

the immense increase in accuracy. The cordite received from England has been subjected to the necessary chemical and ballistic tests before loading.

It was found necessary to purchase a new chronograph and to re-build the velocity range. The old instruments had been in use for about fourteen years, and the measurements obtained with them were so irregular and misleading that good work could not be done with them.

The new instruments of the le Boulengé pattern, as modified by Major Holden, R.A., have been mounted on a stone pedestal in a room especially prepared for the purpose in the factory buildings, and have given excellent satisfaction.

At the laboratory several alterations have been made to provide the greatest possible protection against accident to persons employed in the danger buildings. The table for mixing detonating compositions by hand has been replaced by a machine, in using which the operator is amply protected should an explosion occur. The drums for filled caps and mealing gunpowder have been isolated by means of heavy rope mantlets specially made for this purpose.

All the machines in this department belonging to the Snider or Martini Henry plant, that could be utilized for the manufacture of '303' have been altered locally, avoiding the expense of purchasing new apparatus. The accuracy proof of small-bore ammunition necessitated the erection of a small building on the proof range at the Cove Fields. The system used with Snider and Martini-Henry ammunition consisted in observing the hits on the target from the firing point with a powerful telescope, which could easily be done as these soft bullets made a large splash on the target. Not so, however, with the little '303' bullet, the mark of which can only be found with difficulty, and should the point of impact be in a joint between the plates, is quite invisible at 500 yards. The new bullet proof building was therefore placed a short distance in front of the targets where the shots can be seen plainly with the naked eye. The output of the factory has been considerably restricted by the introduction of the new plant. Before putting this plant into full operation it has been necessary to manufacture a large amount of tools and gauges, also duplicates of the standard gauges sent from England. The old machinery that could be adapted for the purpose had also to be modified as already stated in the beginning of this report. In addition to the above, a complete set of machines for testing components of the cartridge at various stages of manufacture had to be made. All this takes a great deal of time, and having only a small staff of machinists, our resulting output has of course been much affected. The production is at present about 10,000 per day, and it is expected that with a full complement of machinists and operatives this amount will be doubled. We have had in addition the difficulty common to all establishments undertaking a new manufacture, namely, the instruction and breaking in of the "personnel" to the new methods, during which time less work was done than now that all are familiar with their respective duties.

An order was given last winter to put the Martini-Henry plant at work to supply the ammunition of this description required for the Dominion Rifle Association, and the necessary material was ordered from England. The delay in getting out the material was, however, so great, that the idea had to be abandoned, and the cartridges used at the last matches of the Association were purchased in England.

To meet the increasing work of the factory, two 14 inch engine lathes, and one small universal milling machine were purchased from Messrs. J. Bertram & Sons, of Dundas, Ontario, and have given every satisfaction.

The manufacture of '303' smokeless blank cartridge has not yet been taken up. Should it at any time be necessary to do so, the plant used for the manufacture of ball cartridge can be modified and adapted for the purpose. A special kind of cordite for loading these cartridges will have to be imported, as the cordite used with ball cartridge is not suitable for blank.

All the plant is in good order, with the exception of a large annealing furnace built from plans got out from England; this furnace is in bad repair, and it is proposed to replace it by one of a more economical pattern and better suited to our requirements.

A few minor repairs to buildings were carried out during the year.