No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			GRAYWACKE GRIT MEMBER OF BOHIO FORMATION QUEBRANCHA SYNCLINE, PANAMÁ
39	----------	127	South bank of eastward-flowing tributary of Río Quebrancha, 375 meters west-northwest of Transisthmian Highway bridge across Río Quebrancha. Sandy siltstone in basal part of graywacke grit member of Bohio formation. T. F. Thompson and W. P. Woodring, 1949. Smaller Foraminifera.
			MARINE MEMBER OF BOHIO(?) FORMATION GATUN LAKE AREA, CANAL ZONE
40	----------	------	Vamos Vamos station, Panama Canal, in a cut about 2 meters above level of canal. Collected by F. Sensa, received from Alexander Agassiz, 1891. [A submerged locality off Palenquilla Point west of Barro Colorado Island, originally on south bank of French Canal.] Location approximate.
40a	2683	18	Vamos Vamos, lot 1. R. T. Hill, 1895. [The six collections from Vamos Vamos are presumably from the same locality.] Not plotted.
40b	2685	19	Panama Canal at Vamos Vamos and 10.5 kilometers from Colón. R. T. Hill, 1895. [The designation "and 10.5 kilometers from Colon" should be deleted. Vamos Vamos was about 20 kilometers from Colón.] Not plotted.
40c	2687	26	Vamos Vamos, lot 2. R. T. Hill, 1895. Not plotted.
40d	6028a	------	Vamos Vamos, lower bed. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 542, pl. 154). Not plotted.
40e	6028b	------	Vamos Vamos, upper sandstone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 542). Poorly preserved molds in weathered sandstone. Not plotted.
41	17716	148	East side of promontory 375 meters southeast of Palenquilla Point, west of Barro Colorado Island. Loose calcareous concretions at water's edge. T. F. Thompson and W. P. Woodring, 1949.
41a	18838	208	East side of Palenquilla Point, wide cove east of triangulation station. Approximately same as locality 41a, but from soft weathered medium-grained sandstone. W. P. Woodring, 1954. Not plotted.
			MARINE MEMBER OF BOHIO(?) FORMATION GATUN LAKE AREA, CANAL ZONE—continued
41b	18839	209	East side of Palenquilla Point, head of cove north of triangulation station and southwest of Corozo Island. Calcareous concretion in soft sandstone. W. P. Woodring, 1954. Not plotted.
42	17692	149	Northeast coast of Trinidad Island. Sandy siltstone, basal 3 meters of exposed section. T. F. Thompson and W. P. Woodring, 1949. Also larger Foraminifera (Cole, 1952 [1953]).
42a	17693	149a	Same locality and same part of section, but from thin calcareous layer. T. F. Thompson and W. P. Woodring, 1949. Not plotted.
42b	----------	149b	Same locality, about 3 meters higher stratigraphically. One-meter ledge-forming silty medium-grained calcareous sandstone containing few small pebbles, few worn small heads of calcareous algae, and worn shell tips of *Turritella*. T. F. Thompson and W. P. Woodring, 1949. Larger Foraminifera (Cole, 1952 [1953]). Not plotted.
42c	17965	149c	Same locality, sandy siltstone about 4.5 meters stratigraphically above locality 42b. T. F. Thompson and W. P. Woodring, 1949. Not plotted.
			BOHIO FORMATION, GATUN LAKE AREA, CANAL ZONE
42d	18837	207	Barro Colorado Island, northern part of island, stream heading west of Miller Trail near Miller 17,[4] about 100 meters above mouth. Somewhat calcareous medium-grained subgraywacke. W. P. Woodring, 1954.
42e	18835	205	Barro Colorado Island, northern part of island, stream southeast of Fuertes House, about 275 meters above mouth. Conglomerate. W. P. Woodring, 1954. Not plotted.
42f	18836	206	Barro Colorado Island, same stream as that for locality 42e, but about 60 meters upstream and from slide on west side of stream. Poorly sorted subgraywacke. W. P. Woodring, 1954. Not plotted.

[4] The trails on Barro Colorado Island have consecutively numbered signs at intervals of 1 hectometer, starting from the laboratory at the launch landing or at the end of the trail heading toward the laboratory.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			BOHIO FORMATION, GATUN LAKE AREA, CANAL ZONE—continued
42g	18832	203	Barro Colorado Island, northern part of island, stream crossing Pearson Trail at Pearson 6, about 365 meters above mouth. Poorly sorted subgraywacke. W. P. Woodring, 1954.
42h	-------	215	Barro Colorado Island, eastern part of island, stream east of Shannon Trail, about 365 meters southeast of Shannon 1. Somewhat calcareous coarse-grained gritty subgraywacke. W. P. Woodring, 1954. Larger Foraminifera.
42i	18845	215a	Barro Colorado Island, same stream as that for locality 54b, but 30 meters downstream. Soft muddy subgraywacke. W. P. Woodring, 1954. Not plotted.
			BOHIO FORMATION, PACIFIC COASTAL, AREA, PANAMÁ
43	-------	39	Transisthmian Highway, 9 kilometers north-northwest of junction with Panamá National Highway, about 100 meters north of Continental divide. Lens of algal limestone. J. A. Tavelli and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]).
44	17435	109	375 meters north-northwest of locality 43. Lens of algal limestone. W. P. Woodring, 1949.
45	18375	38	Transisthmian Highway, 1 kilometer north-northwest of junction with Panamá National Highway. Lens of algal limestone. J. A. Tavelli and W. P. Woodring, 1947. Also larger Foraminifera (Cole, 1952 [1953]).
			MIDDLE MEMBER OF CAIMITO FORMATION, GATUN LAKE AREA, CANAL ZONE
46	-------	41	Peninsula 2 kilometers east-southeast of Darien. Limestone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera.
47	-------	42	East side of peninsula 1.3 kilometers east-southeast of Darien. Limestone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera.
48	-------	43	About 45 meters eastward up path from west landing at Darien. Algal limestone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]).
			MIDDLE MEMBER OF CAIMITO FORMATION, GATUN LAKE AREA, CANAL ZONE—continued
49	6021	------	Limestone on relocated line of Panama Railroad opposite San Pablo. First limestone outcrop north of Caimito station, about 4 miles (6.5 kilometers) north [west] of Gamboa bridge. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 539, pl. 154). [Type locality of *Lepidocyclina vaughani*. First cut northwest of Darien, now covered with soil and vegetation. A later collection from same locality was given the permanent number 6673.]
50	-------	44	Trail 1.2 kilometers north of Darien. Calcareous tuffaceous sandstone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera.
51	-------	45	Field in peninsula 3 kilometers south-southeast of Frijoles. Pebbly calcareous tuffaceous sandstone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera (Cole 1952 [1953]).
52	6024b	------	Limestone above foraminiferal marl at Río Agua Salud bridge, about 0.3 mile (475 meters) north of Frijoles, relocated Panama Railroad. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 540, pl. 154). Also corals (Vaughan, 1919a, p. 209). [A submerged locality, originally downstream from Río Agua Salud culvert.] Location approximate.
52a	5908	------	Limestone 1 mile or less (0.5 kilometers) north of Frijoles on relocated Panama Railroad. D. F. MacDonald, 1911. Presumably same as locality 52. Not plotted.
53	-------	53	Low islet 400 meters northeast of landing at Barro Colorado Island. Soft sandy calcareous siltstone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]).
54	-------	46	Barro Colorado Island, northeastern part of island, stream immediately east of laboratory clearing, 150 meters upstream from mouth at launch landing. Calcareous tuffaceous sandstone. W. P. Woodring, 1947. Larger Foraminifera.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			MIDDLE MEMBER OF CAIMITO FORMATION, GATUN LAKE AREA, CANAL ZONE—continued
54a		214	Barro Colorado Island, northeastern part of island, second stream east of laboratory clearing, 150 meters above mouth. Soft sandstone. W. P. Woodring, 1954. Larger Foraminifera. Not plotted.
54d		202	Barro Colorado Island, northwestern part of island, stream heading north of Zetek Trail at Zetek 9, about 550 meters in direct line north-northwest of Zetek 9. Calcareous tuffaceous sandstone. W. P. Woodring, 1954. Larger Foraminifera. Not plotted.
54e		202a	Barro Colorado Island, same stream as that for locality 54d, but about 200 meters downstream. Soft limestone. W. P. Woodring, 1954. Larger Foraminifera. Not plotted.
54f		201	Barro Colorado Island, northwestern part of island, stream crossing Standley Trail at 60 meters northwest of Standley 11, about 30 meters downstream from trail. Soft limestone. W. P. Woodring, 1954. Larger Foraminifera.
54g	18840	210	Barro Colorado Island, western part of island, first stream north of Zetek House, about 300 meters above mouth. Soft medium-grained sandstone. W. P. Woodring, 1954.
54h	18841	210a	Barro Colorado Island, same stream as that for locality 54g, but at mouth. Soft sandstone containing calcareous lumps. W. P. Woodring, 1954. Not plotted.
54i		211	Barro Colorado Island, western part of island, mouth of small stream 450 meters in direct line south-southeast of Zetek House. Soft sandstone. W. P. Woodring, 1954. Larger Foraminifera.
54j	18833	204	Barro Colorado Island, southwestern part of island, stream crossing Conrad Trail at Conrad 2, about 365 meters upstream from mouth. Soft sandstone. W. P. Woodring, 1954.
54k	18834	204a	Barro Colorado Island, same stream as that for locality 54j, but about 60 meters upstream above mouth. Soft sandstone. W. P. Woodring, 1954. Not plotted.
54l	18842	212	Barro Colorado Island, southwestern part of island, second stream northwest of end of Armour Trail, 60 meters above mouth. Gritty sandstone containing larger Foraminifera and mollusks, and somewhat calcareous sandstone containing mollusks. W. P. Woodring, 1954.
54m	18843	213	Barro Colorado Island, southwestern part of island, small stream 400 meters northeast of end of Armour Trail, 15 meters above mouth. Medium-grained sandstone containing somewhat calcareous lumps. W. P. Woodring, 1954.
54n	18844	213a	Barro Colorado Island, same stream as that for locality 54m, but 100 meters above mouth. Fine-grained silty sandstone containing small Foraminifera and mollusks. W. P. Woodring, 1954. Not plotted.
55			Peña Blanca. Type locality of *Lepidocyclina canellei*. A submerged locality, originally on west bank of Río Chagres. Location approximate.
55a	18846	216	Pato Horqueto Island, south coast about 200 meters west of southeast end of island. Tuffaceous siltstone containing small Foraminifera and mollusks. W. P. Woodring, 1954.
55b	18847	216a	Pato Horqueto Island, south coast about 75 meters west of southeast end of island. Conglomerate. W. P. Woodring, 1954. Not plotted.
56	6025		Foraminiferal marl and coarse sandstone about 200 yards (200 meters) south of southern end of switch at Bohio Ridge station, relocated Panama Railroad. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 540, pl. 154). [Type locality of *Lepidocyclina pancanalis*, *Operculinoides panamensis*, and *Miogypsina panamensis*.]
56a		55	Panama Railroad, east side of second cut southeast of Bohio Peninsula. Soft calcareous tuffaceous sandstone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]). Same as locality 56. Not plotted.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			MIDDLE MEMBER OF CAIMITO FORMATION, GATUN LAKE AREA, CANAL ZONE—continued
57	6026	------	Foraminiferal coarse sandy marl about halfway between Monte Lirio and Bohio Ridge, relocated Panama Railroad. D. F. MacDonald and T. W. Vaughan, 1911. (MacDonald, 1919, p. 541, pl. 154). Also corals (Vaughan, 1919a, p. 208).
57a	5901	------	Relocated Panama Railroad about 2 miles (3 kilometers) south of Mitchelville [Monte Lirio]. D. F. MacDonald, 1911. Same as locality 57 Not plotted.
			UPPER MEMBER OF CAIMITO FORMATION, GATUN LAKE AREA, CANAL ZONE
58	--------	54	Puma Island, in front of shed near crest of island. Hard calcareous sandstone. S. M. Jones and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]).
			UNDIFFERENTIATED CAIMITO FORMATION, RÍO MANDINGA AREA, CANAL ZONE
59	--------	110	Northward-flowing tributary of Río Mandinga, 3.3 kilometers southwest of west end of Gamboa bridge. Medium-grained poorly sorted silty tuffaceous sandstone. R. H. Stewart, 1948. Also collection by W. P. Woodring, 1949. Larger Foraminifera (Cole, 1952 [1953]).
60	17685	111	300 meters upstream from locality 59. Pebbly calcareous tuffaceous sandstone. W. P. Woodring, 1949.
61	--------	112	About 45 meters west of pipe-line road and 3.5 kilometers west-southwest of west end of Gamboa bridge. Limestone. W. P. Woodring, 1949. Corals.
			QUEBRANCHA LIMESTONE MEMBER OF CAIMITO FORMATION, QUEBRANCHA SYNCLINE, PANAMÁ
62	16939	11	North side of Transisthmian Highway at entrance to plant of Cía. Cemento Panamá, S. A., 125 meters northwest of Transisthmian Highway bridge across Río Gatuncillo. Lower part of limestone. T. F. Thompson and W. P. Woodring, 1947.
			QUEBRANCHA LIMESTONE MEMBER OF CAIMITO FORMATION, QUEBRANCHA SYNCLINE, PANAMÁ—continued
62a	--------	11a	Quarry of Cía. Cemento Panamá, S. A., 150 meters northwest of locality 11. Middle part of limestone. J. R. Schultz and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]). Not plotted.
			LOWER PART OF CAIMITO FORMATION, MADDEN BASIN, PANAMÁ
63	--------	29	Transisthmian Highway, 4 kilometers north-northwest of Río Chagres bridge. Sandy limestone in calcareous sandstone-siltstone member. W. P. Woodring, 1947. Larger Foraminifera.
64	--------	30	Transisthmian Highway, 3.3 kilometers north-northwest of Río Chagres bridge. Medium-grained calcareous tuffaceous sandstone in calcareous sandstone-siltstone member. W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]).
65	5907	------	Río Chagres at locality where trail from Alhajuela reaches river, about 6 miles (10 kilometers) by river above Alhajuela. D. F. MacDonald, 1911. [A submerged locality.]
66	8386	------	Río Chagres about a mile (1.5 kilometers) below mouth of Río Pequení, limestone at Marcelito, just below Bajilla Rain Gage Station. A. A. Olsson, 1919. [A submerged locality.] Location approximate.
67	--------	121	Río Chilibrillo, 650 meters above bridge on road to Casa Larga. Coarse-grained poorly sorted calcareous somewhat tuffaceous sandstone in calcareous sandstone-siltstone member, about 15 meters above base of Caimito formation. W. P. Woodring, 1949. Larger Foraminifera (Cole, 1952 [1953]).
68	--------	120	Río Chilibrillo, 325 meters above bridge on road to Casa Larga. Very fine-grained silty sandstone in calcareous sandstone-siltstone member. W. P. Woodring, 1949. Smaller Foraminifera.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			LOWER PART OF CAIMITO FORMATION, MADDEN BASIN PANAMÁ—continued
69	-------	123	Río Chilibrillo, 1 kilometer below bridge on road to Casa Larga. Medium-grained somewhat calcareous and somewhat tuffaceous sandstone in calcareous sandstone-siltstone member, about 300 meters above base of Caimito formation. W. P. Woodring, 1949. Larger Foraminifera (Cole, 1952 [1953]).
70	-------	130	Río Chilibrillo, 1.5 kilometers below bridge on road to Casa Larga. Sandy siltstone in calcareous sandstone-siltstone member. W. P. Woodring, 1949. Smaller Foraminifera.
71	16945	6	Transisthmian Highway, 1 kilometer northwest of Madden Highway overpass. Limestone in pyroclastic-clay member. J. R. Schultz and W. P. Woodring, 1947.
72	16957	40	Madden Highway, 1.7 kilometers northwest of Transisthmian Highway underpass. Limestone in pyroclastic-clay member. J. A. Tavelli and W. P. Woodring, 1947.
73	16944	7	Transisthmian Highway, 2 kilometers northwest of Madden Highway overpass. Limestone in pyroclastic-clay member. J. R. Schultz and W. P. Woodring, 1947.
74	17439	142	Transisthmian Highway, 1.5 kilometers south of Río Chilibrillo bridge. Conglomerate near top of pyroclastic-clay member. W. P. Woodring, 1949.
74a	17493	142a	Same locality. Coarse-grained sandstone overlying conglomerate. W. P. Woodring, 1949. Not plotted.
75	17437	133	Transisthmian Highway, 0.5 kilometer north of Río Chagres bridge. Clay at top of pyroclastic-clay member. T. F. Thompson and W. P. Woodring, 1949. Also smaller Foraminifera.
			UPPER PART OF CAIMITO FORMATION, MADDEN BASIN, PANAMÁ
76	5906a	------	Río Chagres about 1.5 miles (2.5 kilometers) above Alhajuela, about 50 to 75 feet (15 to 23 meters) stratigraphically below 17c (5905), in lighter colored limestone. D. F. MacDonald, 1911. [A submerged locality.] Location approximate.
			UPPER PART OF CAIMITO FORMATION, MADDEN BASIN, PANAMÁ—continued
76a	5906b	------	Same locality, 10 to 25 feet (3 to 7 meters) lower stratigraphically, in hard limestone. D. F. MacDonald, 1911. [A submerged locality.] Not plotted.
77	5905	------	Río Chagres about 1.25 miles (2 kilometers) above Alhajuela, about 50 to 75 feet (15 to 23 meters) stratigraphically below 17b (5904). D. F. MacDonald, 1911. [A submerged locality, about 375 meters southwest of locality 76.] Not plotted.
78	8399	------	Río Chagres, pebbly limy sandstone at Purgatorio, about 2 miles (3.2 kilometers) below mouth of Río Pequiní. E. R. Lloyd, 1919. [A submerged locality, probably about 750 meters northeast of locality 76.] Not plotted.
79	8398	------	Río Chilibrillo. A. A. Olsson, 1919. [Location indefinite.] Not plotted.
80	7289	------	Cave near Chilibre River, about 6 miles (10 kilometers) from Alhajuela. August Busck, 1911. [Matrix consists of sandstone. Presumably near locality 81.] Not plotted.
81	16932	24	Transisthmian Highway, 1.2 kilometers south-southwest of Río Chilibrillo bridge, about 150 meters west of highway. Chilibrillo limestone member. J. R. Schultz and W. P. Woodring, 1947.
82	16929	8	Transisthmian Highway, 650 meters south-southeast of Río Chilibrillo bridge. Calcareous sandstone member. J. R. Schultz and W. P. Woodring, 1947.
82a	17494	8a	Transisthmian Highway, 75 meters south of locality 82. Calcareous sandstone member. W. P. Woodring, 1949. Not plotted.
83	16930	10	Transisthmian Highway, 400 meters north of Río Chagres bridge. Calcareous sandstone member. J. R. Schultz and W. P. Woodring, 1947.
84	17941	10a	Transisthmian Highway, west end of north abutment of Río Chagres bridge. Calcareous sandstone member. T. F. Thompson and W. P. Woodring, 1949.
84a	17942	10b	Same locality, but at east end of abutment. Calcareous sandstone member. W. P. Woodring, 1949. Not plotted.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			UPPER PART OF CAIMITO FORMATION, MADDEN BASIN, PANAMÁ—continued
85	5903	------	Río Chagres, top of hill opposite Alhajuela. [Alhajuela sandstone member.] D. F. MacDonald, 1911. [For location of Alhajuela see Reeves and Ross, 1930, pl. 5.]
85a	8385	------	Río Chagres, top of hill opposite Alhajuela. [Alhajuela sandstone member.] A. A. Olsson, 1919. Same as locality 85. Not plotted.
86	5904	------	Río Chagres, ⅛ to ¼ mile (200 to 400 meters) above Alhajuela. [Alhajuela sandstone member.] D. F. MacDonald, 1911. [A submerged locality, about 400 meters north of locality 85.] Not plotted.
87	5874	------	Río Chagres between Alhajuela and El Vigia. [Presumably Alhajuela sandstone member.] H. Pittier, 1911. [For location of El Vigia see Reeves and Ross, 1930, pl. 5. [A submerged locality, too indefinite to plot.]
88	17682	143	1.6 kilometers northwest of Madden Dam, on abandoned Public Roads Administration road to powder magazine. Alhajuela sandstone member. W. P. Woodring, 1949.
89	16956	17	Madden Highway, 1 kilometer northwest of Madden Dam. Alhajuela sandstone member. J. R. Schultz, T. F. Thompson, and W. P. Woodring, 1947.
90	17683	144	1.2 kilometers south-southwest of Madden Dam, on road between Madden Highway and Transisthmian Highway. Alhajuela sandstone member. W. P. Woodring, 1949.
90a	17684	144a	30 meters southwest of locality 90. Alhajuela sandstone member. W. P. Woodring, 1949. Not plotted.
91	16952	9	Transisthmian Highway, 1.3 kilometers southeast of Río Chagres bridge. Alhajuela sandstone member. J. R. Schultz and W. P. Woodring, 1947.
92	16940	16	Madden Highway, 2 kilometers south-southeast of Madden Dam. Alhajuela sandstone member. J. R. Schultz, T. F. Thompson, and W. P. Woodring, 1947.
			UNDIFFERENTIATED CAIMITO FORMATION, RÍO CHAGRES AREA, CANAL ZONE
93	------	126	Trail 750 meters southwest of Nuevo San Juan. Coarse-grained conglomeratic pebbly sandstone. T. F. Thompson and W. P. Woodring, 1949. Larger Foraminifera.
94	6509	------	Río Chagres, limestone at and a little above Las Cruces. D. F. MacDonald, 1913. [A submerged locality.] Location approximate.
94a	6510	------	Río Chagres, limestone a little below Las Cruces, on north bank of river. D. F. MacDonald, 1913. [A submerged locality a short distance south of locality 94.] Not plotted.
			LOWER PART OF CAIMITO FORMATION, PACIFIC COASTAL AREA, PANAMA
95	------	37	Transisthmian Highway, 325 meters north of junction with Panamá National Highway. Thin lens of algal limestone in tuff and tuffaceous sandstone. J. A. Tavelli and W. P. Woodring, 1947. Larger Foraminifera (Cole, 1952 [1953]).
96	------	104	Panamá National Highway, about 175 meters northeast of junction with Transisthmian Highway. Lens of algal limestone in tuff and tuffaceous sandstone. T. F. Thompson and W. P. Woodring, 1947. Larger Foraminifera.
96a	------	------	Borrow pit on north side of road to housing development, about 3.2 kilometers northeast of Tocúmen. Fine-grained tuff. T. F. Thompson and W. P. Woodring, 1947. Larger Foraminifera.
			LOWER PART OF CAIMITO FORMATION, MADDEN HIGHWAY AREA, CANAL ZONE
97	------	18	Stream about 100 meters west of Madden Highway and 1.6 kilometers northeast of junction with Gaillard Highway. Limestone T. F. Thompson and W. P. Woodring, 1947. Larger Foraminifera

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			CULEBRA FORMATION, GAILLARD CUT, CANAL ZONE
98	16942	35a	West side of Gaillard Cut, canal station 1600.[5] Float from Culebra formation. T. G. Moran and W. P. Woodring, 1947. Not plotted, same as locality 120.
99	6019	------	Lower half of section near Las Cascades, exact horizon not known. D. F. MacDonald and T. W. Vaughan, 1911. [Presumably float near canal station 1610.] Not plotted.
99a	6019a	------	Near canal station 1611. D. F. MacDonald and T. W. Vaughan, 1911. Also larger Foraminifera (Cole 1953a). Plotted on plate 2. [Localities 6019a to 6019g, inclusive, are located between canal stations 1606 and 1611 and are arranged in upward sequence in that order. For stratigraphic section see MacDonald, 1919, p. 537–538 and for general location see MacDonald, 1919, pl. 154. Location with reference to the canal stations are taken from manuscript structure sections prepared by MacDonald. The construction-period localities in Gaillard Cut presumably represent the excavated prism of rock. Those plotted are shown by the symbol for submerged localities, though many may be above the level of the canal.]
99b	6019b	------	Near canal station 1611. D. F. MacDonald and T. W. Vaughan, 1911. Not plotted.
99c	6019c	------	Canal station 1610. D. F. MacDonald and T. W. Vaughan, 1911. Not plotted.
99d	6019d	------	Canal station 1609. D. F. MacDonald and T. W. Vaughan, 1911. Not plotted.
99e	6019e	------	Near canal station 1608. D. F. MacDonald and T. W. Vaughan, 1911. Not plotted.
99f	6019f	------	Near canal station 1607. D. F. MacDonald and T. W. Vaughan, 1911. Also larger Foraminifera (Cole, 1953a). Not plotted.
99g	6019g	------	Canal station 1606. D. F. MacDonald and T. W. Vaughan, 1911. Also larger Foraminifera (Cole, 1953a). Plotted on plate 2. [Assigned by MacDonald to Emperador limestone member, but apparently represents a sandy limestone referable to the Culebra formation proper.]
			CULEBRA FORMATION, GAILLARD CUT, CANAL ZONE—continued
99h	5857	------	Near canal station 1610. D. F. MacDonald, 1911. Not plotted, practically same as locality 99c.
100	6020a	------	Near canal station 1614. D. F. MacDonald and T. W. Vaughan, 1911. Plotted on plate 2. [Localities 6020a to 6020c, inclusive, underlie 6019a (MacDonald, 1919, p. 538). Type locality of *"Orbitolites" americana*.]
100a	6020b	------	Near canal station 1614. D. F. MacDonald and T. W. Vaughan, 1911. Not plotted.
100b	6020c	------	Near canal station 1613. D. F. MacDonald and T. W. Vaughan, 1911. Also corals (Vaughan, 1919a, p. 208). Not plotted.
101	16943	34	West side of Gaillard Cut, canal station 1619. Black clay 60 centimeters below base of limestone. T. G. Moran and W. P. Woodring, 1947. Plotted on plate 2.
102	6012a	------	Near canal station 1723. D. F. MacDonald and T. W. Vaughan, 1911. Plotted on plate 2. [For stratigraphic section including localities 6012a and 6012b see MacDonald, 1919, p. 537 and for general location see pl. 154.]
102a	6507	------	Lower part of Culebra formation about 0.25 mile (300 meters) south of Empire bridge, altitude 55 feet (17 meters). D. F. MacDonald, 1911. (Probably near canal station 1720.) Not plotted.
103	6012b	------	Near canal station 1717. D. F. MacDonald and T. W. Vaughan, 1911. Plotted on plate 2.
104	16933	31	West side of Gaillard Cut, canal station 1730. Sandy pebble bed in almost black mudstone. T. G. Moran and W. P. Woodring, 1947. Plotted on plate 2.
104a	6976	------	Culebra (Gaillard) Cut, about midway between Empire and Culebra, about 50 feet (15 meters) below original surface. Received from George Gaillard, 1909. [Presumably near canal station 1730.] Not plotted.
104b	5863	------	Conglomerate near canal station 1731, about 0.3 mile (0.5 kilometer) below Empire bridge. D. F. MacDonald, 1911. Not plotted.
105	6517	------	East side of canal opposite Culebra railroad station. D. F. MacDonald, 1913. [Between canal stations 1750 and 1760.] Not plotted.

[5] The canal stations are located along the center alinement of the canal at intervals of 100 feet (30.5 meters) and are numbered from the Caribbean terminus to the Pacific terminus.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			CULEBRA FORMATION, GAILLARD CUT, CANAL ZONE—continued
106	6012c	------	Near canal station 1759. D. F. MacDonald and T. W. Vaughan, 1911. Plotted on place 2. [For stratigraphic sections including localities 6012a to 6012c inclusive, see MacDonald, 1919, p. 536–537 and for general locations see plate 154.]
107	6012d	------	Near canal station 1768. Calcareous sandstone. D. F. MacDonald and T. W. Vaughan, 1911. Also larger Foraminifera. [Type locality of *Miogypsina cushmani*.] Plotted on plate 2.
108	--------	1	West side of Gaillard Cut, canal station 1759. Dark gray calcareous mudstone 1.5 meters above water level. See stratigraphic section, page 35 J. R. Schultz and W. P. Woodring, 1947. Smaller Foraminifera. Not plotted.
108a	16951	1a	Same locality, float 7.5 meters below uppermost calcareous sandstone of Culebra formation. J. R. Schultz and W. P. Woodring, 1947. Not plotted.
108b	4897	------	East side of Culebra [Gaillard] Cut, about three-fourths mile (1.2 kilometers) northwest of Gold Hill. Sidney Paige, 1908. [Presumably near canal station 1760.] Not plotted.
108c	5859	-----	West side of canal, canal station 1760 D. F. MacDonald, 1911. Not plotted.
109	6013	------	East side of Culebra [Gaillard] Cut, opposite Culebra. Pebbly calcareous sandstone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 536, plate 154). [Canal station 1762.] Plotted on plate 2.
110	16886	5	East side of Gaillard Cut, canal station 1754, about 60 meters northeast of edge of canal and about 100 meters northwest of northwest edge of Culebra Extension slide. Tuffaceous sandstone and calcareous concretions in transition zone between Culebra and Cucaracha formations. J. R. Schultz and W. P. Woodring, 1947. Plotted on plate 2.
110a	6508	------	East side of Culebra [Gaillard] Cut, canal station 1755, upper part of Culebra formation. D. F. MacDonald, 1913. Not plotted; approximately same as locality 110.
111	--------	------	Stanford University locality 2701, west side of Gaillard Cut, canal station 1754, altitude 140 feet (42.5 meters). T. F. Thompson, 1943. Plotted on plate 2.
111a	16887	25	West side of Gaillard Cut, canal station 1755 and 30 meters northwestward along strike, about 45 meters southwest of edge of canal. Calcareous concretions in sandy siltstone corresponding to top of bed 13 of section on page 35. J. R. Schultz and W. P. Woodring, 1947. Not plotted; same as locality 111.
111b	16888	25a	West side of Gaillard Cut, canal station 1754, from dirty sandstone brought to surface by test explosion, evidently from base of bed 13 of section on page 35. J. R. Schultz and W. P. Woodring, 1947. Not plotted; same as locality 111a.
112	16910	2	West side of Gaillard Cut, canal station 1759, about 30 meters southwest of edge of canal. Basal part of bed 13 of section on page 35. J. R. Schultz and W. P. Woodring, 1947. Plotted on plate 2.
112a	16927	3	Same locality, top of bed 13 of section on page 35. J. R. Schultz and W. P. Woodring, 1947. Not plotted.
113	6011	------	East side of Culebra [Gaillard] Cut, near canal station 1845, between Paraiso and Gold Hill. Foraminiferal limy sandstone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 535, pl. 154). Plotted on plate 2.
114	5860	------	West side of Culebra [Gaillard] Cut, canal station 1847 plus 25 feet (6.2 meters). D. F. MacDonald, 1913. Plotted on plate 2.
115	6505	------	West side of Culebra [Gaillard] Cut, near canal station 1860. Lower part of limy sandstone. D. F. MacDonald, 1913. Also larger Foraminifera: *Miogypsina intermedia* (Drooger, 1952, p. 36). Plotted on plate 2.
115a	6515	------	West side of Culebra [Gaillard] Cut, about one-third mile (500 meters) north [northwest] of Paraiso. D. F. MacDonald, 1913. Not plotted; apparently close to locality 115.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			CULEBRA FORMATION, GAILLARD CUT, CANAL ZONE—continued
115b	6443	------	A mile (1.6 kilometers) south of Culebra Cut. Ralph Arnold and D. F. MacDonald, 1913. [The locality data are indefinite, but this presumably is the collection to which MacDonald referred in a notation on his label for 6515: "Arnold took fossils from here."] Not plotted; evidently same as locality 115a.
116	5853	------	West side of Culebra [Gaillard] Cut, canal station 1863. Pebbly tuffaceous sandstone about 2.5 feet (75 centimeters) thick. D. F. MacDonald, 1911. Also coral (Vaughan, 1919*a*, p. 208, cited as locality 5863). Plotted on plate 2.
			EMPERADOR LIMESTONE MEMBER OF CULEBRA FORMATION, CANAL ZONE
117	6014	------	Limestone on street near railroad at Empire, 0.25 or 0.3 mile (400 or 500 meters) north-northwest of railroad station. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, pl. 154). Plotted on plate 2; location approximate, based on MacDonald's plotted location.
118	6016	------	Old quarry 0.3 mile (500 meters) west-northwest of Empire. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, pl. 154). Also corals (Vaughan, 1919a, p. 208–209). Plotted on plate 2, location approximate, based on MacDonald's plotted location.
118a	6444	------	Quarry at Empire. Ralph Arnold, 1913. Not plotted; presumably same as locality 118 or nearby.
119	5858	------	Lower part of upper limestone near tower N. Thought to be equivalent of fossil lot 6a [5856], but bed is not directly traceable. D. F. MacDonald, 1911. [Tower N was a signal tower on the original line of the Panama Railroad near Las Cascades. The right-of-way, still recognizable at some places as a low artificial ridge, immediately adjoins the left bank of the canal in the Las Cascades area. Locality 119 presumably is near locality 120.] Not plotted.
119a	5866	------	Upper limestone bed near tower N. Same as fossil lot 6c [5858]. D. F. MacDonald, 1911. Also larger Foraminifera (Cole, 1953a). Not plotted; same as locality 119.
			EMPERADOR LIMESTONE MEMBER OF CULEBRA FORMATION, CANAL ZONE—continued
119b	6669	------	Upper bed of limestone near tower N. D. F. MacDonald, 1913. Not plotted; same as locality 119.
119c	5856	------	Highest limestone near tower N, between towers M and N. D. F. MacDonald, 1911. Not plotted; near locality 119.
120	16958	35	West side of Gaillard Cut, canal station 1600. Calcareous siltstone and limestone. T. G. Moran and W. P. Woodring, 1947. Plotted on plate 2.
120a	8043	------	Las Cascades [west side of Gaillard Cut, canal station 1600]. Limestone. W. P. Woodring, 1917. Not plotted; same as locality 120.
121	16941	34a	West side of Gaillard Cut, canal station 1619. Limestone overlying clay and siltstone. T. G. Moran and W. P. Woodring, 1947. Not plotted; same as locality 101.
			CUCARACHA FORMATION, CANAL ZONE
122	6012e	------	East side of Gaillard Cut, one-eighth mile (200 meters) north of Gold Hill [near canal station 1775]. Black carbonaceous shale. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 535–536). Plotted on plate 2.
			LA BOCA MARINE MEMBER OF PANAMÁ FORMATION, CANAL ZONE
123	16955	33	East of Gaillard Cut, 200 meters up Río Masambí from east bank of canal. Río Masambí enters the canal at canal station 1696. Coralliferous limestone at base of La Boca member. T. G. Moran and W. P. Woodring, 1947. Plotted on plate 2.
124	--------	32	East side of Gaillard Cut, canal station 1702. Dark, almost black mudstone. T. G. Moran and W. P. Woodring, 1947. Smaller Foraminifera. Plotted on plate 2.
125	5852	------	East side of Gaillard Cut near Empire bridge. [The Empire bridge was located approximately at canal station 1709.] D. F. MacDonald, 1911. Plotted on plate 2; location approximate.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			LA BOCA MARINE MEMBER OF PANAMÁ FORMATION, CANAL ZONE—continued
126	6267	------	Relocated line of Panama Railroad, a little south of station at New Culebra, about opposite Catholic church at Culebra, half a mile (750 meters) northwest of 6268. Same formation as 6268 and 6018. Yellowish spherically weathering limy sandstone. D. F. MacDonald, 1912. [Possibly the unnumbered fossil locality west of 6018 on MacDonald's map (MacDonald, 1919, pl. 154)]. Plotted on plate 2; location approximate.
127	6018	------	Cut on relocated line of Panama Railroad opposite Empire, near road from Empire to Las Cascades Plantation. Tuffaceous calcareous(?) sandstone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, pl. 154). Plotted on plate 2; location approximate.
127a	6268	------	Relocated line of Panama Railroad, junction with track leading down to Canal between Gold Hill and Empire bridge. Yellowish spherically weathering limy sandstone. D. F. MacDonald, 1912, 1913. Not plotted; presumably near locality 127.
127b	6336	------	Relocated line of Panama Railroad, junction with track leading down to Canal between Gold Hill and Empire bridge. Light-colored tuff and kaolinitic beds overlying light gray and buff spherically weathering sandstone. Hill's Panamá formation. D. F. MacDonald, 1913. Not plotted; same as locality 127a, but from overlying tuff.
128	16947	4	Abandoned quarry on north side of Old Gaillard Highway, 230 meters southwest of New Gaillard Highway entrance to Summit Experimental Gardens. Massive calcareous sandstone. J. R. Schultz and W. P. Woodring, 1947. Plotted on plate 2.
129	16954	14a	South side of New Gaillard Highway at milepost 11, about 400 meters northwest of Madden Highway turnoff. Relatively soft yellowish coralliferous limestone with marly partings at base of La Boca marine member of Panamá formation. J. R. Schultz, T. F. Thompson, and W. P. Woodring, 1947. Also corals.
			LA BOCA MARINE MEMBER OF PANAMÁ FORMATION, CANAL ZONE—continued
129a	16953	14	South side of New Gaillard Highway, 100 meters southeast of locality 129. Hard grayish limestone overlying limestone at locality 129, but part of same unit. J. R. Schultz, T. F. Thompson and W. P. Woodring, 1947. Not plotted.
130	6010	------	Near Canal station 1910, northwest of Pedro Miguel Locks. [About 600 meters northwest of north end of Pedro Miguel Locks.] Mudstone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 534, pl. 154). Also smaller Foraminifera; type locality of *Siphogenerina transversa*. Plotted on plate 2.
131	6256	------	One-eighth mile (200 meters) east of wagon road at Bald Hill, 1.5 miles (2.4 kilometers) south of Miraflores. Limestone. D. F. MacDonald, 1912. Corals (Vaughan, 1919a, p. 209). Presumably near locality 132. [Bald Hill is identified as the currently unnamed hill immediately northeast of Red Tank. For a section at Bald Hill see MacDonald (1919, p. 534). His manuscript on the geology of Panamá, includes a sketch of the strata at this locality labeled, in his writing, "Section at Bald Hill, a mile (1.6 kilometers) south [southeast] of Pedro Miguel and 100 yards (100 meters) east of the main road." The locality data just quoted approximately fit the specified identification of Bald Hill. The data in the Cenozoic register evidently are erroneous.] Not plotted.
131a	6257	------	Practically same limestone bed as 6256, but about 10 feet (3 meters) higher stratigraphically. D. F. MacDonald, 1912. Also larger Foraminifera (Cole, 1953a). Not plotted.
132	16939	57	1.6 kilometers north-northwest of north end of Miraflores Locks, on incinerator road leading off Gaillard Highway on west side of middle arm of Miraflores Lake. Fine-grained tuff and tuffaceous siltstone. T. F. Thompson and W. P. Woodring, 1947.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			LA BOCA MARINE MEMBER OF PANAMÁ FORMATION, CANAL ZONE—continued
132a	6255	------	Fossiliferous limy sandstone ½ mile (750 meters) south of Miraflores station, on wagon road to Panamá. D. F. MacDonald, 1912. Larger Foraminifera (Cole, 1953a). Type locality of *Lepidocyclina miraflorensis*. Apparently submerged. Not plotted.
133	6237	------	Limestone in swamp north of Ancon Hill, about ¼ mile (400 meters) south of Diablo Ridge. D. F. MacDonald, 1912. [The swamp and any outcrops in it are now covered with fill.] Not plotted.
			LOWER PART OF GATUN FORMATION
134	17691	102	Road from Sabanita to María Chiquita, cut on south side of ridge, 1.3 kilometers south-southwest of María Chiquita, Panamá. Silty sandstone. W. P. Woodring, 1949.
135	17690	101	Cut on west side of Transisthmian Highway at south edge of Sabanita, Panamá. Ferrugineous concretions in sandstone interbedded with conglomerate. W. P. Woodring, 1949.
136	16912	12	North side of Transisthmian Highway, knoll about 30 meters north of highway, 1.2 kilometers northwest of Sabanita, Panamá. Silty fine-grained sandstone. T. F. Thompson and W. P. Woodring, 1947.
136a	------	------	Same locality. Stanford University locality 2611. Latitude 9°21′ N., plus 1,100 feet (335 meters), longitude 79°49′ W. T. F. Thompson, 1942. Not plotted.
137	16911	26	South side of Transisthmian Highway, 1.7 kilometers northwest of Sabanita, Panamá. Soft silty fine-grained sandstone. W. P. Woodring, 1947.
137a	------	------	Same locality. Stanford University locality 2655. Latitude 9°21′ N., plus 3,000 feet (915 meters), longitude 79°49′ W., plus 1,100 feet (335 meters). T. F. Thompson, 1942. Not plotted.
138	16909	27	North and south sides of Transisthmian Highway, 1.6 kilometers northeast of Canal Zone boundary, Panamá. Soft silty fine-grained sandstone. W. P. Woodring, 1947.
138a	------	------	Same locality. Stanford University locality 2656. Latitude 9°21′ N., plus 5,000 feet (1,525 meters), longitude 79°50′ W., plus 1,000 feet (300 meters). T. F. Thompson, 1942. Not plotted.
139	6667	------	Steep ridge about 2.5 miles (4 kilometers) northeast [north] of Monte Lirio, overlooking and about 250 feet above Gatun Lake, Canal Zone. D. F. MacDonald, 1913. [Southern part of Zorra Island.] Location approximate.
			MIDDLE PART OF GATUN FORMATION, EASTERN AREA
140	------	------	Stanford University locality 2708. Latitude 9°21′ N., plus 4,200 feet (1,280 meters), longitude 79°51′ W., plus 800 feet (245 meters). T. F. Thompson, 1943. [500 meters northwest of intersection of Transisthmian Highway and Canal Zone boundary, Canal Zone.]
141	16948	28	About 100 meters northwest of Transisthmian Highway, on secondary road entering Highway 600 meters west of Canal Zone boundary, Canal Zone. Medium-grained sandstone. W. P. Woodring, 1947.
142	------	------	Stanford University locality 2698. Northeast of Fort Gulick, latitude 9°20′ N., longitude 79°52′ W., plus 1,010 feet (310 meters). T. F. Thompson, 1943. [1.1 kilometers southeast of junction of Transisthmian Highway and road to Fort Gulick, Canal Zone.]
143	6030	------	Relocated Panama Railroad, 85-foot (25 meter) cut 1.5 to 2 miles (2.4 to 3.2 kilometers) east of Camp Cotton, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 542, pl. 154).
144	6029a	------	Relocated Panama Railroad, big cut ¼ to ½ mile (0.6 to 0.8 kilometers) northeast of Camp Cotton, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 542, pl. 154).

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			MIDDLE PART OF GATUN FORMATION, EASTERN AREA—continued
144a	6029b	------	Same locality, from overlying 32 to 42 feet (10 to 13 meters). D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 542). Not plotted.
144b	6335	------	Relocated Panama Railroad, lowest bed in big cut about ½ mile (0.8 kilometer) east of Camp Cotton, Canal Zone. Same locality as lot 17 of 1911 [6029a]. D. F. MacDonald, 1913. Same as locality 144. Not plotted.
144c	6235	------	Relocated Panama Railroad, 3.5 miles (5.6 kilometers) out from Gatun, Canal Zone. Above fuller's earth beds. D. F. MacDonald, 1912. [Apparently same as locality 144a.] Not plotted.
144d	6334	------	Relocated Panama Railroad, big curved cut about 1 mile (1.6 kilometers) east of Camp Cotton, Canal Zone. Above fuller's earth beds. D. F. MacDonald, 1913. [Probably close to locality 144a.] Not plotted.
145	6031	------	Relocated Panama Railroad, ½ mile (0.8 kilometer) west of Camp Cotton, Canal Zone. Basal part of section; conglomerate and 1 foot above conglomerate. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 543, pl. 154).
146	5845	------	Quebrancha Hills overlooking Gatun Lake, 1.5 miles (2.4 kilometers) northeast [east-southeast] of Gatun, Canal Zone. D. F. MacDonald, 1911. [Presumably in railroad cut.] Location approximate.
147	6033a	------	Panama Railroad, about 3,500 feet (1,065 meters) southeast of Gatun railroad station, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 543, pl. 154).
147a	6033b	------	Same locality, from overlying 4 feet (1.2 meters). D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 543). Not plotted.
147b	6033c	------	Same locality, from overlying 15 to 20 feet (4.5 to 6 meters). D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 543). Not plotted.
147c	6003	------	Same locality and bed as locality 147. D. F. MacDonald, 1911 (MacDonald, 1919, p. 543). Not plotted.
147d	6004	------	Same locality, but higher stratigraphically. D. F. MacDonald, 1911. Not plotted.
147e	6005	------	Same locality, but higher stratigraphically. D. F. MacDonald, 1911. Not plotted.
147f	6006	------	Same locality, but higher stratigraphically. D. F. MacDonald, 1911. Not plotted.
147g	5899	------	Highest fossil-bearing beds, Quebrancha Hills, ¾ mile (1.2 kilometers) out from Gatun, Canal Zone. D. F. MacDonald, 1911. Probably same as locality 147b. Not plotted.
147h	6442	------	Half a mile (750 meters) south [southeast] of Gatun, Canal Zone. Ralph Arnold and D. F. MacDonald, 1913. [Probably at or near locality 147.] Not plotted.
147i	8376	------	Panama Railroad, southeast of Gatun, station 6 plus 20, Canal Zone. A. A. Olsson, 1918. [Probably near locality 147.] Not plotted.
147j	8379	------	Panama Railroad, southeast of Gatun, station 4A, Canal Zone. A. A. Olsson, 1918. [Probably near locality 147.] Not plotted.
148	8380	------	Lower Gatun along Panama Railroad between Monte Lirio and Gatun, station 4, Canal Zone. A. A. Olsson, 1918. Echinoid. Location indefinite; not plotted.
149	8381	------	Panama Railroad, southeast of Gatun, station C, Canal Zone. A. A. Olsson, 1918. Locality indefinite; not plotted.
150	8377	------	Panama Railroad, first cut south of Gatun, Canal Zone. A. A. Olsson, 1918.
150a	10997	------	Panama Railroad, high cut about 0.4 mile (650 meters) southeast of Gatun railroad station, Canal Zone. W. P. Woodring, 1923. [Same as locality 150.] Not plotted.
151	8388	------	Gatun, station B, Canal Zone. Lower Gatun, lower *Turritella altilira* zone. A. A. Olsson, 1918. [In Gatun area, but location indefinite.] Not plotted.
152	8483	------	Gatun area, station B, Canal Zone. A. A. Olsson, 1918. Location indefinite; not plotted.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			MIDDLE PART OF GATUN FORMATION, EASTERN AREA—continued
153	16950	47	Gatun Third Locks excavation, plug at south end of excavation, Canal Zone. Unit 1 of section on p. 44; silty to marly sandstone. T. F. Thompson and W. P. Woodring, 1947.
153a	------	------	Stanford University locality 2657. Gatun Third Locks excavation, south end of excavation, Canal Zone. Latitude 9°15′ N., plus 5,600 feet (1,705 meters), longitude 79°54′ W., plus 5,150 feet (1,570 meters). Unit 3 of section on p. 44; medium-grained to very fine-grained sandstone. T. F. Thompson, 1942. 425 feet (130 meters) north of locality 153. Not plotted.
154	16935	------	Gatun Third Locks excavation, west side of excavation 0.6 mile (1 kilometer) north of Gatun Lake, Canal Zone. Unit 10 of section on p. 44; conglomerate. T. F. Thompson and W. P. Woodring, 1947.
155	------	------	Stanford University locality 2653. Gatun Third Locks excavation, Canal Zone. Latitude 9°16′ N., plus 4,700 feet (1,430 meters), longitude 79°54′ W., plus 5,800 feet (1,770 meters). Units 11 and 12 of section on p. 44; fine-grained sandstone and marly siltstone. T. F. Thompson, 1942.
155a	16970	------	Spoil dump of Gatun Third Locks excavation, Canal Zone. T. F. Thompson, 1945. [Essentially same stratigraphic range as locality 155.] Not plotted.
155b	16949	49	Spoil dump of Gatun Third Locks excavation, Canal Zone. T. F. Thompson and W. P. Woodring, 1947. Essentially same stratigraphic range as locality 155. Not plotted.
155c	16915	50	Gatun Third Locks excavation, east side of excavation 1 mile (1.6 kilometers) north of Gatun Lake, Canal Zone. *Turritella*-bearing marly siltstone in lower part of unit 12b of section on p. 44. T. F. Thompson and W. P. Woodring, 1947. Included in stratigraphic range of locality 155. Not plotted.
156	16928	13	Jadwin Road at crossing of Panama Railroad, northern part of Gatun, Canal Zone. *Turritella*-bearing marly siltstone. T. F. Thompson and W. P. Woodring, 1947.
157	16926	56	Westernmost cut on Panama Railroad cutoff south of Fort Davis, 1.2 miles (1.9 kilometers) northeast of Gatun railroad station, Canal Zone. Siltstone and silty sandstone. W. P. Woodring, 1947.
158	2682	17	Vamos á Vamos, Canal Zone. R. T. Hill, 1895. [Locality erroneous; it apparently should be "French Canal, 10.5 kilometers from Colón"; that is, near Gatun. See remarks under locality 173a.] Not plotted.
159	5211	------	Lock site at Gatun, Canal Zone. W. S. Standifer, 1909. Not plotted.
159a	5414	------	Upper lock site at Gatun, Canal Zone. W. J. Ergenzinger, 1910(?). Not plotted.
159b	6273	------	Lock site [at Gatun], Canal Zone, 10 to 50 feet (3 to 15 meters) below surface. Dan St. Clair, 1912(?). Not plotted.
159c	5662	------	Near Gatun Dam site, Canal Zone. D. F. MacDonald, 1911. Not plotted.
160	5846	------	Near spillway at Gatun Dam site, Canal Zone. D. F. MacDonald, 1911.
160a	8369	------	Chagres Dam spillway, station 5, Canal Zone. Just above contact with Caimito sandstone. A. A. Olsson, 1918. [At or near locality 160.] Not plotted.
			MIDDLE PART OF GATUN FORMATION, WESTERN AREA
161	8365	------	Railroad cuts west of Gatun Dam, station C, Canal Zone. A. A. Olsson, 1918. Location approximate.
161a	8395	------	Railroad cuts west of Gatun Dam, station D, Canal Zone. A. A. Olsson, 1918. [Near locality 161.] Not plotted.
161b	8375	------	Cuts west of Gatun Dam, station 4 plus 5, Canal Zone. A. A. Olsson, 1918. [Near locality 161.] Not plotted.
161c	8382	------	Railroad cuts west of Gatun Dam, station B, Canal Zone. A. A. Olsson, 1918. [Near locality 161.] Not plotted.
161d	8366	------	Cuts west of Gatun Dam, station 3a, Canal Zone. A. A. Olsson, 1918. [Near locality 161.] Not plotted.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			MIDDLE PART OF GATUN FORMATION, WESTERN AREA—continued
162	8396	------	Lower trail on west side of Río Chagres, a mile (1.6 kilometers) north [west-northwest] of Gatun Dam, Canal Zone. A. A. Olsson, 1918. Location approximate.
162a	8359	------	Lower trail on west side of Río Chagres northwest of Gatun Dam, Canal Zone. D. D. Condit and A. A. Olsson, 1918. [Probably near locality 162.] Not plotted.
163	8394	------	Trail on east side of Río Chagres, halfway between Gatun Dam and mouth of river, station 2, Canal Zone. A. A. Olsson, 1918. Location approximate. Represents upper part of formation.
164	8391	------	Bluff on west side of Gatun Lake, Canal Zone. D. D. Condit, 1918. Location indefinite; not plotted.
165	8372	------	Headwaters of Río Piña, station 14b, Canal Zone. Middle Gatun. A. A. Olsson, 1918. Location approximate.
166	8357	------	Piña triangulation station region, station 6c, Canal Zone. Base of upper Gatun. D. F. MacDonald and A. A. Olsson, 1918. Location approximate.
167	8374	------	Tick Creek, station 56B, Canal Zone. Top of middle Gatun, oyster bed. A. A. Olsson, 1918. Location approximate.
168	8361	------	Tick Creek, station 27, Canal Zone. Base of upper Gatun. A. A. Olsson, 1918. [Downstream from locality 167.] Not plotted.
169	8360	------	West of Gatun Lake, Tick Camp sheet, station 6c, Canal Zone. A. A. Olsson, 1918. [Probably near locality 167.] Location indefinite; not plotted.
170	8368	------	Headwaters of Quebrada Caña [Río Caño Quebrado], station 4a, Panamá. Base of upper Gatun. A. A. Olsson, 1918. Location approximate.
170a	8411	------	Headquarters of Quebrada Caña [Río Caño Quebrado], station 2 plus 50, Panamá. A. A. Olsson, 1918. Near locality 170. Not plotted.
			UPPER PART OF GATUN FORMATION, EASTERN AREA
171	------	------	Stanford University locality 2707. Drainage ditch 500 feet (150 meters) west of French Canal, Canal Zone. Latitude 9°17′ N., plus 3,500 feet (1,065 meters), longitude 79°55′ W., plus 4,000 feet (1,220 meters). T. F. Thompson, 1943.
172	6035	------	Mindi Hill cut, near bottom of canal, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 544, pl. 154). A submerged locality.
173	------	------	Stanford University locality 2654. Panama Railroad realignment [Third Locks realignment] cut about ¾ mile (1 kilometer) north of north end of Gatun Third Locks excavation, Canal Zone. Latitude 9°18′ N., longitude 79°55′ W., plus 200 feet (60 meters). T. F. Thompson, 1942.
173a	------	48	[French Canal] 10.5 kilometers from Colón, Canal Zone. R. T. Hill, 1895. [According to Dall (Hill, 1898, p. 271), Hill's no. 48 represents Hill's Monkey Hill beds. The locality record probably should read 6 kilometers from Colón. See remarks under locality 158.] Not plotted.
174	2688 2690	29 49	Deviation [Diversion] cut south of Monkey Hill [Mount Hope], Canal Zone. R. T. Hill, 1895. Location approximate.
175	8410	------	Cuts on north [west] side of French Canal [East Diversion], Mount Hope, Canal Zone. A. A. Olsson, 1918. Location approximate.
176	8358	------	Road bordering French Canal [East Diversion], near Mount Hope, Canal Zone. A. A. Olsson, 1918. Location approximate.
176a	8409	------	Road on south [east] side of French Canal [East Diversion], Canal Zone. A. A. Olsson, 1918. [Probably near locality 176.] Not plotted.
177	------	------	Monkey Hill [Mount Hope], near Gatun, Canal Zone. J. Rowell, 1857 and possibly later. [Some specimens have early Smithsonian Institution catalog numbers, but most have later U. S. National Museum numbers.]

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			UPPER PART OF GATUN FORMATION, EASTERN AREA—continued
177a	4895	------	Mount Hope, west side of Panama Railroad, Canal Zone. Ernest Howe, 1908. [Essentially same as locality 177.] Not plotted.
177b	5854	------	Mount Hope, west side of Panama Railroad near oil tanks, Canal Zone. D. F. MacDonald, 1911. [Essentially same as locality 177.] Not plotted.
177c	5855	------	[West side of Panama Railroad] opposite Mount Hope Cemetery, Canal Zone. D. F. MacDonald, 1911. [Essentially same as locality 177.] Not plotted.
177d	6036	------	Mount Hope, about ⅙ mile (270 meters) south of railroad station, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 544, pl. 154). [Essentially same as locality 177.] Not plotted.
178	--------	------	Stanford University locality 2672. Old quarry ¾ mile (1 kilometer) west-southwest of junction of Transisthmian Highway and Coco Solo road, Canal Zone. Latitude 9°20′ N., plus 2,000 feet (600 meters), longitude 79°53′ W., plus 4,000 feet (1,200 meters). T. F. Thompson, 1943.
			UPPER PART OF GATUN FORMATION, WESTERN AREA
179	8413	------	Upper edge of Chilas [Chila] village, Río Indios [Indio], Panamá. D. D. Condit and Strohm, 1918. Plotted on figure 3.
180	8362	------	Caribbean coast 8 miles (13 kilometers) west of Río Indios [Indio], Panamá. Strohm, 1918. Plotted on figure 3.
181	8364	------	Caribbean coast 10 miles (16 kilometers) west of Río Indios [Indio], Panamá. Strohm, 1918. Between locality 180 and Río Miguel. Not plotted.
182	8408	------	Caribbean coast east of San Miguel [Río Miguel], station 25 plus 600 feet (150 meters), Panamá. E. R. Smith, 1918. [Between locality 180 and Río Miguel.] Not plotted.
182a	8488	------	Caribbean coast east of San Miguel [Río Miguel], station 25 plus 400 feet (120 meters), Panamá. E. R. Smith, 1918. [Between locality 180 and Río Miguel.] Not plotted.
183	8487	------	Caribbean coast east of Río San Miguel [Río Miguel], station 4 plus 40 feet (12 meters), Panamá. E. R. Smith, 1918. [Between locality 180 and Río Miguel.] Not plotted.
184	8363	------	Río San Miguel [Río Miguel] 4 miles (6.5 kilometers) above mouth, Panamá. Strohm, 1918. Plotted on figure 3.
185	8383	------	Caribbean coast, west of Río San Miguel [Río Miguel], station 26 plus 100 (30 meters), Panamá. E. R. Smith, 1918. Location approximate. Plotted on figure 3.
			UPPER PART OF GATUN FORMATION, WESTERN AREA—continued
			TORO LIMESTONE MEMBER OF CHAGRES SANDSTONE
186	6037	------	Coquina limestone at Toro Point, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 545).
186a	6675	------	Coquina rock at Toro Point, Canal Zone. D. F. MacDonald, 1913. [Same as locality 186.] Not plotted.
186b	8440	------	Toro Point, Canal Zone. D. F. MacDonald and A. A. Olsson, 1918. [Same as locality 186.] Not plotted.
187	--------	------	Stanford University locality 2700. Between Limon Bay and Río Chagres, Canal Zone. Latitude 9°18′ N., plus 1,000 feet (300 meters), longitude 79°56′ W. T. F. Thompson, 1943.
188	16946	51	Río Piña road, 0.9 mile (1.4 kilometers) southwest of Gatun Dam spillway bridge, Canal Zone. Coquina limestone. T. F. Thompson and W. P. Woodring, 1947.
188a	5909	------	Limestone overlying Gatun formation west of Gatun Dam, Canal Zone. D. F. MacDonald, 1911. [Approximately same as locality 188.] Not plotted.
188b	6034	------	Top of ridge at west end of Gatun Dam, Canal Zone. D. F. MacDonald and T. W. Vaughan, 1911 (MacDonald, 1919, p. 543). [Approximately same as locality 188.] Not plotted.
188c	6668	------	Coquina limestone on crest of ridge west of Gatun Dam, Canal Zone. D. F. MacDonald, 1913. [Approximately same as locality 188.] Not plotted.

No. used in this report	USGS Cenozoic No.	Field No.	Description of locality
			TORO LIMESTONE MEMBER OF CHAGRES SANDSTONE—continued
188d	6236	------	Borrow pit west of Gatun Dam, Canal Zone. Limestone overlying Gatun formation. D. F. MacDonald, 1912. [Approximately same as locality 188.] Not plotted.
188e	8442	------	Hill southwest of Gatun locks, Canal Zone. A. A. Olsson, 1918. [Approximately same as locality 188.] Not plotted.
189	8392	------	Río Indio trail from Gatun to Chagres, Canal Zone. A. A. Olsson, 1918. Location approximate.
190	8402	------	Tick Creek, station 4H, Panamá(?). *Anomia* zone. A. A. Olsson, 1918. [Probably downstream from locality 167.] Not plotted.
191	8371	------	Headwaters of Río Piña, station 46, Canal Zone. *Anomia* zone. E. R. Lloyd and G. M. Bevier, 1918. Location approximate.
192	8404	------	Piña triangulation station region, station O, Canal Zone. *Anomia* zone. D. F. MacDonald and A. A. Olsson, 1918. Location approximate.
193	8401	------	200 feet (60 meters) below and 500 feet (150 meters) southeast of Ramos triangulation station, Canal Zone. *Anomia* zone. A. A. Olsson, 1918. Location approximate.
194	8373	------	Trail from Gatun Dam to Escobal, station 28, Canal Zone. *Anomia* zone limestone. G. M. Bevier and A. A. Olsson, 1918. Location indefinite; not plotted.
195	8403	------	Trail from Escobal to Lagarto, station 1, Panamá. *Anomia* zone. A. A. Olsson, 1918. [Possibly along Río Arriero.] Not plotted.
196	8405	------	Trail from Escobal to Lagarto, station 6, Panamá. *Anomia* zone limestone. A. A. Olsson, 1918. [Possibly along Río Arriero.] Not plotted.
			CHAGRES SANDSTONE PROPER
197	8482	------	Río Indio area, station 4, Canal Zone. A. A. Olsson, 1918. [This Río Indio is the minor tributary of Río Chagres west and northwest of Gatun Dam; unnamed on plate 1.] Location approximate.
198	8484	------	Piña region, station 33, Canal Zone. A. A. Olsson and G. M. Bevier, 1918. [Probably along Río Piña.] Not plotted.
199	8443	------	Piña region, station 34, Canal Zone. A. A. Olsson and G. M. Bevier, 1918. [Probably along Río Piña.] Not plotted.
200	8406	------	Headwaters of Quebrada Caña [Río Caño Quebrado], station 32 plus 100 feet (30 meters), Panamá. A. A. Olsson, 1918. Location approximate.
201	8439	------	Quebrada Caña [Río Caño Quebrado] region, station 2 plus 200 feet (60 meters), Panamá. A. A. Olsson, 1918. [Probably along Río Caño Quebrado or Río Arriero.] Not plotted.
202	8389	------	Trail from Escobal to Lagarto, station 2 plus 100 feet (30 meters). A. A. Olsson, 1918. [Probably along Río Caño Quebrado or Río Arriero.] Not plotted.
203	8436	------	Río Pavolina, a tributary of Río Lagarto, station 4, Panamá. A. A. Olsson, 1918. Location indefinite; not plotted.
204	8441	------	1.5 miles (2.4 kilometers) east [northeast] of mouth of Río Chagres, 1,000 feet (300 meters) from ocean, Canal Zone. A. A. Olsson, 1918.
205	8387	------	Caribbean coast between Río Chagres and Piña, near Piña, Canal Zone. A. A. Olsson, 1918. Not plotted.
206	16937	52	Caribbean coast near mouth of Río Piña; road cut on west side of river about 90 meters west of road fork, Panamá. Massive fine-grained sandstone. T. F. Thompson and W. P. Woodring, 1947.
206a	------	------	Stanford University locality 2699. Same locality. Latitude 9°16′ N., plus 4,200 feet (1,280 meters), longitude 80°3′ W. T. F. Thompson, 1943. Not plotted.
206b	16938	52a	Caribbean coast near mouth of Río Piña; road cut about 90 meters west of locality 206, Panamá. Massive fine-grained sandstone. T. F. Thompson and W. P. Woodring, 1947. Not plotted.
207	16969	------	Caribbean coast; road cut on south side of Río Lagarto about 230 meters south of Lagarto, Panamá. S. M. Jones, 1947.
208	8437	------	Caribbean coast at mouth of Río Indios [Indio], station 5, Panamá. A. A. Olsson, 1918. Plotted on figure 3.

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INDEX

[Italic numbers indicate descriptions]

A

Page

abbreviata, Marginulina cf. 17
abrupta, Turritella 48, *106–107*, pl. 23
robusta 106
trinitaria, Turritella 107
Acila cf. *A. isthmica* 40
Acknowledgments 4–5
Acropora saludensis 42
acuñai, Cubanaster 22
acutauricularis, Saracenaria 18
aculicostata, Lagena 17
adela, Turritella 24, *99*, 109, pl. 15
adelinensis, Uvigerina 19
Uvigerina cf. 27
advena, Siphonina 18
Virgulina cf. 19
Aepystoma *70*, 71
agglutinans, Pharus 77
agna, Tectonatica 48, *88–89*, pl. 17
alabamensis, Hantkenina 17, 19
Alabamina cf. *A. scitula* 26
Alabamina sp. 16
alazanensis, Anomalina cf. 16
Bolivina 16, 26
Bulimina 16, 26
Ceratobulimina 16
Dentalina 26
Gaudryina (Pseudogaudryina) 26
Plectofrondicularia 26
Robulus cf. 27
Vaginulinopsis 27
alcicornis, Millepora aff. 21
Allomorphina trigona 16
A-L-Owensi, Turritella plebeia 107
alowensi, Turritella plebeia 107
alternans, Pleurostomella 18, 27
altilira, Turritella 33, 37, 46, 47, *50*, 101, 102–104, 105, 108
Turritella aff. 102
Turritella cf. 27, 33, 104
Turritella altilira 103
(Torcula) 31, 48, pl. 15
altilira 48, *102–104*, pl. 23
altilira, Turritella 103
(Torcula) 48, *102–104*, pl. 23
praecellens, Turritella 47, 103, 105
(Torcula) 48, *105*, pl. 23
urumacoensis, Turritella 102
altilira subsp., *Turritella* 102, 105
Turritella cf. *T. altilira praecellens* 105
(Torcula) *104–105*
altilirata, Turritella 102
altispira, "Crepitacella" 110
"Crepitacella" n. sp. indet. aff. 110
Alvania 76
"Alvania" aff. *"A." epulata* 48, *76*, *77*
amaras, Turritella 101
(Torcula?) 37, *101–102*, pl. 16
Amaurellina? 95
Amaurellina garzaensis 95
Amaurellina? sp. 21, *95–96*, pl. 14
"Amauropsis" burnsii meridionalis 96, 97
aff. *"A." burnsii meridionalis* 97
floridana 97
jacksonensis 96, 97
trinitatensis 97
americana, "Orbitolites" 36, 121
Ammospirata mexicana 26
Ampulella *95*
Ampullina 95
Ampullinopsis spenceri 31
Anadara 39
Andesite 54
andreasi, Turritella 99
andrium, Teinostoma (Acpystoma) 48, *70–71*, pls. 17, 18
anebus, Solariorbis (Hapalorbis) hyptius 48, *75–76*, pl. 17
anguillana, Globularia 95
angulatum, Teinostoma 70
trochalum, Teinostoma (Idioraphe) 48, *70*, pl. 17
angulifera, Littorina 36, 70, 71
Littorina aff. 37, 38, *68*, pl. 16
Angulogerina sanjuanensis 16
Angulogerina sp. 16, 26
annectens, Encope 47
Annulicallus 72
annulifera, Siphonodosaria cf. 18
Anomalina cf. *A. alazanensis* 16
pacoraensis 16
Anomalina sp. 16
Anomalinoides sp. 16
anomalum, Teinostoma 69
Anticlimax *72*
Anticlimax s. s. *72*, 73
derbyi 72
hispaniolensis 73
schumoi 72
teleospira 73
tholus 73
willetti 73
(Anticlimax) gatunensis 48, *72*, pl. 18
(Subclimax) teleospira hystata 48, *73*, pl. 18
teleospira 48
Antiguan coral fauna 27–28
antillea, Heterostegina 27, 30, 33
Miogypsina 27
(Miogypsina) 30, 33
Antillia cf. *A. hadleyi* 21
aperta, Calyptraea 80
Calyptraea cf. 21, *80*
Aquitanian, age 38–39
araucana, Discorbis 26
Archaias compressus 27, 30
arenasensis, Karreriella 17
armiger, Schizaster 22
articulatus texanus, Robulus 27
asperum, Chrysalogonium 26
Chrysalogonium cf. 16
Astacolus nuttalli 26
Astacolus sp. 16, 26
Asterocyclina georgiana 20, 61
mariannensis 20
minima 20
asterodisca, Lepidocyclina (Lepidocyclina) 30
Astreopora n. sp. 21
Astrocoenia incrustans 21
atacta, Turritella 99, 108
atriformis, Hemisinus (Longiverena) n. sp., cf. 27
attenuata, Marginulina cf. 17
atwilli, Uvigerina 19
auricula, Crucibulum 82
aurora, Calliostoma 63
australis, Buccinum 65

B

Background, historical 2–3
Bactospira 98, 101
balkanicus, Velates 66
barbatus, Hipponix 78
Bas Obispo formation, age 32
stratigraphy and lithology 31–32
Basalt 54
Bathysiphon eocenica 16, 26
beaumonti, Natica (Stigmaulax) sulcata 88
Stigmaulax guppiana 88
berjadinensis cocoditana, Turritella 110
Turritella cf. 37, *110*
Bermúdez, P. J., quoted 19, 26–27
Bibliography, annotated 5–10
bierigi, Pleurostomella 27
bifastigata, Turritella 48, *111–112*, pl. 22
cartagenensis, Turritella 111
democraciana, Turritella 111
maracaibensis, Turritella 111
bipartita spirifera, Terebra 46
blountensis, Turritella 109
gatunensis 109
Bohio formation, description 24–25
fossiliferous localities 115–116
fossils and age 23–24, 26–28
marine member 22–24
stratigraphy and lithology 22–23, 25–26
structural history 57
bolivarensis, Neverita 91, 92
tapina, Neverita (Glossaulax) 24, *91–92*, pl. 15
bolivari, Episcynia 76
Bolivina alazanensis 16, 26
byramensis 16, 26
gracilis 16
cf. *B. gracilis* 16, 26
jacksonensis 16
cf. *B. jacksonensis* 16
maculata 16
cf. *B. maculata* 16
malkinae 16
plicatella mera 26
rhomboidalis 26
tectiformis 26
cf. *B. ventricosa* 16
Bolivina sp. 16, 26
bolus, Natica 84
(Natica?) 48, *84–85*, pl. 20
bondplandi, Natica 92
bosworthi, Turritella 98
boutakoffi, Polinices 89
bowersi, Clypeaster 50
Clypeaster aff. 50
brevis, "Phasianella (Eucosmia)" 66
briani, Calliostoma 63
broderipiana, Stigmaulax 87, 88
Turritella 110, 111, 112
brunnea, Polinices cf. 90
(Mammila) cf. 89
brunneus, Polinices 90, 91
subclausus, Polinices 48, *89–90*, pl. 20
Buccinum australis 65
tritonis 65
Bulimina alazanensis 16, 26
consanguinea 16
cf. *B. cooperensis* 16
guayabalensis 16
cf. *B. impendens* 16
jacksonensis 16, 19
cf. *B. jacksonensis cuneata* 16
palmerae 16
cf. *B. palmerae* 16
pupoides 16
cf. *B. pyrula* 16
tuxpamensis 16
Bulimina sp. 16
Buliminella sp. 16
bulloides, Pullenia cf. 18
burnsii, "Polinices (Amauropsis)" 97
buwaldana, Turritella 98, 99

Page

byramensis, Bolivina 16, 26
Guttulina 26

C

Calmito formation, exclusive of Madden basin and Pacific coastal area 28–31
fossiliferous localities 116–120
fossils and age 29–31
Madden Basin and Pacific coastal area 12, 32–34
stratigraphy and lithology 28–29, 32–33
structural history 57
caleta, Turritella 101
Turritella cf. 24, *100–101*, pl. 15
californicus, Velates 67
calliglyptum, Teinostoma (Climacia) 72
Calliostoma 62, 63
Calliostoma s. s. 63
Calliostoma aurora 63
briani 63
distans 63
grabaui 64
mancinella 64
metalium 50
sayannum 64
Calliostoma? sp. 50
Calliostoma (Calliostoma) metalium *63*, pl. 18
(Leiotrochus) eremum 48, *63–64*, pl. 22
Calliostomatinae 63
Callopoma 64
calypta, Tricolia 24, *65–66*, pl. 15
Calyptraea 80
aperta 80
cf. *C. aperta* 21, *80*
centralis 48, *80*
cf. *C. centralis* 37, 80
centralis candeana 80
chinensis 80
"Calyptraea" diabloensis 81
Calyptraea mamillaris 80
"Calyptraea" martini 81
Calyptraea sp. 24, 31, 80
Calyptraea? sp. 31
Calyptraea (Trochatella) trochiformis 81
(Trochita) trochiformis 81
Calyptraeidae 79
canalizonalis, Natica 89
Polinices 48, *89*, 91, pl. 20
cancellata, Rissoina 77
candeana, Calyptraea centralis 80
canellei, Lepidocyclina 27, 29, 30, 33, 36, 117
(Lepidocyclina) 30, 33
canrena, Natica 86, 87
(Naticarius) 48
caparonis, Turritella 102
Capulus? gatunensis 83
Capulus? sp. 83
Cardium (Fragum) gatunense 23
carinata, Turritella 98
Turritella cf. 21, 22, *98*, pl. 14
carinatum, Teinostoma 70
Teinostoma cf. 69, 70
carinicallus, Teinostoma 72
carmenensis, Pseudocrommium 96, 97
carolinianus, Polinices 89
caronensis, Turritella 108
gatunensis 109
caroniense, Teinostoma 71
cartagenensis, Turritella 111
bifastigata 111
cascadensis, Goniopora cf. 30
Cassidulina crassa 16
havanensis 16
subglobosa 16, 26
Cassidulina sp. 16
Cassidulinoides sp. 16
castaneus, Turbo 64
Turbo aff. 50
Turbo (Marmarostoma) aff. 48, *64–65*, pl. 20
(Senectus) cf. 65
castrenoides, Natica 84
castrensis, Natica 84
cecinella, Teinostoma 70
centralis, Calyptraea 48, *80*
Calyptraea cf. 37, 80
Globorotalia 17, 19
Infundibulum 80
Ceratobulimina alazanensis 16
Cernina fluctuata 94
cerrosensis, "Circulus" 74
Chagres sandstone, description 12, 47
fossiliferous localities 129–130
fossils and age 50
stratigraphy and lithology 47, 50
structural history 57
chagresensis, Lagenoglandulina subovata 17
chilostoma, Karreriella 17
chaperi, Lepidocyclina 19, 20, 21, 61, 112
(Nephrolepidina) 20
charana, Turritella 106
Cheilea 79
equestris 80
princetonia 48, 79
Chilibrillo limestone 32
Chilostomella mexicana 16
cf. *C. ovoidea* 16
Chilostomella sp. 16
Chilostomelloides oviformis 16
chinensis, Calyptraea 80
chipolana, Neritina 68
Neverita 92
chipolanum, Crucibulum 82
auricula 82
(Crucibulum) *82*, pl. 19
chipolanum, Sinum 93
chirana, Nodosaria 17
Uvigerina 27
Uvigerina cf. 19
Chrysalogonium asperum 26
cf. *C. asperum* 16
elongatum 16
Chrysalogonium sp. 16, 26
chrysostomus, Turbo 64
Cibicides cocoanesis 16
cf. *C. concentricus* 16
cf. *C. cookei* 16
leoni 16
mexicanus 16, 26
perlucidus 16, 26
cf. *C. perlucidus* 16
cf. *C. pseudoungerianus* 16
Cibicides n. spp. 16
Cibicides sp. 16
Cibicides spp. 26
ciperoensis, Globigerina 17, 26
"Circulus" cerrosensis 74
cosmius 74
liriope 75, 76
occidentalis 74
Circulus pentagona 73
"Circulus" pentagonus 73
trilix 74
clausa, Natica 88
Clavulinoides cubensis 16, 26
havanensis 16
Clavulinoides sp. 16
Clementia dariena 46
clevei, Eupatagus 22
Climacia 72
Clypeaster bowersi 50
aff. *C. bowersi* 50
concavus 31
concavus? 42
gatuni 42, 47
lanceolatus 33, 37
cf. *C. pinarensis* 33
cocleana, Natica youngi 84
cocoaensis, Cibicides 16
Marginulinopsis 17
cocoditana, Turritella berjadinensis 110
Turritella cf. *T. berjadinensis* 37, *110*
coensis, Polinices 91
Cole, W. S., quoted 20, 30, 33
colima, Natica 86
collazica, Turritella 98
Turritella cf. 42, *98*, pl. 16
collinsii, Trochita 80
Collonia radiata 72
Colpophyllia sp. 21
communis, Dentalina cf. 16
compressus, Archaias 27, 30
concavum, Sinum 94
concavus, Clypeaster 31
concavus?, Clypeaster 42
concentricus, Cibicides cf. 16
conchyliophora, Xenophora 77, 78
conica, Pseudoglandulina 27
conradi, Turritella 108
consanguinea, Bulimina 16
cookei, Cibicides cf. 16
Plectofrondicularia 18
cooperensis, Bulimina cf. 16
Dentalina cf. 16
Corals, from Calmito formation 30
from Culebra formation 36
from Gatuncillo formation 21
from Panamá formation 42
from Pleistocene series 50
Cornuspira olygogyra 16
cosmius, "Circulus" 74
costata, Montastrea 42
costellata, Trochita 81
crassa, Cassidulina 16
crassolamellata, Diploastrea n. sp., aff. 21
Crassostrea 39
crenulatoides, Turbo 65
crenulatus, Turbo 64
castaneus 65
Crepidula 79
fornicata 79
gatunensis 79
maculosa 79
cf. *C. maculosa* 48, *79*, pl. 19
nivea 79
nummaria 79
plana 48, *79*, pl. 19
Crepidula sp. 37, 42, 79
Crepidula? sp. 27
Crepidulidae 79
"Crepitacella" altispira 110
n. sp. indet. aff. *"C." altispira* 110
Cretaceous rocks 52
Cretaceous system, stratigraphy 13
crispa, Xenophora 78
Crommium 97
Crucibulum *82*, 83
Crucibulum s. s. 82
Crucibulum auricula 82, 83
chipolanum 82
Crucibulum chipolanum 82
dodoneum 82
pectinatum 83
spinosum 82
Crucibulum? springvaleense 83
Crucibulum cf. *C. springvaleense* 84
Crucibulum sp. 37, 50, 82
(Crucibulum) chipolanum 48, *82*, pl. 19
(Dispotaea) gatunense 83
springvaleense 48, *83–84*, pl. 19
Crypta fornicata 79
Cryptonatica 88
cryptospira, Teinostoma 70
cubae, Weisbordella 22
Cubanaster acuñai 22
cubensis, Clavulinoides 16, 26
Fabiania 20, 21, 23
Gümbelina 17, 26
Cucaracha formation, description 39
fossiliferous localities 123
fossils and age 39
mammal 39

Page

Cucaracha formation—Continued
stratigraphy and lithology 39
Culebra formation, description 34
fossiliferous localities 121–123
fossils and age 36–39
mammal 37–38
stratigraphy and lithology 34–36
cuneata, Bulimina jacksonensis cf. 16
curta, Uvigerina 19
curvatura, Siphonodosaria aff. 18
cushmani, Miogypsina 36, 122
Valvulineria 19
cuspidata, Neverita 92
Cyclammina cf. *C. deformis* 26
cf. *C. pacifica* 16
Cyclammina sp. 16
Cyclostrema pentagona 73
quadrilineatum 73
Cyclostremiscus 73, 74
Cyclostremiscus s. s. 73, 74
Cyclostremiscus glyptobasis 74
glyptomphalus 74
tricarinatus 74
(*Penocyclus*) *pentagonus* 48, *73–75*, pl. 17
cylindrica, Dorothia 17

D

Dacite 53, 54
dalli, Loxostoma 17
Weisbordella 22
Dallitesta 91
danvillense, Nonion 18
danvillensis, Virgulina cf. 19
daricna, Clementia 46
dariensis, Mactra (*Mactrella?*) 23
dartoni, Lepidocyclina (*Nephrolepidina*) 30
deformis, Cyclammina cf. 26
delecta, Phorus 77
Xenophora 48, *77–78*, pl. 22
democraciana, Turritella bifastigata 111
Dentalina alazanensis 26
cf. *D. communis* 16
cf. *D. cooperensis* 16
cf. *D. mucronata* 16, 26
semilaevis 16, 26
Dentalina sp. 16, 26
Dentalina spp. 16
dentaliniformis, Siphonodosaria cf. 18
depressa, Solariella n. sp., cf. 27
derbyi, Anticlimax 72
diablaensis, "Calyptraea" 81
Diaerecallus *71–72*
dibollensis, Haplophragmoides cf. 17
Virgulina cf. 19, 27
dicampylus, Robulus cf. 18
Dike rocks 54
Diorite 53–54
Diploastrea n. sp. aff. *D. crassolamellata* 21
Discorbis araucana 26
Discorbis sp. 16
Dispotaea *83*
distans, Calliostoma 63
dodaneum, Crucibulum chipolanum 82
dodonum, Pachycrommium 97
Sinum 93
Dorothia cylindrica 17
cf. *D. nuttalli* 17
Dorothia sp. 17
douvillei, Porites cf. 42

E

Echinoids, from Caimito formation 31
from Chagres sandstone 50
from Culebra formation 37
from Gatun formation 47
from Gatuncillo formation 22
from Panamá formation 42
Echinolampas semiorbis 37
elegans, Höglundina 17
denae, Stigmaulax 87

Page

Ellipsoglandulina labiata 17
multicostata 17
elongatum, Chrysalogonium 16
emaciata, Siphonodosaria verneuili 18
emendorferi, Hannatoma 68
Hannatoma? cf. 21, 22, *68*, pl. 14
eminuloides, Polinices 90
Emperador limestone 34, 36, 59
Encope annectens 47
megatrema 47
platytata 47
Entosolenia cf. *E. laevigata* 17
cf. *E. marginata* 17
orbignyana 17
Entosolenia sp. 17
eocanica, Hastigerinella 17
Eocene or Oligocene series 22–24
Eocene series 13–22
eocenica, Bathysiphon 16, 26
Episcynia *76*
bolivari 76
megalia 48, *76*, pl. 18
naso 76
nicholsoni 76
Eponides jacksonensis 17
cf. *E. rutteni* 17
umbonatus 17
multisepta 17, 26
epulata, "Alvania" aff. 48, *76–77*
"Rissoa" 76
equestris, Cheilea 80
eremum, Calliostoma (*Leiotrochus*) 48, *63–64*
"Eucosmia" lurida 66
Eulepidina fauna 27–28
Eupatagus clevei 22
eurybedra, Sinum 48, *93–94*, pl. 21
Eurytorus 101
Euspirocrommium 97
eximia, Marginulina cf. 17
exoleta, Turritella 101, 104

F

Fabiania cubensis 20, 21, 23
fasciata, Mesalia 68
Favia cf. *F. weisbordi* 21
fawosa, Lepidocyclina (*Eulepidina*) 27
figulopicta, Neritina (*Puperita*) 68
finitima, Natica 84
fischeri, Globularia 94, 95
Globularia? cf. 95
Globularia (*Globularia*) aff. 27, 31, 37, *94–95*, pl. 15
flintensis, Pseudophragmina (*Proporocyclina*) 20
floridana, "Amauropsis" 97
Tectonatica 88
Xenophora delecta 78
floridanus, Velates 67
floridensis, Operculinoides 20
fluctuata, Cernina 94
fluctuatus, Turbo 64
fluctuosus, Turbo 64
Foraminifera, from Bohio formation 23, 26–27
from Caimito formation 29–30, 33
from Culebra formation 36
from Gatun formation 45
from Gatuncillo formation 15–21
from Panamá formation 41–42
fornicata, Crepidula 79
Crypta 79
Fossiliferous localities 45, 112–130
Fossils, descriptions 62–112
from Bohio formation 23–24, 26–28
from Caimito formation 29–31
from Culebra formation 36–39
from Gatun formation 45–47
from Gatuncillo formation 15–22
from Panamá formation 41–42
fredeai, Turritella 106
robusta 106
supraconcava 106

Page

Froudicularia tenuissima 17

G

gabbi, Sigaretus (*Eunaticina*) 94
Sinum 48, *94*, pl. 21
Turritella 102
gabrielensis, Pseudocrommium 96
galvesia, Turritella 99
Gamboa area, Gatuncillo formation 15, 20
gardnerae nuttalliana, Uvigerina 19, 27
garzaensis, Amaurellina 95
gasparensis, Valvulineria 19
Gastropods 62
Gatun formation, description 42–47
fossiliferous localities 125–129
fossils and age 45–47
stratigraphy and lithology 43–45
structural history 57
Gatun Lake area, Bohio formation 25
Caimito formation 28
Gatun Lake district, oil possibilities 60–61
Gatuncillo formation, description 13–14
fossiliferous localities 112–114
fossils and age 15–22
stratigraphy and lithology 14–15
structural history 57
gatunense, Cardium (*Fragum*) 23
Crucibulum (*Dispotaea*) 83
Sinum 48, 93
gatunensis, Anticlimax (*Anticlimax*) 48, *72*, pl. 18
Capulus? 83
Crepidula 79
Turritella 47, 99, 100, 108–109, 110
gatunensis?, Turritella 33, 50
gatunensis, Turritella cf. 108, 109
Turritella gatunensis 48, *108–109*, pl. 23
bluntensis, Turritella 109
caronensis, Turritella 109
gatunensis, Turritella 48, *108–109*, pl. 23
lavelana, Turritella 108, 110
rhytodes, Turritella 48, *109–110*, pl. 23
taratarana, Turritella 110
"gatunensis" taratarana, "Turritella" 110
gatunensis willistoni, Turritella 110
gatuni, Clypeaster 42, 47
Gaudryina (*Pseudogaudryina*) *alazanensis* 26
cf. *G. jacksonensis* 17
Geographic names, orthography 4
georgiana, Asterocyclina 20, 61
gibba, Globulina cf. 17
gigas, Lepidocyclina 27
girardana, Gyroidinoides 17
Gyroidinoides cf. 26
giraudi, Lepidocyclina 27
Glandulina sp. 17, 26
glauca, Natica 92
Neverita 92, 93
Polinices (*Neverita*) 92
Globigerina ciperoensis 17, 26
ouachitaensis 17, 26
Globigerina sp. 17, 26
Globigerinoides mexicanus 17
Globigerinoides sp. 17
Globobulimina hannai 17
cf. *G. hannai* 17
Globobulimina sp. 17
Globorotalia centralis 17, 19
globosa, Triloculina cf. 19
Globotruncana 13
Globularia 94, 95
Globularia s. s. 94, 95
Globularia anguillana 95
fischeri 94, 95
Globularia? cf. *G. fischeri* 95
Globularia parisiensis 95
sigaretina 94
streptostoma 95
(*Ampulella?*) *nana* 24, *95*, pl. 15
(*Ampulella*) sp. 24, *95*, pl. 15
(*Globularia*) aff. *G. fischeri* 27, 31, 37, *94–95*, pl. 15

Page

Globulariinae ... 94
Globulina cf. *G. gibba* ... 17
rotundata ... 17
Globulina sp ... 17
Glossaulax ... 91, 92
glyptobasis, Cyclostremiscus ... 74
glyptomphalus, Cyclostremiscus ... 74
Glyptostyla panamensis ... 23
Gold ... 58–59
Goniopora cf. *G. cascadensis* ... 30
aff. *G. taberi* ... 21
gothica, Turritella ... 111
grabaui, Calliostoma ... 64
gracilis, Bolivina ... 16
Bolivina cf. ... 16, 26
gracillima, Siphonodosaria nuttalli ... 27
grateloupi, Nonion cf. ... 26
"Gratelupia?" mactropsis ... 45
guayabalensis, Bulimina ... 16
Gyroidinoides ... 17
gubernacula, Lepidocyclina (Pliolepidina) ... 20
Gümbelina ... 13
cubensis ... 17, 26
martini ... 17
gunteri, Miogypsina ... 27
guppiana, Natica ... 86, 87
(Stigmaulax) ... 86
sulcata ... 86
Stigmaulax ... 47, 50, *86–88*, pl. 20
guppyana, Natica ... 86
(Naticarius) ... 86
(Stigmaulax) ... 86
guppyi, Pachycrommium ... 96, 97
Pachycrommium aff. ... 27
Pachycrommium? cf. ... 37, 38, *97*, pl. 16
Rissoina ... 77
Turritella ... 103
gurabensis, Natica sulcata ... 87
Guttulina byramensis ... 26
irregularis ... 17
Guttulina sp. ... 26
Gyroidinoides girardana ... 17
cf. *G. girardana* ... 26
guayabalensis ... 17
soldanii octocamerata ... 17
Gyroidinoides sp. ... 17

H

hadleyi, Antillia cf. ... 21
hadra, Tricolia (Eulithidium) ... 66
hanleyana, Turritella (Haustator) aff. ... *110*
hannai, Globobulimina ... 17
Globobulimina cf. ... 17
Hannatoma ... 68
Hannatoma? ... 68
Hannatoma emendorferi ... 68
Hannatoma? cf. *H. emendorferi* ... 21, 22, *68*, pl. 14
hantkeni, Marginulina ... 17
Saracenaria cf. ... 18
Hantkenina alabamensis ... 17, 19
suprasuturalis ... 17, 19
Hapalorbis ... *75*, 76
Haplophragmoides cf. *H. dibollensis* ... 17
Hastigerinella eocanica ... 17
Hastigerinella sp. ... 17
havanensis, Cassidulina ... 16
Clavulinoides ... 16
Nodogenerina cf. ... 26
helicoides, Natica ... 92
Neverita ... 47, 93
(Hypterita) ... 48, *92–93*, pl. 18
Polinices ... 92
Helicolepidina spiralis ... 20, 21
Helicostegina soldadensis ... 20, 21
Heliopora sp. ... 21
Hemisinus (Longiverena) n. sp., cf. *H. atriformis* ... 27
heterosculpta, Nodogenerina ... 17
Heterostegina antillea ... 27, 30, 33
israelskyi ... 30
ocalana ... 20, 61

Page

Heterostegina antillea —Continued
panamensis ... 30
hexagona, Lagena cf. ... 17
hilli, Pitaria (Lamelliconcha) ... 23
Hipponicidae ... 78
Hipponicidae? ... 78
Hipponix ... 78
barbatus ... 78
pilosus ... 78
Hipponix sp. ... 21, *78*
Hipponix? sp. ... 37, *78*
hispaniolensis, Anticlimax ... 73
hockleyensis malkinae, Textularia ... 18
Höglundina elegans ... 17
homala, "Pseudorotella" ... 71
Homalopoma ... 66
subobsoletum ... 66
hybrida, Turritella ... *98*
Hypterita ... *92*, 93
hyptius, Solariorbis (Hapalorbis) hyptius ... 48, *75*, pl. 17
anebus, Solariorbis (Hapalorbis) ... 48, *75–76*, pl. 17
hyptius, Solariorbis (Hapalorbis) ... 48, *75*, pl. 17
hystata, Anticlimax (Subclimax) teleospira ... 48, *73*, pl. 18

I

Idioraphe ... *69*, 70
Igneous rocks ... 52–57
impendens, Bulimina cf. ... 16
imperatoris, Mantastrea ... 42
Stylophora ... 42
imperfectum, Teinostoma ... 71
imperialis, Turritella ... 104
incrustans, Astrocoenia ... 21
inezana, Turritella ... 104
Infundibulum centralis ... 80
trochiforme ... 81
intermedia, Miogypsina ... 36, 122
Introduction ... 2–10
iotus, Robulus ... 27
iridea, "Solariella" ... 63
irregularis, Guttulina ... 17
israelskyi, Heterostegina ... 30
isthmica, Acila cf. ... 40

J

jacksonensis, "Amauropsis" ... 96, 97
Bolivina ... 16
Bolivina cf. ... 16
Bulimina ... 16, 19
cuneata, Bulimina cf. ... 16
Eponides ... 17
Gaudryina (Pseudogaudryina) cf. ... 17
Operculinoides ... 20, 23
jamaicensis, Yuberinella ... 20, 21, 22

K

Karreriella arenasensis ... 17
chilostoma ... 17
mexicana ... 17, 26
cf. *K. mexicana* ... 17
Karreriella sp. ... 17
kugleri, Operculinoides ... 23

L

La Boca marine member, Panamá formation ... 40–41
labiata, Ellipsoglandulina ... 17
laevigata, Entosolenia cf. ... 17
Pseudoglandulina ... 18
Pseudoglandulina cf. ... 18
Lagena acuticostata ... 17
cf. *L. hexagona* ... 17
striata ... 26
Lagena sp. ... 17
Lagenoglandulina subovata chagresensis ... 17
Lagenonodosaria cf. *L. sigmoidea* ... 17
Lagenonodosaria sp. ... 17
lanceolatus, Clypeaster ... 33, 37

Page

Las Cascadas agglomerate, age ... 32
stratigraphy and lithology ... 21–32
latifrons, Saracenaria cf. ... 18
lavelana, Polinices subclausa ... 90
Turritella gatunensis ... 108, 110
Leiotrochus ... *63*
lens, "Pseudorotella" ... 76
leoni, Cibicides ... 16
Lepidocyclina canellei ... 27, 29, 30, 33, 36, 117
chaperi ... 19, 20, 21, 61, 112
gigas ... 27
giraudi ... 27
macdonaldi ... 21, 61
miraflorensis ... 36, 41, 125
pancanalis ... 117
parvula ... 42
pustulosa ... 20, 21, 23
vaughani ... 27, 29, 30, 33, 116
waylandvaughani ... 27, 36
(Eulepidina) favosa ... 27
undosa ... 30
(Lepidocyclina) asterodisca ... 30
canellei ... 30, 33
montgomeriensis ... 20
parvula ... 27, 30, 33
waylandvaughani ... 27, 30
yurnagunensis ... 27, 30
morganopsis ... 27, 30
(Nephrolepidina) chaperi ... 20
dartoni ... 30
tournoueri ... 30
vaughani ... 27, 30, 33
(Pliolepidina) gubernacula ... 20
macdonaldi ... 20, 23
pustulosa ... 20, 23
pustulosa tobleri ... 20, 23
leucostoma, Turritella ... 111
limacina, Natica ... 86
Limestone, cement ... 59–60
limi, Polinices rapulum ... 90
limula, Neverita ... 91
liriope, "Circulus" ... 75, 76
Lirophora mactropsis ... 45, 46
Littoraria ... 69
Littorina ... *68*
angulifera ... 36, 68, 69
aff. L. angulifera ... 37, 38, *68–69*, pl. 16
Littorinidae ... 68
lloydsmithi, Turritella ... 110, 111
longiscala, Nodosaria ... 17, 26
lorenzana, Turritella variata ... 100
Loxostoma dalli ... 17
lubrica, "Solariella" ... 63
Lucina? ... 39
Lupia perovata ... 96
"Lupia" perovata ... 96, 97
luridu, "Eucosmia" ... 66

M

macdonaldi, Lepidocyclina ... 21, 61
(Pliolepidina) ... 20, 23
Stylophora ... 42
Mactra (Mactrella?) dariensis ... 23
mactropsis, "Gratelupia?" ... 45
Lirophora ... 45, 46
maculata, Bolivina ... 16
Bolivina cf. ... 16
Quinqueloculina cf. ... 27
maculatum, Sinum ... 94
maculosa, Crepidula ... 79
Crepidula cf. ... 48, *80*, pl. 19
Madden basin, Bohio formation ... 26
Caimito formation ... 32
Gatuncillo formation ... 14–15, 20
oil possibilities ... 61–62
structural description ... 58
malkinae, Bolivina ... 16
Textularia hockleyensis ... 18
mamillaris, Calyptraea ... 80

Page

Mammal, fossil ... 37–38, 39
mancinella, Calliostoma ... 64
Manganese ... 59
maracaibensis, Turritella bifastigata ... 111
"Margarites" ... 62
"Margarites" sp. ... 48, *62–63*
Margaritinae ... 62
marginata, Entosolenia cf. ... 17
marginatus, Velates balkanicus ... 66
Marginulina cf. *M. abbreviata* ... 17
cf. *M. attenuata* ... 17
cf. *M. eximia* ... 17
hantkeni ... 17
pseudohirsuta ... 26
similis ... 26
cf. *M. subcrassa* ... 17
cf. *M. triangularis panamensis* ... 17
Marginulina sp. ... 17
Marginulinopsis cocoaensis ... 17
Marginulinopsis sp. ... 17
marialana, Planulina ... 18, 26
mariana, Turritella ... 104
mariannensis, Asterocyclina ... 20
Marmarostoma ... *64*
undulata ... 64
undulatum ... 64
marmoratus, Turbo ... 64
martini, "Calyptraea" ... 81
Gümbelina ... 17
masinguiensis, Turritella ... 99
Matanzia? sp. ... 17
matarucana, Turritella ... 48, *107–108*, pl. 22
megalia, Episcynia ... 48, *76*, pl. 18
megatrema, Encope ... 47
mera, Bolivina plicatella ... 26
meridionalis, "Amauropsis" burnsii ... 96, 97
aff. *"Amauropsis" burnsii* ... 97
meroensis, Turritella ... 31, *99–100*, 108, pl. 15
Mesalia fasciata ... 68
metalium, Colliostoma ... 50
(*Calliostomo*) ... *63*, pl. 18
metuloides, Phos ... 46
mexicana, Ammospirata ... 26
Chilostomella ... 16
Karreriella ... 17, 26
Karreriella cf. ... 17
Osangularia ... 18, 26
Plectofrondicularia ... 26
Rotaliatina ... 18
mexicanus, Cibicides ... 16, 26
Globigerinoides ... 17
Vaginulinopsis ... 19
Vaginulinopsis cf. ... 19
Millepora aff. *M. alcicornis* ... 21
millepunctata, Naticarius ... 85
millepunctatum, Teinostoma ... 71
milleri, Natica ... 84
mimetes, Turritella ... 48, *110–111*, 112, pl. 22
Turritella cf. ... 110
mimetes?, Turritella ... 50
Mineral resources, metallic ... 58–59
nonmetallic ... 59–60
minima, Asterocyclina ... 20
Miocene series ... 34–47
Miogypsina antillea ... 27
cushmani ... 36, 122
gunteri ... 27
intermedia ... 36, 122
panamensis ... 42, 117
(*Miogypsina*) *antillea* ... 30, 33
(*Miolepidocyclina*) *panamensis* ... 30
miraflorensis, Lepidocyclina ... 36, 41, 125
mitchelli, Turritella ... 102
mixta, Turritella ... 101
Mollusks, from Bohio formation ... 23–24, 27–28
from Caimito formation ... 30–31, 33
from Chagres sandstone ... 50
from Culebra formation ... 36–37
from Gatun formation ... 45–47, 48–49
from Gatuncillo formation ... 21–22

Page

Mollusks—Continued
from Panamá formation ... 42
from Pleistocene series ... 50
Tertiary, description ... 62–112
Montastrea costata ... 42
imperatoris ... 42
montgomeriensis, Lepidocyclina (*Lepidocyclina*) ... 20
montserratensis, Turritella ... 105
moodybranchensis, Operculinoides ... 20
morganopsis, Lepidocyclina (*Lepidocyclina*) *yurnagunensis* ... 27, 30, 33
morreyae, Plectofrondicularia ... 18
mucronata, Dentalina cf. ... 16, 26
multicostata, Ellipsoglandulina ... 17
multilineata, Nodosaria ... 17, 26
multisepta, Eponides umbonatus ... 17, 26

N

Nacca ... 85
nana, Globularia (*Ampullella?*) ... 24, *95*, pl. 15
naranjoensis, Pleurostomella cf. ... 27
naso, Episcynia ... 76
Natica ... *84*, 85
Natica s. s. ... 84, 85
Natica s. s.? ... 84
Natica bolus ... 84
bonplandi ... 92
canalizonalis ... 89
canrena ... 86, 87
castrenoides ... 84
castrensis ... 84
clausa ... 88
colima ... 86
finitima ... 84
glauca ... 92
guppiana ... 86, 87
guppyana ... 86
helicoides ... 92
limacina ... 86
milleri ... 84
patula ... 92
permunda ... 85
"Natica" phasianelloides ... 97
Natica precanrena ... 86
"Natica" pusilla ... 88
Natica subclausa ... 89
sulcata gurabensis ... 87
tectula ... 88
unifasciata ... 84
vitellus ... 84
youngi ... 84
youngi cocleana ... 84
(*Natica?*) *bolus* ... 48, *84–85*, pl. 20
(*Natica?*) sp. ... 24, 31, *84*
(*Naticarius*) *canrena* ... 48
guppyana ... 86
stenopa ... 48, *85–86*, 87, pl. 20
(*Naticarius*) sp. ... 27
(*Naticarius?*) sp. ... 31, 37, 85
(*Polinices*) cf. *youngi* ... 84
(*Stigmaulax*) *guppiana* ... 86
toulana ... 86, 87
guppyana ... 86
sulcata beaumonti ... 88
guppiana ... 86
Naticarius ... *85*, 86
millepunctata ... 85
Naticidae ... 84
Naticinae ... 84
nelsoni, Polinices ... 90
nercidis, Neverita ... 92, 93
Neritidae ... 66
Neritina ... 67
chipolana ... 68
virginea ... 67, 68
Neritina sp. ... 27
Neritina (*Puperita*) *figulopicta* ... 68
(*Vitta?*) cf. *N. virginea* ... 48, *67–68*, pl. 21
(*Vitta?*) sp. ... 37, *67*, 68

Page

Neritinae ... 66
Neverita ... *91*
bolivarensis ... 91, 92
tapina ... 91
chipolana ... 92
cuspidata ... 92
glauca ... 92, 93
helicoides ... 47, 93
limula ... 91
nereidis ... 92, 93
reclusiana ... 47, 91, 92
xena ... 91
secta ... 91
subporcana ... 92
subreclusiana ... 91, 92
Neverita? sp. ... 21, 24, 31, 37, 42, 91
Neverita (*Glossaulax*) *bolivarensis tapina* ... 24, *91–92*, pl. 15
reclusiana xena ... 48, *92*, pl. 21
(*Hypterita*) *helicoides* ... 48, *92–93*, pl. 18
nicholsoni, Episcynia ... 76
nivea, Crepidula ... 79
Nodipecten ... 34
Nodogenerina cf. *N. havanensis* ... 26
heterosculpta ... 17
Nodogenerina sp. ... 17, 26
Nodosaria chirana ... 17
longiscata ... 17, 26
multilineata ... 17, 26
obliqua ... 26
cf. *N. pyrula* ... 26
soluta ... 17
cf. *N. soluta* ... 26
Nodosaria sp. ... 17, 26
noetlingi, Velates ... 67
nolani, Sinum ... 94
Nonion danvillense ... 18
cf. *N. grateloupi* ... 26
pompilioides ... 18, 26
cf. *N. pompilioides* ... 18
Nonion sp. ... 18
noyesi, Sinum ... 93
nummaria, Crepidula ... 79
Nummulites striatoreticulatus ... 20, 21, 23
nuttalli, Astacolus ... 26
Dorothia cf. ... 17
Plectina ... 18, 26
Siphonodosaria cf. ... 18
gracillima, Siphonodosaria ... 27
nuttalliana, Uvigerina gardnerae ... 19, 27

O

obliqua, Nodosaria ... 26
ocalana, Heterostegina ... 20, 61
ocalanus, Operculinoides ... 20
occidentalis, "Circulus" ... 74
ocoyana, Turritella ... 105, 106, 107
octocamerata, Gyroidinoides soldanii ... 17
Oil possibilities, Gatun Lake district ... 60–61
Madden basin ... 61–62
Oligocene and Miocene series ... 32–34
Oligocene series ... 12, 24–32
olssoni, Turritella ... 101
olygogyra, Cornuspira ... 16
oncera, Rissoina (*Phosinella*) ... 48, 77, pl. 23
Operculinoides floridensis ... 20
jacksonensis ... 20, 23
kugleri ... 23
moodybranchensis ... 20
ocalanus ... 20
panamensis ... 30, 117
trinitatensis ... 23
vaughani ... 20
orbignyana, Entosolenia ... 17
"Orbitolites" americana ... 36, 121
oreodoxa, Turritella ... 111
Orthomorphina cf. *O. rohri* ... 18
Osangularia mexicana ... 18, 26
Osangularia sp. ... 18
Ostracodes from Gatun formation ... 47

Page

onachitaensis, Globigerina 17, 26
ovata, Pseudoglandulina 18
oviformis, Chilostomelloides 16
ovoidea, Chilostomella cf 16

P

Pachychilus 110
Pachycrommium 96, 97
Pachycrommium? 96, 97
Pachycrommium dodonum 97
guppyi 96, 97
aff. *P. guppyi* 27
Pachycrommium? cf. *P. guppyi* 37, 38, *97*, pl. 16
proinum 24, *96–97*, pl. 15
solenaeum 21, *96*, pl. 14
cf. *P. trinitatensis* 96, *97*
cf. *P.? trinitatensis* 31, 37, 96, *97*, pl. 16
Pachycrommium sp 96
Pachycrommium? sp 97
pachyheilus, Virgulina 19
Vulvulina 27
Pacific coastal area, Bohio formation 26
Caimito formation 33
pacifica, Cyclammina cf 16
pacoraensis, Anomalina 16
Palenquilla Point, marine member of Bohio formation 23
palmerae, Bulimina 16
palmerae, Bulimina cf 16
Pleurostomella cf 18
Panamá formation, description 39–40
fossiliferous localities 123–125
fossils and age 41–42
stratigraphy and lithology 40–41
panamensis, Glyptostyla 23
Heterostegina 30
Marginulina triangularis cf 17
Miogypsina 42, 117
(*Miolepidocyclina*) 30
Operculinoides 30, 117
Schizaster 47
pancanalis, Lepidocyclina 117
parisiensis, Globularia 95
parvicallum, Teinostoma 71
parvula, Lepidocyclina 42
(*Lepidocyclina*) 27, 30, 33
patula, Natica 92
paucistriata, Siphonodosaria 18
Pecten scissuratus 46
pectinatum, Crucibulum 83
Pedro Miguel agglomerate member, Panamá formation 40–41
pentagona, Circulus 73
Cyclostrema 73
Vitrinella 73
pentagonus, "Circulus" 73
Cyclostremiscus (*Ponocyclus*) 48, *73–75*, pl. 17
perattenuata, Turritella 101, 105
praecellens, Turritella 105
Turritella aff 104, 105
perlucidus, Cibicides 16, 26
Cibicides cf 16
permunda, Natica 85
perornatus, Systellomphalus 75
perovata, Lupia 96
"Lupia" 96, 97
perspectivum, Sinum 93
perversus, Velates 22, 66, 67
perversus subsp.?, *Velates* 21, *66–67*, pl. 14
petrosa, Schenckiella cf 18
Phasianella 65
variegata 65
'Phasianella (Eucosmia)" brevis 66
Phasianellidae *65*
Phasianellidae? 66
phasianelloides, "Natica" 97
Phorus agglutinans 77
delecta 77
Phos metuloides 46
Phosinella 77

Page

pilosus, Hipponix 78
pinarensis, Clypeaster cf 33
Pitaria (Lamelliconcha) hilli 23
plana, Crepidula 48, *79*, pl. 19
planigyrata, Turritella 111
Planularia sp 18, 26
Planulina marialana 18, 26
suturata 18
cf. *P. wuellerstorfi* 26
planulis, Spiroplectammina 18
platytata, Encope 47
plebeia, Turritella 108
A-L-Owensi, Turritella 107
alowensi, Turritella 107
Plectina nuttalli 18, 26
Plectofrondicularia alazanensis 26
cookei 18
mexicana 26
morreyae 18
vaughani 18, 26
Plectofrondicularia sp 18
Pleistocene series, fossils and age 50
stratigraphy and lithology 50
Pleurostomella alternans 18, 27
bierigi 27
cf. *P. naranioensis* 27
cf. *P. palmerae* 18
cf. *P. praegerontica* 18
Pleurostomella sp 18
plicatella mera, Bolivina 26
Pliocene series 47, 50
Polinices 89, 91
boutakoffi 89
cf. *P. brunnea* 90
brunnea subclausa 89
brunneus 90, 91
subclausus 48, *89–90*, pl. 20
canalizonalis 48, *89*, 91, pl. 20
carolinianus 89
coensis 91
eminuloides 90
helicoides 92
nelsoni 90
porcellanus 89
rapulum limi 90
robustus 91
springvalensis 90
stanislas-meunieri 48, *90–91*, pl. 21
venezuelana 90
subclausa 89
subclausa lavelana 90
uber 90
Polinices sp 27, 31
Polinices? sp 21, 24, 37, 89
"Polinices (Anauropsis)" burnsii 97
Polinices (Mammilla) cf. *brunnea* 89
(*Neverita*) *glauca* 92
Polinicinae 89
politum, Teinostoma 69
pompilioides, Nonion 18, 26
Nonion cf 18
Ponocyclus *73*, 74
porcellanus, Polinices 89
Porites cf. *P. douvillei* 42
(*Synaraea*) n. sp 21
praecellens, Turritella altilira 47, 103, 105
altilira subsp. cf 105
perattenuata 105
perattenuata aff 104, 105
(*Torcula*) *altilira* 48, *105*, pl. 23
praegerontica, Pleurostomella cf 18
precanrena, Natica 86
precursor, Tricolia 65–66
princetonia, Cheilea 48, 79
proinum, Pachycrommium? 24, *96–97*, pl. 15
Pseudocrommium 97
carmenensis 96, 97
grabrielensis 96

Page

Pseudoglandulina conica 27
laevigata 18
cf. *P. laevigata* 18
ovata 18
radicula 18
cf. *P. radicula* 18
Pseudoglandulina sp 18, 27
pseudohirsuta, Marginulina 26
pseudoinornata, Pyrgo 18
Pseudophragmina (Proporocyclina) flintensis 20
Pseudodorotella 70, *71*
"Pseudorotella" homala 71
lens 76
Pseudorotella pycna 71
pseudowngerianus, Cibicides cf 16
Pullenia cf. *P. bulloides* 18
cf. *P. quinqueloba* 27
Pullenia sp 18
puntensis, Siphonodosaria 18
pupoides, Bulimina 16
Purpose of report 3–4
pusilla, "Natica" 88
Tectonatica 89
pustulosa, Lepidocyclina 20, 21, 23
(*Pliolepidina*) 20, 23
tobleri, Lepidocyclina (*Pliolepidina*) 20, 23
pycna, Pseudorotella 71
pycnum, Teinostoma (*Pseudorotella*) 48, *71*, pl. 17
Pyrgo pseudoinornata 18
Pyrgo sp 18
pyrula, Bulimina cf 16
Nodosaria cf 26

Q

quadrilineatum, Cyclostrema 73
Quartz diorite 53
Quebrancha syncline, Bohio formation 25
Caimito formation 29
description 58
Gatuncillo formation 14, 20
quinqueloba, Pullenia cf 27
Quinqueloculina cf. *Q. maculata* 27
Quinqueloculina sp 18
quirosana, Turritella venezuelana 106
quirosanum, Sinum 94

R

radians, Trochita 81
Trochus 81, 82
radiata, Collonia 72
Teinostoma (*Climacia*) 72
radicula, Pseudoglandulina 18
Pseudoglandulina cf 18
reclusiana, Neverita 47, 91, 92
xena, Neverita (*Glossaulax*) 48, *92*, pl. 21
recta, Siphonodosaria 18
Textularia cf 18
References cited 131–135
Renz, H. H., quoted 19, 26–27
rhomboidalis, Bolivina 26
rhytodes, Turritella gatunensis 48, *109–110*, pl. 23
Río Aqua Salud area, Gatuncillo formation 14, 20
Río Agua Sucia area, Gatuncillo formation 14, 20
Río Casaya area, Gatuncillo formation 15
Río Chagres area, Caimito formation 29
Río Frijol area, Gatuncillo formation 15, 20
Río Mandinga area, Caimito formation 29
"Rissoa" epulata 76
Rissoidae 76
Rissoina 77
cancellata 77
guppyi 77
(*Phosinella*) *ancera* 48, 77, pl. 23
(*Zebinella?*) sp 37, 77
Rissoinae 76
Rissoinidae 77
Robulus cf. *R. alazanensis* 27
articulatus texanus 27
cf. *R. dicampylus* 18

Page

Robulus cf. *R. alazanensis* -Continued
iotus 27
terryi 18
Robulus sp 27
Robulus spp 18
robusta, Turritella 106
(*Haustator*) 106
Xenophora 78
abrupta, Turritella 106
fredeai, Turritella 106
robustus, Polinices 91
rohri, Orthomorphina cf 18
Rotaliatina mexicana 18
rotundata, Globulina 17
ruttteni, Eponides cf 17

S

sagraiana, Tectonatica 89
saltoensis, Turritella 100
saludensis, Acropora 42
samanensis, Turritella 99
Turritella cf 21, 98
sandomingense, Teinostoma 70
sanjuanensis, Angulogerina 16
sapotensis, Turritella 102
Saracenaria acutauricularis 18
cf. *S. hantkeni* 18
cf. *S. latifrons* 18
cf. *S. schencki* 18
saxosus, Turbo 64
sayanum, Calliostoma 64
schencki, Saracenaria cf 18
Schenckiella cf. *S. petrosa* 18
Schenckiella sp 18, 27
Schizaster armiger 22
panamensis 47
schmideliana, Velates 66
schumoi, Anticlimax 72
scissuratus, Pecten 46
scitula, Alabamina cf 26
Scope of report 2-3
secta, Neverita 91
semilaevis, Dentalina 16, 26
seminuda, "Vitrinella" 76
semiorbis, Echinolampas 37
Senectus 64
senegalensis, Xenophora 78
sigaretina, Globularia 94
Sigaretus (Eunaticina) gabbi 94
sigmoidea, Lagenonodosaria cf 17
Sigmoilina tenuis 18
Sigmomorphina cf. *S. trinitatensis* 27
Sigmomorphina sp 18
similis, Marginulina 26
Sininae 93
Sinum *93*
chipolanum 93
concavum 94
dodonum 93
euryhedra 48, *93–94*, pl. 21
gabbi 48, *94*, pl. 21
gatunense 48, 93
maculatum 94
nolani 94
noyesi 93
perspectivum 93
quirosanum 94
Sinum sp 21, 24, 27, 31, 37, 93, 94
Siphogenerina transversa 36, 41, 124
Siphogenerina sp 18
Siphonina advena 18
tenuicarinata 18, 27
Siphonodosaria cf. *S. annulifera* 18
aff. *S. curvatura* 18
cf. *S. dentaliniformis* 18
cf. *S. nuttalli* 18
nuttalli gracillima 27
paucistriata 18
puntensis 18
recta 18

Page

Siphonodosaria cf. *S. annulifera*—Continued
aff. *S. subspinosa* 18
verneuili 18
emaciata 18
Siphonodosaria sp 18, 27
Siphotextularia sp 18
Solariella 63
Solariella n. sp., cf. *S. depressa* 27
"Solariella" iridea 63
lubrica 63
Solariella? sp 31
Solariorbis 75
Solariorbis s. s *75*
Solariorbis (Hapalorbis) hyptius anebus 48, *75–76*, pl. 17
hyptius 48, *75*, 76, pl. 17
(*Solariorbis*) *strongylus* 48, *75*, pl. 17
solduadensis, Helicostegina 20, 21
soldanii octocamerata, Gyroidinoides 17
solenaeum, Pachycrommium? 21, *96*, pl. 14
soluta, Nodosaria 17
Nodosaria cf 26
spencceri, Ampullinopsis 31
spermatia, Teinostoma 46
(*Idioraphe*) 48, *69–70*, pl. 17
spinicostata, Uvigerina 19, 27
spinosum, Crucibulum 82
spinulosa, Uvigerina 19
Uvigerina cf 19
spiralis, Helicolepidina 20, 21
spirifera, Terebra bipartita 46
Spiroloculina texana 27
cf. *S. texana* 18
Spiroloculina sp 18
Spiroplectammina planulis 18
springvalecense, Crucibulum? 83
Crucibulum cf 84
Crucibulum (Dispotaea) 48, *83–84*, pl. 19
springvalensis, Polinices 90
stanislas-meunieri, Polinices 48, *90–91*, pl. 21
stemonium, Teinostoma (Pseudorotella) 48, *71*, pl. 17
stenopa, Natica (Naticarius) 48, *85–86*, 87, pl. 20
Stigmaulax *86*, 87, 88
broderipiana 87, 88
guppiana 47, 51, *86–88*, pl. 20
beaumonti 88
elenae 87
sulcata 87
vererugosum 87
Stirton, R. A., quoted 37
Stratigraphic section, basal part of Gatuncillo formation 15
marine member of Bohio formation 23
middle part of Gatun formation 44
upper part of Culebra formation 35
Stratigraphy, outline 10–13
streptostoma, Globularia 95
striata, Lagena 26
striatoreticulatus, Nummulites 20, 21, 23
strongylus, Solariorbis (Solariorbis) 48, *75*, pl. 17
Structural features 58
Structural history 57–58
Stylophora imperatoris 42
macdonaldi 42
Suavotrochus 63
subannulata, Turritella 110
subclausa, Natica 89
Polinices 89
brunnea 89
brunneus 48, *89–90*, pl. 20
Subclimax *73*
subcrassa, Marginulina cf 17
subglobosa, Cassidulina 16, 26
subgrundifera, Turritella 105–106
Turritella cf 37, 38, *105–106*, pl. 16
subobsoletum, Homalopoma 67
subovata chagresensis, Lagenoglandulina 17
subporcana, Neverita 92
subreclusiana, Neverita 91, 92
subrotundata, Triloculina cf 19

Page

subspinosa, Siphonodosaria aff 18
sulcata, Stigmaulax 87
supraconcava, Turritella 106
fredeai, Turritella 106
suprasuturalis, Hantkenina 17, 19
suturata, Planulina 18
sychnum, Teinostoma (Diacrecallus) 48, *72*, pl. 17
syntoma, Tricolia? 48, *66*, pl. 17
Systellomphalus 75
perornatus 75

T

taberi, Goniopora aff 21
tapina, Neverita bolivarensis 91
(*Glossaulax*) *bolivarensis* 24, *91–92*, pl. 15
taratarana, Turritella gatunensis 110
tarataranoides, "Turritella gatunensis" 110
tectiformis, Bolivina 26
tectispira, Teinostoma 70
Tectonatica *88*, 89
agna 48, *88–89*, pl. 17
floridana 88
pusilla 89
sagraiana 89
Tectonatica sp 24, *88*
tectula, Natica 88
Teinostoma *69*, 73
Teinostoma s. s 69
Teinostoma angulatum 70
anomalum 69
carinatum 70
cf. *carinatum* 69, 70
carinicallus 72
caroniense 71
cecinella 70
cryptospira 70
imperfectum 71
millepunctatum 71
parvicallum 71
politum 69
ultimum 69
sandomingense 70
spermatia 46
tectispira 70
umbilicatum 70
vitreum 71
(*Aepystoma*) *andrium* 48, *70–71*, pls. 17, 18
(*Climacia*) *calliglyptum* 72
radiata 72
(*Diacrecallus*) *sychnum* 48, *72*, pl. 17
(*Idioraphe*) *angulatum trochalum* 48, *70*, pl. 17
spermatia 48, *69–70*, pl. 17
(*Pseudorotella*) *pycnum* 48, *71*, pl. 17
stemonium 48, *71*, pl. 17
teleospira, Anticlimax 73
(*Subclimax*) *teleospira* 48
hystata, Anticlimax (Subclimax) 48, *73*, pl. 18
teleospira, Anticlimax (Subclimax) 48
Tellina? 39
tenuicarinata, Siphonina 18, 27
tenuis, Sigmoilina 18
tenuissima, Frondicularia 17
Terebra bipartita spirifera 46
terebralis, Turritella 107
Teredo 35
terryi, Robulus 18
Tertiary formations, correlation 50–52
locations 11, 12
texana, Spiroloculina 27
Spiroloculina cf 18
texanus, Robulus articulatus 27
textilina, Xenophora 78
Textularia hockleyensis malkinae 18
cf. *T. recta* 18
Textularia? sp 18
Textulariella sp 19
Thiaridae? 68
tholus, Anticlimax 73
tobleri, Lepidocyclina (Pliolepidina) pustulosa 20, 23

Page

Torcula 99, *101*
tornata, Turritella 103
Toro limestone member of Chagres sandstone 47, 50
toulana, Natica (Stigmaulax) guppiana 86, 87
touroueri, Lepidocyclina (Nephrolepidina) 30
transversa, Siphogenerina 36, 41, 124
triangularis panamensis, Marginulina cf. 17
tricarinatus, Cyclostremiscus 74
Tricolia *65*, 66
calypta 24, *65–66*, pl. 15
precursor 65–66
Tricolia? *syntoma* 48, *66*, pl. 17
Tricolia (Eulithidium) hadra 66
Tricoliidae 65
trigona, Allomorphina 16
trilix, "Circulus" 74
Triloculina cf. *T. globosa* 19
cf. *T. subrotundata* 19
Triloculina sp 19
Trinidad Island, marine member of Bohio formation 23
trinitaria, Turritella 107
abrupta 107
trinitatensis, "Amauropsis" 97
Operculinoides 23
Puchycrommium? cf. 31, 37, 96, *97*, pl. 16
Siymomarphina cf. 27
tristis, Turritella 100, 108
tritonis, Buccinum 65
trochalum, Teinostoma (Idioraphe) angulatum 48, *70*
Trochatella trochiformis 81
Trochidae *62*
trochiforme, Infundibulum 81
trochiformis, Calyptraea (Trochatella) 81
(Trochita) 81
Trochatella 81
Trochita 47, 48, *81–82*, pl. 19
Trochita cf. 31, 82
Trochita? cf. 37, 82
Turbo 81, 82
Xenophora aff. 77
Trochita *80–81*
collinsii 80
costellata 81
radians 81
trochiformis 47, 48, *81–82*, pl. 19
cf. *T. trochiformis* 31, 82
Trochita? cf. *T. trochiformis* 37, 82
Trochita sp. indet. 80
Trochita? sp. 81, 82
Trochus radians 81, 82
Turbinidae 64
Turbo 64, 65
castaneus 64
aff. *T. castaneus* 51
castaneus crenulatus 65
chrysostomus 64
crenulatoides 65
crenulatus 64
fluctuatus 64
fluctuosus 64
marmoratus 64
saxosus 64
trachiformis 81, 82
(Marmarostoma) aff. *T. castaneus* 48, *64–65*, pl. 20
(Senectus) cf. *castaneus* 65
Turbo (Senectus) sp. 65
Turritella *97–98*
abrupta 48, *106–107*, pl. 23
trinitaria 107
adela 24, *99*, 109, pl. 15
altilira 33, 37, 46, 47, 50, 101, 102–104, 105, 108
aff. *T. altilira* 102
cf. *T. altilira* 27, 33, 104
altilira altilira 103
praecellens 47, 103, 105
urumacoensis 102
altilira subsp. 102, 105

Page

Turritella—Continued
altilira subsp., cf. *T. altilira praecellens* 105
altilirata 102
amaras 101
andreasi 99
atacta 99, 108
berjadinensis cocoditana 110
cf. *T. berjadinensis cocoditana* 37, *110*
bifastigata 48, *111–112*, pl. 22
cartagenensis 111
democraciana 111
maracaibensis 111
blountensis 109
bosworthi 98
broderipiana 110, 111, 112
buwaldana 98, 99
caleta 101
cf. *T. caleta* 24, *100–101*, pl. 15
caparonis 102
carinata 98
cf. *T. carinata* 21, 22, *98*, pl. 14
caronensis 108
cartagenensis 111
charana 106
collazica 98
cf. *T. collazira* 42, *98*, pl. 16
conradi 108
exoleta 101, 104
fredeai 106
gabbi 102
galvesia 99
gatunensis 47, 99, 100, 108–109, 110
gatunensis? 33, 50
cf. *T. gatunensis* 108, 109
gatunensis blountensis 109
caronensis 109
gatunensis 48, *108–109*, pl. 23
lavelana 108, 110
rhytodes 48, *109–110*, pl. 23
taratarana 110
"Turritella gatunensis" taratarana ides 110
Turritella gatunensis willistoni 110
gothica 111
guppyi 103
hybrida 98
imperialis 104
inezana 104
leucostoma 111
lloydsmithi 110, 111
mariana 104
masinguiensis 99
matarucana 48, *107–108*, pl. 22
meroensis 31, *99–100*, 108, pl. 15
mimetes 48, *110–111*, 112, pl. 22
mimetes? 51
cf. *T. mimetes* 110
mitchelli 102
mixta 101
montserratensis 105
ocoyana 105, 106, 107
olssoni 101
oreodoxa 111
perattenuata 101, 105
praecellens 105
aff. *T. perattenuata praecellens* 104, 105
planigyrata 111
plebeia 108
A-L-Owensi 107
alowensi 107
robusta 106
abrupta 106
fredeai 106
saltoensis 100
samanensis 99
cf. *T. samanensis* 21, 98
sapotensis 102
subannulata 110
subgrundifera 105–106
cf. *T. subgrundifera* 37, 38, *105–106*, pl. 16

Page

Turritella—Continued
supraconcava 106
fredeai 106
terebralis 107
tornata 103
trinitaria 107
tristis 100, 108
unsana 99, 100
variata lorenzana 100
variegata 111
venezuelana 37, *106*, pl. 16
n. sp., aff. *T. venezuelana* 27
venezuelana quirosana 106
watkinsi 106
vientoensis 100
Turritella sp. 21, 31, 37, 98, *99*
(Haustator) aff. *T. hunleyana* 110
robusta 106
(Torcula) altilira 31, 48, pl. 15
altilira 48, *102–104*, pl. 23
praecellens 48, *105*, pl. 23
altilira subsp. *104–105*
(Torcula?) amaras 37, *101–102*, pl. 16
Turritellidae 97
turpamensis, Bulimina 16

U

uber, Polinices 90
ultimum, Teinostoma politum 69
umbilicatum, Teinostoma 70
umbonatus, Eponides 17
multisepta, Eponides 17, 26
undosa, Lepidocyclina (Eulepidina) 30
undulata, Marmarostoma 64
undulatum, Marmarostoma 64
unifasciata, Natica 84
urumacoensis, Turritella altilira 102
uvasana, Turritella 99, 100
Uvigerina adelinensis 19
cf. *U. adelinensis* 27
cf. *U. atwilli* 19
chirana 27
cf. *U. chirana* 19
curta 19
gardnerae nuttalliana 19, 27
spinicostata 19, 27
spinulosa 19
cf. *U. spinulosa* 19
Uvigerina sp. 19, 27

V

Vaginulina sp. 27
Vaginulinopsis alazanensis 27
mexicanus 19
cf. *V. mexicanus* 19
Vaginulinopsis sp. 19
Valvulineria cushmani 19
gasparensis 19
Vamos Vamos, marine member of Bohio formation 22
variegata, Phasianella 65
Turritella 111
vaughani, Lepidocyclina 27, 29, 30, 33, 116
(Nephrolepidina) 27, 30, 33
Operculinoides 20
Plectofrondicularia 18, 26
Velates 66, 67
balkanicus 66
marginatus 66
californicus 67
floridanus 67
noetlingi 67
perversus 22, 66, 67
perversus subsp.? 21, *66–67*, pl. 14
schmideliana 66
vokesi 67
venezuelana, Polinices stanislas-meunieri 90
Turritella 37, *106*, pl. 16
Turritella n. sp., aff. 27

Page

venezuelana—Continued
quirosana, Turritella 106
watkinsi, Turritella 106
ventricosa, Bolivina cf. 16
vererugosum, Stigmaulax 87
verneuili, Siphonodosaria 18
verneuili emaciata, Siphonodosaria 18
vientoensis, Turritella 100
virginea, Neritina 67, 68
(*Vitta?*) cf. 48, *67–68*, pl. 21
Virgulina cf. *V. advena* 19
cf. *V. danvillensis* 19
cf. *V. dibollensis* 19, 27
pachyheilus 19
Virgulina sp. 19
vitellus, Natica 84
vitreum, Teinostoma 71
Vitrinella pentagona 73
"Vitrinella" seminuda 76
Vitrinellidae 69
Vitta *67*
vokesi, Velates 67

Page

Volcanic and intrusive rocks, Cretaceous 52–53
Tertiary, age 56–57
chemical composition 55
dike rocks 54
granular intrusive rocks 53–54
tuff 13, 54
Vulvulina pachyheilus 27

W

watkinsi, Turritella venezuelana 106
waylandvaughani, Lepidocyclina 27, 36
(*Lepidocyclina*) 27, 30
Weisbordella cubae 22
dalli 22
weisbordi, Favia cf. 21
Wells, J. W., quoted 21, 42
willetti, Anticlimax 73
willistoni, Turritella gatunensis 110
wuellerstorfi, Planulina cf. 26

X

xena, Neverita reclusiana 91
(*Glossaulax*) *reclusiana* 48, *92*, pl. 21

Page

Xenophora 77, 78
conchyliophora 77, 78
crispa 78
delecta 48, *77–78*, pl. 22
floridana 78
robusta 78
senegalensis 78
textilina 78
aff. *trochiformis* 77
Xenophora sp. 21, 37
Xenophoridae 77

Y

Yaberinella jamaicensis 20, 21, 22
youngi, Natica 84
youngi, Natica (*Polinices*) cf. 84
yurnagunensis, Lepidocyclina (*Lepidocyclina*) 27, 30
morganopsis, Lepidocyclina (*Lepidocyclina*) 27, 30, 33

Z

Zebinella 77