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New Leader for Coupled Rockets

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which it is to be intersected, which constitutes the aim, are optically at the same distance from the eye; and the one can be laid as easily upon the other, as I can place the point of my pen upon any spot on the paper before me. This, of itself, would be a great advantage, even if the telescope had no magnifying power, but when added to this it gives an enlarged view of the object, its superiority cannot be disputed.

This seems the proper place to notice what is perhaps the most important practical advantage possessed by the telescope over any other rifle sight in use. With all other sights, and with none more than with the aperture sight, it is requisite to have, what is never had in service, namely, a white target, and a clearly defined bull's-eye; with the telescope this is altogether unnecessary, for the aim can be taken as readily at a small stone or bush on the hill side, as at the blackest bull's-eye on the cleanest target.

A glance at any of the complicated long range sights in use will satisfy any one that they are utterly unfit for military purposes. Besides the difficulty just referred to of aiming with them at any of the objects usually met with in the field, they are from their construction peculiarly liable to injury. Standing up, as they do, above the barrel or the stock, they are much exposed, and their light frame and delicate hinges could not resist rough usage. On the contrary, the patented telescope lies close to the rifle, and is strong in its construction. It does not interfere with the use of the common military sight for close quarters, and it can be taken off or applied in a moment.

There is another practical advantage which must not be overlooked. In aiming at long ranges with any of the ordinary sights, it is necessary to raise the eye to an inconvenient height, and to support the cheek by an elevating cheek-piece; whereas with the telescope now described, 10 or 12 degrees of elevation may be given, without involving any sensible movement of the eye.

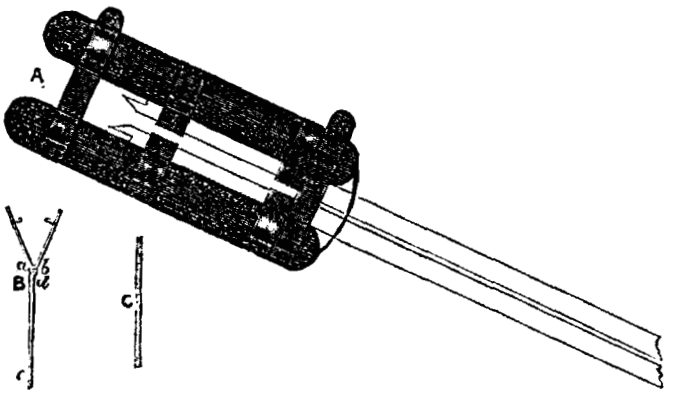
Rifles fitted with telescopes would be of great value in rifle-pits, in dislodging bushfighters, and in keeping down the fire of artillery. A heavy large-bore telescope-rifle, taking a large charge and throwing an exploding projectile, would be serviceable against field batteries at the longest ranges.

NEW LEADER FOR COUPLED ROCKETS.

Contributed by Lieutenant W. F. A. Harris, R.N., Coastguard, Grey-stones, Ireland.

The leaders now in use are very objectionable for several reasons; firstly, from the time wasted in fitting them to the rockets, as will be seen by reading the instructions for their use. "Take a leader and

"insert one of its legs into the mouth of the lower rocket, hook the "hook into the hole in the mouth of the case, and pinch the hook close "between the finger and thumb, take the other leg and insert it into "the mouth of the upper rocket, hook it into its place and close the "hook as before, lay the rockets into the frame, taking care not to "jamb the leader between the bottom of the rocket and the end of the "shaft of the frame inside, pass the loose end of the leader down "through the hole in the lock case, and insert the small end of the "percussion tube into the vent hole (for steadiness only) and close "the jaw upon the seizing where the paper joins the quill." I need hardly remark that, on a dark and cold night, and men likely to be excited at a wreck, there would be a great loss of time, perhaps under circumstances, where every minute would make a great difference in saving life. There also is no certainty in their firing the rockets, when you *have* got them in their places. My experience of them is, that the average, firing the rockets *simultaneously*, does not amount to more than one in four, the leader being generally blown off (without communicating the fire) at the parts marked a, b, c, d; then supposing one leg, say b, to be blown off, and the fire communicated to the one rocket only, by the other leg a, the one rocket has to do the duty of two, and consequently, with its double weight, falls into the water at a distance of about 20 yards. If it is blown off at c, the whole operation of hooking, &c., has to be gone through again with a new leader.



A. Coupled rockets, with leader entered ready for firing.
B. Leader now in use for firing coupled rockets.
C. Improved leader.

Having stated my objections to these leaders, I will proceed to state how my own act, so as to do away with loss of time, and to ensure the simultaneous firing of the rockets, without which a single rocket is much preferable to the coupled. My leader (C) is perfectly straight, and can be entered in a moment, even with one hand, the black end in the lower rocket, the other in the upper; it is then fired as a single

rocket. The fire from the tube ignites the lower rocket, and the leader instantaneously conveys it to the upper, thus insuring their going off together, and attaining the greatest range that can be got out of them; the figure A shows the leader entered and ready for immediate use. I enclose a copy of an extract of a letter from Captain de Courcy to the Commodore Controller-General on the subject, in which he says, "I have to report I witnessed a trial of them on the "3rd, when the line was thrown over the 'Stag' cutter. The leaders "supplied with the rockets often fail in conducting the fire, and are "liable to break at the joint. Lieut. Harris's leaders are easily made, "and much easier adjusted to the rockets than those supplied." This letter was dated March 7th, 1864. On March 14th the matter was forwarded to the Board of Trade, in whose hands it now is.

CALCULATION OF RANGE FOR THE SERVICE OF ARTILLERY.

A Paper contributed by Captain J. R. Campbell, Hants Artillery Militia.

That the course of a projectile is not a straight line, but a curve technically called its *trajectory*, is a fact known to every gunner and rifleman of the present day; and he learns from this that, in order to hit an object, he must give his gun a certain elevation depending on the distance he is from it, the nature of the gun and projectile, charge of powder, &c. Give him the distance or range, and he can, by the aid of certain rules or by reference to tables, ascertain the elevation required. In target practice, where the ground is measured out, this naturally ceases to be a matter of question; but in war, when firing at an actual enemy, or at his works, or ships, the range is seldom or never known. For short distances, and within certain limits of error, it may be *judged* by the eye, but for the higher artillery ranges, especially across water, this is impossible. Artillerymen generally depend upon their first shot or two—*trial shots* as they are termed—correcting each succeeding one by the result of the last, until they strike the object. But there are disadvantages attending this system, which is, besides, clumsy and unscientific. I will mention what I believe to be two.

1stly. In many cases, owing to the nature of the ground where the shots pitch, or other causes, it may be extremely difficult to observe the graze of the trial shots. We read of actions where at least the majority of the shots fired by one contending party have either all dropped short of, or all passed over, the heads of their adversary, and I ascribe this principally to the want of some better method of determining the range. The late engagement between the "Kersage"