

Summary of Major Unsolved Problems

The preceding summary of the geology of the Greater Antilles arc demonstrates the existence of numerous, major knowledge gaps in one of the most accessible orogenic belts in the world. The principal unanswered questions are summarized briefly.

MAJOR TECTONIC PROBLEMS

1. Is the Greater Antilles a formerly active island arc?
2. If so, did it consist of more than one arc segment?
3. Can an island arc and an orthogeosyncline be synonymous?
4. Would volcanic pile be a more appropriate term for the Greater Antilles?
5. Are the sites of the present Gulf of Mexico and Caribbean Sea founded on continental blocks, basified continental material, or remnants of once-larger ocean basins?
6. When did the history of the Greater Antilles as a geological entity begin?
7. What are the relative roles of vertical, thrust, and wrench tectonics in the Greater Antilles?
8. What is the history of the major active fault zones and fault troughs of the Greater Antilles?
9. What is the significance of the north-south zone of intermediate-depth earthquakes beneath the eastern Dominican Republic?
10. Why has Hispaniola remained tectonically so active in contrast to the remaining islands of the Greater Antilles?
11. Is the development of the Greater Antilles related to a spreading sea floor, or is sea-floor spreading even a valid concept (A. A. Meyerhoff, 1970)?

PRE-ORTHOGEOSYNCLINAL HISTORY

12. Are Paleozoic rocks present?
13. If so, what is the Paleozoic history of the area?
14. Are the Nicaragua Rise and Beata Ridge ancient features with a Paleozoic history?
15. What is the relation between the Cayman Ridge, Nicaragua Rise,

Beata Ridge, the Bahamas Platform, and the development of the Greater Antilles?

16. What is "basement" beneath each of the islands?
17. What are the ages of and relations between the various metamorphic rock exposures of the Greater Antilles?
18. What is the relation between the metamorphic rocks, the San Cayetano Formation, and the Punta Alegre Formation?
19. What are the relative ages of the San Cayetano and Punta Alegre Formations?
20. How do the post-San Cayetano units of Pinar del Río Province relate to the history of the rest of Cuba and the Greater Antilles?

ORTHOGEOSYNCLINAL HISTORY

21. When did the orthogeosyncline form?
22. Radiolaria are abundant in some of the undated volcanic rocks, yet no one has studied them for possible dating. Why? Several papers have been published in which Radiolaria have been shown to be useful for dating and correlation purposes, but none has been applied to the Greater Antilles.
23. How do the Sierra de los Órganos and the Sierra del Rosario fit into the orthogeosynclinal history?
24. How did the Zaza-like facies get into its position north of the Sierra del Rosario?
25. What is the significance of the middle Eocene Cascarajicara Formation?
26. Is there a Neocomian hiatus in the Greater Antilles?
27. What are the structural relations between the eugeosynclinal rocks and the San Cayetano-Viñales-Artemisa sequences, particularly in southern Cuba?
28. What are the ages of the serpentinites?
29. Could the serpentinites be ocean crust or upper mantle material?
30. If so, what are the relations, in time and space, between the metamorphic rocks of Cuba (Sierra de Trinidad) and the alpinotype ultramafic bodies north of the Sierra de Trinidad?
31. What is the relation between the metamorphic rocks and the serpentinite of the Bermeja complex?
32. Why is most serpentinite in the Greater Antilles found in Cuba?
33. Why are some serpentinites in Cuba alpinotype, whereas huge areas are underlain by stratiform, layered peridotite and serpentinite?
34. What is the eastern extent of the miogeosynclinal carbonate rocks?
35. Do the Greater Antilles have any geologic relationship with Yucatán (Baie, 1970)?
36. Is the Blue Mountains zone part of the eugeosyncline?
37. Why were central and western Cuba, Jamaica, and Puerto Rico-Virgin Islands tectonically isolated from Hispaniola after middle Eocene time?
38. Why is a major unconformity reported in the middle Eocene of the Dominican Republic but at the top of the late Eocene strata of Haiti?

39. Why have no Paleocene fossils been found in Jamaica?
40. Why has mapping in Puerto Rico led to such contradictory age assignments for supposedly correlative units?
41. What is the significance of the divergent structural geological interpretations of Cuba?

POST-ORTHOGEOSYNCLINAL HISTORY

42. Is there Oligocene in the Greater Antilles?
43. What are the facies relations between time-equivalent middle Eocene and younger units in the Greater Antilles?
44. Why was folding so intense through the Pliocene and Pleistocene of Hispaniola, but nowhere else in the Greater Antilles?
45. Why did the Bartlett Trough form in middle Cretaceous time or earlier, but the Puerto Rico Trench did not form until middle Eocene time or later?
46. Why is the Puerto Rico Trench considered to be an island-arc-type trench by so many geologists and geophysicists when the seismic and geologic characteristics of the trench are totally unlike those associated with true island arcs?