

fect glory on Canada as their native land, have been rewarded by a grateful government. Even a measure wise in some respects, may be stultified by the severity with which it is enforced, and the length to which its provisions are carried. In this matter, although no one expects a government to be gifted with bowels of compassion, the order to discharge extra clerks in certain departments only seems to have been carried with ruthless exactitude, and an absolute disregard of fair play or justice. Were general economy aimed, at surely some newly appointed extra clerks in other departments might have been discharged instead of these veterans, and at least the anomaly of nearly forty clerks, against whose character not one complaint could be advanced, being discharged in one department, whilst in another department in the same corridor extra clerks were being taken on, including one man discharged by a minister for a grave offence. Even now, though the consideration would come too late to save the suffering from absolute poverty during the late severe winter, tardy justice might be done, and old friends be given appointments instead of new faces.

### On the Use of Long Steel Tapes in Measuring a Base Line.

REPORT OF U. S. C. AND G. SURVEY.

At the Rochester Meeting of the American Association for the Advancement of Science, Mr. R. S. Woodward of Washington, D. C., described a method of standardizing steel tapes by means of an iced bar comparator. The iced bar employed in the comparator consists of a bar of steel, on which are lines five meters apart, at a temperature of 32 degrees Fahr. To preserve the bar at this temperature it is surrounded by ice. The whole is mounted on a carriage that travels on a small railway. In measuring off the length of the comparator, which in most cases was 100 metres, the cross hairs of two microscopes were first made to coincide with the lines on the bar. The bar was then moved forward, and the mark on the end nearest the starting point placed under one of the set microscopes. A third microscope was then set over the end away from the starting point. The microscopes were mounted on wooden posts. At the ends of the comparator two stones are solidly embedded in the earth. In each of these stones a rounded brass projection is embedded, to mark the ends of the comparator. To place the microscopes directly over these points a special device containing a level is used. Having obtained the proper setting of two microscopes that are the length of the comparator apart, the tape is held under them in a way that was found to be the most convenient and reliable in field work. Stakes are set ten metres apart along the line to be measured, and in the side of these round steel wire nails are driven. The tape is supported on these nails. The corrections necessary to apply, if the posts are set at a greater distance, as in crossing a stream, can be easily computed from data furnished by preliminary experiments. The tension of the tape was made the same, about 25 pounds in all measurements, by means of a spring balance at one of its ends, a breaking piece being inserted, so that by no means could the operators overstrain the tape. Temperature observations were made in each case, three special thermometers being used with blackened bulbs, so that the surface had approximately the same radiating power as the tape.

It was proved by the comparator that, with ordin-

arily careful handling, there was no variation in length of the 100 metre tapes after long use. To test the efficiency of the steel tapes when used in the field, a Kilometre was measured by means of the iced bar, and this Kilometre used as a standard. It was found that the probable error of a single measurement of this Kilometre by means of the steel tapes was about one part in 500,000, and that the probable error of the average of a number of observations was about one part in 1,500,000. So that the general conclusion arrived at is, that for measuring base lines, steel tapes, as standardized by the iced bar comparator will give ample accuracy. The time required to make duplicate measures of the Kilometre with the tapes is about one hour, and in special cases it was measured in one direction in twenty minutes. The method of measuring the standard Kilometre by means of the iced bar apparatus, and probable error of the total length, was given in another section of the society, but as it is of interest in connection with the present paper, the following table is here given, which compares the probable errors involved, with the results obtained by previous workers in the same line:—

#### PROBABLE ERROR IN MEASURING A KILOMETRE.

Best work of Lake Survey.....	+ 0.40 <sup>m</sup> /m
Recent work of French on Paris and Perpignan base.....	+ 0.67 <sup>m</sup> /m
Best work of iced bar:	
1st. On Comparator.....	+ 0.10 <sup>m</sup> /m
2d. On Kilometre.....	+ 0.12 <sup>m</sup> /m

This table shows that the error in the work done with the iced bar is about one-quarter that of any other method previously adopted.

The greatest source of error was found to be the difficulty of determining the temperature of the tape correctly. It is generally supposed that a cloudy day is preferable for measuring with steel tapes, but the experiments indicated that such was not the case. The best time was found to be in the evening, while dew was being deposited.—*American Machinist.*

#### Temporary Clerks.

Many persons at present outside the service, but who are anxious to obtain appointments in one of the departments as extra or temporary clerks, often think that could they once obtain such appointments, they would have advanced one step at least towards securing a permanent position. This in many cases is the one aim they have in view. "All is not gold that glitters," and if they will read the following "short tales which are true," they will realize that they are pursuing a shadow that has no substance.

Some 13 or 14 years ago, a middle-aged gentleman, married, with a large family to support, entered one of the departments as a temporary clerk. After these many years' service, at a salary of \$1,000 per annum, he has by the stern order-in-council enforcing the Civil Service Act, been reduced to the minimum salary of a third-class clerk, viz., \$33.33 per month, or \$400 per annum. This is all the income he has on which to support and clothe his family and himself.

In the same department is a similar case, if anything perhaps a trifle harder. In this instance there is a father of a family of nine small children who has done nearly fifteen years' service. As in the former case, and for the same cause, he also has been reduced from a salary of \$1,000 to \$400. Anyone who has experienced maintaining a family, and what it costs, can imagine how far this sum will go in simple necessities of life, without touching education, and the unforeseen expenses incidental to such a winter as that just ended.

These are plain facts, and might be multiplied by

the score. What have been the results? Homes, have been broken up, furniture sold to pay creditors, and all family ties severed. Not only so, but the parents, now well on in years, are left with only one resource—to take the the pittance meted out to them. With them it is Hobson's choice. They are too old to be able to compete with younger men in looking for situations, and so must either accept the reduced salary or starve.

#### Is it Forgetfulness.

When the session opened, orders were issued in some of the departments that the hours of labour on Saturday afternoon should be from 1 to 5 p.m. The session now has ended for nearly a month, and still the orders are extant, not having been withdrawn. The clerks who are suffering from this apparent forgetfulness, are anxious now the pressure of the session is over to have the order rescinded.

#### Cheap Ammunition.

Riflemen throughout the Dominion will receive with delight the information that the Government has decided to reduce the price of Martini Henry ammunition, from \$20, to \$15 per 1000 rounds. On Thursday April 27th, a deputation consisting of Majors A. P. Sherwood, 43rd Batt., and W. E. Hodgins, G. G. F. G. waited upon the Minister of Militia and presented the claims of shooting men, for the reduction in price, with the above result. The Minister called in Adjutant General Powell and together they discussed the matter with the deputation at considerable length. Hon. Mr. Patterson evinced the greatest desire to do everything in his power to encourage rifle shooting in the Dominion, and promised the deputation that he would recommend to his colleagues the reduction sought for.

A much greater quantity of Martini ammunition will of necessity be used in weekly practices this year than heretofore, in view of the fact that the Martini Henri rifle has been adopted for all the provincial and Dominion matches. The average number of rounds of cartridge per man used in a season is about 1,000, so that it will be seen the question of cost of ammunition is an important one, and the thanks of militia men are due to the members of the deputation for the manner in which they presented their claims.

Some time ago it was decided to reduce the price of Snider ammunition from \$16 to \$8 per thousand rounds. These charges, will, of course, not affect the decision to grant free ammunition for this year's military rifle league matches.

#### Mr. Edward Miall.

Mr. Edward Miall, Deputy Minister of Inland Revenue, and Commissioner of Standards, was born at Leicester, England, in 1838. His father was the late Edward Miall, M.P. for Bradford, in the English House of Commons. He received his education in England, and in 1859 came to Canada, first establishing himself in Oshawa, where in 1860 he married Miss Ackland. He entered the Civil Service in 1870, and in 1872 was appointed Assistant Commissioner of Inland Revenue. During the session of the historical Fishery Commission, which met in Halifax in 1877, his abilities were utilized by the government of the day, and he was highly complimented on the manner in which he discharged the duties assigned to him. In 1880 and '81 Mr. Miall sat as a member of the celebrated Canadian Pacific Railway Commission, and in 1883 was promoted to his present position.