

The Canadian Engineer

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The Canadian Engineer.

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pay duty on cuts from abroad. Changes of advertisements should
be in our hands not later than the 1st of each month to ensure
insertion.

CONTENTS OF THIS NUMBER :

Acetylene Gas on a Canadian Rail- way	353	Mineral Production of Canada, Bonus of	371
Bridge, Toronto, The York St.	354	Mining in Quebec	355
Canadian Association of Stationary Engineers	356	Montreal Island Belt-Line Railway. Motor Carriage, The	350 363
Chatbam Municipal Plant	356	Ontario Land Surveyors	354
Chemistry of Foundry Practice	300	Personal	369
Commercial Progress as Influenced by the Iron Industry	360	Piers, Steel Cylinder	355
Drummond, President of Federated Canadian Mining Institute, Ex- tracts from address of	359	Plumbing Appliances, Ventilation of Pump, Centrifugal	358 359
Electric Flashes	368	Railway Engineering	341
Engine, The Steam	361	Railway Matters	365
Industrial Notes	366	Railway, Montreal Island Belt-Line. Sewage Disposal through the Action of Bacteria	350 344
Iron Industry, Commercial Progress as Influenced by the	360	Sewage Purification, The Oxygen System of	346
Marine News	369	Steam Engine, The	361
Milling Machinery, Some Modern	347	Ventilation of Plumbing Appliances. York St. Bridge, Toronto, The	356 354

WITH this issue Volume V. of the CANADIAN
ENGINEER is completed. On application at this office an
index of the year will be sent to any subscriber who
wishes to bind the volume.

For THE CANADIAN ENGINEER.

RAILWAY ENGINEERING.*

BY CECIL B. SMITH, MA. E., MEM. CAN. SOC. C.E., ASSISTANT
PROF. OF CIVIL ENGINEERING IN M'GILL UNIVERSITY.

CHAP. V.

ROADBED CONSTRUCTION.

ARTICLE 28.—LAYING OUT AND MEASURING WORK.

Cross-sections should be taken at such intervals that
the prismoid between two adjacent ones will have planes
as boundaries on a top surface with longitudinal convolu-
tions only, extending in straight lines from one section to
the other; to do this quickly and without unnecessary
sections is a matter of experience and visual judgment,
requiring the personal attention of the engineer. The
slope stakes should be marked on one side with the cut
or fill and on the other with the distance from the centre
line; some engineers also write the station (chainage) on
the slope stakes. These stakes are put in at every 100
feet in light work and on tangents, but on curves and
heavy work they should be put in every 25 or 50 feet,
depending on circumstances, and on all side-hill work
liable to slip the sections should be carried up the hillside
200 or 300 feet to points beyond any danger of movement,
and should be taken before excavation has been com-
menced.

*This series of papers will be issued in book form as soon as they have
appeared in THE CANADIAN ENGINEER.

There are two methods of keeping notes in use in Can-
ada; in the first, each rod reading is entered in a separate
line and the corresponding cut or fill reduced from the grade
elevation; in the second method the difference between
height of instrument and grade is called "grade rod," and
the rod readings are subtracted mentally from it, and
the corresponding cuts or fills are recorded, consecu-
tively, on one line of the book in the form of fractions,
with the distances from centre line as denominators. It
is evident that the first method is more laborious and fills
much more space in a note book, and is not so convenient
for plotting, but, on the other hand, the reductions can be
checked afterwards, and are legal documentary evidence,
whereas the second method is entirely one of convenience
and leaves great chances for error by careless mental
subtraction, which cannot be duplicated, and the note
books are, therefore, not very strong evidence in a law
court.

Plate XXI

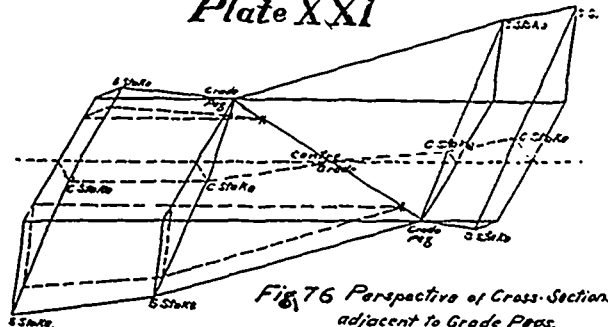


Fig. 76 Perspective of Cross-Sections adjacent to Grade Pigs.



Fig. 77 Ordinary Three-level Section.

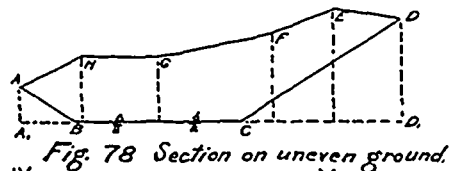


Fig. 78 Section on uneven ground.

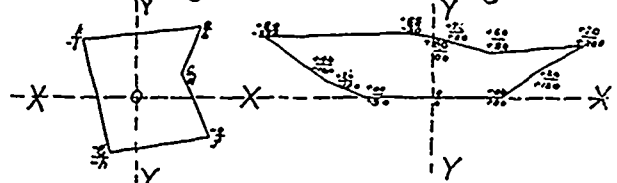


Fig. 79 Eckel's Formula with application to Sections.

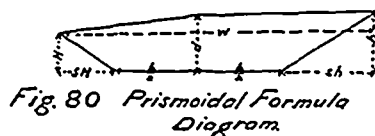


Fig. 80 Prismoidal Formula Diagram.

The following are notes of surface levels of Figure 80
taken by both methods :

(I) ENGLISH METHOD.

Station.	B. S.	H. of I.	F. S.	Int. S.	Ground.	Grade.	Cut.	Fill.	Remarks.
102...	..	311.20	..	10.2	301.0	293.0	8.0
2 R..	10.7	300.5	..	7.5
8 R..	12.2	299.0	..	6.0
20 R..	11.2	300.0	..	7.0	..	S. S.
3 L..	9.7	301.5	..	8.5
22 L..	10.2	301.0	..	8.0	..	S. S.