

diano de cuantos contribuyen hoy al conocimiento cada vez más preciso de la geología de las Montañas Cantábricas.

**F. H. Cramer & R. Rodríguez (\*).**—ROBLEDO AND ARROYACAS FORMATION (ARROYO DE LAS ARROYACAS, PROVINCE OF PALENCIA, SPAIN) PALYNOLOGICALLY DATED AS LATE SILURIAN.

AMBROSE 1974 described three more or less new Lower Paleozoic Formations at the Horca de Lores, in the very north of the Province of Palencia. These formations are: 1. The Robledo Formation (said to consist of 160 m of quartzites and sandstones with minor shales; no macrofossils present; AMBROSE nevertheless correlated the Robledo Formation with the Arenigian (*sic*) Barrios Formation in the Province of León); 2. The Arroyacas Formation (350 m of black shales and dark sandy shales. The discovery of a Ludlovian graptolite in the upper part of the formation prompted AMBROSE to correlate the Arroyacas Formation with the slightly diachronous, but essentially Upper Llandoveryian through Late Wenlockian Formigoso Formation of León); and 3. The Late Silurian to Earliest Devonian Carazo Formation.

The type sections of the Robledo and the Arroyacas Formations are in the Arroyo de las Arroyacas, 2 km northwest of the village of Lebanza (42° 58' 45" N; 04° 31' 10" W) and the type section of the Carazo is along the Río Araúz, to the northwest of the village of Vidrieros (42° 58' 46" N; 04° 38' 00" W). The palynology of the Carazo Formation in the Araúz Valley is now known: the entire Araúz sequence is Latest Ludlovian through Gedinnian in age. LOBATO presents a succinct geological map and a summary of the lithology of the Araúz Valley; CRAMER & RODRÍGUEZ date the lower part of the section with palynomorphs (*in*: LOBATO *et al.* 1977).

The abundant and quite well preserved acritarchs, miospores and chitinozoans of the Robledo and Arroyacas Formations in the valley of the Arroyo Arroyacas bracket the age of the entire Arroyacas section (that is: the oldest two of AMBROSE's formations) within the interval of Late Ludlovian to Gedinnian. The

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PLATE I

1. *Synorisporites downtonensis* RICHARDSON & LISTER 1969. 2. Distal side of an as yet undescribed murinate miospore, characteristic of the San Pedro Formation of León. 3. *Retusotriletes* sp. D. *in*: RICHARDSON & IOANNIDES 1973. 4. *Emphanisporites* cf. *robustus* MCGREGOR 1961. 5, 6. *Multiplicisphaeridium denticulatum* (STOCKMANS & WILLIERE 1963) of a much larger size than the specimens described to date. 7. As yet undescribed acritarch. 9. *Leiofusa cantabrica* CRAMER 1964. 9. *Ambitisporites avitus* HOFFMEISTER 1959. 10. *Multiplicisphaeridium denticulatum* (STOCKMANS & WILLIERE 1963). 11. *Multiplicisphaeridium* cf. *gotlandicum* (EISENACK 1954). 12. *Stellinium* sp. 13. *Quadraditum fantasticum* CRAMER 1964. 14. cf. *Multiplicisphaeridium scaber* CRAMER & DIEZ 1976. 15. *Veryhachium trispinosum* (EISENACK 1938): This specimen shows a fortuitous bilateral symmetry and is not conspecific with *Domasia limaciforme*, from which it is distinguished by a different wall structure. 16, 17. *Neoveryhachium carminae* (CRAMER 1964): triangular variants, characteristic of the Silurian-Devonian transition. 18. *Quadraditum fantasticum* CRAMER 1964. 19. *Multiplicisphaeridium ramusculosum* (DEFLANDRE 1948). 20. As yet undescribed form, characteristic of the San Pedro Formation of León. 21, 22. *Neoveryhachium* sp., characteristic of the San Pedro Formation of León.

Magnification of all specimens, approximately 1.000x.

