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1. NEWARK SUPERGROUP, A REVISION OF THE NEWARK GROUP IN EASTERN NORTH AMERICA[1]

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The Newark Supergroup includes the largely continental clastic rocks ("red beds") and interbedded basaltic flow rocks of Late Triassic and Early Jurassic age that crop out in discrete elongate basins parallel to the Appalachian orogen in eastern North America (fig. 1.1). The term "Newark Supergroup" was introduced by Van Houten (1977), referring to an unpublished manuscript by Olsen, to replace "Newark Group" (Redfield, 1856), a term that had been widely used but frequently misapplied in a time-stratigraphic sense (Klein, 1962). The use of the term "Newark Supergroup" preserves a well-established name (North American Stratigraphic Code, art. 7: c), which has increasingly been applied outside the U.S. Geological Survey to the rocks in all of the exposed basins (Geological Society of America, 1983). The Newark Supergroup is a formal assemblage of related groups and formations (North American Stratigraphic Code, art. 29) with close lithologic and structural relationships that are implied through use of the supergroup designation. The term was clearly redefined by Olsen (1978) and was expanded to include subsurface red beds of early Mesozoic age beneath the Atlantic Coastal Plain and Continental Shelf. As these subsurface rocks are poorly understood and apparently of diverse age, lithology, and origin, the term "Newark Supergroup" is here restricted to rocks that crop out, although we recognize that coeval strata are certainly concealed at depth beneath the Coastal Plain.

The Newark Supergroup strata in the exposed basins of eastern North America have variously been considered to be partly or solely of Early Jurassic (Rogers, 1842; Lyell, 1847; Redfield, 1856), Permo-triassic (Emmons, 1857), Jurassic or Late Triassic (Fontaine, 1883), and solely Late Triassic age, at first on the basis of rare vertebrate and plant fossils (Ward, 1891; Eastman, 1913) and subsequently on the basis of vertebrate and plant fossils (Reeside and others, 1957) and radiometric ages of intercalated igneous rocks (Armstrong and Besancon, 1970). Some of the basins, however, have been determined to contain Lower Jurassic as well as Upper Triassic strata, as evidenced by spores, pollen, and well-preserved vertebrate remains in lacustrine mudstones (Cornet and others, 1973; Cornet, 1977; Olsen, 1978; Olsen and others, 1982) interbedded with basalt flows. The Lower Jurassic flows and interbedded strata can be considered informally as the "upper" Newark Supergroup and the Upper Triassic rocks as the "lower" Newark Supergroup.

The basins with only Upper Triassic rocks (with Group names where used) are the Wadesboro-Sanford-Durham (Chatham Group of Emmons, 1857) (1, 2, 3 on fig. 1.1); Davie County (4); Dan River and Danville (Dan River Group of Thayer, 1970) (5); Scottsburg (6);

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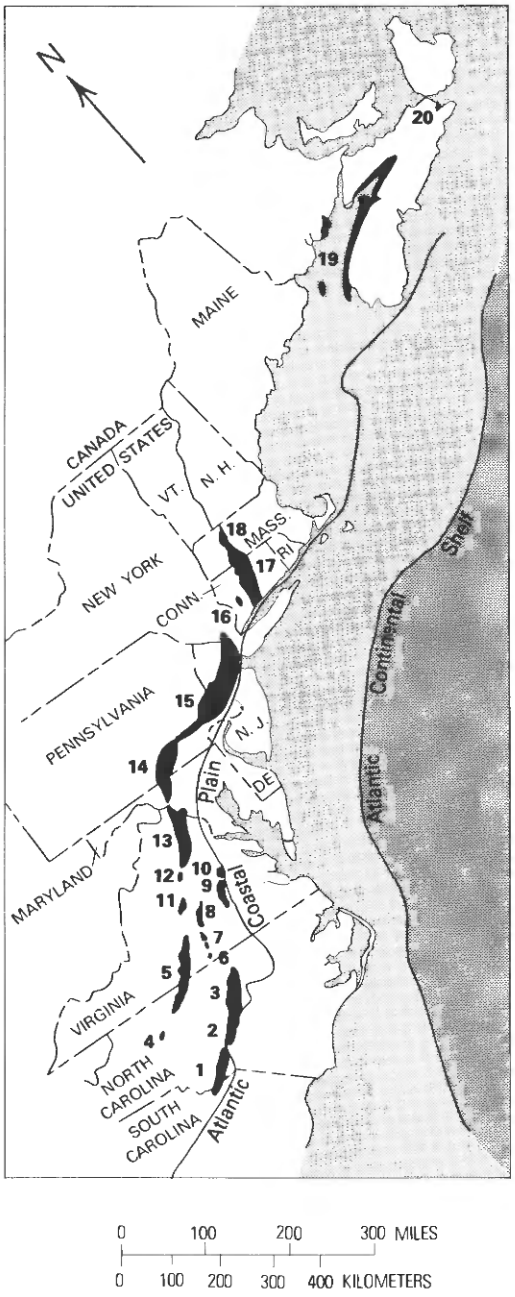
basins north of Scottsburg basin (7); Farmville (8); Richmond (Tuckahoe and Chesterfield Groups of Shaler and Woodworth, 1899) (9); Taylorsville (10); Scottsville (11); and Barboursville (Culpeper Group of Lindholm, 1979) (12). The basins in which Upper Triassic rocks are overlain by Lower Jurassic rocks are the Culpeper (Culpeper Group of Lindholm, 1979) (13); Gettysburg (Conewago Group of Ashley, 1931) (14); Newark (15); Pomperaug (16); Hartford with Cherry Valley outlier (Meriden Group of Krynine, 1950) (17); Deerfield (18); Fundy or Minas (Fundy Group of Klein, 1962) (19); and Chedabucto (20).

Older Mesozoic strata of the lower Newark Supergroup (Upper Triassic, middle and upper Carnian), which are commonly coal-bearing, are preserved in the southern basins (1–10, fig. 1.1). Strata in two small, centrally located basins (11, 12, fig. 1.1) are mainly conglomerates and red beds that apparently lack diag-



EXPLANATION

1. Wadesboro (N.C. – S.C.)
2. Sanford (N.C.)
3. Durham (N.C.)
4. Davie County (N.C.)
5. Dan River and Danville (N.C. – Va.)
6. Scottsburg (Va.)
7. Basins north of Scottsburg (Va.)
8. Farmville (Va.)
9. Richmond (Va.)
10. Taylorsville (Va.)
11. Scottsville (Va.)
12. Barboursville (Va.)
13. Culpeper (Va. – Md.)
14. Gettysburg (Md. – Pa.)
15. Newark (N.J. – Pa. – N.Y.)
16. Pomperaug (Conn.)
17. Hartford (Conn. – Mass.)
18. Deerfield (Mass.)
19. Fundy or Minas (Nova Scotia – Canada)
20. Chedabucto (Nova Scotia – Canada)

FIGURE 1.1.—Exposed basins of the Newark Supergroup in eastern North America.

nostic fossils but resemble Upper Triassic (upper Carnian and middle and upper Norian) rocks in adjacent basins to the north. Strata from the northern basins contain intercalated basalt flows and younger strata of the upper Newark Supergroup (13–18, fig. 1.1), span Late Triassic (Carnian and Norian) through Early Jurassic (Hettangian to Toarcian) time, and in the Hartford basin (17, fig. 1.1) perhaps extend into Middle Jurassic (Bajocian) time. In the extreme northeast, the Fundy (Minas) basin (19, fig. 1.1) is anomalous to this regional pattern because it contains Upper and possibly Middle Triassic (Ladinian) strata at the base and Lower Jurassic strata and basalt flows of the upper Newark Supergroup at the top.

As Olsen (1978) pointed out: "* * * Raising the rank of the term Newark to Supergroup preserves the original and familiar meaning of Redfield's designation, allows the formations of individual basins to be included in specific groups while remaining in a strictly rock-stratigraphic hierarchy, and permits the maximum amount of flexibility for future subdivision. * * *"

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