

Prinz von Ligne. Briefe während des türkischen Feldzugs im Jahre 1787 bis 1789. Dresden 1799.

Resmi Ashmet Effendi. Wesentliche Betrachtungen, oder Geschichte des Kriegs zwischen den Osmanen und Russen in den Jahren 1768 bis 1774. Aus dem türkischen übersetzt von Dietz Halle und Berlin 1813.

An index to works on the wars, from the first French Revolution to the present time, can be found in the Catalogue of Colonel Stobnitzky; and of those treating the cavalry from a theoretical point of view, in the Catalogue of Colonel Levitzky, in the XIVth vol. of the Military Library (St. Petersburg).

We copy from the United States Army and Navy Journal of 13th February, the following interesting description of "Bowleng's Military Telemeter" or range finder, for infantry and artillery. It is the invention of a well known Belgian officer, who has the honor also to be the inventor of the best practical Chronograph or time measurer in existence. The value of the instrument described depends on the perfect manipulation of it—as it measures distance by velocity of sound, which is marked by the time elapsing between the seeing the flash and hearing report.

It is the best practical attempt at solving a most important problem in the science and practice of modern artillery:

"The instrument herein described measures the distance of the adversary by observing the interval which elapses between the smoke or flash and the report of his piece. It is a glass tube graduated along its length into divisions which represent distances. This tube, closed at both ends, is filled with liquid, through which moves a metal index formed of two discs united by a central stem. The diameter of these discs is somewhat smaller than that of the tube, so that, when the latter is vertical, the index slowly descends with a uniform movement. The glass is protected by a brass casing, having an aperture which discloses the scale and index. To use the telemeter hold it horizontally in the hand, the index at the origin of the scale, and attentively regard the enemy's position. At the instant the smoke or flash is perceived quickly turn the wrist so as to bring the instrument into the vertical, when the index descends; upon hearing the report return it to the horizontal, and the index stops. The number on the scale corresponding to the lower disc, which serves as marker, is the distance sought.

An important attribute, which has been successfully given the instrument, is its power of self-adjustment for temperature. To effect this the volume and density of the index and the density and dilatibility of the liquid are so combined that the velocity of the index is influenced by temperature in the same proportion as is the velocity of sound, consequently the readings are always correct.

A velocity 1-25000 that of sound has been adopted for the index, so that a millimetre on the scale represents twenty five metres of distance. Each degree of the scale represents twenty-five metres and with the eye the fifth of a division can be estimated.

A great number of trials have been made of this telemeter. When proved, by the

vibrations of a pendulum or the beats of a watch it is absolutely true, while the exactness of its indications in measuring distances depends upon the aptness of the observer. The basis of an opinion on this point may be drawn from the following experiment, which has been frequently repeated:

A dozen men, non-commissioned officers and privates, each furnished with a telemeter, observed the fire of a musket or gun, placed successively at different known distances, and under the varying circumstances offered by an actual campaign. From the results obtained, the following conclusions may be drawn: Any soldier can avail himself advantageously of the field telemeter; the accidental error committed by the ordinary observer does not generally exceed fifty metres; with practice this is diminished to twenty or twenty-five metres. Every one has his own personal equation, and this should be known to derive all possible advantage from the instrument; though it varies little among observers, and on the average lessens the distance fifty metres, the report being noted more quickly than the flash or smoke. This mean equation is corrected on the instrument itself by making the origin of the scale correspond not to zero but to fifty metres. It is an advantage always to use the same telemeter in order to unite in the personal equation the slight error which may exist in the graduation. An observer is liable to commit very great errors in his first attempts, because, unaccustomed to the duty, he is surprised by the flash or smoke and does not promptly note it. The error is independent of the distance, hence the personal equation decreases slightly with the distance. The fire of small-arms may be observed as exactly as that of artillery up to two thousand metres in favorable weather. The wind appears to have very little influence upon the observation; this, however, has not yet been fully proved.

PRACTICAL DIRECTIONS FOR THE USE OF THE INSTRUMENT.

The instrument is carried in the pocket, either open or in a case, or it can be slung by a cord tied to the knob of the cap.

To use it, it is held in the right hand, (the arm extended without stiffness, the eye to the right, the aperture toward the observer,) between the joints of the fingers rather than in the hollow of the hand; more tightly grasped toward the fore than the little finger, so that, in turning the wrist, the tube may be as vertical as possible. Begin by turning the wrist to the left to bring the index to the origin, then hold the instrument horizontal, the eyes fixed upon the point to be observed; mark the flash or smoke by turning the wrist to the right, by a quick but gentle movement, and the report by the opposite movement of the wrist, made as nearly as possible in the same cadence. Bring back the hand, keeping the tube horizontal, and open the fingers to read the indication. Practice bringing the telemeter into the horizontal and vertical without hesitation by a cadenced movement until it is done instinctively. One of the great practical beauties of the instrument is, that even if held slightly inclined during the descent of the index the resulting error is very slight, generally inappreciable. If the instrument has not been in use for some time, the index should be made to travel up and down several times before use. Unless this precaution be taken, its course might be slightly retarded, a fact taught by experience, and probably due to the liquid losing its fluidity by quiescence. The telemeter being intended for carriage in the pocket or hand, its temperature, even in cold weather,

will not fall below about 60 deg. This condition has been considered in its construction, and therefore it is recommended that, in cold weather, it be continually kept in the pocket of the trousers or carried in the hand, so that the temperature of the liquid may not fall too much, in which case the readings obtained will be a little too small. In summer no especial precaution is necessary.

LIMIT OF THE INDICATIONS.	PRICE.	
	Without Case.	With Case.
Between 1,600 and 1,800 yards.	\$2.50	\$2.55
Between 2,400 and 2,700 yards.	3.20	3.50
Between 3,800 and 4,400 yards.	4.00	4.30

TOTAL LENGTH.	INCHES.
No. 1.—Infantry telemeter: to register into musket fire.	3.74
No. 2.—Field telemeter: a pocket instrument for officers.	4.72
No. 3.—Artillery telemeter: to form part of the equipments of field, garrison batteries, etc., and garrison batteries.	7.09

At present these are the only models adopted, but nothing prevents the making of them for greater distances.

DETAILS OF CONSTRUCTION.

Among the different fluids which were tried—especially water, alcohol, glycerine, and their mixtures—distilled water alone, with a small proportion of alcohol, fulfils the conditions desired. This liquid should be used with a silver index of very small size; aluminium and platinum do not offer the same advantages with regard to density and expansibility. Various forms of indexes were also put to the test. Hemispherical and conical discs worked less regularly than the slightly convex ones adopted. To insure a uniform movement of the index, the glass tube must be perfectly cylindrical throughout its length, a condition which demands special care in its fabrication and calibration. The scale is printed on paper and pasted on the face of the tube opposite the opening in the brass casing; it is accordingly seen through the liquid, which forms a lens and renders the reading exceedingly easy by illuminating and magnifying the divisions and figures. As the edge of the marker decreases directly upon the scale, there is never any doubt concerning the reading, for it is very distinctly indicated. To facilitate the reading, hundreds of metres are distinguished by a long mark with figure, the divisions twenty five and seventy five by a dot, and the division fifty by a short mark. The scale can be made in any other unit of length, such as the pace, yard, etc.,