the suggestion opinion. moved that the ort on it and the lacGregor being ntly as to how on the second in his lot with ort from the ene of the repor scussion. dvertising. athly report ere were items s in the Toronto Montreal Star, ermen thought

Westminster

Water Works

Reports on His In-

vestigation.

Some Practical Points of Value

Regarding Improvements to

the System.

Mr. A. McL. Hawks, consulting en

incer, having, by instruction of the City

Council made a thorough expert investi-

gation of the New Westminster water-

works, presented a full and exhaustive

to five topics or divisions, namely: Ex-

Examination of Pipe Line

Under this heading Mr. Hawks says:

On February 9th, in company with Al-

dermen Gilley and Peck (the latter as

chairman of the water committee), I

drove to the intake on Coquitlam river,

near the lake, to inspect the surround-

ings. While there the water in the in-

take was observed, the height of water

at twelve, noon, being 428.26 feeat eleva-

fon above datum. Wm. Henderson was

left at the patrol house to observe hour-

intake well for the next two days."

readings of the height of water in the

The pipe line, Mr. Hawks continues,

recompanied by Ald. Peck, from the

Advisability of Constructing a Dam.

ments and additions.

fined in the valves.

he overfall.

report of the same to the council, at its

whether as an or not did net ones. re was an item for the month MacGregor comone had not yet fore should not layward thought might stil Beckwith said should not be t is so often out at useless. The aldermen to reheadquarters of having always emedy any little

advertisements

the attention of

the prices

Contract.

resolution passnayor referred atter of the con ing that he did council and had Ald. Hayward on the subject for the first six the Albion Iron nd six months to The motion car

d to know when

park will be reohnson street. it ork recommend ee it to be done got in readiness ussion arose be-Id. Williams, as is being done in s saying it was e done and the staken in regard

a question of

statement made the last meeting fect that he said could be obtain explaining that ncil had had the t judge for that said he was ail for being reh a derogatory the judges of the council laughing to the simhe words used by reported in the om last vear re streets was then

wing result:

## VICTORIA TIMES, FRIDAL, MARCH 10, 1899.

main, the head which you will have to danger, which, for the purposes of pres- that you purchase two of them for this consider as your effective working head | ent economy, may be constructed along purpose. "Along the same line I would recommust necessarily be that minimum head the following lines:

which will result from the conditions of "First. An 18-inch wood stave pipe to mend the installation of two 'Venturi' your reservoir being at its fullest stage be taken off the 14-inch main at Rich- metres on your 14-inch supply main, one at precisely the same time when your mond street, and follow along the lower immediately below your patrol house river is at its lowest flow. All other consider of that street to the penitentiary and one near the proposed 'Y' on Eighth siderations are entirely inappropriate, as grounds, crossing these grounds in a di- avenue. These meters read the total you are apt to need your water most at rect line, to enter the street bounding water flowing through the main, in cubit some time when these conditions prevail, Mr. A McL. Hawks, the Expert and computations based on any other Park, and across the park to the reser- plied daily to the city; and in checking than those conditions are misleading. voir site. This pipe being of larger dia- one by the other, determine whether

"From the judge's report re fire investigation, with the reservoir full and the the 14-inch steel main, will act solely as two metres. river at low water stage, as observed, the minimum head is 31.03 feet; using

co-efficient friction, N-.013, this head will give a discharge of 564,200 imperial gal-"From the judge's report, with a mean head of 37 feet, which is called the average head, using the same co-efficient, the

discharge is 616,000 gallons per diem. "From the judge's report, with a maximum head (the reservoir inlet being covered, and the river at full stage), of 50.25 feet, the discharge equals 721,450 gallons per diem.

lons per diem

time "When the by-pass pipe is in use, unlast meeting. The report, a comprehen- der varying conditions, it serves a vary-Park, near the lower end of the bicycle sive summary of which, embracing all ing purpose. If the reservoir is full, and track, is well suited for such purpose, the essential features, is given below, is the draught upon it becomes so great as and for a reservoir 130x230 feet, bottom conveniently divided by the engineer in- to make the outflow exceed the amount of water coming in, the opening of the amination of pipe line; advisability of by-pass throws a small additional dis-2,250,000 U.S. gallons. The highest onstructing a dam at the intake; gang- charge into the 22-inch main; inasmuch bank on the lower side of this reservoir will retain a head of about 8 feet of ing the delivery of water at the reser- as the distance to the city, via the byvoir; advisability of building a low ser- pass, is 1,500 feet shorter than via the water; as there is ample material from vice reservoir; other desirable improve- reservoir, and also that the hydraulic the excavation of the basin, the bank af grade is lowered somewhat. As the wathis point will be so wide as to preclude , ter in the reservoir draws down, the byany danger whatever from leakage or pass becomes more effective, until finalbreak. The depth of 10 feet is selected ly, when the reservoir is emptied, or the on account of the economy in making the gate leading to it is closed, so as to throw excavation, and also for the reason that the whole discharge upon the by-pass, a thereby the loss of head between full new hydraulic grade comes into effect,

reservoir and low water in reservoir is having the summit of the by-pass for its least. With water of the purity of your lower extremity, in place of the surface supply and freedom from algae and othshould be observed that in using the byer microscopical growths, there is no pass in this manner the entire effect of danger of such pollution as is usually inthe reservoir is lost to the city: no surcident to shallow reservoirs. plus water is stored against the city's re-"Third. Connection with city distribquirement in case of sudden draught for ution should be made with cast-iron fire, nor reserve supply in case of break mains of ample size to permit free flow in the 14-inch main. In fact, if a direct from this reservoir into the low service. supply main to the city were to be con-As, under normal conditions, there will was traversed on February 11th by him, sidered only, it would have been better to have brought the main in at a conhave specified them as light weight as is eservoir to the lake. At no point was siderably lower elevation. However, I as root to the lake. At he point have computed the inflow, with the reservoir a surface of the second the inflow, with the reservoir and the second the inflow, with the reservoir and the second the inflow, with the reservoir and the second th consistent with god casting. "At some future time, when the exwhich the constant flow of water might voir cut out, and a head of 81 feet, upon

be retarded or reduced. Nor was there the pipe at the summit of the by-pass, inch stave pipe, which should be covered my external indication that the exces- which gives, with N-013, a discharge of sive weight of the covering of earth had flattened the steel main. Under the 000 gallons (about 18 per cent.) more engineer's directions Foreman Ankers than the flow at the minimum head. In examined all the blow-offs (eighteen) and air-valves (seventeen), and the water was the river, if necessary. At this same every year, time another reservoir can be built in "When the reservoir and conduit are ound free from silt and no air was con- by-pass as a relief from the drain upon Queen's Park beside the present proyour waterworks system from overdraughts, lest from a little negligence pacity.

The advisability of constructing a dam an occasion might arise when there is "At the same time, a 10-inch cast iron at the intake is gone into thoroughly in urgent need for a full supply of water, the report. The flow of the main at the and it is found that the reservoir has been minimum head, 31.03 feet (as per Judge drawn down and left in that condition; Harrison's report), will furnish 564,200 the supply to the city not having given mperial gallons of water per diem. With out, and therefore the citizens themfoot dam, increasing the head to selves being unaware of such a condiand high enough to overtop the high ser-36.03 feet, the discharge will equal 610,- tion of affairs. It is much safer to pervice reservoir (say, 405 elevation), which 850 imperial gallons per diem; with a mit the citizens to suffer a little from tean-foot dam, and 41.03 head, 651,450 shortage of water and maintain a resermperial gallons; with a fifteen-foot voir supply rather than that they should 335 feet levetl. dam, and 46.03 head, 691,200 gallons; be permitted to use, even to waste, water and with a twenty-foot dam, and 51.03 at the expense of the reserve."

foot head, 726,600 gallons. These figures A Clerical Error, are slightly above what may be expected. Mr. Hawks then refers to a certain as the co-efficient N.-013 (on which the clerical error, obvious to one familiar ulations are based), is somewhat with such work, in a former report he higher than generally accepted by hyhad made on these waterworks, in April, draulie engineers for this type of pipe. 1896. His report having been criticized, om the above figures it will be seen, de at some longth to show Ir Hawks that the computed indue to the dam at the intake, where the criticism is in error, and by equal 162,400 gallons per day, or way of justifying himself. Mr. Hawks then compares at length the two filling thirty per cent. of the present tests, made by him in April, 1896, and This gain, says the engineer, is February, 1899, which, in brief form, orthy of serious consideration if it can shows that in April, 1896, with a head of secured without excessive expendi-32.2 feet, the water discharged into the reservoir at the rate of .99 cubic feet From an inspection of the probable ite the cost of a dam is roughly esti- per second, \$5,436 per diem, or 640,770 gallons; while in February, 1899, with a head of 41.3 feet, the discharge was nated at \$15 000. This amount should . ave a cedar-cribbed dam, twenty feet ich, twenty feet wide on top, and 1,204 cubic feet per second, 104,026 per diem, or 780,200 gallons. This latter is within a small percentage of the oring to thirty feet at the bottom. filled with boulders, sheeted on the upstream face, and provided on the down- ginal estimate of sixty gallons per diem tream face with a strong apron to catch per capita for 13,300 people. It must be remembered, however, points out the en-Should it be considered feasible to con- gineer, that when this test was made, we the investigations along this line, the water at the head-gate was 430.3 elevation above city datum: whereas, in ngineer recommends that a topoaphical map may be made of the outlet the judge's report, the observed height of quitlam lake, between the lake and low water in the Coquitlam at the introl house, and that the surround- take was only 429.11 feet, and that the shores of the lake be thoroughly inflow pipe at the reservoir was bare, inpoitred, so that a good idea may be stead of the reservoir being filled to of the nature of the land which | 397.75 feet above city datum. ld be submerged were such a dam Continuing, the report states that in structed, "and the possibility of such order for the 14-inch main to supply 106.rgence," adds the engineer, "caus- 200 cubic feet per diem, the discharge must be as great as 1.22 cubic feet per pollution of your present wonderfully We water supply." For this purpose the second, which will require a 41.5 feet

Block III. of the asylum plot; thence feet per diem, and will serve to give a crossing the Boulevard into Queen's check upon the quantity of water sup-

meter and smoother interior surface than there is any waste or loss between the a conduit to convey the water flowing | "At places along the (pipe) line, more to it from the 14-inch main into the res- especially at a brook near Cape Horn; ervoir. It is designed, therefore, to the 14-inch steel main is uncovered. and carry only the pressure due to its dis- the coating has been worn off. This is tance below the hydraulic grade shown a dangerous condition to allow it to fall in the profile. As a factor of safety, it into. From appearances, it has been this

might be used to throw the pressure of same way for some time and should be the high service reservoir and 14-inch promptly attended to. "There is pressing need of a 14-inch main into the city distribution; but, to avoid constant use for this purpose, the gate at the head of Mary street, where gates at the take-off "Y" at Richmond the 14-inch main down Mary (Sixth) street should be so placed as to inter- street is taken off the 22-inch main. At

fere with both being opened at the same present there is no gate nearer than the reservoir to cut the water off this main, "Second. The reservoir site in Queen's | or in any of the cast connections along it especially near the lower end, where the head approximates 150 feet, the damage which would be wrought by the out-rush area, which, with 10 feet depth of wa- of waters before they could be cut off, ter, will store 336,000 cubic feet, or about would be very great. This hazard should be no longer taken.

"At the inflow of the reservoir, not far from the gate house, a stand-pipe, 8inches in diameter, should be carried up ten feet above the embankment, in order that in case of a break in the 14-inch main, when the water in the reservoir stands above the mouth of the inlet pipe there may be an ample supply of air to take the place of the out-rushing waters and thus prevent a collapse of the pipe "It would we an advantage to have a guage in the reservoir, which, instead o reading heights above the bottom of the reservoir, would read thousands of cubic feet of water in reserve. A glance at this would always determine what the reserve supply was at that time, and no errors of calculation could enter it.

"A telephone line from the City Hall to the reservoir is almost a necessity. In construction work similar to this it was be little pressure upon these pipes, I my invariable custom to stretch a telephone wire before attempting any other portion of the work. Such a line, extended to the patrol house at the lake pense can be more easily borne, the 18- and Foreman Ankers equipped with what is known as a lineman's telephone,

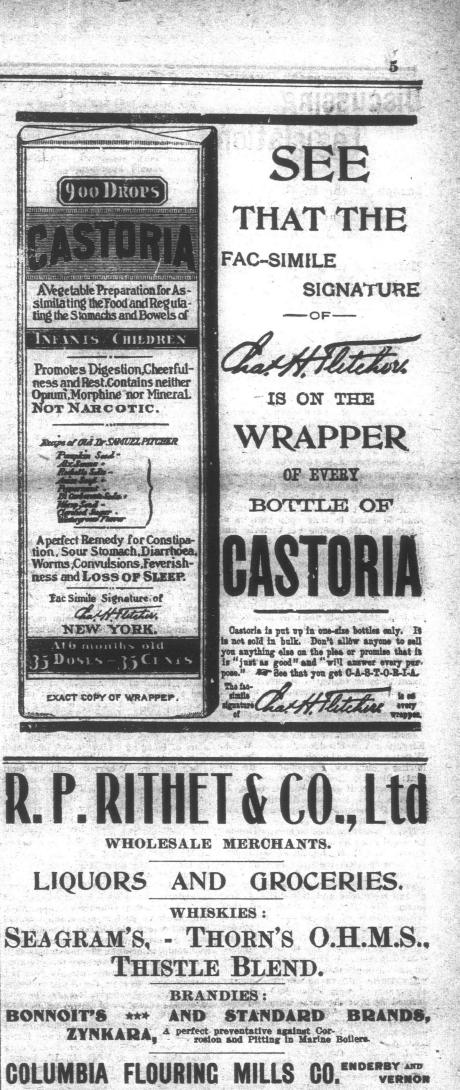
at present not more than a foot, can be uncovered, and by the addition of extra any point and connect with headquarbands, changed from a conduit into a ters, will save in time expense and pressure pipe to carry the full head of worry, probably more than its rental,

constructed, as soon thereafter as is conposed reservoir, of somewhat larger ca- venient, a keeper's house should be built in the immediate vicinity. As these plans are carried forward, more and main can be taken off this 18-inch stave | more are the important connections cenpipe and carried up First street to a tered about this point. A telephone stand-pipe, on the summit of the hill, should connect directly from the City near Fourth avenue. The stand-pipe Hall or fire station with the keeper's may be built of wood, of 8-inch diameter house, in order that even the short tin which would be spent in travelling from the fire station to the reservoir in time will supply high service on the hill, and of an emergency might not be lost. More contain about 20,000 gallons, above the and more is it becoming realized that the

first minutes of the fire is the time in "When this work has been completed, which to subdue it; therefore, the more he city can be entirely supplied through promptly one can handle the connecti the better arranged is the system for this one set of conduits, the gates of which will be located in or near the reser-voir in Queer's Park. By means of the such service. "In these latter recommendations

latest devices, all these gates may be have not attempted to estimate the cost operated hydraulically from some central as I have not data at hand for so doing. point (say, the City Hall or fire station), "I beg to remain, my dear sirs, "Yours very truly, in case the foreman of the city system

"A. MeL. HAWKS,



ne. double sidewalk the fountain, an 151 will be used. er walk between will have a tar t of \$65. e of \$100 will be

concrete gutter Brothers' new

e last item Ald. e need of a new lew England and not get that in report was being ms said he was remark in. ed at 10:15 to k in the morning.

UT THE KNIFE, ASE'S OINT-

ter, of Woodville, "For thirteen rom bleeding piles which I passed ears and relief I tment prompts me My physicians operation, but I without the knifc. e's Ontment stop e's Ointment stop cted a permanen

## LASSES.

instruction in art adian Royal Art d 240 St. James aintained in the Building, Mon-y free. Monthly y of each month, les street office Works of Art.

annanny es in busibad policy. with your t thing to let a little n way until it yourself. & A ABBEY'S SALT will use regulates d prevents uggists sell 🕿 nglish prelarge bot-Zamman

tee classes-swamp, timber and bar- of the reservoir at 397.95 feet elevation, the river must be at 439.45 feet eleva-Mr. Hawks also says that a dam con- tion, or more than ten feet above the ted at the outlet of Coquitlam Lake observed low stage; or, if the reservoir might have a value to the city, apart be completed to hold water at 400 feet is service to the city's water sup-ly, by furnishing power with which to 441.5 feet above city datum, or more perate the city's electric light plant, and than twelve feet above observed low-wae estimates that such a dam would pos- ter stage, to obtain which result a dam bly give a nominal force of 200 horse- at least ten feet high must be constructed Moreover, such a dam would at the intake. "With all the factors as vent the variation in the head of wa-at the lake or the reservoir, as at 397.75 feet elevation above datum, and according as it happens to be the observed height of low water in the or low water season. In this con- Coquitlam at the inlet being 429.11 feet he says, that if the city does above datum, a discharge of more than instruct such a dam some private 677,000 U.S. gallons per diem cannot be

ation may do so, in which case, as depended upon through the 14-inch user of the water, the city might main." le to impose conditions, besides. Low Service Reservoir. at expense, reaping the benefit of Under this important heading Mr.

ditional head upon its supply main. Hawks says: "In the matter of the adthe above facts in view Mr. visability of building a low-service resers advises that the dam be not conat present, but held as a reserve cessity. Gauging the Delivery.

Hawks then takes up the matter waste of water from allowing taps to ging the delivery of water at the ir, and describes the method run to prevent freezing during cold snaps he pursued on February 17th. The in the winter season, the delivery of the as made by guaging the quantity 14-inch main into the high service reservoir has been exceeded, and upon many in the shape of audiphones to be used by tter which flowed into the empty

ir from 8:45 p.m. to 12:50 a.m., occasions the reservoir has been drawn hich time the water rose 161-10 down, upon several occasions has been drained, and has placed the city water-The reservoir, at this test, measworks at a disadvantage and the city at 3.149 square feet, average area, great hazard from fire. This must not was submerged 1.34 feet in 245 be permitted to continue, or one of the giving a volume of 17,620 cubic allowing 80 cubic feet for voids primary reasons for constructing such aving, a total of 17,700 cubic works and one of the great advantages Dividing this total by 14,700 secto be derived from such works, the re-245x60) gives 1.204 cubic feet per or 104.040 cubic feet per diem.

muing, Mr. Hawks remarks: "In profiles, together with an outline of a means of careful nightly inspection with land, New Westminster, and C. Little, of tion with the flow through your means to abate the trouble and avoid these devices. I therefore recommend Lake District, are at the Oriental.

is not at the reservoir at the time when such services are required. "When the reservoir and the 18-inch

conduit are completed, the delivery through the 14-inch main will be deterwooden conduit and low service reservoir, mined by the conditions of low water in | and appends an itemized list of the sums the Coquitlam at 425.11 feet elevation. making this aggregate.

and the grade at "Y" at Richmond street and Eighth avenue taken as 258 elevation, which gives an effective head of 171.1 feet By Kutter's formula, using N-.013, the discharge will be 2.516 cubic feet per second, or about 1,600,000 U.S. Diseases That Make People gallons per diem; therefore, by discharging for 16 hours into low service reser

voir, there will be supplied for low serlike. vice about 1.000.000 gallons. If the remaining 8 hours the discharge be turned into high service reservoir the supply will be about 227,500 gallons, or 110 gallons per capita for 2,070 persons. As there are now 406 services in the high service system (of which 80 are in Sapperton,

and can be conveniently supplied by placing a "T" on the 18-inch main, thus changing them into the low service sys tem), it is probable the 8-hour flow will be sufficient to supply the high service system, even during the irrigation period in summer.

"As a fire protection for the lower porion of the city the Queen's Park reser voir will prove an efficient one. With the reservoir standing full at 250 feet elevation, the hydrant at the postoffice

corner, at 34 feet elevation, will show a standing pressure of about 90 pounds. From what I have learned of the distrioution system, I judge that it will supply water fast enough to maintain a essure at the hose nozzle, with 200 feet of best rubber hose coupled up, with a as follows: "A large number of sickly-lide physics as follows: "A large number of sickly-looking and half-well people have passed 220 gallons per minute, the stream reach-us to-day, which, I am sure has prompting 133 feet linear distance, or 100 feet ed your question. You must remember vertical distance, from the nozzle of the | that grippe has been epidemic during the hose as held by pipe-men; or, with a 11/4inch smooth nozzle, will discharge 250 gallous per minute, the stream reaching 124 feet linear, or 90 feet vertical, distance from the nozzle, held by pipe-men. These are the standard manufacturers'

ton, and if they cannot be met in this city there is something wrong, either with the distribution system or the fire apwhen such a reservoir has become a ne- tached to a hydrant, if the supply main to state positively that as a people we Through the excessive use of to the hydrant be only 6-inches diameter; are deteriorating in true manhood and

> Other Desirable Improvements. "Most prominent under this head," says the engineer, "are the little devices

inspectors in detecting water waste and water leaks in house services. To the Philadelphia, however, showed that one drop per second made a waste of about 5 gallons per day; and that the smallest all weaknesses soon become things of the kind of a stream from a tap-meant a past, and solid health, refreshing sleep, duction of fire risks and consequent sav-ing on premiums to the community, will terworks system, with 1,000 services in use, this may mean a very serious loss,

"Con. Engineer." VIOTORIA ACENTS, WHARF ST., VICTORIA, B.C. Mr. Hawks gave \$20,015 as a prelim inary estimate of the cost of the 18-inch A Great Draw... 'Tis But the After Effects of Grippe and the Common

Look So Weak and Death-

Paine's Celery Compound The Great Disease Banisher and True Health Builder.

The writer a few days ago enjoyed a half hour walk with a well-known phy-

sician on one of Montreal's crowded business streets. Meeting with a great many pale and sallow-faced men and women-young and middle-aged-the writer asked his physician friend the question: "Doctor, we are passing scores of 'sick-looking people; does this fact prove that we are deteriorating as a people in health and

general physical development?" The physician's answer was very much 25, 27, 28 and 29 Yates St. winter, and has left thousands in a sad condition of health: then there are other common causes of sickness that have been operating, such as insomnia, headaches, digestive disturbances, blood troubles, rheumatism, and kidney and tests, as carried out by the city of Bos- liver ailments. All these have contributed to sickness and deaths this year, and time. They left the schooner on a hunt-those we have passed are but a few of ing excursion, and in going over the bar Fort Wadsworth as she sails through those we have passed are but a few of the victims. The same conditions exist voir, the time seems to have arrived paratus. Only one hose should be at- in all countries, and I would not care The bodies have not been found, but men as the boat was subsequently reecssity. Through the excessive use of otherwise, friction in the supply main womanhood. Early attention to, and the summer season, and through the will reduce the nozzle pressure." covered, being bottom up when found. Erickson was 26 years of age and Newweaknesses will bring all back to good bury 24. Neither had any relatives in health." this city. The Queen City reports hav-The class of sick people to whom the ing spoken the following sealing schooncity physician referred stand in urgent ers: The Aretis at Kyuquot; the Ainoka need of Paine's Celery Compound, if at Hesquiot; the Umbrina and Dora Siethey would quickly regain nerve force

and power, weight in flesh, fresh blood Borealis at Clayoquot; the Favorite in ordinary man, such a slight matter as the dripping from a water tap means nothing." Experiments recently made in the dripping from a water tap means nothing." Experiments recently made in winds were experienced by the Queen City on the trip. Among her passengers tensive practice equal to Paine's Celery Compound for building up the weakened were Mr. William Munsie, of sealing body. When the great compound is used, fame; Alvin Engvits, bookkeeper in Mr. T. Earle's store at Clayoquot; George Brown, Miss Armstrong, G. H. Hall, A. natural appetite and vivacity of disposition make life a pleasure.

Ogilvie's Hungarian Flour, \$1.25 sk Hudson Bay Hung'n Flour, \$1.25 sk Snowflake Flower, \$1.05 sk. Best Island Potatoes, 90c sk. Best Creamery Butter, 25c lb. IXIH.ROSS&CO. J. PIERCY & CO. Wholesale Dry Goods

Spring stock in Underwear, Silk, Wool and Cotton, Prints, Zephyrs, Fancy Flannelettes, Muslins, Lace Curtains, Dress Goods, etc.

Steamer Queen City returned last THE TALBOT READY TO SAIL. evening from Kyuquot and way ports New York, March 8-The body of Lord on the west coast of the island. She Herschell lies in its mahogany casket in brings news of a double drowning on the Gordon river, of which C. Erickson and Huns Newbury, Swedes, employed Talbot will leave her anchorage, abreast on the schooner Minnie, were the vic- of Liberty Island, this morning. She will of the river in a small boat were upset. the narrows for England.

there is little doubt of the fate of the NORTHERN PACIFIC EXTENSION

- - VICTORIA, B.G.

Just watch us draw down the prices and

give you the greatest bargains ever offer

ed. These are for this week only

Tacoma, Wn., March 8.-It is reported that the Northern Pacific Railway is preparing to build a line from Black River Junction to Anacortes. It is said a branch will run to Renton coal mines. It is understood the Northern Pacific long ago surveyed a route from Black ward at Ahousett; the Viva Otto and River Junction by the way of Lake Washington.

THE KIPLINGS IMPROVING.

New York, March 8 .- Last night in Rudyard Kipling's apartments at the Hotel Grenoble was the quietest since the author was taken ill. Only the nurse was astir. The patient rested comfort-Wilkinson and Judge Kinney of Alberni. Captain Campbell, of the schooner Um-brina, was also among the passengers, that schooner to result has been for several days. Elsie Kipling, the three-year-old in-

that schooner now going to sea with her owner, J. W. Peppet, in charge.