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For THE CANADIAN ENGINEER.

RAILWAY ENGINEERING.

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PROF. OF CIVIL ENGINEERING IN M GILL UNIVERSITY.

CHAP. V.

ROADBED CONSTRUCTION.

ARTICLE 18. LARGER WATERWAYS WITH HEAVY EMBANKMENTS.

When a single box culvert 4 by 5 feet in cross section
or, with very long covers and corbels, possibly 5 by 5 feet,
will not carry the maximum flow of a stream, we must either
use double or treble box culverts or an arch culvert.
The intermediate walls of double box culverts may be
made pointed to divide the flow of water, and a screen or
paling may be erected some distance up stream to catch
driftwood, but, even at best, their use is doubtful for the
same reasons as for double lines of culvert pipes, *i.e.*, the
danger of logs, etc., choking up the entrance, whether an
arch culvert of equivalent area will be cheaper than such
a structure will depend on the availability of brick,
cement or cheaply cut stone for arch sheeting on the one
hand, or of large-sized stones for covers on the other.

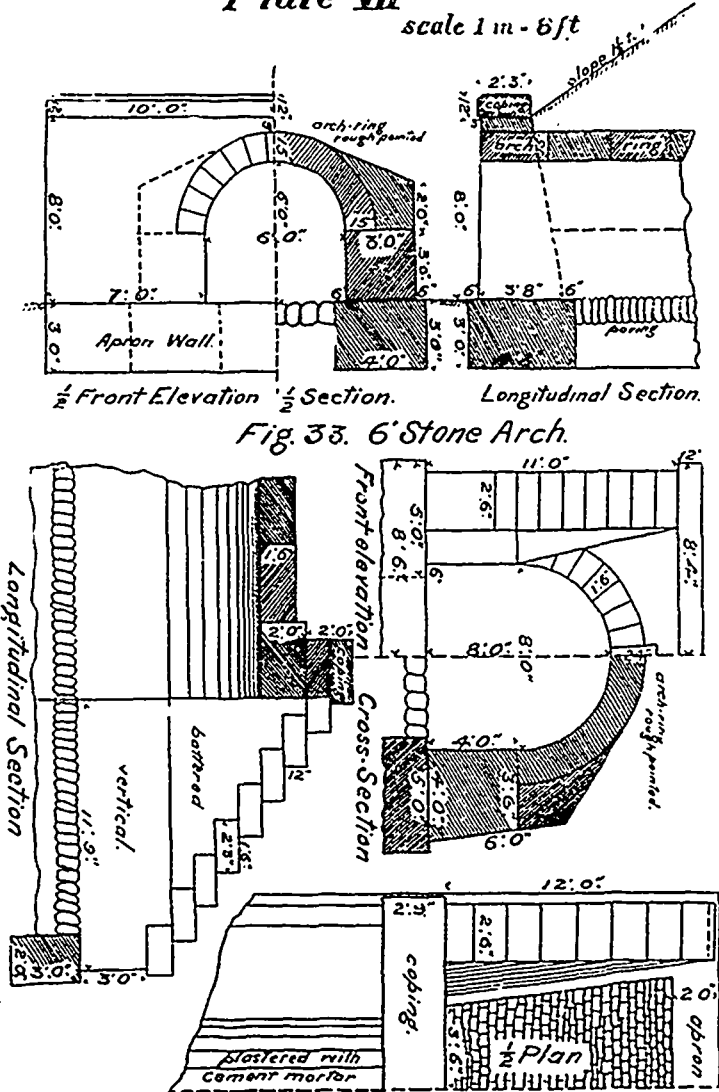
*This series of papers will be issued in book form as soon as they have
appeared in THE CANADIAN ENGINEER.

ARTICLE 19.—ARCH CULVERTS.

The selection of materials for the construction of arch
culverts will depend on circumstances; where good
weathering stone can be easily quarried and cut in the
vicinity it will be usually used, but if stone is scarce or
costly, and well-burnt brick plentiful, then brick may be
found cheaper; of course brick so soft as to be unable to
stand erosion or frost should never be used on exterior
faces or for the arch sheeting. The use of concrete for
arch culverts is yet a very occasional one in America, but
is likely to steadily increase as we have more skilled civil

Plate VII

scale 1 in = 6 ft



engineers who are familiar with the production of a cheap
concrete with superior exterior finish, capable of standing
frost and erosion and certain to remain sound for an indef-
inite number of years, which necessitates using absolutely
sound, high-grade cements, and until an engineer has the
opportunity of making certain of his cement by system-
atic testing, he is advised to avoid the use of any but the
very smallest monolithic arch culverts, although, of course,