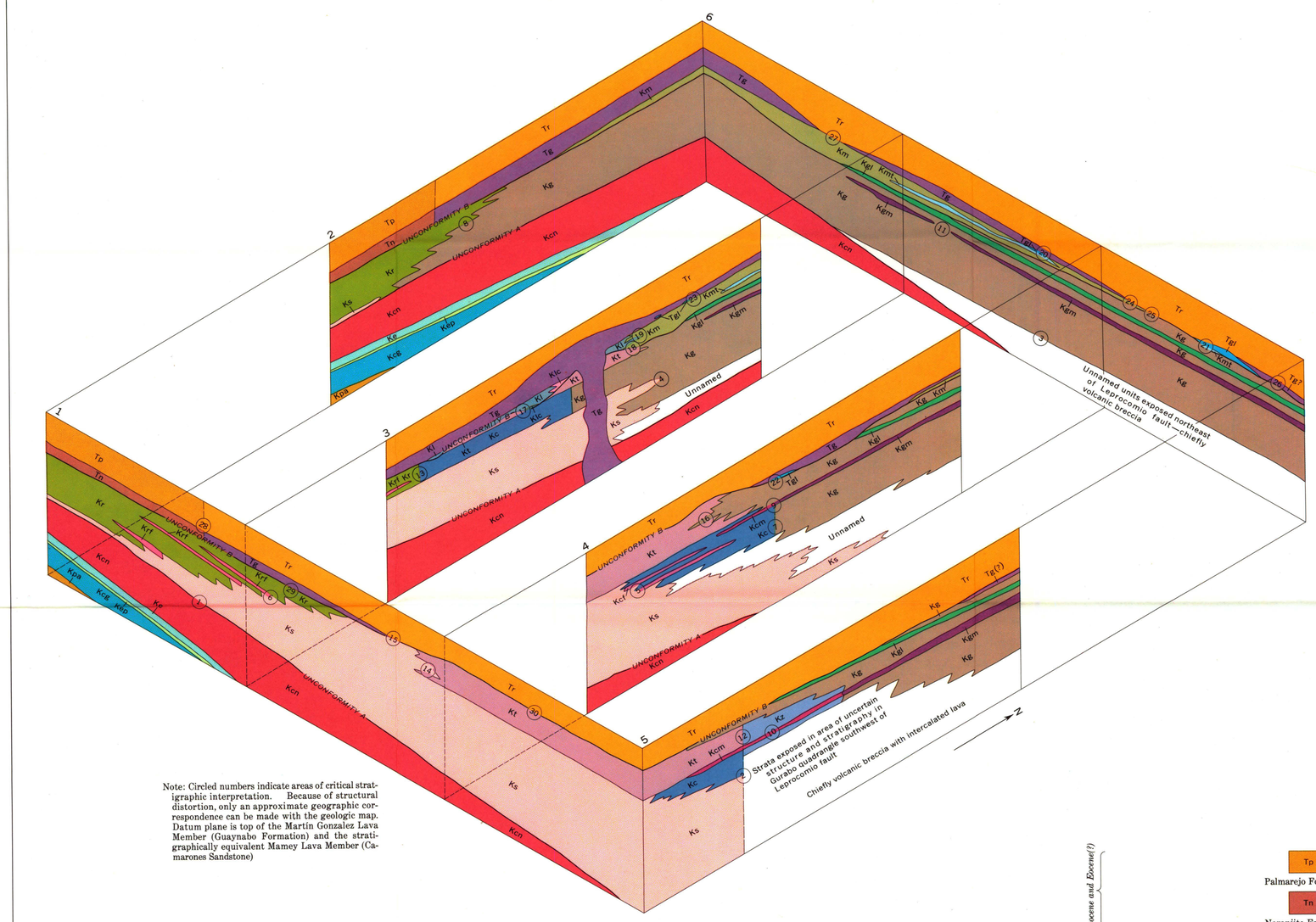
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF PUERTO RICO
ECONOMIC DEVELOPMENT ADMINISTRATION
INDUSTRIAL RESEARCH DEPARTMENT

BULLETIN 1253
PLATE 1

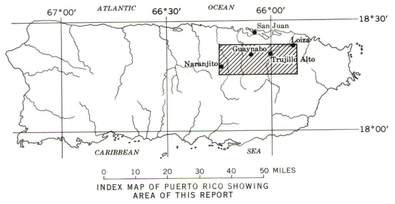


Note: Circled numbers indicate areas of critical stratigraphic interpretation. Because of structural distortion, only an approximate geographic correspondence can be made with the geologic map. Datum plane is top of the Martin Gonzalez Lava Member (Guaynabo Formation) and the stratigraphically equivalent Mamey Lava Member (Camarones Sandstone)

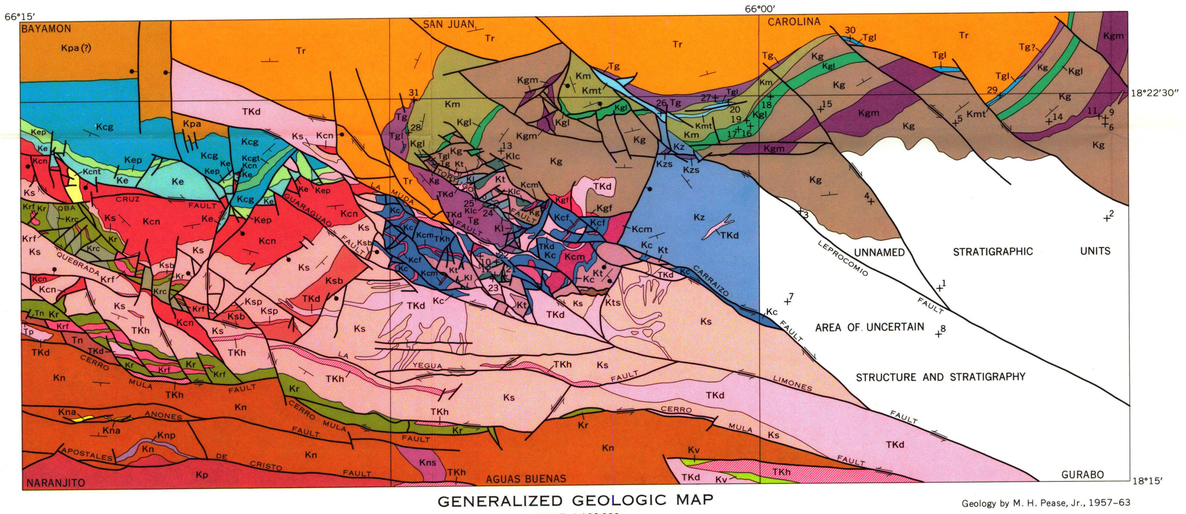
SCHEMATIC DIAGRAM SHOWING STRATIGRAPHIC INTERPRETATION OF CRETACEOUS AND LOWER TERTIARY FORMATIONS NORTH OF THE CERRO MULA FAULT

AREAS OF CRITICAL STRATIGRAPHIC INTERPRETATION
Interpretations were made without reference to paleontology, but facies relations are in general accord with biostratigraphic evidence

1. Ks rests unconformably on Kcn: submarine lava (Ks) rests on nonmarine sequence (Kcn); northwestward, Ks appears to rest on progressively older Kcn strata
2. Arbitrary cutoff separates Ks and Kc from area of uncertain structure and stratigraphy: strata believed to be in part stratigraphically equivalent because volcanic breccia containing abundant greenish-gray scoriaceous lava and pumice fragments is a conspicuous lithic facies common to both eastern exposures of Ks and to the strata in the Gurabo quadrangle, and because Ks-type pillow lava is intercalated with the volcanic breccia in the Gurabo quadrangle
3. Kg overlies unnamed strata in Gurabo quadrangle north of Leprocomio fault: contact appears transitional; Kg, thin-bedded facies, interlayered with and probably interfingers with unnamed facies composed chiefly of massive volcanic breccia
4. Ks interfingers with Kg: Ks-type pillow lava exposed at base of Kg type section in north-central Aguas Buenas quadrangle
5. Kc stratigraphically equivalent to part of Ks; intertonguing relation observed in area of Aguas Buenas-Naranjito quadrangle border; Ks-type lava interlayered with Kc strata
6. Kr stratigraphically equivalent to part of Ks: Kr rests on progressively younger Ks; Ks-type lava interlayered with Kr strata
7. Arbitrary cutoff separates Kc from part of Kg: lithic character of basal beds of Kg in Aguas Buenas quadrangle very similar to Kc strata in this area, except that Kc is more indurated owing to greater alteration
8. Kr interfingers with Kg: units far removed from each other on present surface, but geometry of illustration indicates stratigraphic equivalence. Lithic character of formations similar but Kr more altered; possibly separated entirely by Ks volcanic pile, but marked westward thinning of Ks suggests Kr-Kg facies once were contiguous
9. Arbitrary cutoff separates Kcm and Kgm: mineralogy, texture, and mode of emplacement remarkably similar; believed to be correlative but separated by faults and are on opposite flanks of major anticline
10. Lava equivalent to Kcm-Kgm underlies Kz: not exposed; apparently cut out by north-northeast-trending fault that marks the western boundary of Kz exposures
11. Kgm discontinuous in north-central Aguas Buenas quadrangle: lava not present in several fault blocks at stratigraphic position of Kgm, which suggests steep lobate margin of flow
12. Arbitrary cutoff between Kt and Kz: Kz separated by faults from other formations exposed in Aguas Buenas quadrangle; relation to adjacent unnamed strata in Gurabo quadrangle uncertain, but lithic character of Kz very similar to Kt in easternmost exposures
13. Arbitrary cutoff separates Kr and Kc: lithic character of formations similar. Possibly separated by Ks volcanic pile, but westward thinning of Ks suggests contiguity before separation by faults
14. Kt stratigraphically equivalent to upper part of Ks: Kt appears to be local subaerial eruption concurrent with late Ks submarine eruption. Detritus of both Kt and Ks found in stratigraphically equivalent volcaniclastic facies. Contact probably is locally unconformable
15. Ks truncated by unconformity B: clasts from Ks occur within Kl and Km
16. Kt interfingers with upper part of Kg: observed in northeast corner of Aguas Buenas quadrangle; Kt debris occurs within upper beds of Kg
17. Unconnected deposits of Kl and Klc rest unconformably on Kt and Kc: Kt clasts predominate in Klc; observed in northeast part of Aguas Buenas quadrangle
18. Km rests unconformably on Kt: contact not exposed, but strata in area of possible contact apparently removed by post-Tr erosion
19. Kl intertongues with Km: Km not mapped south of Tortugo fault; Kl is probable stratigraphic equivalent south of fault; Kt is principal source of clasts in Klc and Km conglomerate; Klc is a coarser Km-type conglomerate
20. Tgl rests with apparent conformity on Kmt: distinctive light-gray miliolid limestone, Tgl, apparently rests on dark-gray limestone, Kmt, in quarry in northeastern Aguas Buenas quadrangle
21. Same as 20: exposures in low hill in north-central Gurabo quadrangle; identification of Kmt based strictly on lithology
22. Tgl rests unconformably on Kg: observed in small faulted syncline just north of Tortugo fault near its northwestern end; indicates Tgl overlaps Km southward and rests on pre-Km unconformity
23. Tg and lenses of Tgl rest conformably on Km: observed at several localities in northwestern Aguas Buenas quadrangle
24. Tg pinches out northeastward; exposures in borrow pit in southeast Carolina quadrangle show Tr resting on Km with no intervening Tg
25. Km pinches out east of Tg pinchout, and Tr rests on Kg: postulated stratigraphic interpretation; Km very thin at locality 24 and not observed further east where contacts are buried by overburden
26. Possible reappearance of Tg(?) in northeastern corner of mapped area: strata lithologically similar to Tg are interbedded with Tgl on north side of low hill at fossil locality 20
27. Tr rests on Km: observed in southwest corner of San Juan quadrangle; Tg evidently not deposited
28. Arbitrary cutoff separates Tp and Tn from Tr and Tg: strong lithic similarities but given different formational names because exposures widely separated by faults and a major anticline
29. Tg rests unconformably on Kr: relationship not exposed in area because of post-Tr erosion. The fact that Tg, or its equivalent Tn, occurs on opposite flanks of anticline suggests that these strata overlapped entire mapped area above unconformity B
30. Tr rests unconformably on Kt: suggested by geometry of section; Tg may have intervened but is known to thin eastward in the Carolina quadrangle



INDEX MAP OF PUERTO RICO SHOWING AREA OF THIS REPORT



GENERALIZED GEOLOGIC MAP
SCALE 1:120 000
5 0 5 MILES
5 0 5 KILOMETERS

Geology by M. H. Pease, Jr., 1957–63

EXPLANATION

STRATIFIED ROCKS

TERTIARY

Paleocene and Eocene(?)
- Tp — Palmarejo Formation
- Tn — Naranjito Formation

Upper Cretaceous
- Tr — Río Piedras Siltstone
- Tg Tgl — Guaracanal Andesite
- Kl Klc — La Muda Formation: Klc, *conglomerate member*
- Kmt Km — Monacillo Formation: Kmt, *Trujillo Alto Limestone Member*

UNCONFORMITY

- Kr Krf Krc — Río de la Plata Sandstone: Krf, *lava members*; Krc, *conglomerate member*
- Ksb Ksp Ks — Santa Olaya Lava: Ksb, *breccia member*; Ksp, *pyrozene lava member*
- Kt Kts — Tortugas Andesite: Kts, *sandstone member*
- Kc Kcm Kcf — Camarones Sandstone: Kcm, *Mamey Lava Member*; Kcf, *lava members*
- Kz Kzs — Carraízo Breccia: Kzs, *siltstone member*
- Kgl Kgm Kg Kgf — Guaynabo Formation: Kgl, *Leprocomio Siltstone Member*; Kgm, *Martin González Lava Member*; Kgf, *lava member*

SOUTHERN PART OF AREA

Lower to Upper Cretaceous

Río Orocovis Group
- Kns Kna Knp Kn — Los Negros Formation: Kna, *andesite member*; Knp, *pyrozene lava member*; Kns, *siltstone member*
- Kp — Perchas Formation

UNCONFORMITY

- Kcnt Kcn — Cancel Breccia: Kcnt, *tuff member*
- Ke Kep — El Ocho Formation: Kep, *Piña Siltstone Member*
- Kcg Kcgt — Cerro Gordo Lava: Kcgt, *tuff member*
- Kpa — Pájaros Tuff
- Kv — Volcanic rocks, undivided

INTRUSIVE ROCKS
- TKd — Quartz diorite

METAMORPHIC ROCKS
- TKh — Hydrothermally altered rocks

Contact

Fault
Arrows show relative horizontal movement. Bar and ball on downthrown side

Strike and direction of dip of beds

+10 Fossil locality
Number corresponds with those given in table 1

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GENERALIZED GEOLOGIC MAP AND SCHEMATIC DIAGRAM OF THE CRETACEOUS AND LOWER TERTIARY FORMATIONS IN THE NARANJITO AND AGUAS BUENAS QUADRANGLES AND ADJACENT AREAS, PUERTO RICO