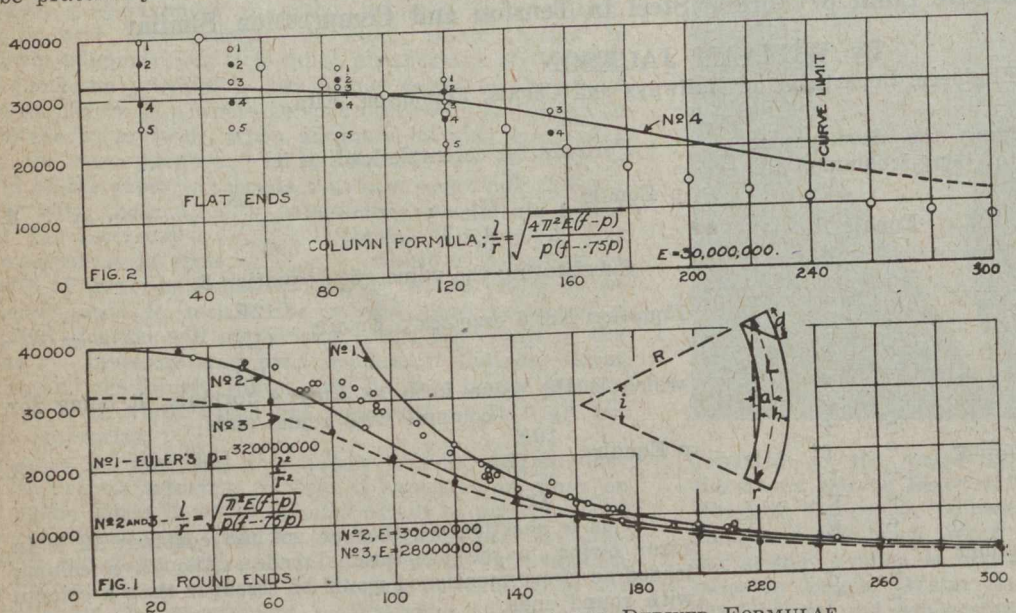
ends; it has been shown by various authors that this is 10 for round ends, 40 for rigidly fixed ends, and about 22.5 for one round end and one rigidly fixed end. Columns with pin connected ends show a great difference in strength even for the same size pins and the writer believes 10 should be used. Columns with flat ends should be as strong as columns with rigidly fixed ends until tension occurs in the ends at the inner edges of the bent column. This occurs when f is equal to 2p, so it would appear that 40 is the constant until this limit is reached. This limit is shown in figure No. 2.

If the top chord of an ordinary through truss be considered, the end at the bridge seat could be taken as a flat end, and if the member between the bridge seat and panel point number one curved to the right when the bridge was loaded and the members in the other panels curved to the left, and right alternatively, the intermediate members would be practically columns with rounds ends, and it would appear that 10 should be the constant to use for the intermediate members and 22.5 for the member in the first panel.



COMPARISON OF EULER'S CURVE WITH DERIVED FORMULAE

On page 685, "Engineering News" dated December 26th, 1907, there is an article, by C. P. Buchanan on tests of pin connected columns, made by the Engineering Department of the Pittsburg, Cincinnati, Chicago and St. Louis Railway. The measurements to find the change in length of the members under loads were taken from the centre of the end pins of the columns, therefore, these measurements must include all rivet slip so it would appear that this is the reason for the low elastic limits (from 13,200 up) shown by these tests. It has been shown that the rivet slip between two members with a number of rivets is progressive, and this would account for the uniform curves of sets.

On page 644, "Engineering News-Record," June 28th, 1917, there is shown typical tests, curves of solid riveted columns. These tests were made for a committee of the American Society of Civil Engineers, and the writer presumes these are the basis of their new formula. This article does not give the true or apparent elastic limits of the material but the curves show that the set increases at a load of about 15,000 lbs. and this is due to rivet slip. If rivets be driven in a piece of steel and the steel is stressed in compression or tension the stretch or shrinkage will only occur in the material between the rivets until the pressure overcomes the friction between the steel and the rivet heads. This means that the true or apparent elastic limit of the material cannot be found by testing a riveted column.

The writer has not seen any explanation of the great decrease in strength of the columns built with heavy material. The specifications according to the article called for a yield point in tension of 37,000 to 39,000 pounds per square inch, and it was left to the mills to adopt any method to procure these results. The analysis showed that practically no chemical differences existed in the thick and thin material. The question now arises, how were the yield points of the heavy material increased and what effect had it on the elasticity of the material when in compression. The writer has very little data on the effect of increasing the elastic limit of the material in tension by rolling, but if the elastic limit in tension be increased by loading, it has been shown that this destroys the elasticity of the material in compression. The method and its effect on the yield point in compression would be of considerable interest to engineers.

The point that interests engineers is the true elastic limit of the material There is a great difference between this point and the ultimate strength in short column as the value of $\frac{L}{r}$ increases, these becoming practically the same point. The tests shown in the last article referred to do not extend far enough to enable a curve to be fitted to them. The writer plotted all the results and then eliminated the tests that did not appear to have a uniform decrease in strength as the ratio of slenderness increased.

Formula No. 9 was then fitted to the tests so that the difference between it and the ultimate strength of the shorter columns was greater than the difference between it and the ultimate strength of the longer columns, and this gave a value of 75 for k. The large circles in Figure 2 show the average of Christie's tests of wrought iron columns with flat ends, but a curve through the true elastic limits would have an entirely different form. Figure 1 shows formula No. 9 plotted for round ends and is merely to show the form of the curve. The small circles show Tetmajor's test taken from page 365 of "Johnston's Materials of Construction." The solid circles are the average of Christie's test of wrought columns with round ends. The writer believes that a constant could be found for formula No. 9 so that a uniform minimum strength of columns could be found.

The writer is of the opinion that the earlier authorities were correct when stating that for practical purposes the elastic limit of normal steel in tension and compression were the same.

The town of Woodstock, N.B., is contemplating the adoption of the Town Manager System. W. P. Hammersley, manager for the town of Norwood, Mass., met the Woodstock council and gave an interesting account of his experiences. In Norwood, the tax rate was reduced by 69.5 per cent. under this system. It is understood that the Woodstock town council will ask for applications from men experienced along these lines.

The Engineering Corporation, Limited, is the name of a new organization just formed to engage in general engineering and construction work, to be associated with DuCane, Dutcher & Co., Vancouver. The directors will include Jasper S. Connell, Major G. A. Walkem, R.E., Howard K. Dutcher and Lieut.-Col. C. G. DuCane, O.B.E., upon his return from Europe. The corporation's offices will be 903-906 Rogers Building, Vancouver.

W. N. McEachern & Sons, Ltd., of Windsor, who are building a model home community of 500 houses to provide homes for the increasing population of Walkerville, Ont., have been awarded the contract for a similar community at Goderich, Ont., for the Lake Huron Steel Corporation, at a contract price of $1,500,000. The town of Leamington and the city of Sarnia are also considering similar propositions and may begin construction in a short time.