SUPERSEDES COPY DATED 3 MARCH 1986.
SEE PAGE i FOR DETAILS.

TECHNICAL MANUAL

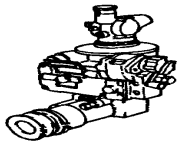
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

TELESCOPE, PANORAMIC: M115 (1240-00-895-9186)

TELESCOPE, ELBOW: M139 (1240-00-328-5631)

MOUNT, TELESCOPE: M138 (1240-00-896-2240)

MOUNT, TELESCOPE: M137 (1240-00-895-6492)



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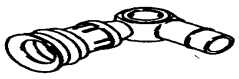

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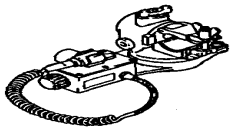

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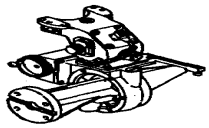

M137

OCTOBER 1993

HEADQUARTERS, DEPARTMENT OF THE ARMY

TECHNICAL MANUAL

No.9-1240-400-34&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington DC, 8 October 1993

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

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Current as of March 1993 for Appendix B

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you,

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*This manual supersedes TM 9-1240-400-34&P, dated 3, March 1986, including all changes.

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HOW TO USE THIS MANUAL

GENERAL. References in the manual are to pages and other technical manuals.

INDEXES. This manual is organized to help the user quickly find the information needed. There are five useful indexes.

a. *Front Cover Index.* Is a tabbed index of chapters and appendixes (keyed to tabbed pages in the manual).

b. *Table of Contents.* Lists in order all chapters, sections, and appendixes. Gives page references.

c. *Nomenclature Cross-References List.* Gives an alphabetical list of common item names used in the manual. Official nomenclature is given for each item (p 1-2).

d. *Symptom Index.* Located just before the troubleshooting table in each maintenance chapter. Lists possible malfunctions and corrective actions. References pages of the troubleshooting tables.

e. *Alphabetical Index.* Located at the end of the manual. An extensive subject index for everything in the manual. Gives page references.

MAINTENANCE PROCEDURES. There is a maintenance chapter for each piece of equipment. Each chapter contains detailed procedures for the maintenance tasks.

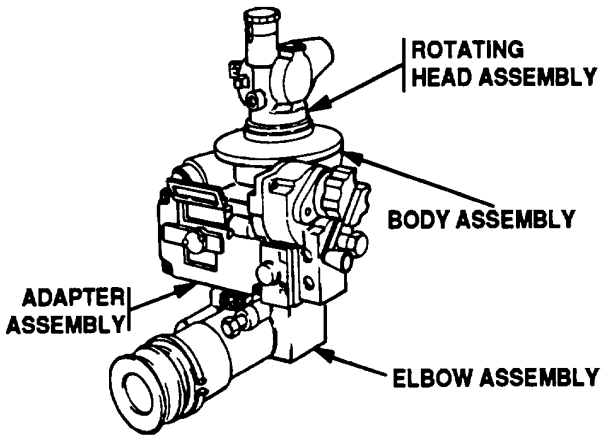
a. *Detailed Procedures.* Contain an initial setup plus step-by-step procedures.

(1) Initial Setup. Gives a list of everything needed in order to do the maintenance task on a component of a fire control instrument.

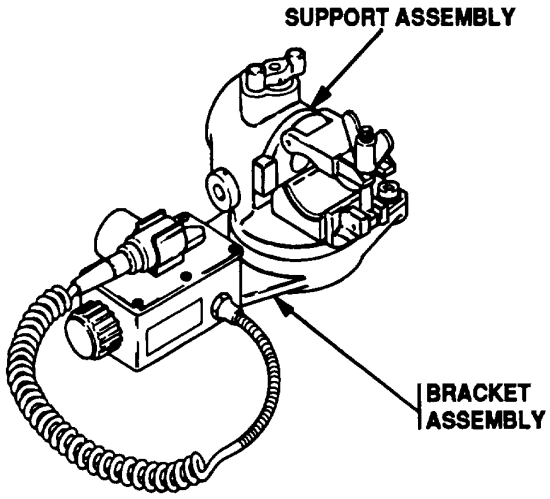
(2) Step-By-Step Procedures. Are illustrated maintenance procedures authorized in Maintenance Allocation Chart (MAC) (TM 9-2350-304-20-2) and Repair Parts and Special Tools List (RPSTL) (appendix B).

b. *Troubleshooting.* Included in each chapter are procedures for direct support or general support troubleshooting.

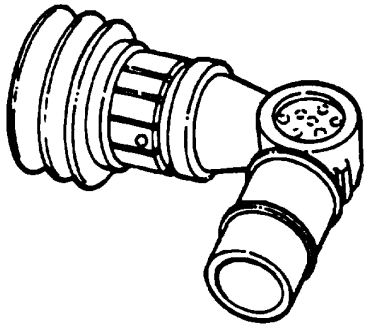
c. *Final Inspection Procedures.* Immediately following the maintenance sections. List inspections and tests required to ensure the serviceability of each fire control instrument.



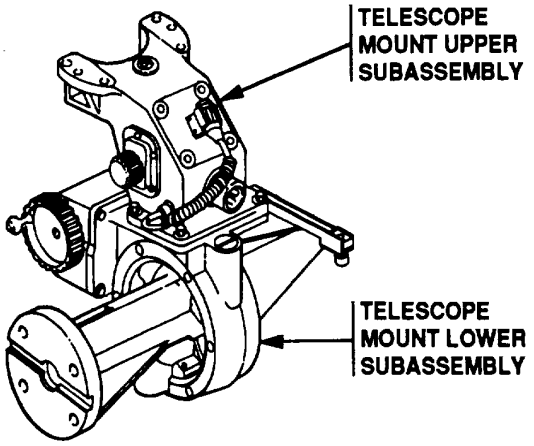
M115 PANORAMIC TELESCOPE

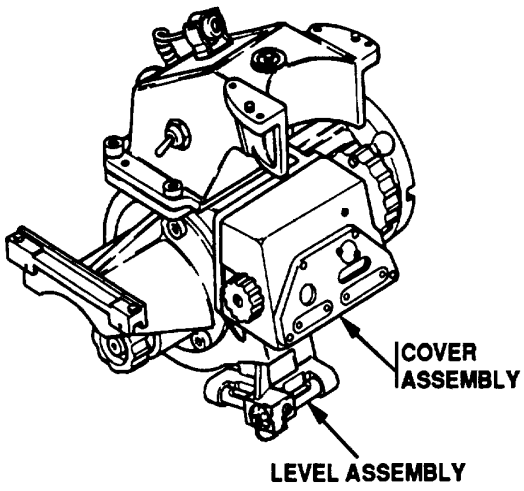


M138 TELESCOPE MOUNT



M139 ELBOW TELESCOPE





M137 TELESCOPE MOUNT

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. Type of Manual. Direct and general support maintenance.

b. Model Numbers and Equipment Names:

(1) M115 Panoramic Telescope
(2) M138 Telescope Mount
(3) M137 Telescope Mount
(4) M139 Telescope Elbow

c. Purpose of Equipment.

(1) M115 Panoramic Telescope is used on M11 OA2 self-propelled howitzer for direct or indirect sighting as part of a two-sight, two-man system.

(2) M138 Telescope Mount adapts M139 elbow telescope to M110A2 self-propelled howitzer and provides adjustments in elevation and deflection (azimuth).

(3) M137 Telescope Mount adapts M115 panoramic telescope to M11 OA2 self-propelled howitzer and provides adjustments in elevation and cant (cross-level).

(4) M139 Telescope Elbow is used to lay the M11 OA2 self-propelled howitzer in elevation and deflection for direct fire operation.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS. Department of the Army forms and procedures used for equipment maintenance will be prescribed by DA PAM 738-750. The Army Maintenance Management System (TAMMS).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE. Fire control instruments must be destroyed in a way that same essential parts, on like equipment, cannot be used to construct one complete unit from damaged ones. Refer to TM 750-244-6.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to TM 9-2350-304-20-2 and SB 740-95-700, Storage Serviceability Standards for ARRCOM Materiel for Fire Control Items, for detailed instructions on administrative storage.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS. Shortened nomenclature is used in this manual to make procedures easier for you to read. A cross-reference between the shortened nomenclature and its official nomenclature is shown in the following table.

Nomenclature Cross-Reference List

Manual Nomanclature	Official Nomenclature
Bracket	Angle bracket
Cap	Air valve cap
Setscrew	Socket wrench attachment
Cover	Riveted door
Eccentric	Control cam
Eccentric ring	Optical element holder
Elevation knob	Knob assembly
Elevation level vial tube	Fire control level

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS (CONT).

Nomenclature Cross-Reference List (Cont)

Manual Nomenclature	Official Nomenclature
Eye lens	Optical instrument lens
Felt	Preformed felt
Field lens	Optical instrument lens
Gear	Segment gear
Gear	Wormwheel gear
Key	Machine key
Key	Woodruff key
Level vial	Fire control level
Pin	Headless straight pin
Pivot	Shouldered shaft
Plate	Bearing retainer plate
Plate	Gear assembly plate
Plate	Riveted assembly plate
Plug	Machine thread plug
Screw	Machine screw
Spring	Helical compression spring
Retainer	Optical retainer
Tapered pin	Plain tapered pin
Torsion spring	Torsion helical spring
Valve stem	Purging valve stem

1-6. REPORTING EQUIPMENT IMPROVE-MENT RECOMMENDATIONS (EIR).

If your M110 A2 Fire Control needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We'll send you a reply.

1-7. CORROSION PREVENTION AND CONTROL (CPC).

a. *General.* Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this equipment be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

b. *Corrosion.* While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

c. *Reporting.* If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure that the information is identified as a CPC problem.

d. *Forms.* The form should be submitted to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAS/Customer Feedback Center, Rock Island, IL 61299-6000.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

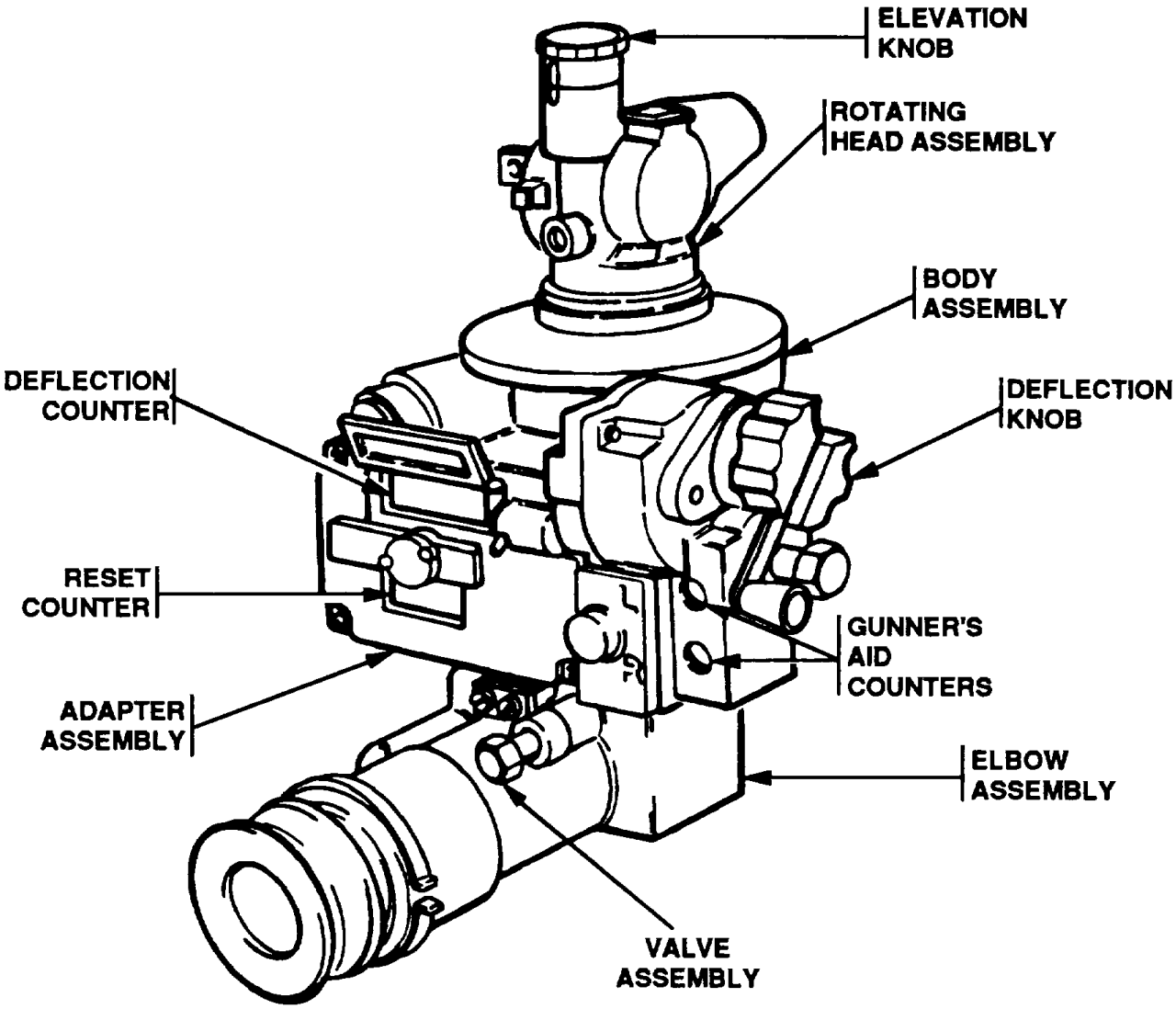
a. *M115 Panoramic Telescope.* The M115 telescope is a hermetically sealed unit used with the M137 telescope mount on the M 11 OA2 self-propelled howitzer. It is a 4-power, 10-degree field of view instrument with analog counters. Counters and reticle are illuminated by LEDs. The telescope consists of three main assemblies: the rotating head, the body assembly, and the elbow assembly. The rotating head contains the entrance window and serves to house the 90-degree prism. The body assembly contains two objective lenses, reticle, deflection knob, and adapter assembly. The elbow assembly has a total excursion of 30 degrees and contains a penta prism, pechan prism assembly, cell assembly (erector), eyepiece assembly, and assembled gearing.

b. *M138 Telescope Mount.* The M138 telescope mount adapts the M139 elbow telescope to the M110 A2 self-propelled howitzer. The mount provides adjustments in elevation and deflection (azimuth) for direct fire with the 8-inch gun. Illumination is adjustable by a variable resistor.

c. *M137 Telescope Mount.* The M137 telescope mount adapts the M115 panoramic telescope to the M11 OA2 self-propelled howitzer. The mount provides adjustments in elevation and cant (cross-level) for indirect fire. The M137 telescope mount consists of two subassemblies, one mounted on top of the other, and secured by four screws. The upper subassembly contains most of the electrical system and the mounting surface for the telescope. The lower subassembly consists of a mounting bracket, elevation knob and elevation counter, correction knob and counter, and cross-level knob.

d. *M139 Telescope Elbow.* The M139 elbow telescope is a 3-power, 13-degree, 20-minute field of view instrument. The reticle, illuminated by the M36 instrument light, is used for direct fire and is graduated in meters for range.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

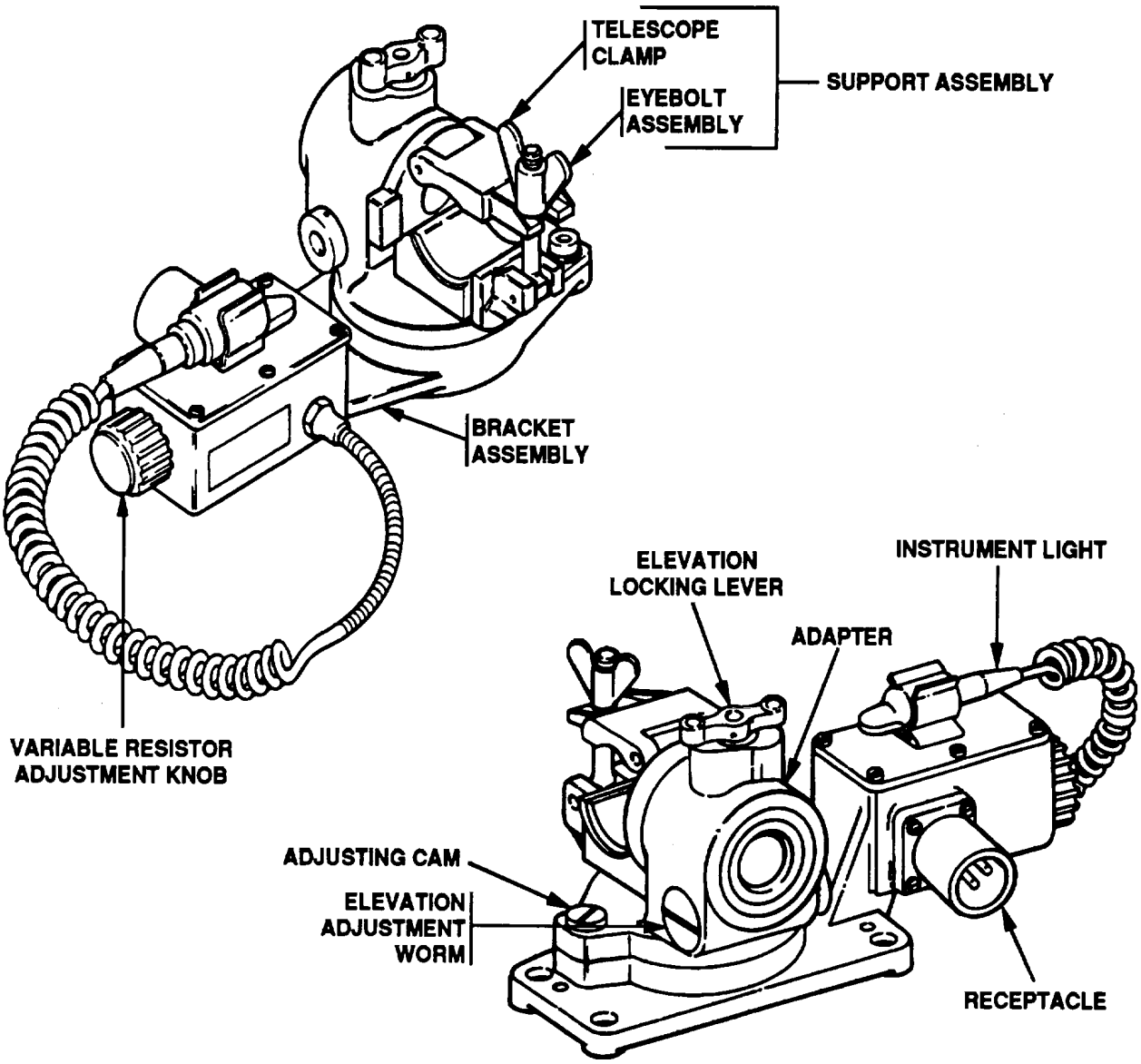


a. *M115 Panoramic Telescope.*

(1) Rotating Head Assembly. The rotating head assembly is capable of 360-degree rotation (6400 mils). It contains a 90-degree prism which is adjustable in elevation (+300 mils) using the elevation knob. The amount of deflection is indicated on the deflection counter on the adapter assembly.

(2) Elbow Assembly. The elbow assembly has an excursion of 30 degrees and contains a penta prism, pechan prism assembly, cell assembly, eyepiece assembly and assembled gearing. A valve assembly is for purging and charging the telescope.

(3) Body Assembly. The body assembly contains two objective lenses, reticle, deflection knob, and adapter assembly. The deflection knob controls deflection of the telescope. The adapter assembly contains a deflection counter, reset counter, two gunner's aid counters, and associated gearing.



b. M138 Telescope Mount.

(1) Support Assembly. The support assembly consists of an eyebolt assembly and a telescope clamp to hold the M139 elbow telescope in place.

(2) Bracket Assembly. The bracket assembly contains the electrical system. A variable resistor adjustment knob controls the various settings for illumination. A receptacle is provided for connection of a 24-volt dc power source for the instrument light.

(3) Adapter. The adapter contains a deflection adjusting cam and an elevation adjustment worm for adjustments in deflection and elevation. An elevation locking lever provides for adjustment at the desired setting in elevation.