

that the barrel and breech action became so fouled that the cartridges could not be put into the barrel, and the working of the bolt became so laborious as to utterly destroy the steadiness of a man's hand by sending a tremor up his arm, which rapidly disqualified him from firing with accuracy. This state of things no longer exists, since a solid-drawn cartridge has been universally adopted abroad, and continental officers assert that a direct bolt action tires a man no more than the indirect lever action that we employ in our rifle."

The breech action is not, however, otherwise easily put out of order, and I quote, in this connection, the following from a clear and complete letter, which appeared in *The Montreal Star* of Feb. 1, signed "Mark IV":

"This rifle is the only one which made a satisfactory showing in the sand and rust tests at the time of its adoption. It is not easily put out of action, is easy to manipulate and easy to keep clean. The action cannot be jammed by rain, sand, or fouling. In the test which led to the adoption of this rifle one arm was exposed to rain, and water artificially applied, for seven days and nights, and in that time fired 400 rounds without cleaning, and then was fired 20 times in 1 min. 3 sec. Easily the best and quickest single military rifle of its day."

Col. Eden Baker, Royal Artillery, in his notes on Tactics, thus sums up the Martini-Henry:

"Sighted up to 1,400 yards. It is very effective up to 800 yards, but at large objects, such as columns and batteries, can be employed up to 2,000 yards range. A man can fire 10 to 12 aimed, and 20 to 24 unaimed, rounds a minute under favorable circumstances, and this rate, under good management with well-disciplined troops, is, in reality, quite fast enough for ordinary war requirements. Few men can fire more than 40 rounds quickly from the shoulder, as the exertion is too great. It was found, lately in India and also in Germany, that a man could fire off as many (and sometimes more) rounds in a given time, say 2 or 3 minutes, with the ordinary rifle as he could with the magazine."

The Martini-Henry continued to give general satisfaction until the Russo-Turkish war of 1877-78; when, as in 1866, the war between Prussia and Austria demonstrated the immense superiority of the breech-loader over the muzzle-loader. The Russo-Turkish campaign, in which the Turks were armed with Winchesters, showed that repeating arms had great advantages over single loaders, owing to their greatly increased rapidity of fire. As a result, all the European powers took up the question of the desirability of introducing repeating or magazine rifles, or of increasing the rapidity of fire of existing patterns by the adoption of what was known as a "quick-loader," being a de-

vice hung upon the rifle near the breech to reduce the time necessary to obtain a cartridge and put it into the breech.

But the Russo-Turkish war was not the first in which a repeating arm was used. The Spencer magazine rifle was used in the American war with more or less success, but its mechanism was of a complicated and delicate nature, and, paper cartridges being then in use, the rifle did not promise much advantage for the future, and after this war the question of magazine arms fell into abeyance. In England six systems of repeating rifles were submitted to the committee (in 1867-69), which adopted the Martini-Henry. Of these systems they preferred the Winchester, but considered it too complicated and so liable to injury that it was not calculated to withstand the wear and tear of service. This committee, in its report, said that they were aware that occasion might arise when a magazine rifle might be useful, but considering the increase of weight when the magazine was loaded, and the great rapidity of fire of the Martini-Henry and other single loaders, they were not prepared to recommend a magazine arm for general adoption. In reference to this report the Text Book on small arms says: "The fact was that this description of arm was then in its infancy and the demand for it had not become pressing; it was then a question whether the practical value of magazine rifles would fulfil expectations; but of this there was no doubt, even at that time: that the moral effect of their possession by one army would oblige their adoption by all."

It was not until 1880 that decisive steps were taken in the matter by England. "The prevalent idea that the Martini-Henry was such a superior one as compared with continental rifles," writes Major Mayne, "might probably have been one cause of this delay, but official experiments made in England in 1880 dispelled this pleasant dream, when it was found that our rifle was no better than the French or German rifles, while it was inferior to the Russian one."

THE QUESTION OF A MAGAZINE ARM

was in 1880 referred to the then Machine Gun Committee, but this committee was dissolved in March of the same year, and nothing further of any importance occurred in the matter until 1883, when a committee was appointed to consider and work out details in connection with a new arm, a modification of the Martini-Henry, but not a magazine rifle. This committee was also instructed to take up the question of the desirability of introducing a magazine rifle, and the best form of such arm.

"Every improvement in firearms has had for its main object increase in rapidity of fire," and the advantage of magazines in this respect had long been seen. What are the tactical advantages of the magazine? Major Mayne writes: "The necessity for using magazine rifles in future

will be best seen by considering the tactical use to which they will be put. It has been frequently stated that the moral effect caused by an efficacious fire is greater, as the time in which the losses are effected is less; that is, according to the suddenness and rapidity with which they are inflicted. The objectives usually fired at in war are very variable and mobile, and are often only seen at intervals, and it is in order to pour a rapid fire on these short appearances that a magazine rifle is required to inflict the greatest loss possible in the shortest time."

Magazine rifles have the undoubted advantage of allowing, at any given instant, and especially at the decisive moment of the fight, the enemy to be overwhelmed with a mass of projectiles. "If fire is to be opened on any given object at any range, then while the fire lasts its useful effect should be as great as possible, and it is only by the use of magazines that the greatest possible mass of lead can be directed on an enemy at any given moment. The greater the useful effect the greater will be the moral effect on the enemy, and hence the power of being able to inflict sudden losses on an enemy will go far towards attaining victory."

Nowadays, from the moment when his masses arrive on the field of battle, we try to prevent the enemy coming to short distances. Hence all the power of the fire of the troops ought to be utilized as early as possible, in order to take away as soon as possible from the enemy the vigor that it is necessary for him to possess for the close of the fight. "We can only obtain decisive results by the quantity, as to time and place, as well as by the quality, of the fire. Therefore, we must try and obtain both. Quality can only be obtained by training in peace time, and quantity of fire, as to time and place, by means of magazine rifles. When men are tired and fatigued the greater the number of rounds they can fire under the same conditions the better, and the theoretical destructive effects of the fire of two different rifles will be proportionate to their rapidity of fire, and for this reason—for a fire lasting one to two minutes magazine rifles will have a great superiority."

To illustrate the value of volleys from magazine rifles Major Mayne quotes the following from a lecture on magazine rifles by Col. Fosbery, V.C.:

"I remember hearing a Confederate officer relate his first experience (in the American Civil War) of the Spencer magazine rifle. He stated that the Federals had occupied and stockaded a strong position on the top of a hill commanding the passage of one of their great rivers, a position from which it was necessary that they should be expelled if possible at once. A strong storming party was accordingly formed, and assembled at nightfall at the foot of the hill. When the moon rose they silently commenced their ascent until at last they saw just above