## Pacific Great Eastern Railway Construction.

The Pacific Great Eastern Ry., which is owned by British Columbia, and is under that province's Railways Department's charge, consists of the completed portion of 180.7 miles, and the section under construction from Clinton to Prince George. The completed portions are from North Vancouver to Whytecliffe, 13 miles, and from Squamish Dock to Clinton, 167.7 miles. The B. C. Railways Department's report of the calendar year 1919, laid before the Legislature recently, states that in addition to the regular maintenance-of-way work done by the section and bridge and building crews, to maintain the roadbed in good operating condition, and the bridges and buildings in good state of repair, an extra gang of an average strength of about 20 men built 1,100 ft. of cribbing, of an average height of 15 ft. at miles 53.5 and 65.0 Squamish Division; cleaned slopes at mile 15.5 Squamish Division, and cuts north and south of Mackinnon, Lillooet Division, and resurfaced 34.2 miles of track on Squamish Division from mileage 24.4 and mileage 54 to 76.7. This gang also lined out 409 ft. of track the set of the track for 8 ft. from bank at mile Squamish Division, and put in 13,000 new ties, in addition to the 8,000 ties put in by the regular section crews. On the North 54 North Shore Division, viz., between North Vancouver and Whytecliffe, four Wing dams were built on Capilano Creek to divert the force of flood flow from weak spots along the west bank. A crib was built on the east bank, to help remove a gravel bank which was blocking the channel of the east Howe truee span, and the east abutment of the bridge was protected by laying a double brush mattress up stream along the toe of the river bank to connect with the center. onsiderable repairs were carried out at five bridges on the division, where floods had weakened piers, etc. On the line from Squamish to Clinton, considerable work of a similar character was done for the protection of the line and the bridges, during sudden floods. The bridge across the Cheakamus River Canyon, mile 19.1 north of Squamish, was destroyed Sept. <sup>10</sup>orth of Squamish, was destroyed 507-27 by a forest fire. This bridge con-sisted of a 130-ft. deck Howe truss span, on from the trestle approach on framed towers, with trestle approach at each end. Temporary provision was made by Oct. 4, for carrying on traffic and the and the new bridge was completed and ready for traffic Nov. 8. Considerable work has a traffic Nov. 9. at mile work had to be done on tunnel 3, at mile 18, north of Squamish, where there was a cave in of the roof at an unlined part of the tunnel, Nov. 30. The debris was cleared unnel, Nov. 30. The debris was cleared and traffic resumed Dec. 5. ders have been given to remove the mahered section at the south end, thus making now being supported by the timmaking an open cutting; the south portal will the will then be removed further north, and the remaining portion of the rock section widened and timbered. This will give widened and timbered. This will give a completely lined funnel, safe while the timbering lasts. Fencing was erected on 10 miles of line, principally north of East Lillooet, and between East Lil-looet and line, and between East Lillooet and Kelly Lake, and the 166 bridges between Squamish and Chasm Station were si were given a thorough examination with a view to repair during 1920.

Construction on the lines from Clinton to Prince George was prosecuted on. During the year, and is still going were got out for the summer's work 300,-

000 ties, 2,000 telegraph poles and fence posts for 75 miles of fencing, and a large material yard was laid out at Lone Butte, 6 miles north of Horse Lake summit. About 24,000 tons of construction material were unloaded there. Lone Bute was the farthest point to which track could be laid, as only the clearing of the right of way had been done on the next six miles, and there was a further 12½ miles of right of way, six miles beyond that. Grading and bridge work was pushed actively, and track laying was commenced July 15, Williams Lake, the objective being reached Sort 15 the objective being reached Sept. 15. This necessitated the laying of 66 miles of main line track and 7 miles of secondary track. Ballasting and surfacing was then proceeded with, but owing to the difficulty in securing good ballast, and the inability to get sufficient labor the work is very much behind. The year's work included the grading of 23 miles of new line, laying 113 miles of track (main line, secondary and spur lines), hauling 250,000 cu. yd. of ballast, and train fill, building 102 miles of telegraph line, putting up 49 miles of fencing, building 15 bridges containing 1,750,000 ft timber; erecting three 40,000-gal. water stations, and the erection of station buildings, section houses, etc. A 4-stall locomotive house, a first-class station building, with operating officials' quarters is being built at Williams Lake.

The 1920 construction programme contemplates the completion of the line to Prince George. Tracks had been laid to about 10 miles north of Williams Lake at the end of 1919, and the roadbed was ready for the laying of a further distance of 7 miles to Deep Creek, at which point a steel viaduct is being built. A description of this viaduct was given in Canadian Railway and Marine World for Dec., 1919, pg. 654. The construction headquarters for 1920 will be at Wil-liams Lake, where materials are being assembled. The year's construction pro-gramme covers first the completion of the line through to deep creek, and bal-lasting operations will be started in April, at the point where work was stop-ped in 1919. It is expected that the Deep Creek Bridge, which the report states may be classed among the important bridges on the continent, presenting peculiarly difficult problems in founda-tions and in erection details, due to its great height, and the wide spread of the lower legs—will be completed by the middle of July, and the line ballasted thereto. A bridge has to be built at Quesnel to consist of 3 deck plate girder spans, on concrete piers and abutments, whence track laying and ballasting will be pushed to Cottonwood Canyon, which is expected to be reached Dec. 1. There is expected to be reached Dec. 1. is about 20 miles of new construction to be done between Deep Creek and Cottonwood Canyon.

As early as the weather will permit tracklaying will be started at Prince George, on the grading done towards Cottonwood Canyon, and gangs will be employed regrading the right of way, and in building bridges. The engineers reported that practically the whole of the right of way, between these two points has been covered by brush and small trees, and a great many large trees have blown into the original clearing from the sides, and many new culverts are required. The estimated quantity of material required to be shifted to restore the grade to a condition ready for tracklaying is 710,000 cu. yd., and the estimated cost of the work was \$588,000. The Railway Department's Chief En-gineer states that the experience of the Enwork to Deep Creek has shown that these estimates are too low. The cantilever bridge across Cottonwood Canyon will be of considerable magnitude, and will be built out from both ends. The other bridge construction includes 41 timber structures for the erection of which it is estimated that 8,000,000 ft. of timber will be required. It is expected that all this work will be completed by Dec. 31. It is not intended to do any bal-lasting between Cottonwood Crossing and Prince George this year. This por-tion of the line will simply be lined up and side surfaced and put in a condition to be operated at a low rate of speed.

The 20 miles of new construction referred to, which will be done this year, consists of relocation north and south of Quesnel. The estimated cost of completing the line as originally planned was \$1,821,825, while the cost of the line on the new location is estimated at \$1,210,-340. The new location is said to be in a better country than the original one.

A project was laid before the B.C. Government in 1918 to build a branch from Clinton to connect with the Canadian National Rys., at Ashcroft, and a reconnaissance survey was made in that year by H. E. C. Carry. A survey was made during 1919, the field work being completed Nov. 10. The starting point of the projected line is 0.85 mile west of Clinton station, and connection will be made with the C. N. Rys. near Ashcroft yard limits, the distance between these two points being 41.5 miles. With the exception of a portion of the line between miles 5 and 6 a gradient of 1% compensated is maintained for 33.8 miles to the siding at the top of a pusher grade from Ashcroft, and 4,400 ft. on the level is allowed for passing tracks at this point. The 2.2% compensated pusher gradient from Ashcroft up to this point is 6.8 miles long. The top of the 1%compensated gradient at Clinton is at an compensated gradient at Clinton is at an elevation of 3,278 ft. (Pacific Great Eastern datum), and at the junction with the C.N. Rys. at Ashcroft the elevation is 1,100 ft. (P.G.E. datum), this equals an elevation of 1,000 ft. (C.N.R. datum), giving a fall from Clinton to Ashcroft of 2,178 ft. The curvature is not excessive and 10° curves have been adopted as a maximum. The main enadopted as a maximum. The main engineering difficulty to overcome was the development of distance to maintain a 1% compensated gradient from Clinton to join up with a pusher gradient of reasonable length out of Ashcroft. Trestle work is comparatively light, the greatest being over Allan Creek, 140 ft. high and 800 ft. long. Other large trestles are that over Madden Creek, 500 ft. long by 100 ft. high, and over Hat Creek, 600 ft. long by 85 ft. high. Six steel bridges will be required in the Bonaparte Canyon. Three of them will consist of single 100 ft. deck plate girders, one of a single 80 ft. deck plate girder; one of an 80 ft. and two 40 ft. deck plate girders, and the sixth of three 80 ft. and three 44 spans deck plate girders. There will be six tunnels, the longest being 1,000 ft. The material to be moved is estimated at 56% solid rock, 15% loose rock, 27% hard pan, and 2% earth. An alter-native route via Boston Flats has