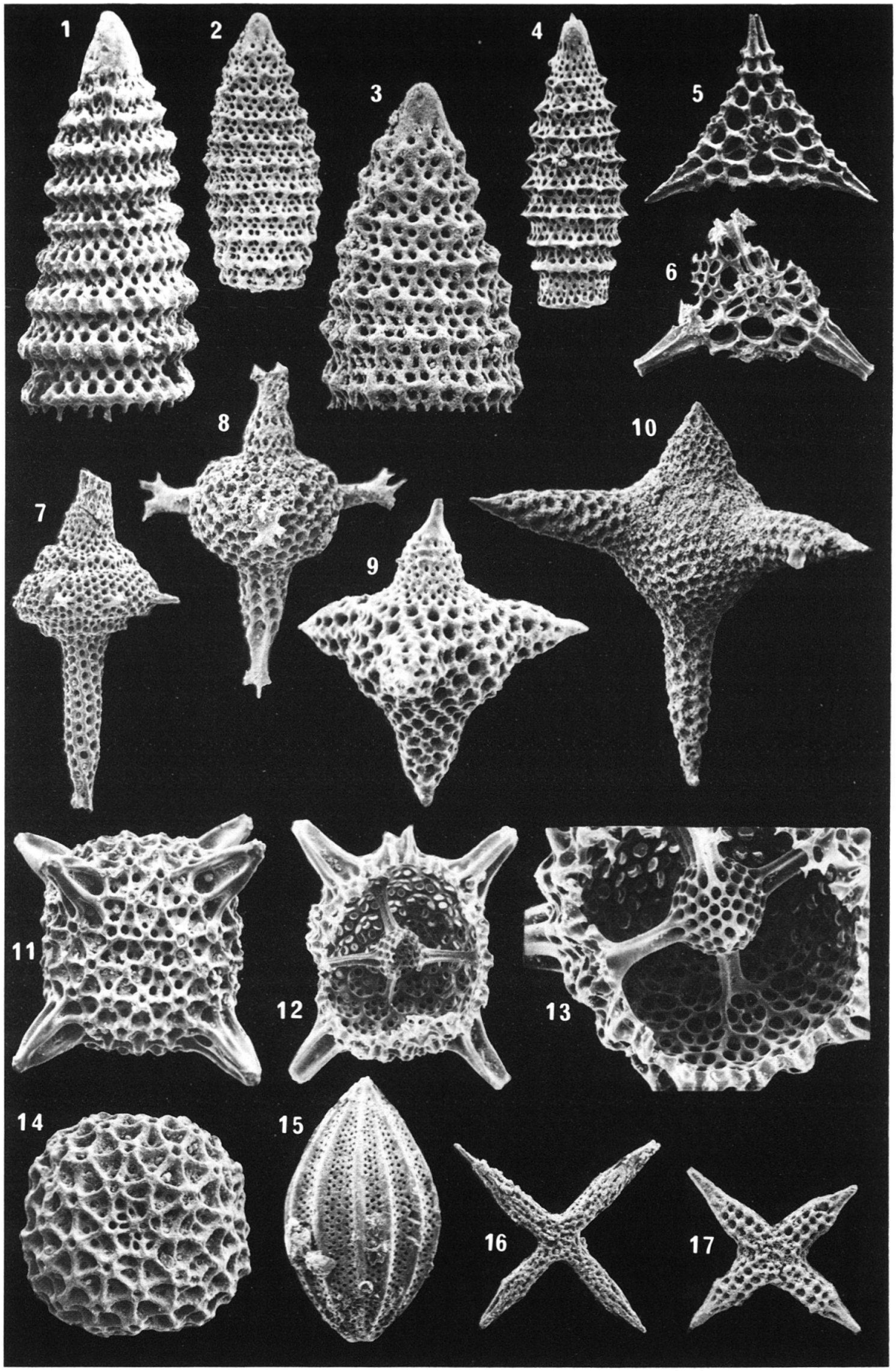
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Plate 8

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1205), Greece (POB 899, 986, 1263), western Switzerland (POB 1134) and Romania (MO) (see locality descriptions).

Fig. 1 *Pseudodictyomitra carpatica* (LOZNYAK)
(data 107, range 105, pob 293, rk –), 534A-81-2-64/81/9121, C 35848, py, ×150.

Fig. 2, 7–8, 11 *Pseudodictyomitra depressa* BAUMGARTNER n. sp.
(data 97, range 101, pob 284, rk –), 2, 11: holotype MO 22/79/0163, C 35849, py, 2: ×150, 11: ×250; 7: paratype 534A-81-2-3/81/9099, C 35850, py, ×150; 8: paratype 534A-81-2-3/81/9097, C 35851, ×150.

Fig. 3–4, 9 *Ristola altissima* (RÜST)
(data 32, range 47, pob 164, rk 52), 3: 534A-106-1-29/81/9011, C 35852, py, ×100; 4, 9: 534A-126-2-125/81/9133, C 35853, py, note distally disappearing outer layer, 4: ×100, 9: ×250.

Fig. 5, 10 *Ristola cretacea* (BAUMGARTNER)
(data 101, range 93, pob 165, rk 23), MO 26/80/1857, C 35854, py, 5: ×100, 6: ×250.

Fig. 6 *Ristola procera* (PESSAGNO)
(data 45, range 72, pob 163, rk 97), POB 899/78/6275, C 35855, si, ×100.

Fig. 12 *Saitoum pagei* PESSAGNO
(data 88, range 49, pob 20, rk 55), POB 986/78/8172, C 35/93, si, ×250.

Fig. 13 *Sethocapsa cetia* FOREMAN
(data 68, range 87, pob 203, rk 39), POB 1205/79/5745, C 35856, si, ×75.

Fig. 14 *Sethocapsa trachyostraca* FOREMAN
MO 46/79/4143, C 35857, py, ×150.

Fig. 15 *Sethocapsa uterculus* (PARONA)
(data 111, range 109, pob 297, rk –), POB 1134/80/2671, C 35858, py, ×150.

Fig. 16 *Spongocapsula palmerae* PESSAGNO
(data 50, range 38, pob 199, rk 76), 534A-125-5-72/81/9204, C 35859, py, ×100.

Fig. 17 *Spongocapsula perampla* (RÜST)
(data 85, range –, pob 267, rk 9), POB 986/79/0202, C 35860, si, ×100.

Fig. 18 *Staurosphaera antiqua* RÜST
(data 49, range 60, pob 218, rk 83), POB 899/78/6730, C 35861, si, ×100.

Fig. 19 *Stichocapsa convexa* YAO
(data 61, range 16, pob 55, rk 56), 534A-125-3-29/81/2440, C 35862, py, ×150.

Fig. 20 *Stichocapsa* sp. aff. *S. japonica* YAO
(data 4, range 3, pob 48, rk –), POB 1263/80/6730, C 35863, si, ×150.

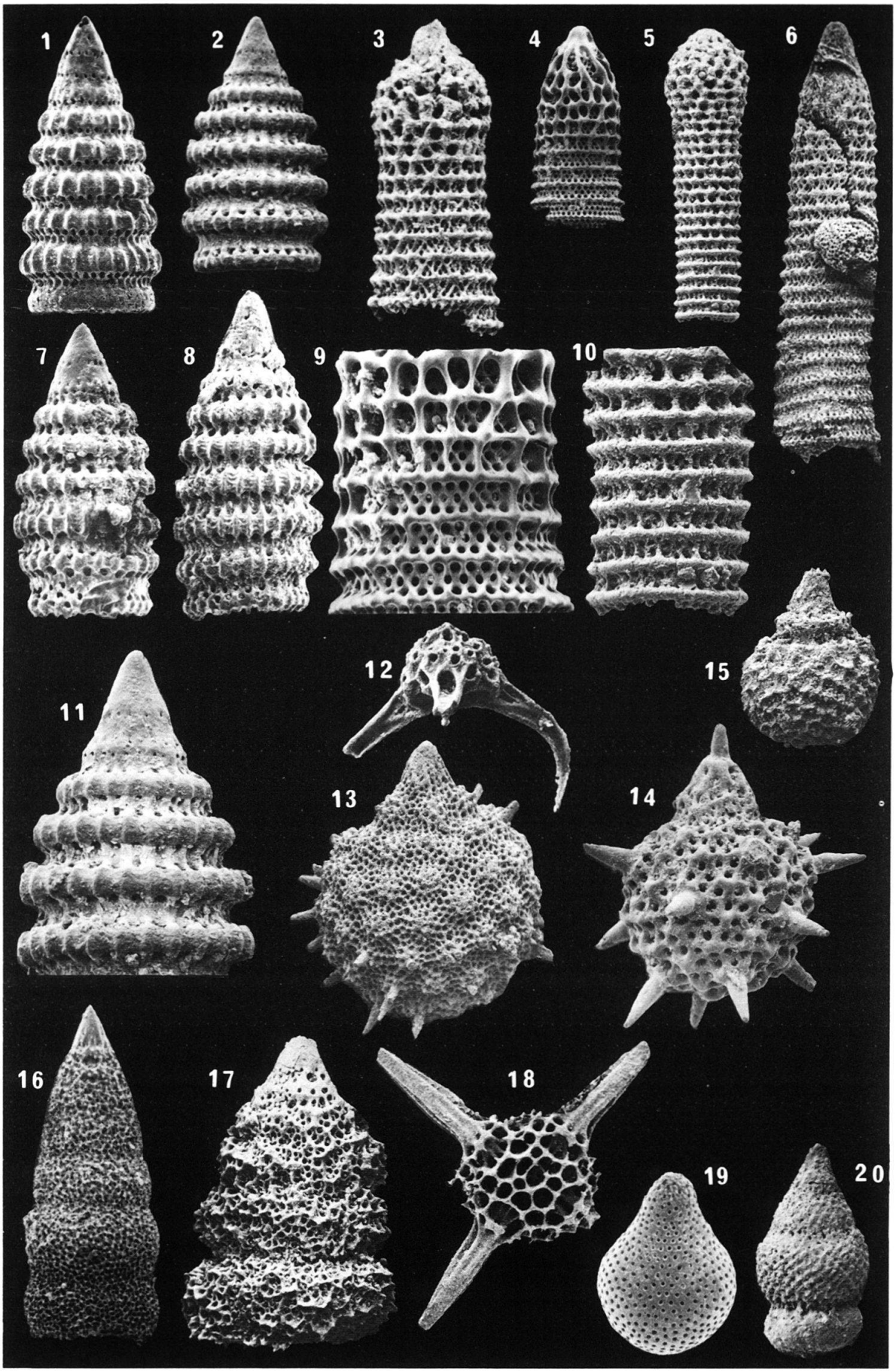
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Plate 9

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Lombardy (POB 1205), Greece (POB 28, 899, 986), western Switzerland (POB 1134) and Japan (IN 7) (see locality descriptions).

Fig. 1–2 *Stylocapsa oblongula* KOCHER
(data 6, range 53, pob 59, rk 111), 1: 534A-125-3-29/81/2438, C 35864, py, ×250; 2: POB 325/80/3802, C 35865, si, ×250.

Fig. 3–4 *Syringocapsa agolarium* FOREMAN
(data 105, range 104, pob 291, rk –), 3: MO 22/79/3706, C 35866, py, ×150; 3: 534A-81-2-64/81/9108, C 35867, py, ×150.

Fig. 5 *Syringocapsa lucifer* BAUMGARTNER n. sp.
(data 96, range 91, pob 283, rk –), holotype POB 1205/79/5033, C 35858, si, ×75.

Fig. 6–7 *Tetraditryma corralitosensis* (PESSAGNO)
(data 20, range 17, pob 124, rk 58), 534A-126-2-125/81/9188, C 35869, py, 6: ×100; 7: lateral view of same specimen as Figure 6, showing internal ray structure with three primary canals and cortical space, ×250.

Fig. 8–9, 13, 13a *Tetraditryma praeplena* BAUMGARTNER n. sp.
(data 5, range 6, pob 125, rk –), 8: paratype IN 7/81/3027, C 35870, si, ×75; 9, 13–13a: holotype IN 7/79/4404, C 35871, si, 9, 13: ×75, 13a: note delicate porous cortical wall (arrow), ×250.

Fig. 10 *Tetratrabs zealis* (OZVOLDOVA)
(data 36, range 24, pob 121, rk 61), POB 1341/81/2955, C 35872, si, small specimen! ×75.

Fig. 11 *Tetratrabs bulbosa* BAUMGARTNER
(data 62, range 74, pob 122, rk 60), S 4/79/4700, C 35873, si, ×75.

Fig. 12, 14 *Tetraditryma pseudoplena* BAUMGARTNER
(data 57, range 36, pob 123, rk 59), 12: POB 28/78/3400, C 35874, si, ×75; 14: holotype POB 899/79/1500, C 34760, si, ×75.

Fig. 15 *Thanarla pulchra* (SQUINABOL)
(data 109, range 107, pob 296, rk –), MO 46a'/81/0948, C 35875, py, ×150.

Fig. 16–17 *Theocapsomma cordis* KOCHER
(data 15, range 30, pob 277, rk 99), 534A-126-2-125/82/9094, C 35876, py, Figure 17 shows basal aperture, ×250.

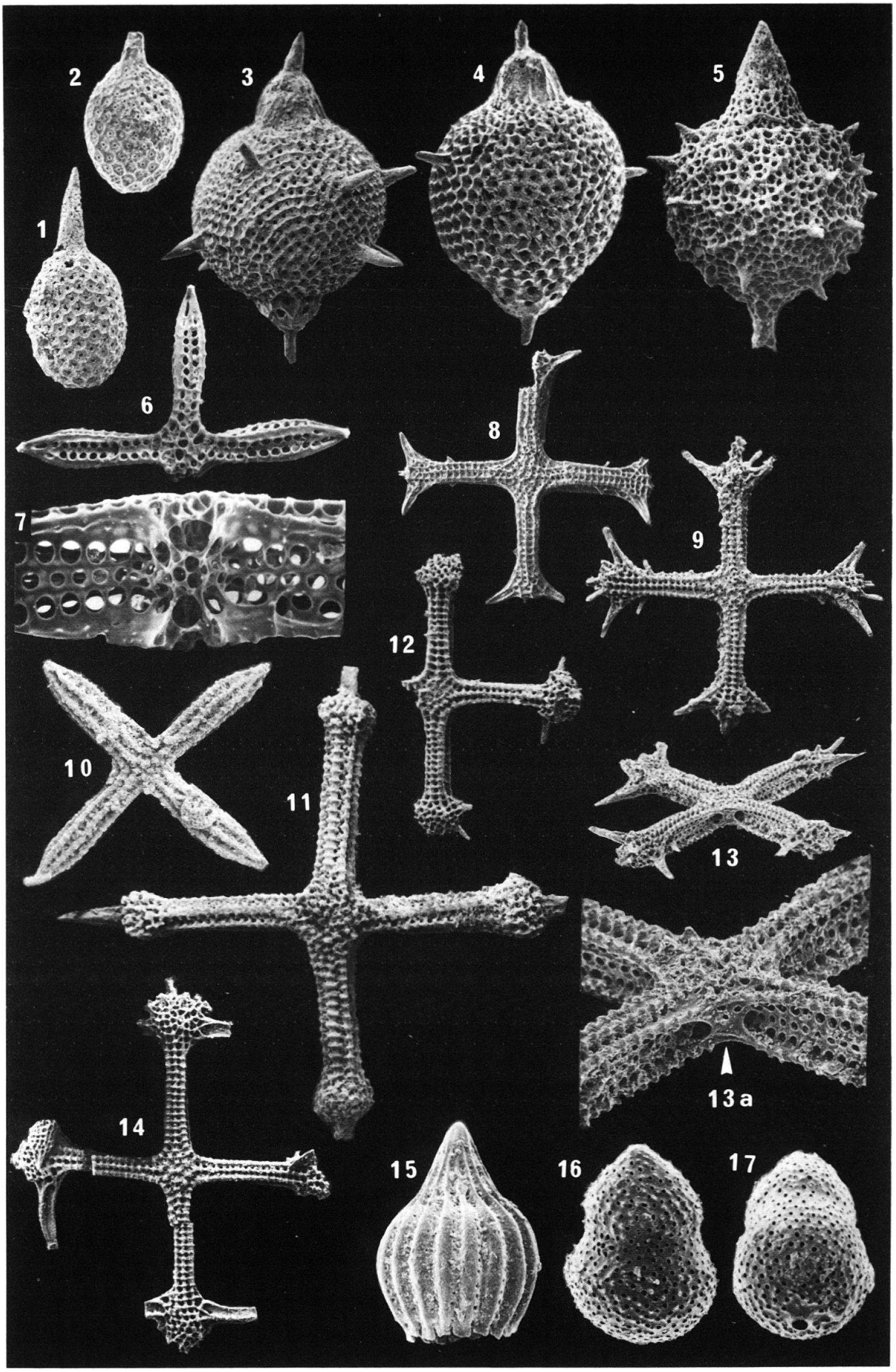
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Plate 10

Scanning electron micrographs of Middle Jurassic to Early Cretaceous siliceous (si) and pyritized (py) Radiolaria from Blake-Bahama Basin (DSDP Site 534), Greece (POB 28, 899, 986, 1262), Romania (MO) and Sicily (S 4) (see locality descriptions).

Fig. 1 *Triactoma cornuta* BAUMGARTNER
(data 89, range 65, pob 166, rk 78), topotype POB 899/78/6085, C 35877, si, ×75.

Fig. 2 *Triactoma echiodes* FOREMAN
(data 81, range 89, pob 94, rk 19), MO 46a'/81/0986, C 35878, si, ×100.

Fig. 3 *Triactoma blakei* (PESSAGNO)
(data 25, range 46, pob 95, rk 64), 534A-126-2-125/81/9133, C 35879, py, ×75.

Fig. 4 *Triactoma jonesi* (PESSAGNO)
(data 29, range 25, pob 96, rk 33), 534A-126-2-125/81/9131, C 35880, py, ×100.

Fig. 5 *Triactoma tithonianum* RÜST
(data 30, range 52, pob 97, rk 40), POB 899/78/6173, C 35881, si, ×100.

Fig. 6–7 *Tricolocapsa plicarum* YAO
(data 9, range 8, pob 51, rk –), 6: POB 1262/80/3954, C 35882, si, ×250; 7: 534A-122-1-43/81/2242, C 35883, py, ×250.

Fig. 8 *Trillus* sp. cf. *T. seidersi* PESSAGNO & BLOME
(data 1, range 1, pob 39, rk –), POB 1262/80/3957, C 35884, si, ×250.

Fig. 9 *Tritrabs casmaliaensis* (PESSAGNO)
(data 26, range 45, pob 117, rk 81), POB 28/78/3777, C 35885, si, ×75.

Fig. 10 *Tritrabs ewingi* (PESSAGNO)
(data 54, range 70, pob 113, rk 34), S 4/79/4689, C 35886, si, ×75.

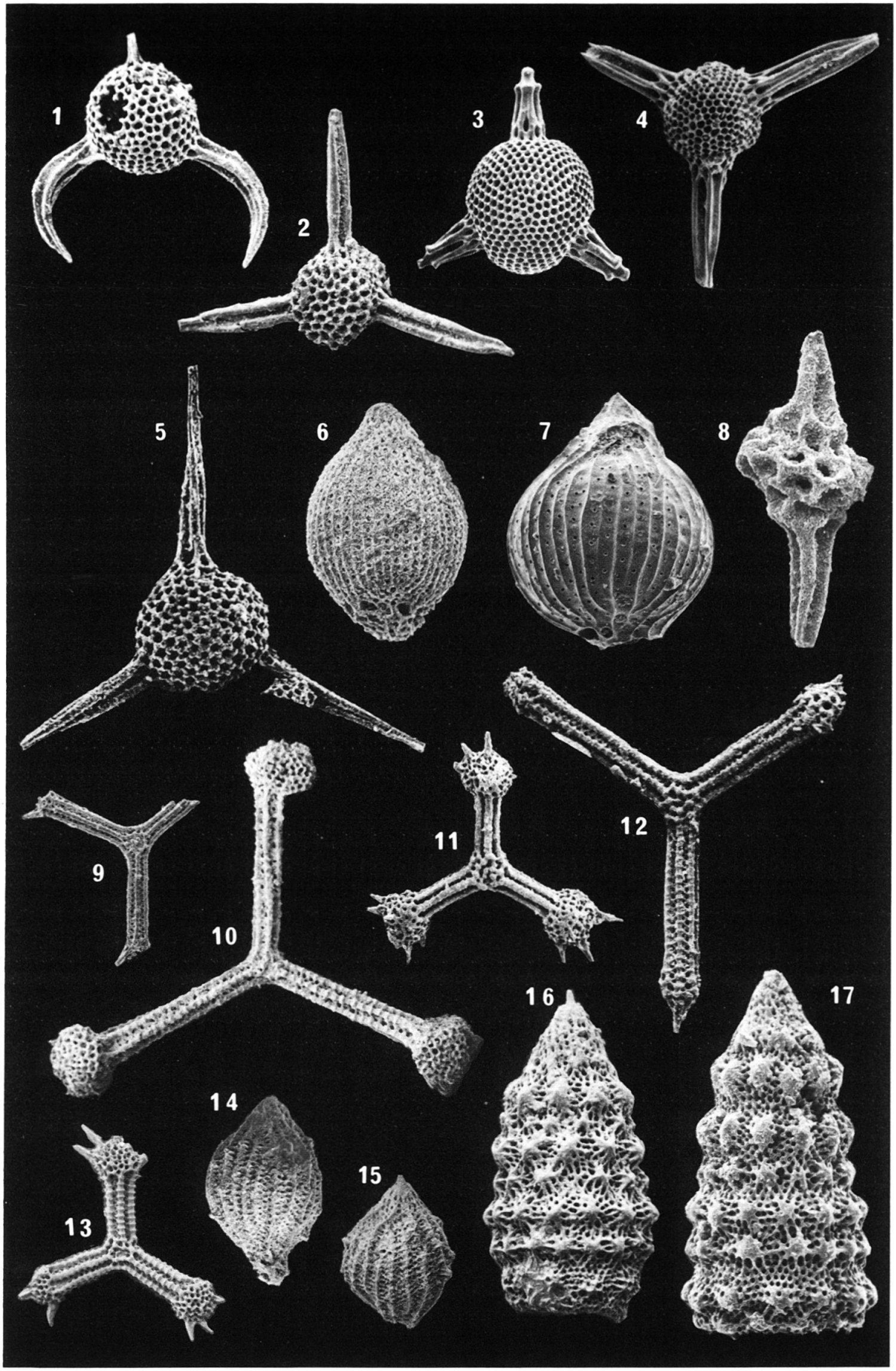
Fig. 11 *Tritrabs exotica* (PESSAGNO)
(data 27, range 37, pob 118, rk 35), POB 899/78/6222, C 35887, si, ×75.

Fig. 12 *Tritrabs hayi* (PESSAGNO)
(data 28, range 20, pob 116, rk 101), POB 899/78/6292, C 35888, si, ×75.

Fig. 13 *Tritrabs rhododactylus* BAUMGARTNER
(data 27, range 26, pob 118, rk 35), POB 986/79/1631, C 35889, si, ×75.

Fig. 14–15 *Unuma echinatus* ICHIKAWA & YAO
(data 2, range 4, pob 231, rk –), 14: POB 1262/80/2144, C 35890, si, ×150; 15: POB 1262/80/2857, C 35891, si, ×150.

Fig. 16–17 *Xitus* sp. cf *X. spicularius* ALIEV
(data 106, range 98, pob 295, rk –), 16: MO 22/79/0177, C 35892, py, ×150; 17: 534A-81-2-64/81/9104, C 35893, py, ×150.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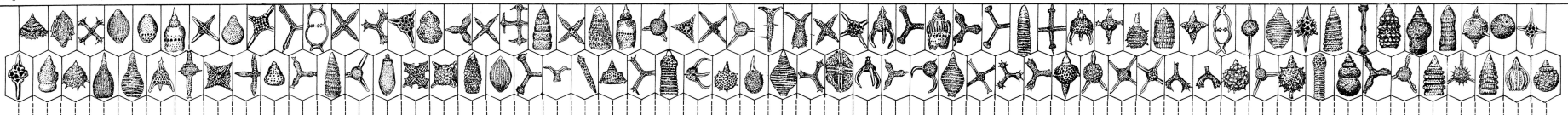


MIDDLE JURASSIC TO EARLY CRETACEOUS RADIOLARIAN RANGE CHART AND ZONAL DEFINITIONS BASED ON UNITARY ASSOCIATIONS

(computed after GUEX & DAVAUD 1982,1984)

ZONES	UNITARY ASSOCIATIONS	
E2	14	
E1	13	
D	12	
	11	
C2	10	
C1	9	
B	8	
	7	
A2	6	
	5	
A1	4	
	3	
	2	
A0	1	
	0	

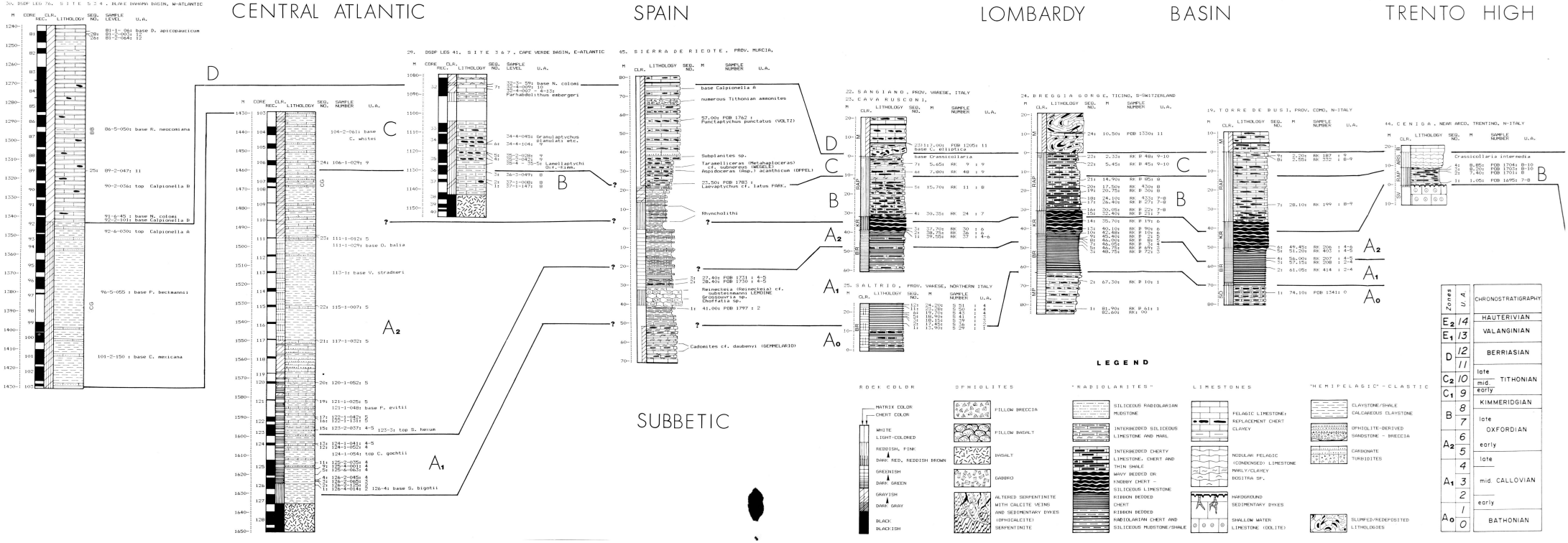
(1)	Trillus sp. cf. T. seidersi
(3)	Andromeda praepodsolensis
(4)	Stichocapsa sp. aff. S. japonica
(2)	Unuma echinatus
(10)	Andromeda praecrassa
(5)	Tetraditryma praeplena
(63)	Eucyrtid gen. et sp. indet.
(9)	Tricolocapsa plicarum
(14)	Mirifusus fragilis
(34)	Diacanthocapsa normalis
(12)	Napora pyramidalis
(17)	Eucyrtidiellum unumaensis
(18)	Podobursa helvetica
(19)	Emiluvia premvogii
(66)	Higumastra sp. aff. H. inflata
(61)	Stichocapsa convexa
(20)	Tetraditryma corralitosensis
(40)	Emiluvia sedecimporata elegans
(22)	Stichocapsa japonica
(28)	Triterabs hayi
(58)	Paronaella bandyi
(24)	Acanthocircus suboblongus
(23)	Hsuum brevicostatum
(36)	Tetrahedrabs zealis
(29)	Triactoma jonesi
(27)	Triterabs rhododactylus
(7)	Guexella nudata
(11)	Gorgansium pulchrum
(13)	Higumastra imbricata
(15)	Theocapsomma cordis
(87)	Praeconocaryomma (?) hexacubica
(38)	Paronaella mulleri
(90)	Parvicingula dhimenensis
(52)	Pseudocrucella adriani
(21)	Protunuma costata
(57)	Tetraditryma pseudoplena
(43)	Homoeoparonaella argolidensis
(50)	Spongocapsula palmerae
(39)	Bernoullius cristatus
(92)	Archaeohagiastrum munitum
(8)	Hagiastrid sp. A
(47)	Hsuum maxwelli group
(16)	Andromeda podbielensis
(91)	Eucyrtidiellum pustulatum
(26)	Tritrabs casmaliaensis
(25)	Triactoma blakei
(32)	Ristola altissima
(31)	Perispyridium ordinarium
(88)	Saitoum pagei
(33)	Emiluvia sedecimporata salensis
(84)	Sethocapsa leicostraca
(30)	Triactoma tithoniana
(6)	Stylocapsa oblongula
(42)	Monotrabs plenoides
(37)	Mirifusus guadalupensis
(35)	Bernoullius dicera
(67)	Angulobracchia purisinaensis
(51)	Pseudocrucella sanfilippoae
(41)	Emiluvia (?) sp. P.
(49)	Staurosphaera antiqua
(73)	Napora bukryi
(46)	Napora deweveri
(65)	Homoeoparonaella elegans
(48)	Paronaella kotura
(89)	Triactoma cornuta
(56)	Eucyrtidiellum ptyctum
(76)	Mirifusus mediodilatatus s.l.
(70)	Homoeoparonaella gigantheа
(74)	Emiluvia hopsoni
(54)	Triterabs ewingi
(44)	Triterabs exotica
(45)	Ristola procera
(53)	Paronaella brennimanni
(62)	Tetratrabs bulbosa
(55)	Dibolachras chandrika
(72)	Napora iospensis
(59)	Acaeniotyle diaphorogona s.l.
(64)	Podobursa spinosa
(71)	Emiluvia pessagnoi
(77)	Mirifusus chenodes
(60)	Emiluvia orea
(75)	Archaeodictyomitra apiara
(78)	Formanella hipposidericus
(69)	Podocapsa amphitreptera
(79)	Formanella diamphidia
(82)	Acanthocircus dicranacanthos
(68)	Sethocapsa cetia
(80)	Acaeniotyle umbilicata
(81)	Triacoma echiodes
(99)	Mirifusus mediodilatatus minor
(96)	Syringocapsa lucifer
(93)	Pantanellium (?) berriasianum
(101)	Ristola cretacea
(102)	Parvicingula cosmoconica
(83)	Obesacapsula rotunda
(103)	Ditrabs sansalvadorensis
(98)	Angulobracchia (?) portmanni
(106)	Xitus sp. cf. X. spicularius
(94)	Acaeniotyle diaphorogona dentata
(95)	Obesacapsula rusconensis
(97)	Pseudodictyomitra depressa
(100)	Archaeodictyomitra excellens
(104)	Alievum helenae
(105)	Syringocapsa agolarium
(107)	Pseudodictyomitra carpatica
(108)	Holocryptocanium barbui
(109)	Thanarla pulchra
(110)	Cecrops septemporatus
(111)	Sethocapsa uterculus

UNITARY ASSOCIATIONS	ZONES
14	E2
13	E1
12	D
11	
10	C2
9	C1
8	B
7	
6	A2
5	
4	A1
3	
2	
1	
0	A0

CORRELATION TO CHRONOSTRATIGRAPHY

(VAN HINTE 1976)

STAGES			M.a.
HAUTERIVIAN			125
VALANGINIAN			130
BERRIASIAN			135
TITHONIAN	late	PORTLANDIAN	140
	mid		
	eo.	VOLGIAN	
KIMMERIDGIAN			145
OXFORDIAN			150
CALLOVIAN			155
BATHONIAN			160

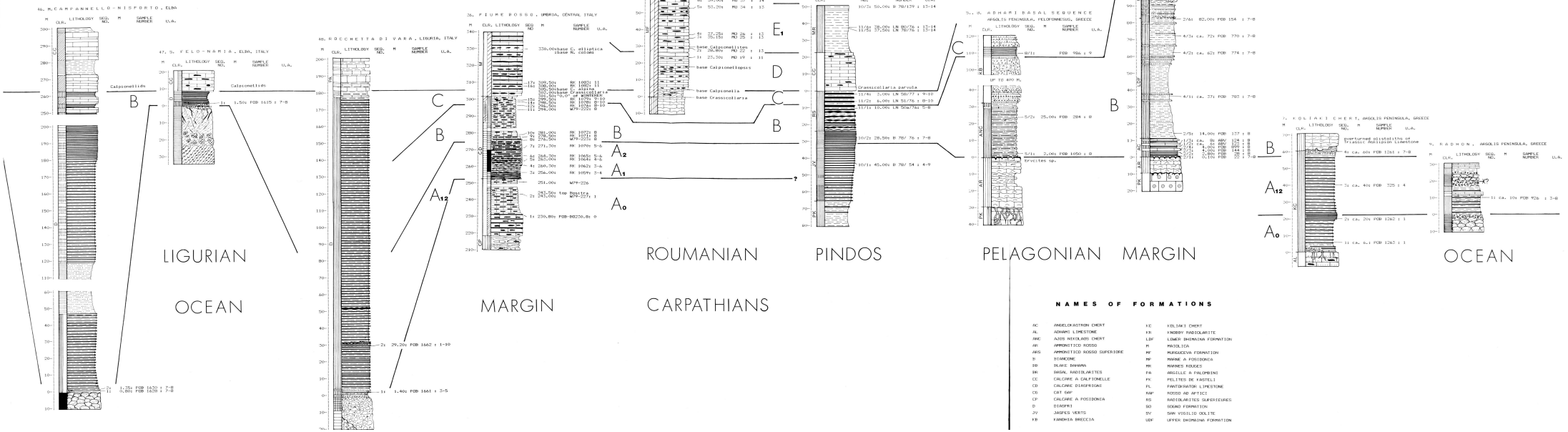

CENTRAL ATLANTIC
SPAIN
LOMBARDY BASIN
TRENTO HIGH
SUBBETIC
30. DSDP LEG 76, SITE 534, BLAKE BAHAMA BASIN, W-ATLANTIC
29. DSDP LEG 41, SITE 367, CAPE VERDE BASIN, E-ATLANTIC
45. SIERRA DE RICOTE, PROV. MURCIA,
22. SANGIANO, PROV. VARESE, ITALY
23. CAVA KUSCONI,
24. BREGGIA GORGE, TICINO, S-SWITZERLAND
25. SALTRIO, PROV. VARESE, NORTHERN ITALY
19. TORRE DE BUSI, PROV. COMO, N-ITALY
44. CENIGA, NEAR ARCO, TRENTINO, N-ITALY
LEGEND
ROCK COLOR
OPHIOLITES
"RADIOLARITES"
LIMESTONES
"HEMIPELAGIC"-CLASTIC
Zones
CHRONOSTRATIGRAPHY
HAUTERIVIAN
VALANGINIAN
BERRIASIAN
TITHONIAN
KIMMERIDGIAN
OXFORDIAN
CALLOVIAN
BATHONIAN

ELBA

LIGURIA

UMBRIA

GREECE



NAMES OF FORMATIONS

AC	ANGELOKASTRON CHERT	KE	KOLIAKI CHERT
AL	ADHAMI LIMESTONE	KR	KNOBBY RADIOLARITE
ANC	AJOS NIKOLAOS CHERT	LDF	LOWER DHIMAINA FORMATION
AR	AMMONITICO ROSSO	M	MAIOLICA
ARS	AMMONITICO ROSSO SUPERIORE	MF	MARGGEVA FORMATION
B	BIANCONE	MP	MARNE A POSIDONIA
BB	BLAKE BAHAMA	MR	MARNES ROUGES
BR	BASAL RADIOLARITES	PA	ARGILLE A PALOMBINI
CC	CALCAIRE A CALPIONELLE	PK	PELITES DE KASTELI
CD	CALCAIRE DIASPRIGNI	PL	PANTOKRATOR LIMESTONE
CS	CAT GAP	RAP	ROSSO AD APTICI
CP	CALCAIRE A POSIDONIA	RS	RADIOLARITES SUPERIEURES
D	DIASPRI	SO	SOGNO FORMATION
JV	JASPES VERTS	SV	SAN VIGILIO OOLITE
KB	KANDHIA BRECCIA	UDF	UPPER DHIMAINA FORMATION