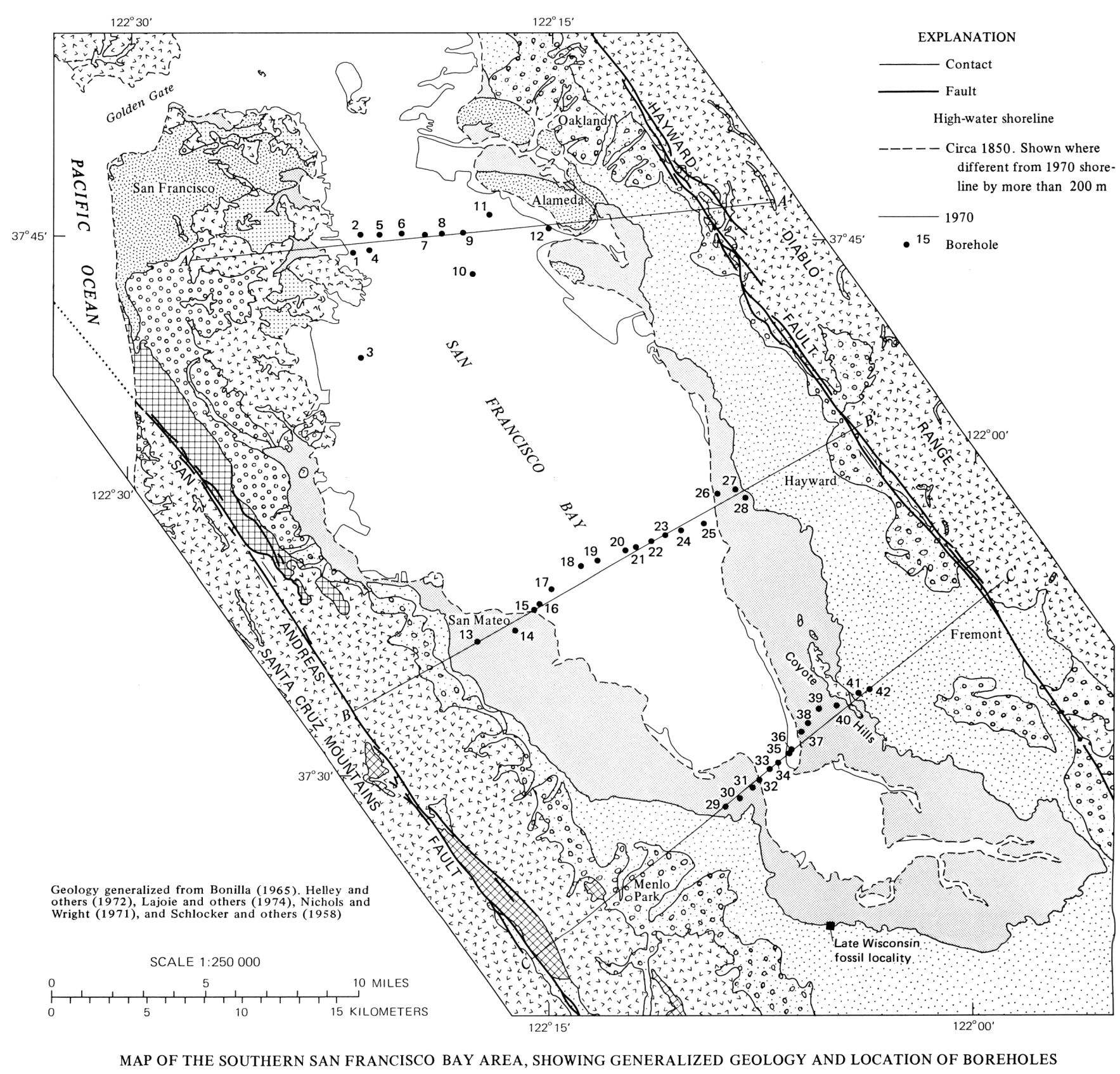
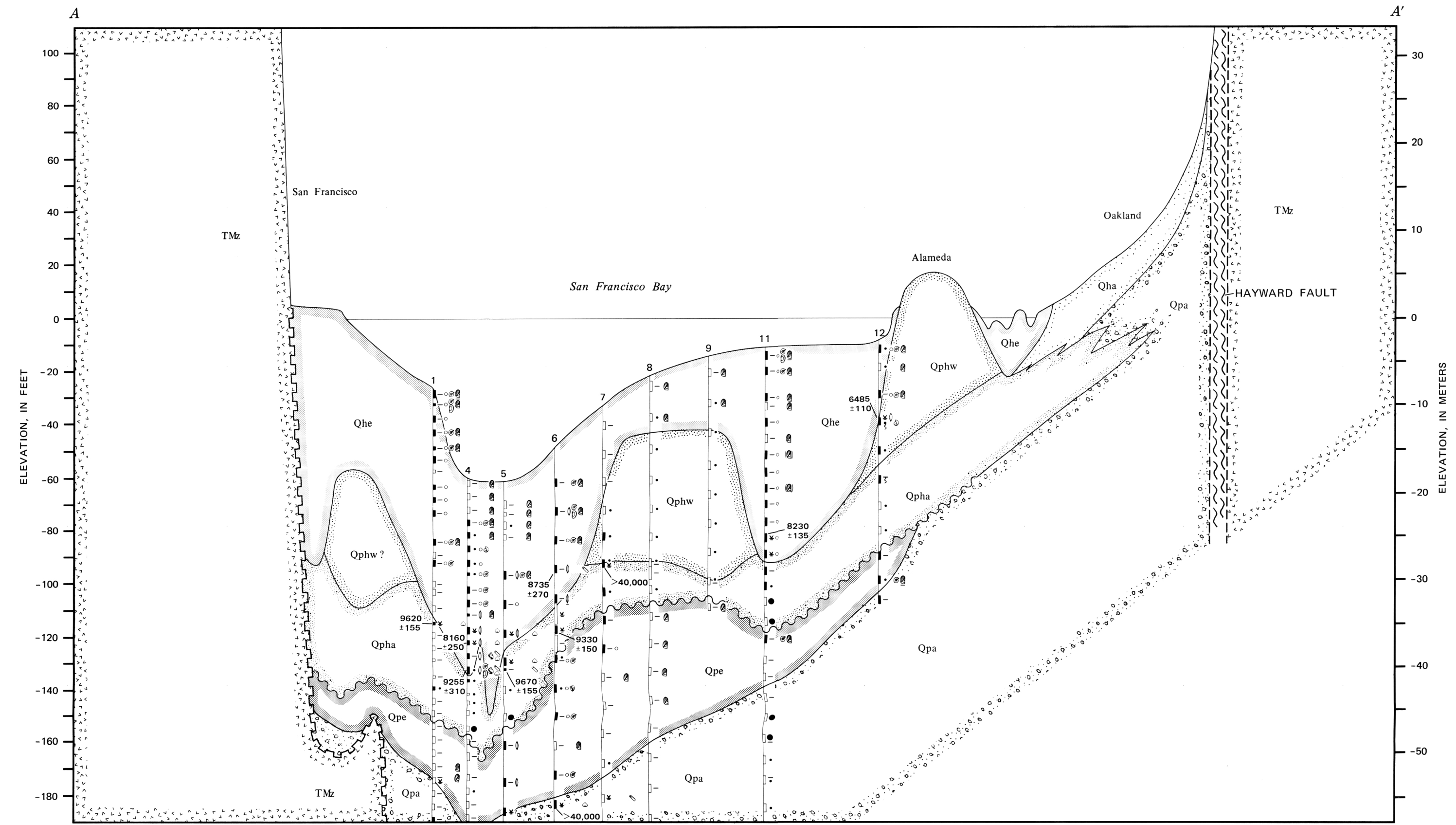


BOREHOLES						
Map No.	Agency ¹	Contract	Date	Field No.	Sampler ²	Location (California coordinates, zone 3) N. E.
1	BTC	82-032	1969	24	Shelby	456,440 1,460,540
2 ³	BTC	101	1948	42	Calif.	461,200 1,461,340
3 ⁴	BTC	2011	1965	XI	D and M	439,090 1,464,465
4	BTC	82-032	1969	37	Shelby	457,380 1,465,450
5	BTC	101	1948	83	Calif.	461,190 1,464,660
6	BTC	101	1948	84	Calif.	461,100 1,468,620
7	BTC	101	1948	85	Calif.	461,100 1,472,720
8	BTC	101	1948	77	Calif.	460,920 1,475,580
9	BTC	101	1948	78	Calif.	461,110 1,479,960
10 ⁵	BTC	2001	1955	12	Calif.	453,100 1,480,380
11	BTC	101	1948	49	Calif.	463,420 1,482,740
12	BTC	2001	1955	18	Calif.	461,540 1,493,870
13	USGS		1975	SM-1	Davis	391,400 1,480,500
14	CDH	04-134644	1966	8	Rotary	392,900 1,486,700
15	BTC	5007	1963	1	Calif.	395,400 1,489,500
16	BTC	5002	1959	1	Calif.	396,800 1,490,700
17	BTC	5002	1959	3	Calif.	399,400 1,492,900
18	BTC	5002	1959	5	Calif.	402,100 1,497,800
19	BTC	5002	1959	6	Calif.	403,000 1,500,300
20	BTC	5002	1959	7	Calif.	404,800 1,505,000
21	BTC	5002	1959	8	Calif.	405,800 1,507,400
22	BTC	5002	1959	9	Calif.	406,100 1,509,800
23	BTC	5002	1959	10	Calif.	407,400 1,512,200
24	BTC	5002	1959	11	Calif.	408,400 1,514,600
25	BTC	5002	1959	12	Calif.	410,100 1,518,900
26	USGS		1974	K-4	Davis	414,800 1,522,300
27	USGS		1974	K-3	Davis	415,700 1,525,500
28	USGS		1974	K-2	Davis	415,100 1,527,000
29	USGS		1975	3-18-1	Davis	360,260 1,520,130
30 ⁶	BTC	86-041	1971	44	Shelby	364,780 1,524,900
31	BTC	86-041	1971	54	Shelby	366,640 1,526,850
32 ⁴	BTC	86-041	1971	60	Shelby	367,750 1,527,680
33	BTC	86-040	1970	24	Shelby	369,210 1,529,460
34	BTC	86-040	1970	15	Shelby	370,650 1,531,220
35	BTC	86-041	1971	65	Shelby	372,370 1,533,250
36 ⁴	BTC	86-041	1971	67	Shelby	373,100 1,533,810
37	BTC	86-041	1971	74	Shelby	374,880 1,534,880
38 ⁶	BTC	86-041	1971	110	Shelby	376,340 1,535,820
39	BTC	86-041	1971	93	Shelby	379,200 1,538,500
40	BTC	86-041	1971	104	Shelby	380,190 1,541,800
41	BTC	86-041	1971	127	Shelby	381,070 1,544,600
42	BTC	86-041	1971	126	Shelby	382,020 1,545,700

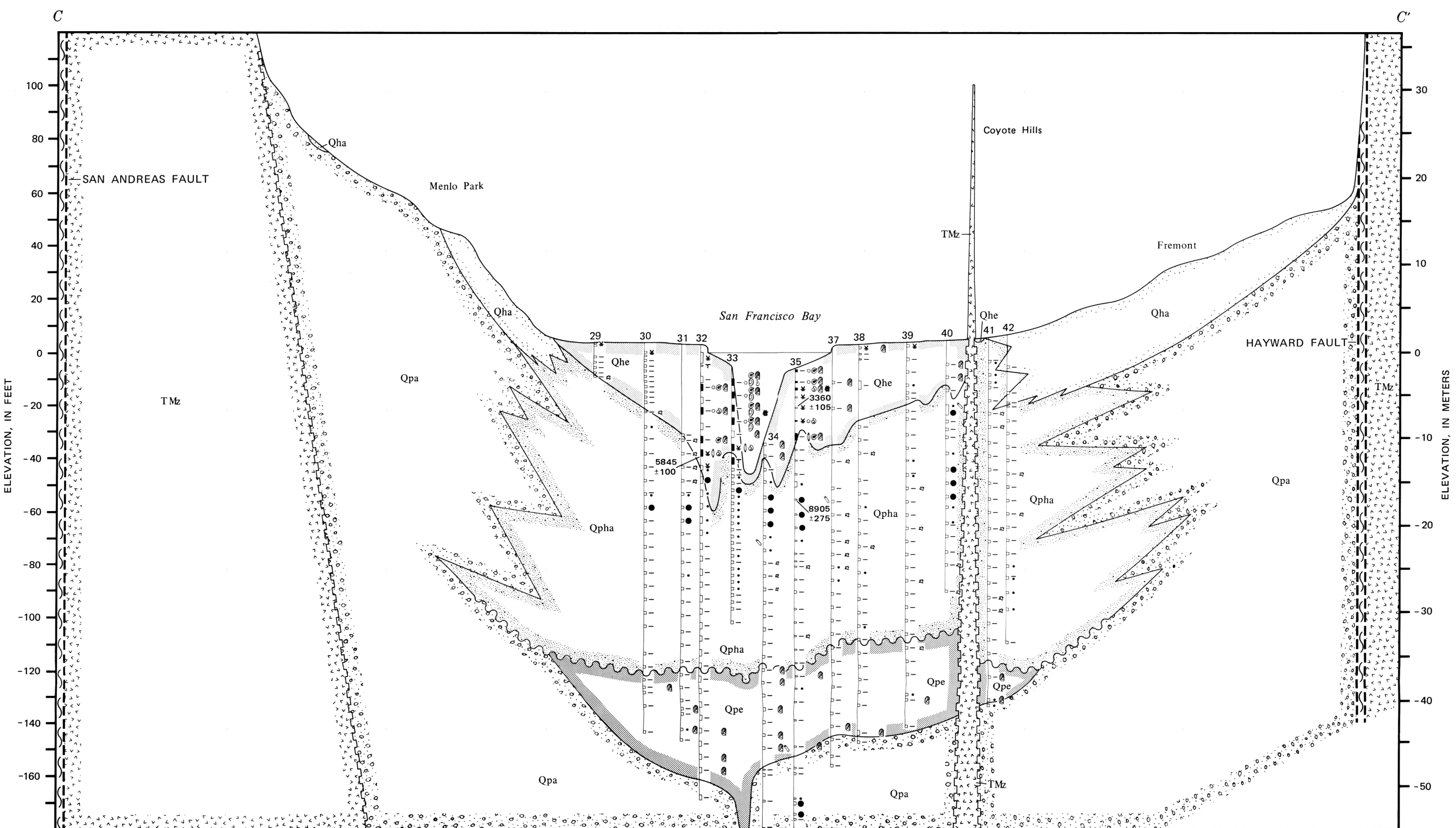
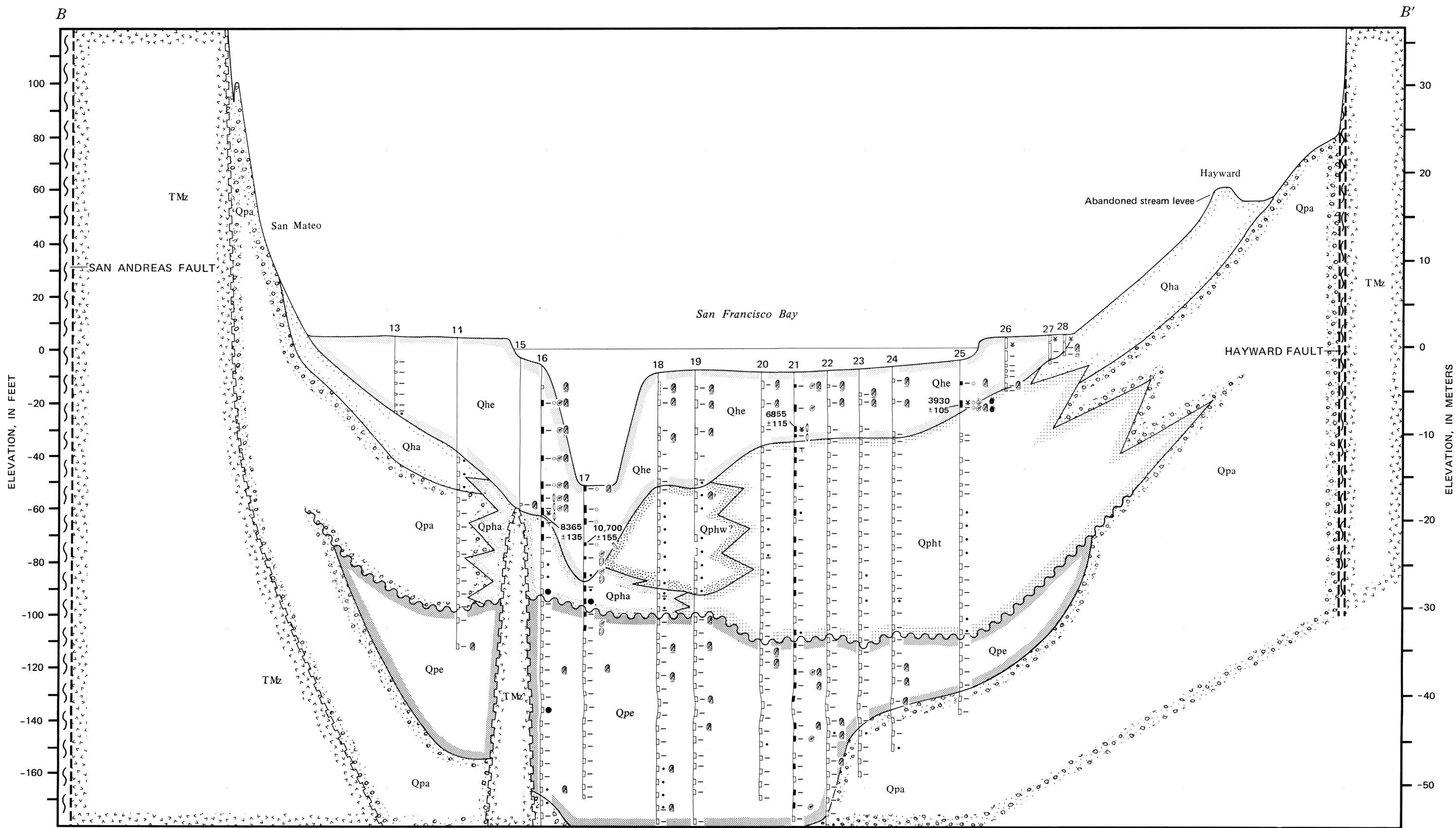
¹ BTC, State of California Division of Bay Toll Crossings; CDH, State of California Division of Highways; USGS, U.S. Geological Survey.
² Calif., California sampler (5 cm diameter); D and M, Dames and Moore Type U sampler (5 cm diameter); Davis, Davis sampler (2 cm diameter) (Bustin and Davis, 1969, p. 61); Rotary, rotary bit (5 cm diameter); Shelby, Shelby sampler (8 cm diameter).
³ Borehole not shown on cross section.
⁴ Upper part of BTC boring resampled by USGS with Davis sampler.



RADIOCARBON DATES OF SEDIMENTS UNDER SOUTHERN SAN FRANCISCO BAY

Borehole No.	U.S. Geological Survey No.	Isotopes, Inc. No.	Elevation, in meters	Dated material	Age, in ¹⁴ C years before present
35	4P	1-6475	-7.9	Peaty mud	3,360±105
6	28PCP1	1-6976	-34.4	Peat	9,330±150
5	30PCP2	1-6978	-39.9	Wood	9,670±155
6	31PCP3	1-6979	-56.7	Peat	>40,000
1	EQ 34	1-7730	-34.4	-do-	9,630±155
4	EQ 35	1-7731	-37.0	Peaty mud	8,160±250
16	EQ 36	1-7732	-18.7	-do-	8,365±135
17	EQ 37	1-7733	-22.3	Wood	10,700±155
21	EQ 38	1-7734	-9.2	Peaty mud	6,855±115
25	EQ 39	1-7742	-6.6	-do-	3,930±105
33	EQ 40	1-7743	-10.8	-do-	6,200±320
32	EQ 41	1-7746	-11.4	-do-	5,845±100
36	EQ 42	1-7747	-9.0	-do-	5,745±185
4	EQ 55	1-7814	-39.5	Wood	8,255±310
3	EQ 58	1-7817	-32.5	Peat	8,885±145
10	EQ 61	1-7820	-21.0	Peaty mud	8,295±125
12	EQ 62	1-7824	-11.8	-do-	6,485±110
11	EQ 82	1-7934	-24.6	-do-	8,230±135
2	EQ 85	1-7939	-37.5	Peat	9,280±155
7	EQ 86	1-7940	-27.5	-do-	>40,000
6	EQ 87	1-7941	-28.0	Wood	8,735±270
35	EQ 92	1-8088	-18.3	-do-	8,905±275

[Locations of boreholes shown on map; boreholes 3, 10, and 36 not shown on cross sections. Typical uncertainty in sample elevation is ±0.5 m. Datum is mean sea level. Dates prepared by James Buckley of Isotopes, Inc., 50 Van Buren Ave., Westwood, N.J. ¹⁴C half-life=5,568 years]



- DESCRIPTION OF UNITS
- Qhe Estuarine deposits (Holocene). On geologic map, pattern represents distribution of salt marshes about 1850
 - Qha Alluvial deposits (Holocene)
 - Qpha Alluvial deposits (late Pleistocene and Holocene; Wisconsin in part)
 - Qphw Eolian deposits (late Pleistocene and Holocene; Wisconsin in part)
 - Qphi Terrestrial deposits, undivided (Pleistocene and Holocene)
 - Qpe Estuarine deposits (late Pleistocene; Sangamon)
 - Qpa Alluvial deposits (late Pleistocene)
 - Colma Formation (late Pleistocene). Eolian, alluvial, and estuarine(?) deposits (Bonilla, 1959). Not shown in cross section
 - Merced Formation (Pliocene and early Pleistocene). Chiefly neritic and littoral deposits (Hall, 1966). Not shown in cross section
 - Santa Clara Formation (Pliocene and early Pleistocene). Not shown in cross section
 - TMz Bedrock (Mesozoic and Tertiary)

- SYMBOLS FOR SAMPLE DESCRIPTION
- Sample intervals. Vertical lines show boreholes
- Environment of deposition interpreted from color, texture, megascopic organic constituents, and bulk density or moisture content
- Environment of deposition interpreted from microscopic constituents in addition to above properties
- Sediment size
- Mainly silt or clay
 - Mainly sand
 - Pebbly sand or gravel
 - Peaty mud or peat
 - Silt or clay with sparse roots in growth positions
 - Sand with sparse roots in growth positions
 - Calcium carbonate or iron concretions
- Diatoms larger than 0.063 mm¹ : Centric genera, typically marine, include *Biddulphia*, *Cocconeis*, *Actinocyclus*, *Arachnodiscus*, *Isthmia*, *Melosira*, and *Hyalodiscus*; also *Aulacodiscus* (boreholes 1, 3, 4, 11). Pennate genera, indicative of freshwater to marine conditions, include *Combidiscus* and *Saracella*; also *Cymbella* (boreholes 1, 2, 4, 11), *Pleurosigma*? (boreholes 2, 11), and *Pinnularia*? (boreholes 1, 2, 6, 11)
- Environmental significance of diatom symmetry after Hanna (1944, p. 712)
- Number of centric genera exceeds number of pennate genera
 - Number of pennate genera exceeds number of centric genera. Underline indicates number of pennate individuals exceeds 1,000 per gram of dry sediment
- Foraminifers
- Salt-marsh assemblage
 - Trochammina inflata* predominant, calcareous species rare or absent
 - Shallow-water estuarine assemblage¹
 - Approximate paleobathymetry 0-10 m (Arnai and others, 1977). *Ammonia beccarii*, *Elphidium incertum*, *E. incertum obscurum*, *E. gunteri*, *Elphidiella hanna*, and *Trochammina inflata*
 - Deep-water estuarine assemblage
 - Approximate paleobathymetry 5-30 m (Arnai and others, 1977). *Bolivina striatula* and *Bulinimmina elegantissima* in addition to shallow estuarine species
 - Estuarine ostracodes¹
 - Cytheromorpha* sp.; also *Leptocythere* sp. (borehole 17), and *Cyprideis beaumonti*, *Megacythere* sp., *Hemicythere* sp., and *Perisocythere* sp. (borehole 33)
 - Estuarine pelecypods¹
 - Approximate bathymetry 0-20 m (W. O. Addicott, written commun., 1975). *Clinocardium nuttalli*, *Cryptomya californica*, *Macoma balthica*, *Macoma nasuta*, and *Ostrea lurida*; also *Plephidia*? sp. (borehole 33); barnacles (*Balanus* sp.) and bryozoans commonly attached. Underline indicates large number of shells. Parentheses indicate mold (shell partly or entirely dissolved)
 - Fresh- and brackish-water gastropods. *Valvata* sp. and an unidentified high-spired species. Fresh- and brackish-water pelecypod, *Pridium* sp., also present
 - Estuarine gastropod. *Odostomia* sp.
 - Seeds or achenes of marsh plants
 - Salicornia* sp.
 - Scirpus*? sp.
 - Detrital wood
 - Radiocarbon age of wood or marsh-plant remains in ¹⁴C years

- PLANAR FEATURES SHOWN ON CROSS SECTIONS
- Conformable or slightly disconformable contact. Hiatus 0-10⁴ years
 - Major disconformity. Hiatus 10⁴-10⁵ years
 - Angular unconformity. Hiatus 10⁵ years
 - Fault zone