stunted mesquite trees, patches of a species of rush grass, and a large species of cactus are occasionally met with."

In clear weather the high volcanic peaks of Las Tres Virgenes, near the eastern coast of the peninsula of Lower California, are plainly visible.

San Ignacio. Not far from the head of San Ignacio Lagoon, at the foot of gradually rising mesas, is the village of San Ignacio (formerly a mission), which numbers about 20 families. Near the village are extensive cultivated tracts of land in which are raised grain, all sorts of vegetables, sugar cane, dates, figs, olives, grapes, pomegranates, and many other fruits. A never failing supply of running water relieves San Ignacio from all fear of drought, and the only labor necessary is to keep the irrigating ditches open and gather the crops.

Anchorage. In moderate weather, good anchorage will be found off the entrance to San Ignacio Lagoon, in from 4 to 5 fathoms, sandy bottom, Point San Ignacio bearing N. 57° E. (NE. mag.), distant 3 miles. (View opposite page 33.)

From the shoals off the entrance to San Ignacio Lagoon the coast trends to the southward and eastward 40 miles, to San Domingo Point. Throughout the entire distance it is low and sandy and for 32 miles from San Ignacio Lagoon, a lagoon lies parallel to the shore, having a strip of sand beach about a mile wide (through which there are several passages) between it and the sea.

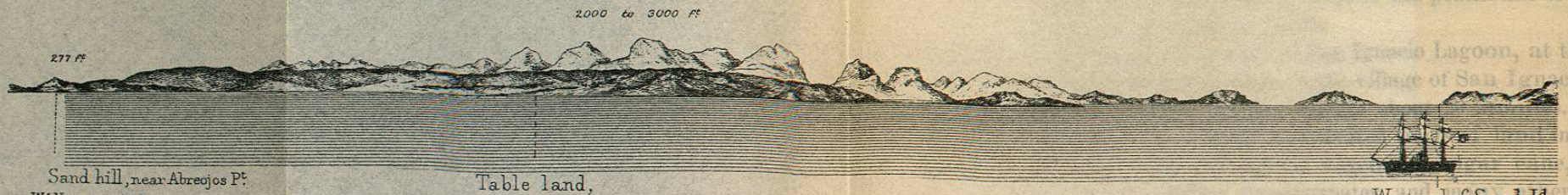
Extensive shoals extend off from the several passages into the lagoon, upon which the sea breaks heavily; the passages are narrow and shallow, and can only be used by boats in smooth weather.

Caution. The soundings off shore increase gradually, and the lead is a good guide in navigating along this part of the coast; the land being low, its proximity is not easily established, especially at night.

San Domingo Point. San Domingo Point is a remarkable perpendicular rocky cliff of dark color, 175 feet high, the cliff extending for several miles above and below the point. A short reef extends off the point in a south-westerly direction; at half a mile distance from the edge of the reef 15 fathoms water were found, sandy bottom.

Anchorage. Anchorage may be found to the eastward of the point, under its lee, in from 5 to 6 fathoms, half a mile from the

Plate VII.

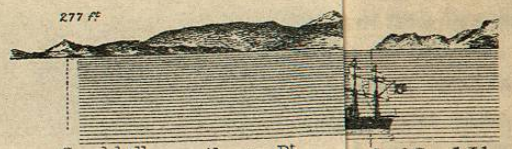


Ballenas Bay from the South-East.

The Coast off Point San Juanico.

Boca de San Domingo from the Bar.

Plate VII.



Sand hill, near Abreojos Pt
W½N. (mag.) 16½ m.

end of Sand Id
W. (mag.) 2 m.

Peak, N½W. (mag.) 19½

E. (mag.) 25½ m.

shore, where a vessel will find some protection from the prevailing wind.

The surf breaks heavily on the rocks at the foot of the cliff and unless the weather is quite moderate it will be found difficult and dangerous to effect a landing.

From San Domingo Point to Point San Juanico the coast consists generally of sand hills from 100 to 200 feet high with high table lands and mountains farther inland. Three and three-quarter miles to the eastward of San Domingo Point there is a break in the cliffs, through which is the entrance to a small lagoon. A shoal extends a short distance off this entrance, over which only small boats can pass. Lagoon entrance.

Twelve miles S. 64° E. (ESE. ¾ E. mag.) from San Domingo Point there is a rocky point with bluffs of a volcanic nature 15 to 30 feet high and a hill at the point 85 feet high. For about half a mile off this point the water is shoal with rocky bottom, over which the sea breaks. Outside the shoal the water deepens quickly, 12 fathoms being found within 2 cables and 22 fathoms at half a mile from its outer edge. Pequeña Bay.

After passing this point the land falls away to the northward for 1½ miles, whence it turns abruptly to the eastward for about 3 miles and then gradually sweeps around to Point San Juanico, forming Pequeña Bay, in which vessels may find shelter from the prevailing coast wind by anchoring to the north-eastward of the point, a mile from the shore, in from 5 to 6 fathoms. On the north-eastern shore of the bay is an estero, which at the time of the *Narragansett's* visit had no opening to the sea.

Point San Juanico is a sand bluff about 50 feet high, resting on a bed of conglomerate. (View on opposite page.) About 2½ miles north-westward of the point a shoal makes off from the land from half to three-quarters of a mile, its outer edge lying nearly parallel with the coast until after passing the point, when it gradually trends toward the shore, terminating about 1¼ miles eastward of the point. Point San Juanico.

About half a mile to the eastward of San Juanico Point is the entrance to the lagoon of the same name. The entrance is narrow and only about 3 feet of water will be found on the bar at low tide. The lagoon extends about 6 miles in a northerly direction and is widest in its northern part. It has an average depth of about 2 fathoms, but San Juanico Lagoon.

is much cut up in its southern part by shoals and sand bars. Small coasters drawing 6 or 7 feet enter it, crossing the bar at the highest spring tides. Considerable orchilla is gathered near the shores of this lagoon.

Orchilla.

Anchorage. Vessels may anchor to the south-eastward of Point San Juanico in 5 to 6 fathoms, about a mile from the shore, and find some protection from the coast wind.

Sulphur spring. Not far from the shore, on a barren hillside, is a spring, the waters of which are slightly sulphurous. Large numbers of snails are found in the vicinity, the dead shells appearing like a light layer

Abalones. of snow on the ground. On the rocks near the shore are numbers of abalones (an edible mollusk).

Sierra de la Giganta. When off the coast the famous peaks of the Sierra de la Giganta, over 5,000 feet high, are distinctly visible, overtopping the intervening ranges of mountains.

From Point San Juanico the coast trends to the eastward for a short distance and then curves around to the southward; 10 miles below the point the hills and table-lands cease; thence to Cape San Lazaro the coast is low and sandy, with high land many miles in the interior.

Boca de la Purissima. Eleven miles S. 43° E. (SE. ¾ E. mag.) from Point San Juanico is the Boca de la Purissima, which is open to the sea only during the rainy season. The valley through which this stream runs is narrow but exceedingly fertile.

Mission. The old mission of Purissima, now a village of 20 or 30 houses with about 250 inhabitants, lies on the bank of this stream about 10 miles from the sea.

Products. Only a small portion of the land near the village is under cultivation, but cotton, sugar-cane, wheat, vines, figs, oranges, peas, beans, &c., are raised almost without labor.

The *lomboi*, a peculiar plant, found nearly the whole length of the peninsula, flourishes here. It is a small tree with soft brittle wood, thick, clumsy branches and twigs, with leaves sparsely distributed. On cutting the twigs or branches a very fluid, milky-looking sap exudes abundantly. This sap on being exposed to the light and air turns black as promptly as a solution of nitrate of silver, and is equally indelible.

Mescal. One of the principal occupations of the people in this vicinity appears to be the manufacture of mescal or pulque, a strong, highly alcoholic liquor made from the sap of the maguey plant (a species of aloe). The plant is taken just

as it is about to send out its flower-stalk and all the leaves cut off, leaving a core not much larger than a man's head. This is crushed, the sap allowed to ferment, and is afterward distilled. The liquor thus obtained is as limpid and colorless as water, but is excessively alcoholic and has a harsh, rasping taste like new whisky.

Boca de Comandu. Seven miles to the southward of Boca de la Purissima is the Boca de Comandu. Like the former, it is open to the sea during the rainy season only. The ancient mission of Comandu is about 25 miles distant, near the headwaters of the river, in a fertile valley. Further information about Comandu and the surrounding country will be given further on.

Boca de las Animas. Boca de las Animas is the northernmost of three entrances to a series of lagoons that, commencing about 5 miles south of Boca de Comandu, extend the entire distance to Magdalena Bay and are connected with it. These lagoons lie nearly parallel to the coast and are connected with one another; they are separated from the sea by a narrow strip of sand and are used by the small, light-draught coasting vessels.

The Boca de las Animas is about three-quarters of a mile wide and is encircled by a shoal that extends half a mile off shore, over which the sea breaks. The best channel is on the southern side, near the beach, where 3 feet of water will be found at low tide. As soon as the bar is crossed the water deepens to 3 and 5 fathoms. The lagoon in this vicinity is filled with shoals and islands, and branches off in all directions; its shores are covered with a thick growth of mangroves.

Tides. The tide rises between 5 and 6 feet.

Variation. Magnetic variation 10° 35′ E. in 1876.

Boca de San Domingo. Boca de San Domingo is the middle one of the three entrances before mentioned, and is 9¾ miles south of Boca de las Animas, the coast between them being a low sand beach, with occasional low hills and a few bushes. It is three-quarters of a mile wide with a shoal extending a mile off the entrance. The best channel is through the middle of the entrance, the breakers on either side plainly marking it; a high mountain 50 miles distant makes an excellent leading mark. (View opposite page 33.)

The least depth on the bar at *low water* is 2½ feet; tides rise 5 feet.

Boca de Soledad.

Boca de Soledad is the southernmost and deepest of the three entrances into the lagoons, and 13¾ miles to the southward of Boca de San Domingo. It is not over half a mile wide, and is marked on either side by a ridge of sand-hills 50 to 100 feet high. From its southern side an extensive

Shoal.

shoal, over which the sea breaks, extends off to the northward and westward 1½ miles. From the northern side the breakers do not extend far from the beach.

Directions.

To enter, approach from the northward, keeping close to the line of breakers making off from the northern side of the entrance; following this line the shoalest part of the bar will be crossed, on a southerly course, in 9 feet water, *at low tide*, and when midway between the two points of the entrance, the course at this time being easterly, there will

Tidal current.

be from 5 to 8 fathoms water. The tide runs at a rate of from 4 to 5 knots between the points of the entrance, and

Variation.

rises about 5 feet. The magnetic variation in 1876 was 10° 30′ E., increasing about 2′ annually.

Between Boca de San Domingo and Boca de Soledad the lagoon has numerous inlets to the eastward.

General remarks.

The description that has been given of the entrances to the lagoons refers to them at the time of the *Narragansett's* visit in 1874. There is good reason to believe that the shoals and bars at the entrances are subject to occasional changes, necessitating a previous examination before attempting to enter. At high water and in moderate weather the channels are plainly marked by the smooth water between the lines of breakers. At low water and in heavy weather the breakers will extend farther out and sometimes across the entrances.

Wells.

On the plains fronted by the lagoons there are many wells furnishing a permanent supply of good water, and there is no reason why, by digging wells for irrigation, the whole plain should not be cultivated.

Remarks

J. Ross Browne in his report makes the following remarks: "Should a successful colony ever be located on the peninsula of Lower California, it must be on this plain. Here is the only tract sufficiently large for a large enterprise of such a kind, that comprises the other requisites of a good soil free from stones and good water accessible in sufficient quantities."

Cape San Lazaro.

The coast south of Boca de Soledad retains the same general character as that to the northward, being low and sandy, until reaching Cape San Lazaro, which is a high, remarkable looking headland of volcanic origin, which can be seen for many miles, and when first made out appears like an island. About this headland are bold rocky cliffs, with high rugged mountains immediately back, the highest being 1,270 feet high. There are numerous outlying rocks along the shore, extending off a quarter of a mile on the northwestern and south-eastern points of the headland. (View opposite page 41.)

From the cape proper the coast trends about south-east 3½ miles to a low rocky point, from which it turns abruptly north for 2 miles to the mouth of a small lagoon.

Santa Maria Bay.

Between Cape San Lazaro and Cape Corso the coast recedes considerably, forming Santa Maria Bay, which is 4½ miles deep from a line drawn between the two capes. The land around the bay is merely a sand beach interspersed with low sand hills and a few bushes, separated from the mainland by the lagoons connecting with Magdalena Bay. The soundings in this bay are very regular, increasing gradually from 3 fathoms near the shore to 20 fathoms at its outer limit.

Anchorage.

Good anchorage will be found in from 5 to 8 fathoms water, sandy bottom, near the western shore of the bay, at from half to three quarters of a mile from the beach, where a vessel will be well protected from the prevailing winds.

Abalones, fish, &c.

Abalones can be found in abundance along the shores, and fish abound in the bay.

Cape Corso.

Cape Corso is a bold, rocky point, fronted by white sand bluffs from 70 to 80 feet high, upon which, in marked contrast, dark-colored hills rise abruptly to a height of 600 feet and upwards.

From Cape Corso to Entrada Point the coast is a succession of rocky points and intervening sand beaches, with numerous detached rocks close to the shore. The land rises abruptly to a height of from 500 to 1,000 feet and over, Mount Isabel, the highest peak, being 1,592 feet high.

Entrada Point.

Entrada Point, at the north-western side of the entrance to Magdalena Bay, is a dome-shaped hill about 200 feet high, connected with the mainland by a narrow strip of sand and rock, which is but a few feet above high-water mark. There are several outlying rocks from 10 to 20 feet high

quite near it, and a reef makes off to the south-east about 300 yards, over which the sea generally breaks.

Cape Redondo. Cape Redondo is the westernmost point of Santa Margarita Island, and is a round, rocky headland nearly 100 feet high, the land rising rapidly back of it to a height of over 500 feet.

Reef. A reef extends off to the westward from the cape a distance of 600 yards, its outer limit marked by a rock *awash*. The sea breaks over this reef in all weathers, although Lieutenant Tanner observed an interval of two hours, including the last of the flood and the first of the ebb, in which there was no break on the outer rock; it was perfectly calm and the sea smooth at the time. Lieutenant Tanner also says: "I observed at the beginning of the flood a heavy overfall at least two cables off from the extremity of the reef, where Lieutenant Taussig found from 7 to 9 fathoms of water."

This may account for the rock reported near the middle of the channel.

Magdalena Bay. Magdalena Bay, one of the most spacious and safe harbors in the world, is about 15 miles long, north-west and south-east, and 12 miles wide. At its north-western limit it is connected with a series of lagoons (already mentioned), which extend in a northerly direction upward of 60 miles. At the junction of these lagoons with the bay there are several shoals and sand bars, the depth of water in the channels between them varying from 4 to 8 fathoms. Whaling vessels have ascended these lagoons for a distance of 40 miles from the bay.

Numerous small lagoons are scattered along the northern shore of the bay, and shoal water extends off from that shore from 1 to 2 miles.

At the south-eastern limit of this great bay it is connected by a navigable channel with another large bay, called Almejas or Lee Bay, which will be described hereafter.

Entrance. The entrance to Magdalena Bay is between Entrada Point and Cape Redondo, and the channel between the reefs that make off from either point is 2½ miles wide, with from 10 to

Directions. 20 fathoms water and no hidden dangers. It has usually been recommended to keep well over toward Entrada Point in entering, but there is no reason why a steamer should do so, as the channel is clear to within half a mile of Cape Redondo. With a sailing vessel it is well to keep well up

toward Entrada Point, as both the prevailing wind and the current tend to set her down toward Cape Redondo.

Anchorage. To reach the best anchorage, at all seasons, follow the land to the north-westward from Entrada Point, keeping at a distance of three-quarters of a mile from it, to Man-of-War Cove, and anchor in from 8 to 10 fathoms water, abreast of some houses that are near the beach, 7½ miles from Entrada Point.

Remarks. The following remarks by Capt. W. H. Parker, P. M. S. S. Co., will be found useful when making for the anchorage in Man-of-War Cove *in the night:*

"Having rounded Point Entrada, half a mile distant, haul up along the land to the westward. From Point Entrada to Mount Isabel the land is only tolerably high. Mount Isabel is the first high land after entering, and when that is abeam the shoal or sand spit running off from the low point (the only danger) 3 miles inside of Point Entrada *is abaft the beam*, and you can haul up with safety for Cove Point. Thence to Cove Point the land is high, gradually sloping toward the point.

"The land recedes a little from Entrada Point to the sand spit.

"You cannot fail to make Cove Point distinct from the land back of it. Run close to it, and follow to the anchorage, which is directly off the houses. Anchor in 8 or 9 fathoms water, one-third of a mile from the beach.

"The land back of the houses is high, with low land to the right."

Anchorage. In the winter months, with *southerly winds*, good anchorage will be found in the southern part of the bay; the chart is sufficient guide for picking out an anchorage. The *lead* should, of course, be carefully attended.

Tides. The tides in the bay are regular and cause strong currents through the entrance (from 1 to 2 knots per hour). It is H. W., F. and C., at Man-of-War Cove at VIII^{h} 25^{m}. Springs rise 5½ feet, neaps 4 feet.

Variation. The magnetic variation is 10° 25′ E. (approx.).

Remarks. Fresh water. In the summer season the only regular supply of fresh water is obtained about 40 miles from the bay, near one of the northern lagoons. Small vessels make regular trips for the express purpose of bringing it to the settlement. There are several places marked on the charts of the bay as water-

ing places. This is accounted for by the fact that water of *inferior quality* was obtained by whalemen by sinking a cask in the sand on the beach. This is done by removing the heads of the cask and working it down, removing the sand from the inside until a sufficient depth is reached for the water to ooze in freely, and can be bailed out conveniently.

The water obtained in this way was of a milky-white appearance, and had to settle a few days before it became clear and drinkable.

There is said to be a spring of excellent water near the southern end of Santa Margarita Island.

The bay is bounded on the south by broken ridges of mountains, which separate it from the ocean. On the north a low sandy country, dotted with low bushes and patches of

Orchilla.

cactus, spreads out as far as the eye can reach. Orchilla is found in great abundance, the gathering and shipping it to

Fish, game, wood, &c.

San Francisco being a profitable business. Fish, oysters, clams, mussels, and abalones are abundant in the bay and lagoons, and there is plenty of game on the northern shore. Plenty of wood may be obtained, the shores of the lagoons being covered with a thick growth of mangrove bushes.

A remarkable phenomenon which occurred during the *Narragansett's* visit in 1874, and is said to occur frequently in the bay, is the appearance of vast numbers of shrimps, from one to two inches long, giving the water a crimson color. The tide receding leaves the shore covered with thick layers of them, on which the sea-birds feed, and at times the atmosphere is filled with the stench arising from their decomposition.

Settlement.

At the time of the *Narragansett's* visit there were about 10 houses near the beach on the west side of Man-of-War Cove, one of which was used as a *custom-house* and the others occupied chiefly by men engaged in collecting and shipping orchilla.

Trail to La Paz.

A rough trail leads through a barren and almost level country to La Paz, a distance of about 115 miles.

Santa Margarita Island.

Santa Margarita Island is a high barren island of volcanic origin, $21\frac{3}{4}$ miles long and of varying width, being $4\frac{1}{4}$ miles wide at its widest part. It presents a bold rocky face its entire length, except a small space in the center, where the land recedes somewhat, forming on the south side an open bay called Pequeña Bay; the land hereabout is low and

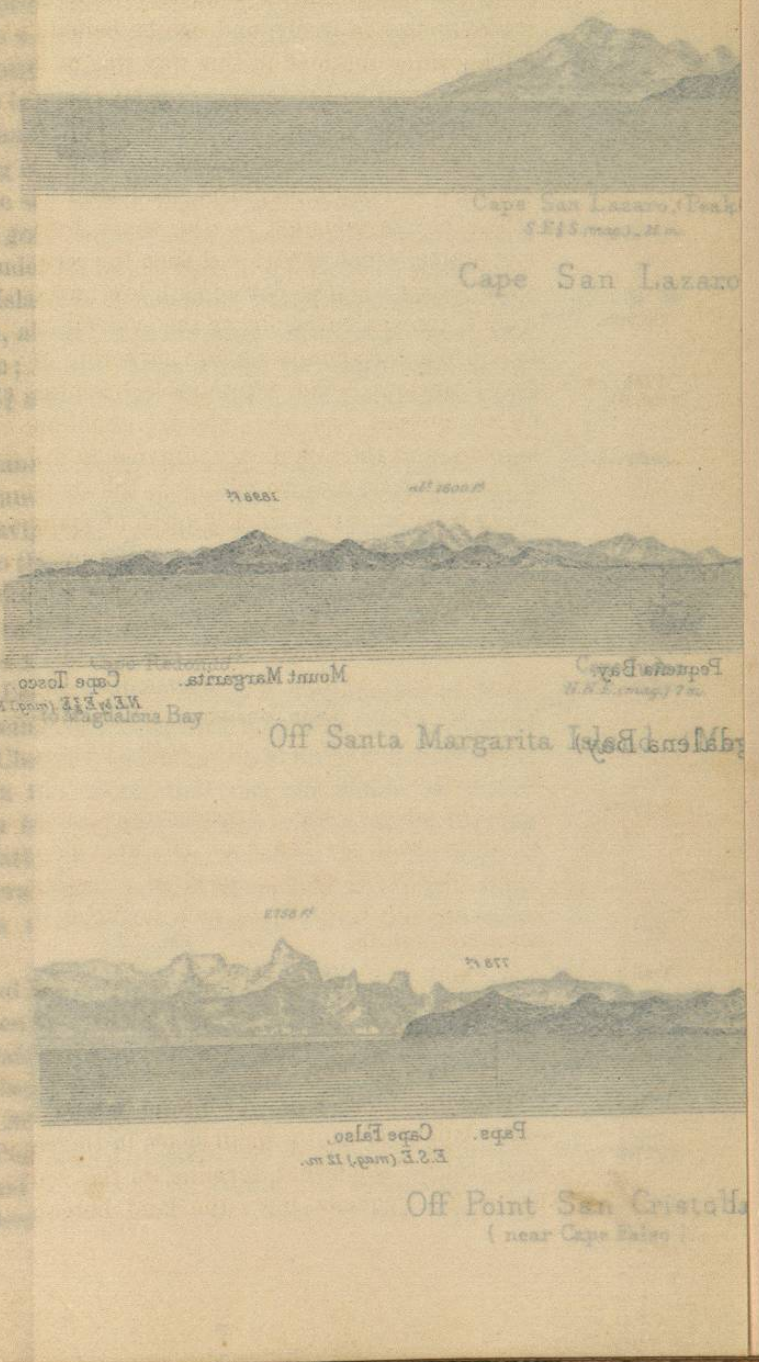
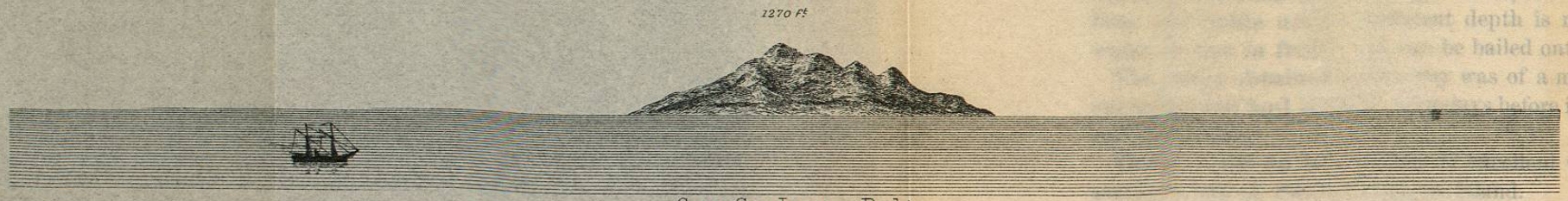


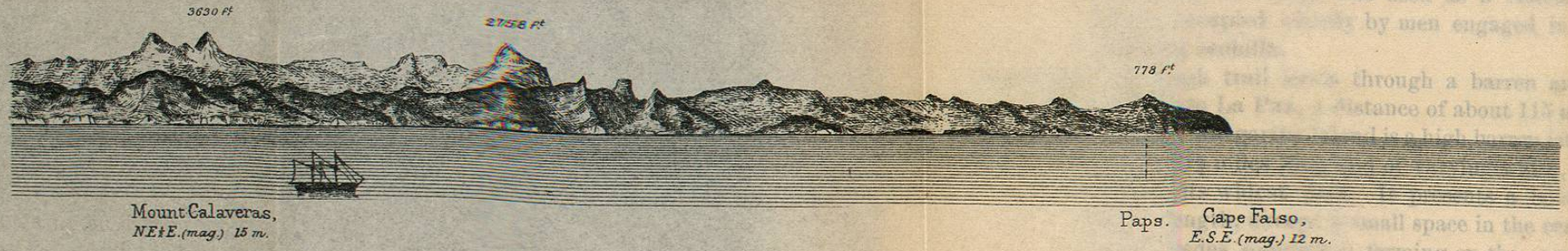
Plate VIII.



Cape San Lazaro, (Peak),
S.E ½ S. (mag.) 25 m.

Cape San Lazaro .

Off Santa Margarita Island . (Magdalena Bay)



Off Point San Cristobal ,
(near Cape Falso).