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TECHNICAL REPORT

SUBJECT: Examination and Evaluation of Foreign Fire Control Instruments

A Comparison of Soviet Panoramic Telescope (MCN-6065) and Soviet Commander's Monocular (MCN-6066) with Panoramic Telescope, M12 and Elbow Telescope, M17, respectively

PROJECT NO. TB3-0035 **REPORT NO.** S-4182

PREPARED BY W. W. Hollis
Physicist

DATE 13 September 1954

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AUTHORITY: APG 386.3/79 (c)

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ABSTRACT: A comparison is presented between the Soviet Panoramic Telescope, model unidentified, the Soviet Commander's Monocular and the Panoramic Telescope, M12 and Elbow Telescope M17, respectively. Conclusions are presented as to the merits of the Soviet instruments as compared to similar domestic types.

INTRODUCTION: The Optical Design Branch, Ground Weapons Division, Research and Development Department, FCIG, has completed an examination and evaluation of the following Soviet Fire Control Materiel:

JTIS No.	NOMENCLATURE	APG STOCK No.
MCN-6065	Telescope: Panoramic model, unidentified	FMFC-592
MCN-6066	Telescope: Monocular, Commander's for DYa-6 Heightfinder Soviet	FMFC-803D

The above listed instruments were compared with the U. S. Army standard Telescope, Panoramic, M12 and Telescope, Elbow, M17, respectively.

The Soviet instruments examined were obtained by the Governme through intelligence channels and forwarded to this arsenal by Aberdeen Proving Ground. Information furnished with the Soviet instruments indicates that the panoramic telescope is used with field artillery in the normal manner and the Commander's Monocular (elbow telescope) is used as an auxilia sighting device on the Soviet Heightfinder DYa-6 (stereoscopic

DISCUSSION: The following table shows a comparison of the Soviet Panorami Telescope with Telescope, Panoramic, M12:

CHARACTERISTICS	TEL. PAN M12	SOVIET PAN
Magnification	4x	3.9x
Entrance Pupil	.66 inch	.61 inch
Exit Pupil	.165 inch	.157 inch
Field of View	10°	9.6°
Weight	5.5#	3.75#
Eye Distance	1.003 inches	.787 inch
Reticle	Yes	Yes
Sealing	Yes	No
Coated Optics	Yes	No
Eye Piece Focus	Fixed	Fixed
Provision for reticle illumination	Yes	Yes
Provision for azimuth slewing	Yes	Yes

A photograph, Fig. 1, is included to provide a size comparison between the two instruments.

The reticle in the Soviet instrument (See Fig. 2) consisted of a cross line pattern graduated every 5 mils (Soviet mils) for ± 20 mils in azimuth. Note: A Soviet mil is 16/15 of an English mil, since there are only 6000 Soviet mils in 360°.

The Soviet Panoramic is provided with a means of scanning 360° in azimuth. The azimuth motion is recorded on a scale which is graduated in 100 mil increments from 0 to 6000 mils and numbered every 200 mils. The azimuth worm is actuated by a drum which is graduated around its periphery in 1 mil increments and numbered every 10 mils. The least count of the instrument is 1 mil although 1/2 mil values could be estimated. The azimuth drive mechanism and scales of the Panoramic, M12 are essentially the same as those of the Soviet instrument examined, the exception being that the azimuth scale of the M12 is graduated from 0 to 3200 mils in 100 mil increments and numbered every 400 mils.

The Soviet instrument is capable of motion in elevation and depression in excess of 300 mils. The main elevation scale is graduated, however, in 100 mil increments to 300 mils only. The elevation scale drum is graduated in 1 mil increments from 0 to 100 mils and is numbered every 10 mils. The Panoramic, M12 is capable of ± 300 mils elevation, and although there is a zero elevation reference line, no scale is provided.

It is pointed out that the Soviet method of graduating the azimuth scale from 0 to 6000 mils in 100 mil increments is preferable to the method employed on the Panoramic, M12 inasmuch as the possibility of introducing a 180° error in azimuth setting is eliminated. It is also to be noted that latest RAD pilots of new panoramic telescopes employ a system of 100 mil increments from 0 to 6400 mils on the main azimuth scale.

The following table shows a comparison of the Soviet Monocular, Commander's with the Telescope, Elbow, M17.

CHARACTERISTICS	TELESCOPE, ELBOW, M17	SOVIET MONOCULAR COMMANDER'S
Magnification	8X	8X
Entrance Pupil	1.944 inches	1.57 inches
Exit Pupil	.243 inch	.2 inch
Field of View	6°	7.6°
Weight	5.0#	4.75#
Eye Distance	.75 inch	.51 inch
Reticle	Yes	Yes
Coated Optics	Yes	No
Focusing Adjustment (Eye Piece)	± 4 diopters	± 5 diopters
Sealing	Yes	No
Provision for reticle illumination	Yes	Yes

A photograph, Fig. 3, is included to provide a size comparison between the two instruments.

The reticle of the Soviet instrument (Fig. 4) is graduated every 5 mils (Soviet) and numbered every ten mils for thirty mils (plus and minus) in both azimuth and elevation. The circle in the center of the reticle has a diameter of 25 mils.

The objective of the Soviet instrument is provided with a sunshade, which has an orange filter mounted within it. This filter may be brought into the line of sight by actuating a spring loaded lever. It is pointed out that the Soviet instrument is provided with only one filter, which is external to the optical system, while the Elbow Telescope, M17 is provided with three filters, which are internal to the optical system.

Appendix I has been prepared to record all markings found on the instruments examined.

CONCLUSIONS: It is concluded that the two Soviet instruments examined are of nominal design and construction and resemble many other instruments of their respective classes. Neither instrument examined possessed any new or unique features or features suitable for incorporation in U. S. Army fire control instruments now being developed.

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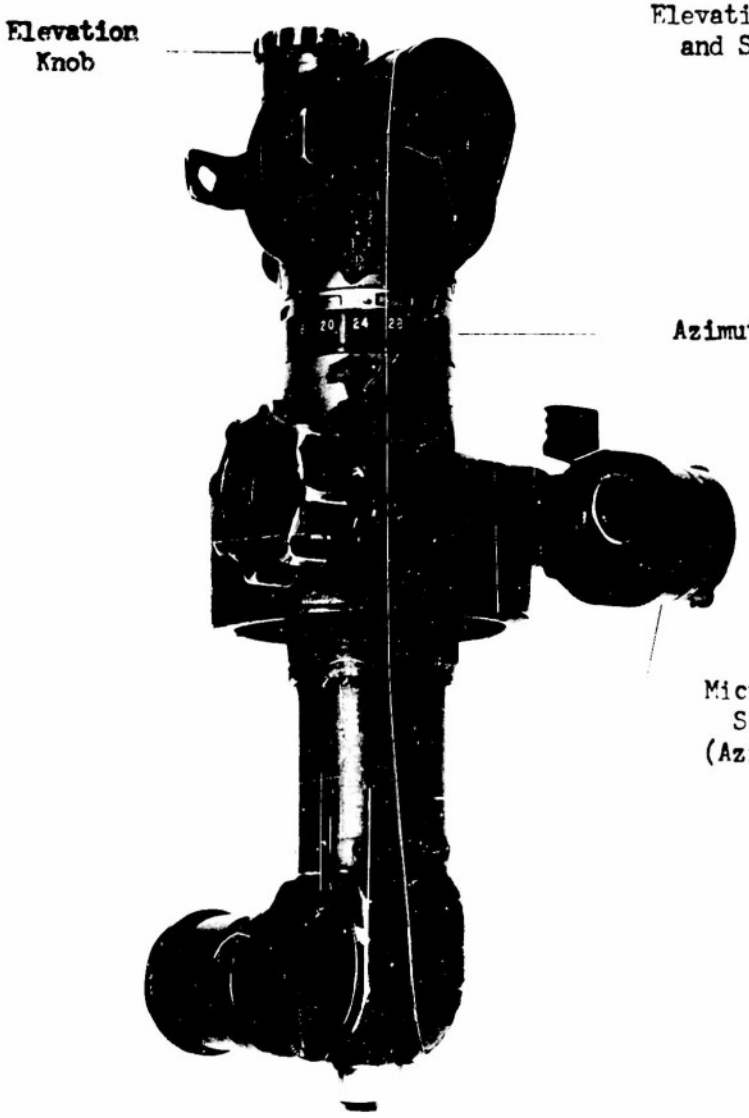
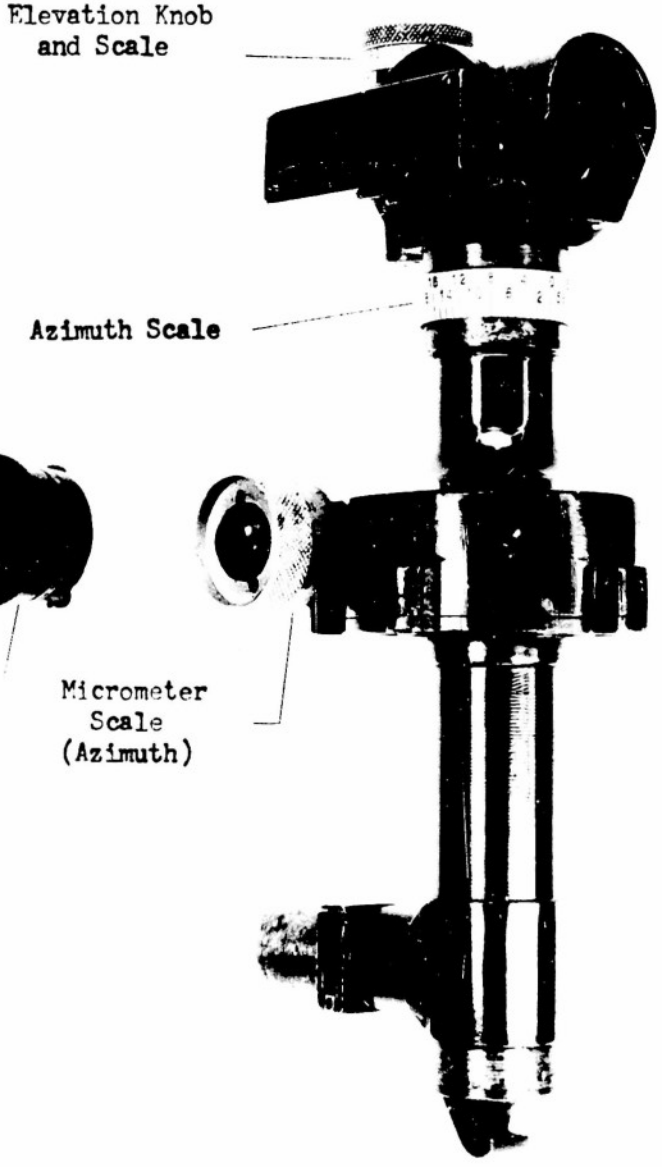


Telescope, Panoramic,
M12



Telescope, Panoramic
(Soviet)

Figure 1
(S-4182)

Neg. #25354-2

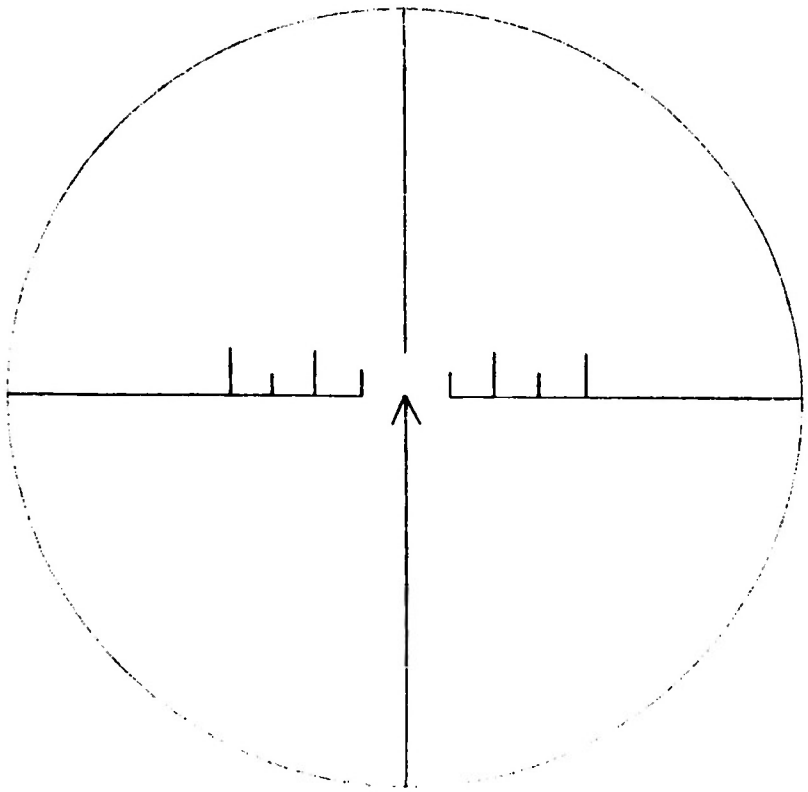


Figure 2. Reticle for unidentified model of Soviet Panoramic Telescope (MCN-6065)
Not to scale
(S-4182)

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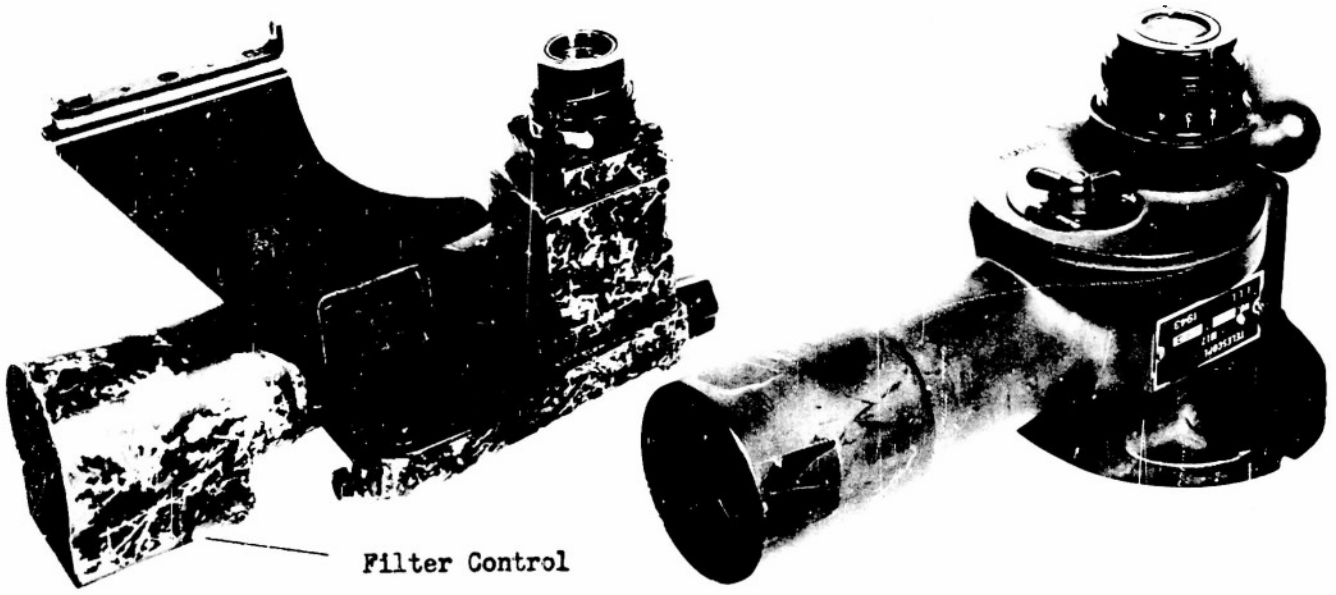


Commander's Monocular
(Soviet)

Telescope, Elbow
M17

Figure 3
(S-4182)

Neg. #25354-4

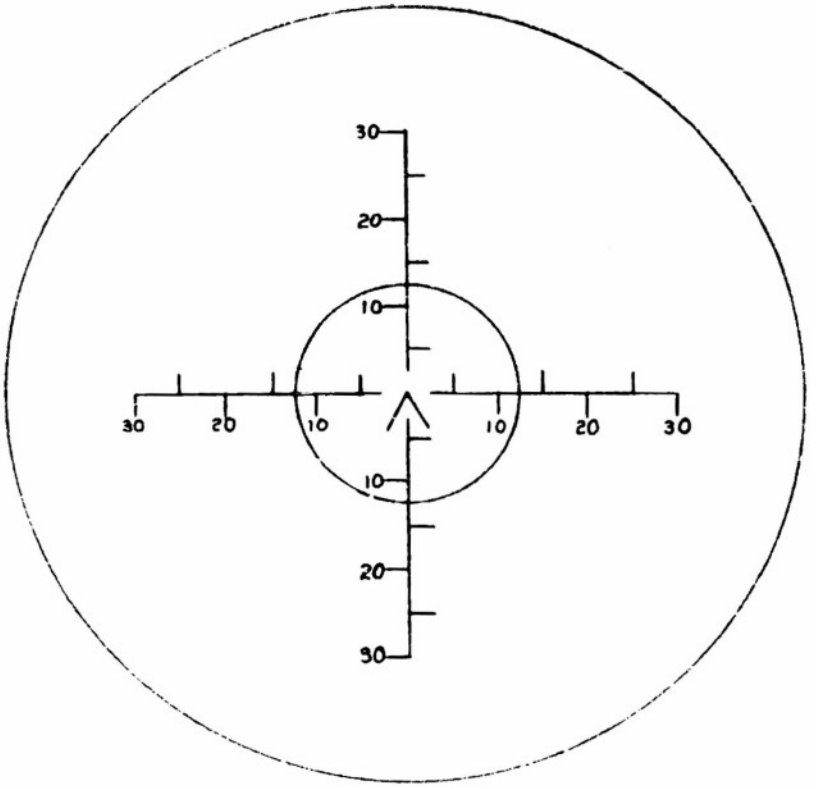


Figure 4. Reticle for Soviet Commander's Monocular Telescope (MCN-6066)
Not to scale
(S-4182)

Neg. #25351-5

APPENDIX I

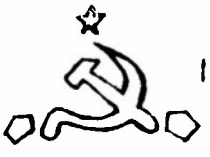
Markings found on Soviet Panoramic Telescope.

Marking	Meaning	Location of Marking
	Identification Symbol	Head Assembly
N 910768	Serial Number	Head Assembly
1945 г.	Year of Manufacture	Head Assembly
ВНИЗ	Up	Elevation Scale
ВВЕРХ	Down	Elevation Scale
ОРУДИЕ	Gun	Main Body Casting
ПР	Right	Main Body Casting Adjacent to Azimuth Scale Knob
ЛЕБ	Left	
2924		Bottom of Gear Housing
2924		Eyepiece Casting
2924		Mounting Stud
2, 9, 9, 2, 7, г		Screw Housings at Joint of Upper and Lower Body Sections

Neg. #25354-6

Appendix I, cont'd

Markings found on Soviet Commanders Monocular Telescope

Marking	Location	Meaning of Marking
ДЯ6	Nameplate	DYa -6
МОНОКУЛЯР КОМАНДИРА	Nameplate	Monocular Commanders
УВЕЛИЧЕНИЕ 8^{x}	Nameplate	Magnification 8x
N 10100  1946 г.	Nameplate	Identification Symbol