INCREASE OF DEPTH TO SOUTHWARD.

4th. At two miles to seaward from point Adams, west, is found five and one-half fathoms.

At two miles to seaward from Grimes' house, west, is found eleven fathoms.

At two miles to seaward from Tillamook Head, west, is found thirty fathoms.

At five miles to seaward from midway between Tillamook and False Tillamook Head, west, twenty fathoms.

At two miles to seaward from False Tillamook Head, west, is found thirty-two fathoms.

We notice that the average ratio of increase of depth to the mile off shore on *southern sheet* is found to be five fathoms or thirty feet.

The average ratio of increase of the depth to the mile off shore *on the northern sheet* is found to be three and five-eighths fathoms, or about twenty-two feet.

The silt, borne out by the river current, has been deposited as an average on the ocean floor northwest, eight feet deeper than on the ocean floor southward of the channels.

Commander Coffin adds:

5th. "Outside of four or six miles are coast currents parallel to the shore line, to the southward in summer, and northward in winter, whose velocities are very dependent on local winds, which, when strong, often reverse the current.

"*Inside* of five to six miles, the currents seem to be governed by the outflow and inflow of the Colsmbia (south of Cape Disappointment)."

6th. "The distance outside the bar at which discolored water may be seen, varies with circumstances. Good signs to the navigator are the strong tide rips met with off the bar, and to the northward and southward of it—sometimes as far as ten or fifteen miles, but rarely more than five or six miles to seaward of the bar."

These official tables are not only valuable to navigators, but also to all persons, who wish to estimate the currents and deposit of sands at the mouth of the Columbia.

Standing on the steamer deck in November, 1880, in line with Tillamook Head and Cape Disappointment, while crossing the bar, it seemed plain that the Columbia had pushed and held both its channels out to the very front of the shore line, and then poured its vast flood of waters with their floating silt, upon the broader ocean currents to be borne away. The tables quoted show this to be the fact. Every year adds a large increment to these currents of discolored water, whose contents must be sifted through the sea waters upon their ocean bead.

The sea and river flow, which meet and form the bar of the sand and silt will never be less, but they must be more, as the soils of the valleys and hills are stirred by the plough, and miner's shovels, and the plash of steamer paddles, breaking down river banks. Doubtless the Columbia will continue to plough its channel out plumb to the coast line.

PROBLEM.

Can the Columbia cut away the shelf or south point of the middle sands and its silt seaward far enough to be borne off by the ocean current. A like process has been going on, resulting in repeated bars, sand spits and islands, until a deep channel has, as we have seen, been made to the sea line. The more sluggish Yukon of Alaska, spreads its mouths through a delta of seventy miles in width, and allows its best channel to wind through this broad alluvium, hardly more than six to ten feet deep.

The Columbia's more rapid flow carries its channel thirty feet deep out to the sub-marine spits and banks which form the bar.

The problem of cutting a deep channel through the middle sands south of the breakers, cannot be solved by dividing its force into two or or three channels. Its natural trend has pressed Sand island and the middle sands to the northward. Its re-curve or swing, trends across the south spit or shelf of the middle sands, as a new southern or central channel, deep enough for our largest merchant ships.

PERMANENCE.

Such a channel will no doubt continue, if its southern bank or wall is held firm. The process of piling and rip rapping on Clatsop spit, as suggested by Col. Gillespie, seems to be the true and wise method to secure the southern wall of the Columbia ship channel. The northern wall will be held firm by the rocky base of Cape Disappointment.

DIVISION OF THE WORK.

It is plain from the experience of years, that the United States government will not push three or four improvements vigorously, viz., the locks at the Cascades; removing rocks in Snake river channel; dredging channels in the lower Willamette and Columbia, and dredging the bar at the mouth and piling Clatsop spit.

Appropriations are soon spent and all the work stops often when most needed and most easily done.

Portland proposes to share the expense in part. Why not share the work? Why not enlist boats and men of the O. R. & N. Co., and buy dredgers and scrapers that can be got, and push the dredging and scraping of river bars as an individual or company can and will push its own enterprises until they are done?

Why not ask Congress to grant a large appropriation and use it to improve the mouth of the Columbia, as advised by U. S. engineers? Why divide petitions and be conquered, instead of uniting them to win success?

The delays of the ocean fleet in 1881, will be repeated in 1882–3, if this commercial city fails to apply its money and business force, first,—to clear out the river bars itself, and second,—to ask Congress to appropriate a large sum and spend it to help the ingress and egress of ships at the mouth of the Columbia.

The proposed purchase of two powerful tugs assures more safety and speed to merchant ships, but steamers want the bar cleared, and the central channel deepened and protected on its left bank.

Every thousand dollars spent there will assure large addition to our direct foreign commerce.

ITS RELATIVE VALUE.

Capt. Maginn, when president of the New York board of pilots, was instructed to report his opinion as to the merits of the entrance to the Columbia river compared with the entrance to New York. He says: "The bar in the Columbia is about half a mile across, while that of New York is three quarters of a mile. The channel of the bar at the mouth of the Columbia is about 6,000 feet, and shoals gradually, while the channel of the bar at Sandy Hook is about 600 feet and shoals rapidly. The channel across the bar is straight at the Columbia; that at New York is crooked. In accessibility to the sea, the Columbia river is the best, as it is immediately at sea, and ships can get out of the sea into the harbor at once, and also get out at once into the high sea.

"The winds at the mouth of the Columbia, are marked, regular and steady, while the winds at New York are entirely variable, and cannot be calculated upon by the marine, for any time. The mouth of the Columbia is free from ice and great heat."