

The proper design of a concrete arch is a matter of first importance. In the construction of arches throughout the Province at the present time there is too great a tendency to overlook this factor. While concrete arches from first to last should be constructed under the guidance of a civil engineer, yet in the matter of design this is essential. The use of an excessive amount of material in the making of an arch in excessive proportions will not always overcome defects in design. Nor can an arch suitable for one location be safely copied for use in another. Concrete arches should always be designed for each situation by an expert in this work. As with steel bridges, if a design for a concrete bridge is submitted by a contractor, it should be accompanied by a stress sheet and schedules showing the method of design—which in the case of concrete arches should be in accordance with the elastic theory. These plans, stress sheet and calculations should be submitted to a competent engineer, to be checked over and approved by him.

Concrete bridges are frequently referred to as "steel-concrete," from the fact that steel is used in their construction. Concrete has very great compressive strength, but is weak in tensile strength. Steel is, therefore, used in concrete arches at points subjected to tensile stress, and in this way the durability of the arch is increased, and the cost is lessened owing to the smaller amount of concrete required. Steel used in this way is fully protected from rust, and arches constructed in accordance with these principles, will it is believed last for hundreds, if not thousands of years. While our own experience with Portland cement does not fully warrant this assertion, yet arches built by the Romans two thousand years ago, in which an inferior kind of cement was used, are still standing.

#### RURAL MAIL DELIVERY

The importance and necessity of an efficient mail service has insensibly grown upon the world. It is one of the most prominent factors of present day civilization. The postal facilities of Canada have in most respects, kept pace, or are in advance of those of many other countries, in a manner of which Canadians are justly proud. The rural delivery of the United States service has, from time to time, been investigated by Canadian officials, but as yet has not been favorably regarded for adoption here under existing conditions. A recent report of the State Engineer of New York gives the following information furnished by the Postal Department, as to how a rural delivery is obtained, and other details.

A petition for such service must be made on the forms furnished by the Department, which are supplied on application to the Fourth Assistant Postmaster General.

Requests for two or more routes should not be included in one petition, a separate petition for each route desired being required.

Each petition for a route of twenty-four or more miles in length, should be signed by at least one hundred persons who are heads of families, and for routes less than twenty-four miles a proportionate number of such persons should sign.

Petitions for rural mail service, when properly signed and prepared, and endorsed by the Representative in Congress or the United States Senator, should be forwarded to the Fourth Assistant Postmaster General, Washington, D. C.

#### Conditions Necessary to Establishment

The purpose of rural delivery service is to carry the mail daily, on a fixed line of travel, to people who would otherwise have to go a mile or more to the post-office to receive their mail. It is required that the roads

transversed by a rural route shall be in good condition, unobstructed by gates, that there must be no unbridged creeks or streams not fordable at all ordinary seasons of the year; and that each route being twenty-four or more miles in length, as a rule, shall serve not less than one hundred families. Routes less than twenty-four miles long are established where they cannot be made the standard length, and a proportionate number of families is required on such routes. A route should be so arranged that the carrier will not be required to retrace or travel over the same road twice the same day.

It is the policy of the Department not to establish rural delivery on roads already transversed by a star route on which "box delivery and collection" service is given, unless it is feasible to supersede the service given by the star route, by the rural delivery service.

#### Distributing Postoffice

Wherever practicable it is desirable to establish the service from postoffices located on or near a railroad and having good railway mail service; and the service is established from postoffices having star route service only when it is not possible to reach the territory intended to be served as well from an office on a railroad.

#### How the Service is Established.

When a petition for rural mail service is filed and accepted it is referred to a rural agent for investigation. Petitions are investigated as far as practical, in their order of filing. The agent visits the locality indicated for the purpose of knowing just what the conditions are and whether they are such as required by the Department. It is his duty to report the facts as he finds them, and if such report is favorable to the establishment of the service, and is approved by the Department, action looking to the establishment of the route is taken within a reasonable time.

In laying out a route the agent is expected to carefully plan the same with a view to as little change in the future as possible, taking into account the routes already established or which will need eventually to be established in order that all the available territory in that particular locality may be served to the best advantage. For this reason it is not always practicable to lay out a route exactly as petitioned for. It may also be necessary to deviate from the roads referred to in the petition for other reasons, such as unfit and private roads and gates maintained on public roads.

#### What the Patrons Must Do.

Persons desiring the benefits of service on a rural delivery route are required to furnish, at their own cost, boxes for the reception of mail to be delivered or collected by the carrier.

More than one family may use the same box, provided written notice of such agreement is filed with the postmaster at the initial postoffice.

Each box must be erected by the roadside so that the carrier can easily have access to it without dismounting from his vehicle.

All boxes must comply with certain specifications fixed by the Postmaster General as to size, shape and workmanship, and be made of galvanized sheet iron or sheet steel and be approved by the Department.

Each box must be equipped with some kind of signal by which the carrier may know there is mail in the box for collection and the patron may know that mail has been delivered by the carrier. A list of approved boxes with information as to where they may be obtained, will be furnished on application to the Fourth Assistant Postmaster General.

Postmasters and carriers are prohibited from assisting