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Improved Instruments for Military Sketching

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The jointed rod might be dispensed with, by using a rifle in its place: all that would be required, when a height of 6 feet is necessary, would be a ring to fit on to the top of the bayonet so as to prevent the sheet slipping down over it. When a height of 4 feet only is needed, then a small double hook would answer, one end being attached to the stud-hole in the sheet, the other end hooking on to the upper swivel of the rifle. The ring might be permanently secured to the hook, so that either might be used as desired. The ends of the two guys might also be attached to the ring; by doing this, the rifle could be disengaged from the tent in a second, by simply slipping the ring off the top of the bayonet in the one case, and casting off the hook from the swivel in the other.

Many Officers object to a rifle being used at all for such a purpose, and I think that one objection, namely, possible injury to a soft iron barrel is perhaps reasonable, at least until steel barrels (Henry-Martini rifles) are introduced. By the addition of three small metal hooks and three eyes, which would not interfere with the tent arrangements, the waterproof becomes available as a cape.

I may add that a friend who has just returned from a journey across the Rocky Mountains—Fort Edmonton to British Columbia—informed me that his party had no shelter but a cotton lean-to; the time occupied in the journey was thirty days; there was much rain, and the thermometer was sometimes as low as 15° F. The health of the party did not suffer.

The question of temporary shelter resolves itself into this: Is it of so much importance that it is worth the trouble of carrying 3 lbs. 1 oz. (or 2½ lbs. only if the rifle is used in place of the rod)? With continental nations who can draw an almost unlimited supply of men from their home depôts to repair the waste of bivouacing, it may perhaps be better policy not to burden the soldiers with the weight of a shelter tent; but in our case, with so much smaller a reserve to draw from, every man's life is of relatively greater value. I therefore venture to think that the question of carrying an increased number of waterproof sheets with the camp equipment for the purpose of obtaining cover when obliged to leave the tents behind, is one worthy of consideration.

HALIFAX, N.S.,
November 30th, 1872.

IMPROVED INSTRUMENTS FOR MILITARY SKETCHING.*

By A. H. HUTCHINSON, F.R.G.S., F.G.S., Major Royal Artillery, late Garrison Instructor at Aldershot.

THE increased attention which everything connected with military sketching has lately received throughout the Army generally, must be

* Exhibited at the Evening Meeting on Monday, February 3rd, 1873, Admiral George Elliot in the Chair. These instruments are made by Messrs. Elliott, Strand.

my apology for laying before the members of the Royal United Service Institution a short description of the following instruments which have been found of great assistance to the military draughtsman, not only in adding to the accuracy of his sketch, but also in materially shortening the time required for its execution.

THE IMPROVED PRISMATIC COMPASS.

Scarcely any alteration has been made in the prismatic compass since its first introduction, upwards of 100 years ago, by an instrument-maker in the Strand, and yet it possesses two serious defects—1st. Rain or moisture can penetrate the interior; 2ndly. When the glass breaks, the instrument is all but useless.

As Garrison Instructor, my attention was called to both these defects. Compasses which had lain by for a time were constantly brought in by Officers with the movement of the card interfered with, by the rusting of pin or magnet. And again, the sketcher would return from his ground with a drawing only half finished, obliged to stop, from the breaking of the glass by a fall.

To obviate these defects, I have reduced the glass on the upper surface to a minimum, allowing only just sufficient to admit the required rays of light, at the same time making the outside so secure that the entrance of moisture is all but impossible.

This improved compass has now been in constant use for upwards of twelve months, and has been favourably reported upon by both the Military Colleges at Woolwich and Sandhurst, and approved of by nearly all the garrison instructors.

It possesses the following advantages over the old pattern:—

1. There is no loose lid.
2. It is lighter and more compact.
3. Much safer and less liable to breakage, as most of the glass is replaced by metal; and, as a further improvement, the piece of glass used, is optically worked and mathematically parallel.
4. Should the glass be broken, the instrument is not rendered unserviceable.
5. No rain can penetrate to rust the interior.
6. It is provided with spare horse-hairs.
7. Does not require a leather sling-case, although one can be used if desired.
8. The steadying-spring is padded with a soft material, which acts as a buffer to the revolving card, without denting it.

9. The sight-vane can readily be raised by the knob, even with the gloves on in cold weather.
10. It is cheaper.

Directions for use.

Take the instrument out of the morocco case, which can be left at home; place the larger strap round the neck and insert the smaller one into the loop which secures the prism, allowing the compass to hang in front of the body, with the sight-vane outwards. A slit in the smaller strap will fasten on to a button of the coat, should further stability be desired.

To take a bearing, raise the sight-vane and erect the prism; afterwards allowing the instrument to fall upon the breast till required for further use. If a fresh horse-hair be required, cut it off the bunch at both ends and draw it out. To get at the card, merely raise the top-half of the compass.

THE NEW SURVEYING ANEROID.

All military draughtsmen agree in the necessity of showing upon the drawing, the relative heights of the different hills, or other important points.

Hitherto a clinometer of some kind or other has been almost the only instrument available for the use of the military sketcher. The process is a tedious one, the time occupied considerable, and should the thread, so to speak, once be lost, it can only be picked up again by returning (perhaps some considerable distance) to any known level.

The new surveying aneroid is intended to take the place of the clinometer as soon as the student has learnt to read by eye the various slopes he is likely to meet with.

This small instrument, carried in the pocket like a watch, can be referred to at any moment.

No time need be lost in ascertaining the different slopes of the ground to be sketched. One observation at the base of a hill and another at the summit, will at once give the number of contours to be inserted, their distance apart being determined by the eye.

It may be also useful in ascertaining the level of some height, which can only be occupied by the observer for less than a minute, and which may be totally unconnected with any part of his previous sketch.

It can be used for any elevation up to an altitude of 3,000 feet above the level of the sea.

By its help, contours of 25 feet and upwards can easily be determined, either by running sections or otherwise.

Experiments have also been carried out which prove that, comparing it with the present tedious process, at least three times as much ground can be sketched in the same time, and with far greater accuracy.

It is carefully compensated for temperature, and forms a reliable weather-glass of the best construction.

Directions for use.

1. Always hold the instrument by the handle in the left hand, the eye level with the needle.

2. When the observer ascends, the point of the needle rises; when he descends, the needle falls; and the difference of level is read off at once on the moveable arc, each of the smallest divisions representing 25 feet.

3. It is desirable to put the instrument, without its case, in the pocket a few minutes before it is used. To set it, place the zero on the moveable arc opposite the point of the needle.

4. Should the weather be unsettled, observations must be taken frequently and for small altitudes, moving the zero-point each time. In fine weather, the arc may remain fixed throughout the day.

5. Tap the instrument lightly with the finger on the centre of the back.

Major HUTCHINSON: I should wish to say a few more words about the new aneroid, because we have introduced in this instrument, something which will be of very great service, especially to army sketchers. The compass has passed through two years' ordeal, but with the aneroid we have only had six months' experience. It has been put into the hands of sketchers at Aldershot who have used it for a month or six weeks, being pitted against Officers measuring ground according to the old plan. So great has been the advantage of this instrument, that several of those who were employed in sketching with the others, have given them up, saying that it was perfectly impossible to go on with them any longer. I have adopted the principle that for all purposes of reading heights with an aneroid it must be held in one direction. It is no use taking the aneroid out of your pocket, and tapping it, and looking at it when it is flat, unless it is one of the most expensive ones. The principle of this new aneroid is this, that you can make your contours with the aneroid only. You can find the height of any hill, however small, with it, and you can go on mapping out your country with this little instrument, and you can do so with accuracy. Suppose there is a hill there, and we have only time to rush up it, and it is of importance that we should go up there with regard to placing guns on another hill. Well, a man gallops up and down again at once and brings the information in a moment.

Captain COLOMB, R.N.: How low will the aneroid register?

Major HUTCHINSON: One contour, viz., 25 feet, but you can take half that if you wish.

Captain SELWYN, R.N.: May I ask if there is any larger scale of aneroid on that system which would register smaller variations of height?

Major HUTCHINSON: A larger aneroid than this would not suit us in the Army.

Captain SELWYN: There has been one brought before the public, of 3 inches diameter, which professes to register 1 foot. I mention this because I have been using them in mines in America, and if you could give us one which would register even 2 or 3 feet, they would be of the greatest value to the miner. My own aneroid,

(one of Elliott's) will register a difference of 10 feet at moderate elevations, but I could not always rely upon it when I got up to the 9,000 feet elevation above the sea common in the Rocky Mountains.

The CHAIRMAN: We are much obliged to Major Hutchinson for coming here and showing us these instruments.

ON BREMNER'S STEAM-STEERING-SCREW.*

By Captain GEORGE BREMNER.

In addressing a company of gentlemen who are professionally and scientifically conversant with steam navigation, it is not necessary to enlarge on the importance of an invention such as that which I have the honour to bring before your notice this evening.

My invention, which I call a steam-steering-screw, has for its object to effect the turning, manœuvring, and revolving of a ship, and it claims to do that without the necessity of headway.

It will be readily conceded that the greatly increased length and dimensions of modern-built ships, especially those belonging to Her Majesty's Navy, require a mechanism more ready and more efficacious than the old-fashioned rudder to perform the evolutions required of them. I trust to be able to demonstrate, by the aid of the working model, that my invention would revolve a ship completely, without, as hitherto, the necessity of steerage way; I believe no mechanical appliance has hitherto been able to accomplish this.

It has justly been remarked that year by year, the sea, especially those parts of it which wash the shores of Europe, is becoming more crowded. The painful result is seen in the increase of accidents, chiefly arising from collisions. Even at the present moment the country is mourning for a fearful catastrophe which resulted from an accident of this kind. Careful navigation may do much to avoid these fatalities; well-considered sailing rules and directions may do much to lessen them; but even after both are accomplished, accidents to a certain extent will remain unavoidable. It is necessary therefore that every device or invention that will facilitate the movement of vessels under these circumstances should be applied, more especially to those steam ships whose trade leads them constantly into channels much frequented and crowded, and therefore especially liable to the disasters of collision or stranding.

The invention I have the honour to submit to you this evening will, in my opinion, if properly applied, be some remedy for this kind of disaster; for even when collision is imminent, the vessel provided with it may be turned, and the threatened collision altogether averted. I have confidence in asserting that its general adoption would tend

* Read at the Evening Meeting on Monday, February 3rd, Admiral George Elliot in the Chair.