

getting a record of the centre line of the track, as they found it on the ground. On tangents, a sight would be taken on the track ahead as far as visible, & a straight line run, any deflection in the track being noted.

The intersection of all township, section, quarter-section & property lines were obtained, the angles recorded, & distances measured to the nearest section or quarter-section corners, one member of the party being employed most of his time in looking up monuments.

Plusses to points of intersection were obtained from the stations marked on rails by the measuring party.

A record was made of the fences on each side of the right of way, & distance from the centre line, this being often important as a means of determining a disputed boundary, where the fence had been in existence for a long period, as many deeds did not state the width of the right of way.

In villages & towns, the streets & lots adjacent to the company's property were located; all important factories, with the tracks leading to them, even if on a foreign railway, & all sidings & structures on the company's property, particular attention being given to apparent encroachments, it being often found that buildings were wholly or partially on the company's property without any lease having been made. In making a survey through a village or town, the transit party was furnished with copies of the official plates, previously obtained at the county seat, to aid them in locating lines & streets.

The transit party measured all bridges, buildings, culverts & other structures, located all "Y" & railroad crossings, & public & private road crossings.

The level party followed, taking levels at every hundred-foot station, on top of tie, at ends of bridges, on railway crossings, of level of water in streams, & approximate levels of adjacent ground. Check levels were run & bench marks established at about half mile intervals, & oftener at places likely to be needed. Levels were connected with sea levels taken from U. S. Government surveys.

The plans were drawn on white drawing paper in sheets, on a scale of 400 ft. to an inch, each sheet showing the line across a square mile section of land, a whole section or two adjoining half-sections being shown on the sheet. The top of sheet was north in every case, all distance & angles obtained on the ground to section & property lines were recorded on the sheets. On top of each

sheet was a plain title giving number of section, township & range.

All deeds & agreements were carefully gone over & compared with the plans, right of way colored in red, with name of grantor, page & number of record book, & any conditions in deeds noted on plans. Villages & towns, where the scale of 400 ft. to an inch did not allow sufficient detail to be shown, were drawn also on a scale of 100 ft. to an inch, a large town often requiring several sheets, the same ground being covered, with less detail, on the smaller scale.

The sheets, when completed, were numbered & bound together by counties, the first page being devoted to title & the second to an index map of the county, showing the route of the railway. The centre line was drawn in red ink, all station numbers & plusses being also in red; distances & all lettering were shown in black. Before binding, all the plans were copied on tracing linen. The profiles were drawn on the usual scales of 400 ft. to an inch horizontal, & 30 ft. to an inch vertical.

In cases where the engineer is unable to have a complete re-survey made, it will be advisable, as time permits, to make accurate surveys of all yards & station grounds, depending for general details of alignment outside these limits on the existing right of way maps. If an accurate set of yard & station ground plans are obtained to start with, it will be a comparatively easy matter to keep them correct as changes are made.

A statement should be prepared, giving length of all sidings, spurs & "Y's," made from actual measurements, & not from foremen's reports. The form can be made with several blank columns to be filled in from time to time, with "Track laid during —," "Track taken up during —," "Total length on —." This statement will show at a glance length of track on any siding, & avoid a search on plans & profiles for the information.

A chart, showing graphically the different makes, weights & date when laid, of the rails in use, should be made, & corrected as new rails are laid.

A bridge book should be kept, devoting a page to each bridge or trestle, giving style, spans, size of stringers, when built, when repaired or rebuilt, conditions when inspected, etc.

A record should be kept of all leases of the company's property, a copy of lease & plat filed.

Detailed statements should be kept of the actual cost of all structures built, & on completion, plans made showing the structure actually as built, showing depth & character of foundations of bridges, retaining walls, etc., & all differences from the original designs. A condensed plan & profile may be prepared when time permits, showing a great amount of general information, useful in the track & operating departments. The scale will depend somewhat on the length of line it is desired to represent, but, even on a scale as small as one mile to an inch horizontal, & 100 ft. to an inch vertical, the principal grades, sections, mileage, water tanks, sidings, railway crossings, etc., can be shown.

The plan will probably have to be somewhat distorted in order to keep it on same paper as the profile, & lengths of sidings & size of structures exaggerated. The arrangement can be somewhat as follows:—

On top a series of lines showing number of telegraph wires; lines showing the fencing, the mileage & the track sections; below this, a plan or graphical chart of the line, showing general geography & alignment, degree of each curve being shown by figures. Then the profile, showing bridges, grades, stations, etc.; below the profile a series of lines showing rails, joints, ballast, & new rails, new joints, new ballast.

An important matter is a system of filing plans so they can be quickly found when needed. When blue prints are much used, it is best to file the tracings. When plans are numerous a card index will be found most convenient. A plan can be indexed on the cards under several headings, & new plans can be added & changes made without spoiling the index.

The tracings can be filed in small pigeon holes, designated by letters & numbers, at sides & top of case respectively. The objection to this method is that the tracings, being tightly rolled, are troublesome to get flat in the blue print frame; this can be avoided by filing them flat in drawers & indexing by letters & numbers in a similar manner.

The C.P.R. hotel at Banff was re-opened for the summer May 17.

It is said traffic arrangements have been made between the C.P.R. & the Bellingham Bay & B.C. Ry., under which the C.P.R. obtains a terminal at New Whatcom, Wash. Connection is made via the C.P.R. Mission Branch from Mission Jct., B.C.

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