reduced by any reduction in speed and tend to further reduce it.

The speed of the periphery of the wheel should be about 65 to 70 per cent. of the velocity of the water due to the head acting upon the wheel.

The greater the load upon the wheel at any time the easier the regulation becomes, so that, while in many cases wheels may be successfully regulated while running somewhat below the tabled speed of the builder, in others, where the load on the wheel is very light at times, it becomes important to have the wheel run fully up to the tabled speed When the load is subject to sudden and heavy changes and good regulation is important, as is the case in electric railway work, it is sometimes advisable to run the wheel considerably above the tabled speed, although some loss in economy of water may result from this.

I had no thought when I began my paper that it would extend so. I had hoped to give many useful rules regarding water power, wheels, flumes, etc., not generally known among users of water power, but time will not permit. I trust that some of my remarks on the subject may have been interesting and profitable; if so, I feel that I am more than repaid for the time spent in writing upon this subject.

A PROBLEM.

Robert Bell, engineer and electrician of the Welland Electric Light Company, operates two American 30 in. water wheels as the source of power for his electric lights. The penstocks are on a direct line with the flume which feeds both, and as will be seen by the accompanying sketch, the head of the second penstock

is sufficiently below the first to give a good flow of water when both are in operation. But what puzzles Mr. Bell, and all who have seen his wheels, is that when the second wheel is stopped and the water is backed up on the first, less power can be got from the first than when both are working. And yet when the first wheel is stopped, there is no difference in the power to be got out of the second wheel. Mr. Bell will be glad to have an explanation of this through THE CANADIAN ENGINEER from any reader who thinks he has the right theory.

BOILER COMPOSITION.

The composition known as "Liquid Anti-Scale Vegetable Boiler Composition," for locomotive, marine and stationary boilers of every description, is manufactured in England by J. C Taylor & Co., Ltd., Bristol, who have had thirty-five years' experience in the manufacture of boiler compounds. This, their latest invention, is claimed to be very effective, in fact it is one which will satisfy a long-felt want amongst engineers who experience trouble with already formed scale in their boilers or are desirous to prevent the same forming without injury to the boiler plates, tubes and fittings, at the same time acting as a preservative and lessening the cost of fuel. Reports strongly in favor of this article can be furnished, and it is deemed only necessary for engineers to give it a trial, as its quality proves all that can be said of it. It is purely vegetable and free from all chemical matter.

This compound is being introduced in Great Britain, France, Germany, India, and Australia, also Canada and the United States, with the intention of extending to other countries. This company is represented in Canada and United States by Samuel Fuge, 464 Dundas street, London, Ont., who will be pleased to receive enquiries from all interested, and endeavor in all ways possible to prove that the article he offers will stand the strongest test of experts. The cost is now competitive with other compounds offered at a low price; it will, therefore, be found effective at a most moderate price, and in the interest of all steam users to give it a trial.

Within the past twelve months "Anti-Scale" underwent a strong practical test in two of the largest boilers of large Hamburg (Germany) manufacturers, resulting in great satisfaction, and the prediction of its being favorably received amongst steam users after testing its merits.

LITERARY REVIEW.

F. W. Helmick, music publisher, of 265 Sixth Avenue, New York, has favored us with a copy of a new popular song which seems likely to "reach the heart of every Christian in the land." It is called "Deal Gently with the Erring" The melody is very touching, and the publisher has thought so well of it that he has paid $2,000 in gold for the right to publish it in America. The price is 40 cts per copy, but readers of THE CANADIAN ENGINEER are to be favored by getting it at 20 cts., which may be forwarded in stamps.

The *Engineering Review*, published at 29 Great George Street, London, Eng., has begun a new series with some important changes. It will now be the aim of our contemporary to provide in the engineering field what the *Review of Reviews* does in the literary realm—a summary of the leading developments of engineering all over the world, rather than the publication of original articles. The idea is a good one, and in the large budget provided in the first number of the new volume, an admirable beginning is made. The subscription is seven shillings a year.

Hawkins' "Handbook of Calculations for Engineers and Firemen," has now gone through seven editions. The seventh edition, published by Theo. Audel & Co., 91 Liberty St., New York, makes a volume of 330 pages, and contains a large variety of information for ready reference for the engineer. The subjects include the elements of mechanical philosophy, mensuration, geometry, etc., with tables of weights and measures, money and wages tables, with calculations and many helpful rules. Besides these are elaborate tables giving the weights of metals, pipes, tables of steam pressure, and such a quantity of miscellaneous information as must make it a highly prized manual for any engineer. It is evidently compiled with great care.

The first edition of the "Year Book" issued by the Imperial Institute of London, Eng., is a most valuable handbook of information on all the colonies of the Empire. In this volume of 824 pages will be found an immense mass of statistics relating to every colony in the British Empire, prefixed in each case with a short historical and descriptive sketch. The statistics are elaborated with great care, and the descriptive introductions are not only very interesting, but, as a rule, impartial. Canada and Newfoundland together take up 65 pages, receiving fair treatment generally. No doubt in future editions many of the statements will be modified, when the compilers have acquired fuller knowledge. For instance, it hardly does justice to this section of Greater Britain to state that "the manufacturing industries of Canada are still in their infancy." An industry which has existed for over two hundred years, as the Canadian iron industry has, can hardly be referred to as "infant," while the products of some branches of it, as, for instance, agricultural implements, are now finding a market in every large country in the world. The same will soon be said of Canadian furniture, which is now being exported in increasing quantities to Great Britain. At the same time an industry which entirely supplies a home market of 5,000,000, cannot be set down as really insignificant, and we have many such industries. In some instances later statistics might have been got. As an instance of this the statistics of the Canadian cotton mills for 1889 are given, while the *Canadian Textile Directory* could have afforded returns for all the textile industries to 1892. But with allowance for these defects—which are to be expected in a first edition—the Imperial Institute "Year Book" is an admirable compilation.

THERE was a tug-of-war recently at the World's Fair between a 600 horse-power electric locomotive, weighing (on the drawing wheels) twenty-five tons, and a modern Baltimore & Ohio steam locomotive weighing 30 tons. The latter won the contest with ease.