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A. F. Rodgers.

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Give here full address to which reply should be sent: San Francisco Cala

U. S. Coast and Geodetic Survey,

North San Diego

September 1st 1887.

Mr E. M. Thorn
Supt: U.S. Ctg Survey
Washington D.C.

Sir: Having closed my examination of San Diego bay & vicinity in accordance with your Instructions & the measure of my allotment for Physical Hydrography I have the honor to submit the following

If a Comparison of San Diego bay as we see it to day & as it was originally formed were entirely possible it would be both interesting & instructive.

From my Observation it seems plain to me that in the dim past what we know as San Diego & False bays were undivided, an indentation in the Coast line extending to the present southern limit of San Diego bay & North to the Northern edge of what we call False bay. At some period when

When the land rose from the water or the Ocean receded — Successive & deeply marked Sea benches all along the Coast clearly point to such epochs in Natures labratory — this original Coast indentation was bordered seaward by four islands the present "St Loma" the largest & most prominent, the other three would perhaps be more appropriately termed "islets" Two of these islets were east of the present entrance to the bay & are covered upon the Coast Survey Chart 606 by the words "THE ISLAND" There are there in fact, two distinctly outlined islands originally separated by what is now called "Spanish Bight" These two are joined by a con=necting Sand Spit over which the Ocean still rolls its higher waves at each high water. The fourth island is quite small as compared in area with the others being about one mile long and a fourth mile in width. It is joined to the Main land at the extreme south

End of the bay by an extension of the Sand Spit which including & partly Enclosing the other two islands mentioned forms a somewhat unstable barrier against the beating of the sea & extends in all 9 miles south from the present entrance to San Diego bay. That these islets were above the surface of the ocean before the formation of the sand spit which now connects them, appears too plain to need argument. They are as much & no more the creation of ocean implements than the adjacent land to which their structure & materials show them to be closely allied.

The epoch of sand spit building was probably the same north & south of the Loma & the waters of the northern part of San Diego inlet were probably impounded at the same time, leaving the inlet then with two entrances one north & the other south of the Loma, the latter standing as an island, unconnected with the mainland. Its later connection

with the main is due to the sediment bearing waters of the so called San Diego River. The normal debouchure of this river, flowing through the strongly marked high bordered cañon known now as "Mission Valley" was the north end of San Diego Inlet, which it first wrecked & then separated from its southern connection - thus making the divisions now known as San Diego & False Bays. The effects caused by the freshets of the river being poured into San Diego Bay are marked by the delta or marshes & shoals which extend out toward the edge of the main channel south of "Old Town" as shown upon Chart 606

Former Areas of San Diego & False Bay
& the Present Channels

Taking the original formation which I have outlined as a basis of measurement I find that the former inlet south of Point Loma measured from bank to bank contained an area of 26 square miles

This measure is practically identical with the present high water area of San Diego bay. That much of this area was originally covered by water of considerable & not in general great depth is suggested by my observation elsewhere. The marshes of San Francisco bay, first formed as shoals, wherever they have been seen or piles frequently show mud or sediment deposits from 50 to 100 feet in depth. Looking at the shaded portion of Chart 606 and measuring the thread of channel which now reaches from the entrance at Ballast Point to the north end of the bay starting at the entrance with a depth of 60 feet & diminishing to "bare at low water" I find a channel area of less than four square miles. The northern end of the original inlet now False bay, contains within its banks an area of four square miles, of this area nearly three fourths is now laid bare at each low water and

The bar in front of its entrance instead of being pushed seaward & graded down by the healthy pulsations of its original tidal reservoir, nearly joins the beach line & has a depth of little over two feet upon its crest at low water.

Entrance San Diego Bay

Point Loma which I have described as a former island, is 6 miles long & averages a mile in width with a height above sea level of 450 feet. East of the southern point of Point Loma is formed the bar of San Diego bay, which is so protected from the prevailing N.W. wind by the high lands of the Loma & by the fringe of kelp which extends south from the point, that on ordinary weather no change of water motion would be noticed in passing over it. From the crest of the bar to the entrance between Ballast Point & the opposite Sand Spit is one & a half miles. The sides of the outer channel between the bar & the entrance are flanked

on the West by Point Loma & upon the East by the Zeeninga Shoal. The highest point of this Shoal is barely awash at low water.

The Effective width of this outer Channel is approximately 3/8 of a mile.

Approaching the entrance from outside the Harbor, Ballast point appears to project half way accross the normal Entrance, leaving a little over 1/4 miles width between it & the opposite sand Spit. From the Character of the Material forming Ballast point & from other evidence I am convinced that Ballast point is an old formation and the opposite sand Spit comparatively new. Ballast point now appears to project into the Channel because the more yielding material on either side North & South have been eroded away thus leaving the sharp curves which appear on its Bay & Ocean faces

Main Channel San Diego Bay

The Main Channel of San Diego bay bends closely round Ballast point & under

& under the high land of the Loma. In entering the bay, passing Ballast Point it turns sharply to the West, then North & gradually bends to the East & South in a crescent form until at its Southern extremity its axis is in the Meridian. Narrow & deep at the entrance it here averages a width of 3/8 of a mile in the first 5 miles inside the entrance & from 1/4 to 1/8 from the 5th to the 13th mile from the entrance where it terminates & is lost in the shoals formed at the South end of the bay. In the first six miles inside the entrance the channel will average 35 feet at low water & from the 5th to the 13th mile the depth gradually diminishes from 30 feet to 5 at low water.

Shoals

Just a prominent feature of the San Diego bay formation is the Zuniga Shoal outside the entrance. This shoal projects South from the sand spit opposite Ballast point one mile westward

and very close to the surface at Low Water, it still extends one mile further gradually increasing in depth until it fades into the Bar formation with the depth of which & its position & width it probably has much to do. It has been feared at times that the Embryotic channel marked upon Chart 606 at the shore end of Zuninga Shoal would develop to the great detriment of the main channel.

The present most serious obstacle to the Easy Entrance of San Diego bay by vessels of the largest class is the Middle Ground or Shoal which makes southwardly from the island side of the channel down toward Ballast Point. I look upon this Shoal as the most vulnerable point in the San Diego bay formation, should it continue to increase in extent its effects must be disastrous. The formation of this Shoal is I think largely due to the erosion behind Ballast point; into this curve the Ebb tide moves rapidly & before

been its course direction & makes exit to the Ocean round Ballast Point. Eddies are thrown out across the normal channel, the ~~[illegible]~~ current in the latter is checked and sediment precipitated to form the Middle Shoal. The original channel of San Diego bay, its normal opening I think extended from the present extremity of Ballast Point across to the Western edge of what Chart 606 calls "The Island". Examination of the entrance suggests to me that the present marsh formation & the sand banks at the extreme West end of the Island are comparatively new and and are due to the same generic cause as the formation of the Middle Ground Shoal, namely, the eroded curve in the Coma shore line behind Ballast Point.

San Diego City & Coronado

My reports from time to time while I was stationed at San Diego gave information of the remarkable progress of population & building both in that place & in Coronado on the opposite side of the bay. The tracings

which I have forwarded will illustrate the building area & its comparison with former years. The City of San Diego is spending large sums in street grading & sewering. Heretofore there were no sewers, surface drainage & cesspools being the alternative. The so called Waring System has been adopted, a specialization of which is the small size of the sewer pipes combined with a method of daily automatic flushing. Coronado across San Diego, fostered by a syndicate of capitalists & the large expenditure of money to develop its possibilities will in all probability in a few years have as large a population as San Diego now has, its water frontage is quite as available for shipping & its land connection with the main ways made for Railways round the northern end of the bay.

These two settlements, San Diego & Coronado equipped as they are with all the latest modern mechanical appliances for rapid filling in & building out are reaching towards each other & contracting

the channel of the bay at a vital point.

That the deepest part of a tidal channel will become deeper, when the bottom is of yielding material, and obstructions are placed upon its sides, seems convincing proof to enterprise that such obstructions are as beneficent in their physical effects as they are profitable to their immediate projectors. The effect of the naturally narrow channel way between San Diego & the Coronado side is readily seen in the 7 fathoms deep shown upon Chart 606 and the rapid shoaling up southward to 4 1/4 fathoms. These effects will be repeated as the so called improvements narrow the waterway in front of San Diego & Coronado. The deepening only will be commented on & the shoaling not noticed until it threatens to stop navigation.

Towns Vicinity of San Diego

The number of towns laid out contiguous to San Diego are many - I mention "South San Diego" at the southern end of the bay which is as yet more a project than a fact

Running North from South San Diego along the Eastern side of the Bay we find National City a well established Suburb of San Diego & the present terminus of the California Southern Rail Road. It is destined at no distant day, I think to be joined to San Diego by continuous lines of buildings & under a common municipal government.

Going North from San Diego, "Middle Town" is laid out, but its limits are not well defined, & its population very limited, & adjoining "Middle Town" on the North is "Old Town" popularly so known, though officially called "North San Diego" The fair-buildings of this former San Diego, adobes with tiled roofs date back into the last century, the town looks its age, both old & decrepit. Its population is under 500 with quite a proportion of its number the descendants of former Mexican occupants. Following the shore of the bay from Old Town toward the entrance, skirting the low, partly tide covered at high water lands between the

San Diego Main & the Coed outlines of the Loma we Come to the Corders of "Rose-Ville" which exists as a town plat carefully laid out upon the ground & represented on paper. The only house within the limits of Roseville is known as "Roseville Hotel" Its location is determined trigonometrically

This Hotel is not occupied & the town has no present population except it native Rabbits, Squirrels & Coyotes, adjoining Roseville on the West is "La Playa" literally "The Beach" which in name seems to extend indefinately toward Pt Loma

The site of this Village seems to stretch from the Collection of Fishermens huts, shown upon the entrance tracing which I had the honor to foward August 20th & to include the site of the former Village of La Playa as shown upon Chart 606. The former Village has no existence now — there is but one house left, that was never a dwelling & is not now occupied for any purpose

A prominent Object in the Old

Site of the Village of "La Playa" is a "Pepper tree" marked upon the tracery of the entrance. This Pepper tree is specially entitled to notice as being the only tree of any kind upon the Loma. The next buildings in sight West of "La Playa" are the white washed Government buildings, two of them upon Ballast Pt & three other upon the Loma, these are prominent objects from their glistening whiteness in the sunlight. Four hundred & thirty feet above the Ocean & half a mile from the southern extremity of Pt Loma is the Pt Loma Light House. This is illuminated with a 3d Order, fixed, white light, visible 24 miles. Light House authority places the lantern of Pt Loma L.Sto 462 feet above tide. Going North from Pt Loma Light-House, neither towns nor houses are met with until the southern extremity of False bay is reached & here upon the comparatively level land at the foot of the Loma & South of the False bay entrance we find a City in Embryo "Ocean Beach"

"Ocean Beach" is laid out upon lands formerly a part of the "Pueblo of San Diego" The street lines are marked by stakes & the streets themselves, carefully cleared of the native sage brush & undergrowth, may be plainly seen in plan, looked down upon from the higher levels of the Loma. The present buildings within the City of Ocean Side are an Hotel nearly completed, intended to contain 60 rooms & two or three more informal buildings

Beside the laborers employed in Public works, the present population does not I think exceed four or five persons.

Quite an encouraged excitement was caused in selling $100.000 worth of town lots in Ocean Side by the discovery of "Fresh water" in the sands close to the surface & within two hundred feet of the Ocean.

This fresh water is evidently found in a former bed of the San Diego river through which the water still percolates in its journey from the mountains to the

Sea, though its route is surface covered & hidden from casual observation.

Beds of Cobble Stones

A notable feature of the formation of the high lands round San Diego bay is the presence at all elevations of Cobble beds

The manager or agent at Ocean Side informed me that in boring for coal of which there are indications on the Loma that forty feet below the surface he encountered a bed of cobbles which proved 75 feet deep

The former "Presidio of San Diego shown upon Chart 606 North of "Old San Diego" at the bend of the San Diego River (the buildings & enclosure there shown upon the chart have no longer existence) was underlaid by a cobble bed apparently 40 or 50 feet thick, the erosion of the river party exposed this bed in a bluff point & the U.S. Engineers availed themselves of its use to furnish a cobble facing & berme for the dam built by them to control the flood waters of the San Diego River.

The San Diego River

This so called "River" is for at least 6 months in the year apparently a river of dry sand filled with glistening grains of Mica. During some years of excessive drouth it fails altogether to reach the Ocean as a surface running stream. At winter times of continuous heavy storms it becomes a torrent & fills Mission Valley through which it runs from bank to bank. That it always runs below the surface many facts evince.

The City of San Diego & Coronado opposite, draw their present supplies of water from this apparently dry river bed. Sub surface tanks are filled by gravitation & the water pumped thence into a hill reservoir, near "Old San Diego" & thence carried by pipe line to San Diego & accop the bay to Coronado. I have endeavored in the above to cover the general requirements of the Circular entitled "Instructions & Memoranda for Descriptive Reports &c & beg to submit it.

Very Respectfully
Hug. F. Rodgers
Hist. Hydro.