increase the quantity and improve the quality of the product under a deeper feeling of personal interest. By his diligence, care and economy he can actually create an additional profit, which is to be used in supplementing regular wages. Profit sharing includes the payment of the best wages current, and promises a bonus beyond this, which experience shows the interested workman can invariably produce in good times. Profit sharing, as a principle, may be applied in a large variety of ways; and it can readily be adapted to the great majority of productive and distributive enterprises. Why not form such an association in Canada?

THE CANADIAN SOCIETY OF CIVIL ENGINEERS.

The first well-directed effort to found a society of civil engineers dates from 1880, when a circular was issued under the pseudonym X. Y. by E. W. Plunkett. The anonymous nature of the circular prevented its receiving proper recognition. In the next year a bill was introduced into the Ontario Legislature, no one seems to know by whom, which proposed to confer extraordinary privileges on a few engineers to the detriment of the profession. From a variety of reasons the bill never reached a committee. The next effort was made in January, 1886, by Alan Macdougall, who tested the profession by issuing a circular over his own signature, to which so many favorable answers were received that he held meetings in Toronto, Montreal and Ottawa in the next two months, at which the society was fairly launched. A provisional committee was appointed of which Mr. Macdougall was elected secretary. The success attending their labors was such that the first general meeting for the formation of the society was held in Montreal on 24th February, 1887, when 288 members of all classes stood on the roll. A charter of incorporation was obtained on the 23rd June, 1887. The progress of the society has been satisfactory and solid. The membership includes nearly every engineer in the Dominion, as well as several in the United States and Europe. As an illustration of the wanderings of engineers, many members have found their way to South America, Mexico, India, Burmah and Australia. The membership at present includes hon. members 7, members 283, associate members 133, associates 60, students 150. Total, 633.

The society pays special attention to its youngest members, the Students, and encourages them to hold meetings and read papers, which are published by the society. The society was extremely fortunate in enlisting the sympathies of Messrs. T. C. Keefer, the late S. Keefer, the late John Page, and Sir C. S. Gzowski, all of whom passed the presidential chair, and among the younger men, of Messrs. John Kennedy, E. P. Hannaford and P. Alex. Peterson, who is the present president. The society owes much to the generosity of Sir C. S. Gzowski, who, among other gifts, has presented a medal to be given annually for a paper. Prof. Bovey, the first secretary, was indefatigable in his exertions; he has an able successor in Prof. McLeod. Herbert Wallis, the first treasurer, resigned at the last annual meeting and was succeeded by Kenneth W. Blackwell.

The officers for this year are:—P. Alex. Peterson, president; Alan Macdougall, P. W. St. George and H. Wallis, vice-presidents; Prof. C. H. McLeod, secretary; K. W. Blackwell, treasurer; W. McNab, librarian; and H. Abbott, P. S. Archibald, J. D. Barnett, H. T. Bovey, O. Chanute, G. C. Cuningham, H. Donkin, G. H. Duggan, J. Galbraith, G. H. Garden, W. Haskins, H. A. F. MacLeod, H. Peters, H. N. Ruttan, L. A. Vallee. There are, besides, four past-presidents, Sir C. S. Gzowski, T. C. Keefer, J. Kennedy, E. P. Hannaford. We present with this issue a supplement containing portraits of all the officers but one.

For THE CANADIAN ENGINEER.

OLD-RAIL OVERHEAD BRIDGES ON I. C. R.

BY P. S. ARCHIBALD, CHIEF ENGINEER, I. C. R.

The overhead bridges of the Intercolonial Railway were originally built of wood, supported by trestle bents resting upon low stone walls on each side of the track. These walls, being near the side ditches, were subjected to the action of frost from the front and to the pressure from the sliding slopes at the back, the result being that the masonry required to be rebuilt by the time the wooden bridges required renewal. In fifteen years the slopes of one-and-a-half to one had flattened down to about two to one.

For the renewal of these bridges, the most stable and economical structure seemed to be a single iron span, resting on stone or concrete abutments, at the top, or beyond the top of the cutting; in which position the abutments would be simply ordinary retaining walls, and not surcharged walls, as they originally were at the toe of the slope. The stones from the old walls were hoisted to the top of the slope and built into the new abutments with cement mortar. Stone drains were laid down the slopes, and since 1879 none of these abutments have shown signs of failure.

Fifteen years ago old U-iron scrap rails were worth one cent per pound when new iron was four cents per pound. These U rails were placed in the chords of the iron superstructure, the stresses in which were made practically uniform throughout by using the bow-string type of truss. In later bridges, where the head-room was limited, the lower chords were raised in the centre, making the grades on the bridges one in twenty both ways from the centre panel. This changed the truss to the crescent or sickle-shaped type, increasing slightly the stresses in the verticals and lower chords. The verticals are made of one tee-rail, to resist compression from a partial load. The diagonals are bars of flat iron, upset at the ends and fastened into the U of the chord rails with $\frac{3}{4}$ in. rivets. The wooden joists are doubled and extended outwards at every second panel-point, to take an angle-iron or light rail brace. The lateral bracing is of flat iron riveted to the chords.

These bridges are figured for 80 pounds per square foot live load. The cost for spans of 70 to 90 feet, erected, is about $11.40 per lineal foot, exclusive of masonry. Girder bridges on trestle bents cost about $7.50 per lineal foot, erected, exclusive of masonry, old rails being figured at one cent per pound.

Twenty-one bridges of the type illustrated have been built, also two old tee-rail girder bridges on bents, besides many small tee-rail girders over open culverts, from 5 to 20 feet spans.

Tee-rails are also used for covers of box culverts, for protecting piers from running ice, and also in combination with concrete in foundations.

One or two rectangular trusses and plate-girders have been built of tee-rails, by making the chords or flanges of two rails with the broad flanges placed vertically and the web-plate riveted between. A plan of one of these bridges appears on the opposite page.