

POCATELLO ASHLAND er GreatHight

WHAT the Mississippi is to the Middle West and the South, the Nile to Egypt, the Amazon to South America the Columbia is to the Northwest. It gathers into its huge channel the whole Northwest except one small corner, and pours them through the gateway of the Cascades in such volume that, when they reach the ocean, they change its color for miles. By this fact this great giver of the West, which had until then been a subject of vague rumor and trav elers' tales, betrayed itself to Captain Gray and he carried the news to Boston which led to its becoming the only fresh water harbor on the Pacific Coast.

The Columbia has a watershed of 265,000 source miles which includes the western slope of the Rocky Mountains, both slope of the Bitter Roots in the United States and the Selkirks in British Columbia, both glopes of the Cascades and both slopes of the Coast Range. It is probably the only river in the world which drains both slopes of three ranges of mountains, cutting it way through them with resistless power in its struggle to reach the ocean. Of its drainage area 182,000 square miles are east of the Cascades, an area cougl to that of

New Jersey and Maryland combined. The Valley of the Columbia is the main artery of commerce for the Oregon Country which Lewis and Clark explored. Seagoing ships ascend it and the Willamette to Portland, 110 miles from the ocean, and 2122 miles of the river and its tributaries are navigable. It is the only river on the Pacific Coast navigable by seagoing ships, and it gives to Portland the only fresh-water harbor on the Coast. The oppor-tunity to enter such a harbor is of great value to ships, for the action of fresh water cleans all barnacles and other ma-

rice growth from their bottoms.

But the Columbia serves also as the natural gateway for land transportation from the great agricultural intermountain country to the sea. Its valley furnishes he only water-level route for a railroad ugh the Cascade and Sierra Nevada

Portland is at the head of navigable water for seagoing ships in the Columbia Basin and is the terminus of the Oregon Basin and is the terminals of the Oregon Railroad & Navigation Company's rail-road through this great gap in the moun-tains. It is therefore the natural outlet to the ocean for the commerce of the interior and the natural inlet for imports from abroad. As Hamburg is to Germany, Liverpool to England, Glasgow to Scoti-land, Havre and Marseilles to France, so is Portland to the Pacific Coast of the

Upited States.

The importance of the Columbia as water highway is thus described by Ma-jor C. F. Powell. of the Corps of United States Engineers:

The Columbia is the great river of the Pa The Columbia is the great river of the Pa-cific Coast. In volume and in commercial value, it is second only to the Mississipple its hanks are more stable, its waters are clearer, its ice blockades are much loss in duration than in the great waterway of the East. Un-like the Mississippl, the Columbia seeks the occan in a line parallel to trade channels, and not at right angles to them.

# SHIP CHANNEL UP RIVER.

Deep-Sea Ships Can Come Up to Fresh Water Harbor at Portland.

ROM the ocean to Portland, the Columbia and Willamette Rivers have been kept open to shipping by the Govern-ment, with the aid of the Port of Portland Commission, a body established by the State of Oregon for the purpose of maintaining an open channel, with powers to levy taxation within the area directly benefited.

At the mouth of the river the sands car ried down by its waters and those drifting from the beach north and south have formed a bar, across which the Govern-ment maintains a ship channel. A jetty from Point Adams on the south has been extended \$\text{1}\_2\$ miles northwest. It forced the water into a single channel, which in 1855 reached a maximum depth of it feet at low water, but had since shoaled again to 22 feet. In order again to deepen the channel, the occan-going dredge Grant has been at work and the south jetty is being extended 2-5 miles, the purpose being to secure a permanent depth of 40 feet at low water in the bar channel. The dredging has already deepened the channel to 25 feet. If these measures should not prove effective, it is intended to construct a north jetty from Mackenzie Head across Peacock Spit for 25 miles in a 895 reached a maximum depth of 31 feet scross Peacock Spit for 25 miles in a southwesterly direction. This is expected to make a channel two miles wide and with a minimum depth of 40 feet, which is ample for the largest ships affort.

By means of dredging and the building of dikes, a channel has been maintained from Portions to the

or discs, a channel has been maintained from Portland to the sea, 25 feet deep at low water as far down as Slaughters Bar, and 25 feet from there downward. Two dredges are employed in this work every Summer, after the Spring freshet has re-Summer, after the Spring freshet has re-tired, leaving a fresh deposit of silt, and they not only restore any shoat places to their original depth but gradualy increase the normal depth from year to year. With a tide ranging from seven feet at the mouth to three feet at Willows Bar, just below the mouth of the Willamette, this gives ample depth for the largest ships

shoat.

Portland's position as a port was shown in 1965, when the steamer Algos took the largest cargo of flour ever shipped from the Pacific Coast from Portland to Astoria in 5½ hours. American warships have repeatedly come up to Portland without difficulty, and the port Portiand without difficulty, and the pot-enjoys as low charter rates as any on the Pacific Coast. It has a harbor three miles long, where ships of the deepest draft can safely anchor in fresh water, the latter fact making it much sought

# NAVIGABLE AT ALL TIMES.

Willamette Above Portland is Open to River Steamers.

HE first large stream which enters the Columbia above its mouth is the It is navigable at extreme low water as of a series of five locks capable of taking



can go to Independence, ten miles further, and with a four-foot stage they go to Corvailis, 120 miles above Portland, where ordinary navigation ends. At high water steamers run up to Harrisburg, ibi miles from Portland, and at extreme high water they have gone to Eugene. 20 miles further, but that stretch of the river has not been navigated for the last five years, as it has an average fall of five feet to the mile and is really only an enlarged mountain stream. The total fall of the river between Eugene and Portland to 396

feet, or over 2 feet to the mile.

The Government has just completed a second dipper dredge, which in a few wreks has cut a channel through the shoals, allowing steamers to go to Salem at extreme low water without sparring or lining.

Government locks in the Yambill, a tributary which enters the Willamette 41% miles above Portland, make that stream navigable as far as McMinsville. IT's miles above its mouth, except at ex-

reme high water.

Long Tom River, which enters the Willamette between Corvalls and Harrisburg. ins also been navigated by steamers

high water for seven miles.

Below Portland the most important trib-utary of the Columbia is the Cowlitz, on the Washington side, which has been made navigable by removal of snags.

made navigable by removal of snags, bars and overhanging rocks for 50 miles above its mouth.

Next in importance in that section is the Lewis River, also flowing through Washington, which can be ascended by steamers for seven tiller, to La Center, dredging and snaggirg and the construction of training and closing dikes having made a safe, deep channel.

On the Oregon side, still further down

On the Oregon side, still further down, the Clatskanie has been opened by dredg-ing for a distance of three miles, and the channel shortened nearly a mile by cutone of the bends. It is navigable at all times.

# CELILO TO BOUNDARY.

Frequent Navigable Stretches Which May in Time Become Continuous.

DENDING the opening of navigation past the rapids between The Dalles and Cellio, little has been done towards Columbia above its mouth is the opening the Upper Columbia. But a good still beginning has been made, the subject has Portland to the Thames at London, and is deeper than that stream at London Bridge. It is navigable at extreme low water as far as Salem, 72 miles above Portland, boats passing Willamette Falls by means of a series of five locks capable of taking mouth of the Snake to the foot of Priest. of a series of five locks capable of taking steamers 200 feet long and 35 feet beam. Rapids, than a demand will arise for a channel up the Snake to the feet of Priest Rapids, than a demand will arise for a channel up the Snake to the feet of Priest Rapids to the feet of Priest Rapids to the boundary, 251 miles, and up the Columbia from the feet of Priest Rapids to the boundary, 251 miles, in time this demand will grow so loud that it casnot be ignored, and the whole inland empire of Oregon, Washing-

# THE COLUMBIA RIVER AND ITS TRIBUTARIES.

RIVERS AND SECTIONS OF RIVERS.	Navigable- miles	Navigable un- der favorable conditions— miles	Not pavigable
Columbia—	1	1	41 ==
Mouth to Willamette River	102	*****	******
	88	*****	******
The Dalles to Cellio.  Cellio to Priest Rapids.  Foot of Priest Rapids to head of Rock Island Rapids.  Rock Island Rapids to Wenatchee.  Wenatchee to mouth of Okanogan.	195	*****	13
Foot of Priest Rapids to head of Rock Island Rapids.	N. STITE	****	11.5
Rock Island Rapida to Wenatchee	57		******
Wenatchee to mouth of Okanogan	68	*****	
Spokane Rapids to Rickey's Landing		*****	109
Rickey's Landing to Marcus	******	58	11
Wenatchee to mouth of Okanogan Mouth of Okanogan to Spokana Rapids Spokane Rapids to Rickey's Landing Rickey's Landing to Marcus Marcus to Robson, B. C. Robson through Arrow Lakes to Arrowhead Arrowhead to Downie Creek Downie Creek to Big Bend.  Bie Feent to Golden	63	*****	******
Robson through Arrow Lakes to Arrowhead	114	*****	******
Downie Creek to Big Bend	67	******	*****
	******	*****	50 93
Golden to the source	100	*****	200.000
State for Columbia	047	-	
Totals for Columbia	867	56	287.5
Willamette and tributaries— Mouth to Portland	8	200	
Portland to Corvality	120	2.00	******
Colvalits to Eugene	******	51	******
Colvalits to Eugene to McMinaville Yamhill River, mouth to McMinaville Long Tom River, mouth to Monroe	17.5	7	******
The state of the s	******		277355
Total Willamette	145.5	58	*****
Month to Piparia	1000	67	
Riparia to Asotin	96		*****
Asotin to Ballard's Landing	******	******	150
Riparia to Asotin Asotin to Ballard's Landing Ballard's Landing to Huntington Clearwater, Lewiston to Kamiah	173722	10	*****
	******	67	277724
Totals for Snake	96	209	150
Mouth to Okanogan City	43	46000	
Okanogan City to boundary	******	44	******
Oscovora Lake to foot of Dee Lake		*****	*****
Foot to head of Dog Lake	8	23000	26
Head of Dog Lake to Penticton		******	2
Osoyoos Lake Osoyoos Lake Osoyoos Lake to foot of Dog Lake Foot to head of Dog Lake Head of Dog Lake to Penticton Penticton to Okanogan Landing	60		*****
	-	-	-
Totals for Okanogan River	117	- 44	29
Canal Lakes to Jennings  Jennings to Bonner's Ferry  Bonner's Ferry to foot of Kootenal Lake  Kootenal Lake, head to foot	159	******	*****
Bonner's Ferry to foot of Kootenal Lake	*****	199	75
Kootenai Lake, head to foot,	70	105	******
Foot of Kootenai Lake to Robson, B. C	25	*****	
	254	199	75
Totals for Kootenai River			
Clatskanie River	3	*****	*****
Lewis River, mouth to La Center. Cowlitz River, mouth to ten miles above Toledo Lake Cheian, foot to Stebekin	50	. ******	255555
Lake Cheian, foot to Stehekin	68	******	******
Spokane River, Post Falls to Coeur d'Alene City	*****	20	******
Coour d'Alene River mouth to Minton	24 32	******	*****
Spokane River, Post Falls to Coeur d'Alene City Coeur d'Alene Lake, Coeur d'Alene City to head Coeur d'Alene River, mouth to Mission	- 54	******	*****
Jun	116		GALLES I
Pend d'Oreille River, head of Box Canyon to mouth	-		
Flathend Lake and River	67	*****	126
	-	******	******
Total, other tributaries	392	20	126
Grand totals	1,873.5	576	967.5
		and the same of the	

Total length of Columbia and main tributaries below head of naviga-

ton and Idaho will be traversed by great navigable waterways, which will force oad rates down to their level.

The first part of this stretch which needs Improvement is from the foot of Priest Rapids to the head of Rock Island Rapids, a distance of lits miles. The three great rapids in this distance are formed by great masses of rock in a deep canyon, as well as by huge isolated rocks. They are navigable at some risk at high water and the Government has reduced the dan-gers by blasting out some of the worst rocks, and by placing ringbolts and iron posts to aid boats in lining up Cabinet and Rock Island Rapids.

From the head of these rapids up to Wenatchee there is a good, deep channel the year around, and from Wenatchee up to Foster Creek Rapids, just above the mouth of the Okanogan, the river is navmouth of the Okanogan, the river is navigable at almost all times, the total distance from Rock Island being 90 miles.
The upper part of this stretch has been
greatly improved by the removal of rock
at Rocky Beach and Methow Rapids, and
the placing of ringbolts by which steamers
can line up over the rapids.

About 60 miles north of Wenatchee, Lake
Chalan amplies high the Columbia through

Chelan empties into the Columbia through the Chelan River, and affords a navigable approach to within 20 miles of the sum-mit of the Cascade Mountains. It is 63 miles long and of fathomiess depth, apparently filling a canyon which has been dammed at the mouth. It is bordered by huge mountains, and is destined to become famed as one of the wonders of the world.

From the mouth of the Okanogan to the boundary there are only two stretche the Columbia which are at present avigable, as it flows for nearly the whole of the Colur distance through a canyon which is in-fested with rapids and obstructed with rocks. The parts now navigable are from Spokane Rapids, at the mouth of the Spo-kane River, to Rickey's Landing, 56 miles, and from Marcus across the boundary to Robson, B. C., 62 miles, and the former

stretch is only open at high water.

In a report made by Captain Thomas W.
Symons, of the United States Engineer
Corps, about ten years ago, the cost of
making a continuous navigable channel
in the Columbia from the boundary to the mouth of the Okanogan was estimated at \$18,005,000. This included \$10,500,000 for the construction of seven dams and locks in the stretch of \$2 miles from Monaghan Rapids to Foster Creek Rapids. While this expenditure would not be justified by this expenditure would not be justified by present conditions, it is much less than that for the improvement of the Mississippi River, and those who are familiar with the resources of the tributary country can, without straining their imaginations, forecast a degree of development which will justify the execution of such a small form. a prodigious work. The power made available by the construction of these dams would have such value as to enter materially into the calculation.

At present steamers ply regularly from the head of Rock Island Rapids to Oka-

nogan City, 6 miles above the mouth of fir the Okanogan, and at high water they run up to the boundary, 4 miles further, tw

but the latter part of the Okanogan has but the latter part of the Okanogan has been obstructed with rapids until recent years, during which the Government has been blasting out rocks, dredging bars and building wingdams, which have deapened the channel by two feet. When this work is finished, the Okanogan will be navigable to the boundary at all stages. Thence northward it is a comparatively shallow, swift stream, but it widens out on the boundary into Osogoos Lake, six miles long, and further north, in British Courable into Deep Lake, sight miles and lumbia, into Dog Lake, eight miles, and Okanogan Lake, 60 miles long, all of

# RAPIDS OF THE COLUMBIA.

Government Will Dig Canal to Open Waterway to Interior.

THE next great stretch of the Columbia is that from the mouth of the Willamette to the Cascades a series of rapids at the point where the water has forced its way through the main backbone of the Cascade Mountains for a dis-tance of four and one-half miles, 60 miles above the Willamette. This is navigable by river steamers at all times, and during the early days prior to the construction of the railroad down the south bank of the river was the chief means of communication with the East. At that time passengers came west by the Northern Pacific Railroad to Wallula, where they were transferred to steamers, which brought them down to Celilo. At that point they were again transferred to a portage railroad which carried them past the 11 miles of river which is obstructed by falls and rapids to the town of The Dalles, where they were again transferred to steamers for the journey to the Cas-cades. Another portage railroad carried them past that point, and then they made the rest of the journey by steamer

to Portland. The government is now engaged in The government is now engaged in opening the whole river to navigation beyond the mouth of Snake River to the foot of Priest Rapids, 299 miles above the mouth of the Willamette. By this means the whole interior of Oregon, Washington and Idaho will be given the benefits of water transportation for their products to the sea, which will pour through this natural gateway to Portland, their natural outlet.

natural gateway to Portland, their natural outlet.

Of this great undertaking, half has been completed already, namely, the construction of a canal and locks at the Cacades at a cost of \$4,000,000. There are two locks of solid masonry, each 461 feet long, and the total length of the canal and locks combined is 3000 feet, capable of accommodating steamers of eight feet draft.

The stretch of open river to which the locks lead ends at Three-Mile Hapids, the first of a series of rapids, of which the next is the Dalles, a narrow trough between walls of basalt 150 to 300 feet apart.

velocity for a mile and a half, comes Ten-Mile Rapids, a similar

through which the river rushes with great velocity for a mile and a half. Then comes Ten-Mile Rapids, a similar gorge of one-third the length, and last is Cello Falls, where the water drops a sheer 20 feet. The length of this series of obstructions is 13 miles, and in that distance the river has a total fall of 30 feet.

The Government has decided to make navigation continuous past these obstructions by the construction of a canal on the Oregon shore at a cost of about 4,00,000, on condition that the necessary land is given without cost. The state has secured the right of way by gift or purchase, and decided it to the United States, and the beginning of work only awaits the approval of the decide by the law officers of the Government.

But the people of Oregon are not content to await the completion of this stupendous task to secure the benefits of cheap transportation which they would gain from an open river. Before Congress had taken decisive action on the canal, the State Legislature had made an appropriation for the construction of a portage and each the not revents another the others.

the State Legislature had made an appro-priation for the construction of a portage railroad, and, this not proving enough, the Open-Riven Association is raising the money by subscription among the people directly interested. There is every reason to believe that the year 1995 will see the completion of this railroad, after which the people can await with patience the completion of the canal, which is expected to occupy ten years.

## SECOND GREAT FEEDER.

Snake Admits Steamers to Interior of Oregon and Idaho.

NEXT to the Willamette, the Snake is the greatest tributary of the Colum-Rising in the southern part of the Yellowstone National Park, it drains an area of 104,000 square miles in a course of 900 miles. It is navigable at hight water from its mouth to Riparia, a distance of 67 miles, and Government engineers have recommended the improvement that section at a cost of \$165,000, so as to give a depth of five feet at low water and make it navigable all the year round. The next stretch of 73 miles from Riparia to Lewiston, at the mouth of the Clearwater, is navigable for light-draft steamers all the year round, and the Government has been steadily improving it by blasting out rocks at the many rapids, scraping and dredging the bars and building dikes at Log Cabin Rapids and Wild Goose island, which have concentrated the flow of water in a single channel. This improvement has been extended up to Asotin, at the mouth of the Grand Ronde River, 25 miles beyond Lewiston, and there is now a navigable channel at all times for boats of 4% feet draft.

The 150 miles of the river from Grand Ronde to Ballard's Landing is so obstructed by rocks and rapids as to be imstructed by rocks and rapids as to be impracticable for navigation at any time, but from the latter point, which is in the fast developing mining district of Seven Devils to Huntington. To miles further up, there is a stretch of water navigable at high water, from which the Government began the removal of rocky obstructions and placing ringboits and iron posts to aid boats in lining over the rapids, but the absence of traffic to use the improvement caused its suspension. the improvement caused its suspension The opening of the Lower Snake to navigation, like that of the Upper Columbia, is dependent on the construction of the canal at The Dalles and Cellio Falls. No sooner would steamers be able to pass from the Lower Columbia to the mouth of the Snake at all seasons than a demand would arise for the opening of the Lower Snake as far as Huntington, a distance of 415 miles. Continuous navigation as far as Asotin would be so easily effected that Congress would doubtless clear the way for it immediately on the opening of The Dalles-Cellio Canal. This done, steamers would try to force a way through the canyon to Ballards, and the Government engineers would be called upon to solve the problems of the rapids. After that, the creation of a channel open at all seasons from Ballards to Hunting-ton would be a simple matter. The Clearwater Valley, of Idaho, en-

joys the benefits of water transportation between Lewiston and Kamiah Idaho, a distance of 67 miles, during the ficod season, and the open river would also be extended to the latter point as soon as it became possible for steamers to come up from below. Already the Government has cleared out the obstructive rocks through 40 miles of the course.

Water transportation, or railroad rates based on it, will certainly follow in a few years the construction of the portage railroad and Dalles-Celilo Canal on all this system of rivers, which covers Northeastern Oregon, Southeastern Washington and Southwestern Idaho,

# NAVIGABLE FROM SOURCE.

Splendid Chain of Lakes Makes Course Through British Columbia.

THE Columbia is probably the only river in the world which is navigable at its source. It rises in two small lakes in British Columbia, which are fed by a number of streams flowing from the Rocky and Selkirk Mountains. The stream uniting these lakes has been improved into a canal, and the river is navigable for light-draft steamers at all seasons through its northward course to Golden, a distance of 100 miles, the Canadian Government having deepened it at shallow This open stretch could be extended northward to Big Bend, 33 miles further, near which point the river pierces the Selkirk Range, by some expenditure on clearing out obstructions.

From Big Bend the River makes an ab rupt turn southward, and is impassable rupt turn southward, and is impassable for steamers as far as Downie Creek, 50 miles further. From that point southward the channel is navigable at all seasons not only to the boundary, a distance of 28 miles, but beyond it to Martune in the State of Washington. At Arrowhead it widens into Upper Arrow Lake, contracts again at its outlet, and a short diteance further again widens into Lower Arrow Lake, which ends a short distance above the mouth of the short distance above the mouth of the Kootenai, the total length of these lakes

Kootenai, the total length of these lakes being 115 miles.

The Columbia basin in British Columbia is blessed with a splendid system of deep mountain lakes, of which the Arrow lakes are two. Of almost equal extent is Kootenal Lake, farther east, 79 miles long and of equal depth, but less extent are Slocan and Trout Lakes, the former being 25 miles long, which 511 guilts in the mountains between Arrow and Kootenal lakes. Their cuttlets into the Chemia lakes. mai lakes. Their outlets into the Co-lumbia are too swift and shallow to be navigable, but steamers ply on them in connection with railroads.