

GURLEY

*ENGINEERING
INSTRUMENTS*

W. & L. E. GURLEY
TROY, N. Y.
U. S. A.

The Gurley Line

This Bulletin is a complete catalog for the busy Engineer and Surveyor. It illustrates and describes the most widely used models of the various Gurley products, indicating their principal use and giving their important dimensions. From this brief presentation, selections can be made rapidly, and prompt delivery can be assured, since substantial stocks of the instruments listed herein are always maintained.

Bulletin 50

Dated May 1, 1929.

Subject to change without notice.

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Main Office and Factory, Troy, N. Y.

New York City Sales Office, 25 Warren Street

W. & L. E. GURLEY. TROY. NEW YORK



IN the year 1845, William and Lewis E. Gurley, brothers, began the manufacture of Surveying Instruments. Both were technical graduates, both had learned the art of instrument-making from an early apprenticeship, and both possessed qualities which laid a sound foundation for a business that has been, and still is, carried on by the Gurley family.

These many years of service to the Engineer and Surveyor have tended to fix firmly certain business policies. Quality in materials and workmanship has always been uppermost, witnessed by the number of early model Gurley instruments still in service. Improvement in the product, based on field experience, has kept pace with the times. Every effort is made to maintain an up-to-date Factory, giving the customer the benefit of the latest development in materials and methods.

An honest effort to give prompt and efficient service, the publication of our actual sales prices, and a strict adherence to those prices, is our method of treating all customers on an equal basis. And lastly, there is an unqualified guarantee to give entire satisfaction in service, taking care of any unintentional error on our part, in a manner which leads our customers to say, "Gurley always makes it right."

W. & L. E. Gurley

Correction Sheet for Gurley Bulletin No. 50, Dated May 1, 1929

Please note carefully the following changes in specifications and prices:

Tripod Thread. Since January 1st, 1930, the tripod heads and bottom plates of all the transits and levels listed in this Bulletin, with the exception of the Explorers Transit, have been made with a new, coarse, long-wearing and quick-detachable thread. Unless specially ordered, all new instruments will be so equipped, and cannot be used with old tripods.

Page 54 No. 32 Precise Transit. For better results with the fine limb reading, attached microscopes have been added to the horizontal limb, and an extra-rigid tripod is now regular equipment. The compass needle is $3\frac{1}{2}$ " long; the magnifying power of the telescope is now 29x; and the weight of the transit is $17\frac{1}{2}$ lbs. Price (ABOSK) \$430.00.

Page 55 No. 52 Precise Transit. The magnifying power of the telescope is now 29x.

No. 42 Precise Transit. Since this model reads to 30 seconds, attached focusing microscopes have been added. The code word has been changed to ABOUS, and the price is now \$405.00.

Page 57 The price list is now incorrect. See corrected price list below.

Page 63 No. 380 Dumpy Level. The magnifying power is now 29x.

Condensed Price List of Gurley Transits

Order by Catalog Number and Code Word

Diameter of Horizontal Limb	Verniers Read to	Length of Telescope	Transits with Compass			Transits Without Compass		
			with Telescope Level	with Tel. Level, Full Circle and Guard	with Tel. Level, and Half Circle	with Telescope Level	with Tel. Level, Full Circle and Guard	with Tel. Level, and Half Circle
*7.00 inches	10 seconds	12 $\frac{3}{4}$ inches Inverting	Cat. No. 11 \$556.00 ABERN	Cat. No. 12 \$581.00 ABERO	Cat. No. 13 \$581.00 ABERT	Cat. No. 16 \$531.00 ABESK	Cat. No. 17 \$556.00 ABESU	Cat. No. 18 \$556.00 ABETE
*7.00 inches	10 seconds	13 $\frac{1}{2}$ inches Erecting	Cat. No. 21 \$556.00 ABSOD	Cat. No. 22 \$581.00 ABSOH	Cat. No. 23 \$581.00 ABSOJ	Cat. No. 26 \$531.00 ABSOR	Cat. No. 27 \$556.00 ABSOT	Cat. No. 28 \$556.00 ABSOV
7.00 inches	20 seconds	12 $\frac{1}{2}$ inches	Cat. No. 31 \$405.00 ABOSI	Cat. No. 32 \$430.00 ABOSK	Cat. No. 33 \$430.00 ABOSU	Cat. No. 36 \$385.00 ABOUK	Cat. No. 37 \$405.00 ABOUG	Cat. No. 38 \$405.00 ABOUF
6.25 inches	30 seconds	12 $\frac{1}{2}$ inches	Cat. No. 41 \$350.00 ABOUP	Cat. No. 42 \$405.00 ABOUS	Cat. No. 43 \$405.00 ABOUY	Cat. No. 46 \$355.00 ABOWK	Cat. No. 47 \$380.00 ABOWL	Cat. No. 48 \$380.00 ABOWM
6.25 inches	1 minute	12 $\frac{1}{2}$ inches	Cat. No. 51 \$335.00 ABOPO	Cat. No. 52 \$360.00 ABOPS	Cat. No. 53 \$360.00 ABOPU	Cat. No. 56 \$310.00 ABORN	Cat. No. 57 \$335.00 ABORO	Cat. No. 58 \$335.00 ABORT
6.25 inches	1 minute	10 inches	Cat. No. 61 \$325.00 ABFEN	Cat. No. 62 \$350.00 ABFER	Cat. No. 63 \$350.00 ABFET	Cat. No. 66 \$300.00 ABFIF	Cat. No. 67 \$325.00 ABFIG	Cat. No. 68 \$325.00 ABFIL
5.65 inches	1 minute	8 $\frac{1}{2}$ inches	Cat. No. 91 \$315.00 ABOKI	Cat. No. 92 \$340.00 ABOLA	Cat. No. 93 \$340.00 ABOLB	Cat. No. 96 \$290.00 ABOLI	Cat. No. 97 \$315.00 ABOLM	Cat. No. 98 \$315.00 ABOLP
*4.00 inches	1 minute	6 $\frac{1}{2}$ inches		Cat. No. 122 \$325.00 ABAEK	Cat. No. 123 \$325.00 ABAEH			
6.25 inches	1 minute	10 inches	Cat. No. 131 \$275.00 ABGOD	Cat. No. 132 \$300.00 ABGOH	Cat. No. 133 \$300.00 ABGOJ	Cat. No. 136 \$250.00 ABGOT	Cat. No. 137 \$275.00 ABGOX	Cat. No. 138 \$275.00 ABGOZ
5 $\frac{1}{4}$ inches	1 minute	8 $\frac{1}{2}$ inches	Cat. No. 101 \$225.00 ABGAW	Cat. No. 102 \$250.00 ABGED	Cat. No. 103 \$250.00 ABGEH	Cat. No. 106 \$200.00 ABGEN	Cat. No. 107 \$225.00 ABGER	Cat. No. 108 \$225.00 ADGET

* Also furnished with 2-Vernier Vertical Circle and other special attachments:—

Hell Gate Model—No. 14, 7" Limb, etc., with Compass, (ABERU) \$725.00. No. 19, 7" Limb, etc., without Compass, (ABETO) \$700.00. No. 24, 7" Limb, Erecting Telescope, etc., with Compass, (ABSOK) \$725.00. No. 29, 7" Limb, Erecting Telescope, etc., without Compass, (ABSOZ) \$700.00. Explorers Model—No. 124, 4" Limb, etc., with Compass, (ABAGU) \$405.00.

W. & L. E. GURLEY



Gurley Precise Transits

Gurley Precise Transits are characterized by accuracy of graduations, ease of reading, fine optics, permanence of adjustment, careful seasoning of metals, exact matching together of parts without unbalanced strain, symmetry of form, structural strength, freedom from wind vibration, light weight, durability, compactness in arrangement, convenience in operating, water-proofness, adaptability for use in all climates, excellent protection afforded by instrument case, diversity of sizes and attachments, and ease of replacing parts when worn.



Gurley One Piece Truss Standard

One Piece Truss Standard: A symmetrical casting, braced in all directions. Multi-groove axis bearings preserve the lateral alignment of the telescope.

Accuracy of Graduations: Gurley dividing engines give accurate spacing and uniform width of graduations. Circles are centered to microscopic fineness.

Telescopes: Fine resolution and plenty of light through objective lenses of large aperture, made in Gurley Factory. Erecting and inverting telescopes, of varying lengths, and with magnification adequate for practical use. Platinum cross and stadia wires.

Level Vials: Accurate and workable under varying temperatures. Curvature and surface free from imperfections, giving uniform run to bubble. Sensitiveness adequate for the fineness of limb reading.

Compass: 4" flat needle, glass cover held in place by a screw bezel ring, entirely waterproof. Needle circle movable for variation.

Metals: Homogeneous, tough, and hard, without brittleness. Many parts of new light instrument metal which is non-corrosive, and has twice the strength and one third the weight of the best bronzes. Thoroughly seasoned by heat treating.

Screws: Leveling and tangent screws, having fine threads and large bakelite heads, give sensitive adjustment. Clamps hold firmly and the screws are accessible. There are no projecting parts to Gurley Transits to catch in the brush or to become easily damaged.

Leveling Head: Four-screw, non-cramping, large shift, same tripod thread on all sizes, (interchangeable with Levels), except Explorers and Architects.

Tripod: Extremely rigid, large bolts and nuts for easy clamping, made with fixed length legs (extension legs extra). Made of ash, weighing 12 lbs.

Box: Mahogany top-opening box which protects the transit and preserves its adjustment, while being transported.



Quarter-section of Gurley Telescope



Gurley Precise Transits

Hell Gate Model

The Hell Gate Model is Gurley's finest transit, a portable instrument intended to replace the more cumbersome theodolite, for secondary triangulation and precise traversing. Thus, it is suitable for bridge, tunnel, and precise topographic control surveys. The inverting telescope, having a large objective lens, gives extremely fine resolution, and the interchangeable eye-pieces, of different magnifications, give splendid vision below ground as well as above it.

Completely described in New Transit Bulletin



No. 19
Hell Gate
Precise
Transit

No. 19 Hell Gate Precise Transit

7" Limb, reading to 10 seconds; 12 $\frac{1}{4}$ " Inverting Telescope, magnifying 26x, 1.93" aperture; 5" 2-Vernier Vertical Circle, reading to 10 seconds, with sensitive control level movable by tangent screw; Weight 22 lbs.; Tripod having fixed-length legs.
Price (ABETO) \$700.00

Municipal Model

The city surveyor making line surveys of valuable property must depend upon a fine reading transit having a powerful telescope. This transit is suitable for master line surveys for large construction projects.

Completely described in New Transit Bulletin

No. 32 Municipal Precise Transit

7" Limb, reading to 20 seconds; 12 $\frac{1}{2}$ " Erecting Telescope, magnifying 25x, 1.37" aperture; 4" Waterproof Compass; 5" Vertical Circle, reading to 1 minute; Weight 15 $\frac{1}{2}$ lbs.; Tripod having fixed-length legs.
Price (ABEUY) \$395.00



No. 32
Municipal
Precise
Transit



Engineers Model

An excellent transit, for the city, railroad, construction, and highway engineer. Suitable for property line and master line surveys. A splendid telescope for the prolongation of lines and an extra-fine limb reading for precise traversing.

This model is made up with the quickly read single minute divisions, and also with the finer reading thirty second graduations.

Completely described in New Transit Bulletin.

No. 52 Engineers Precise Transit

6 1/4" Limb, reading to 1 minute; 12 1/2" Erecting Telescope, magnifying 23x, 1.37" aperture; 4" Waterproof Compass; 5" Vertical Circle, reading to 1 minute; Weight 14 lbs.; Tripod having fixed-length legs.

Price (ABOPS) \$360.00

No. 42 Master Precise Transit

For engineers who prefer the long telescope with the finer limb reading. No. 42 is the same as No. 52, except that the 6 1/4" limb reads to 30 seconds.

Price (ABFAG) \$375.00

Gurley Precise Transits



**No. 52
Engineers
Precise
Transit**



**No. 62
Standard
Precise
Transit**

Standard Model

The standard model is the ideal instrument for general surveying on railroads, highways, sewers, streets, building construction, and topographic mapping. Besides its fine optical qualities, the telescope focuses sharply within 5 feet. This transit is a full-sized instrument, yet light in weight and compactly packed. It is Gurley's most popular transit.

Completely described in New Transit Bulletin

No. 62 Standard Precise Transit

6 1/4" Limb, reading to 1 minute; 10" Erecting Telescope, magnifying 22x, 1.37" aperture; 4" Waterproof Compass; 5" Vertical Circle reading to 1 minute; Weight 13 1/2 lbs.; Tripod having fixed-length legs. Price (ABFER) \$350.00



Gurley Precise Transits

Light Mountain Model



No. 92
Light
Mountain
Precise
Transit

The Light Mountain Model is particularly adapted for mountain and mining work. It is compactly arranged and sturdily built. Engineers report unusual steadiness in the wind. The telescope has a large aperture, fine resolution and focuses to within $4\frac{1}{2}$ feet.

When so specified, this model will be equipped so that the auxiliary mining telescope, described on page 57, can be attached later without return to the Factory. This adds \$10.00 to the price of the transit, which is deducted from the price of the auxiliary telescope when furnished.

Completely described in New Transit Bulletin.

No. 92 Light Mountain Precise Transit

5.65" Limb, reading to 1 minute; $8\frac{1}{2}$ " Erecting Telescope, magnifying 19x, 1.19" aperture; 4" Waterproof Compass; 5" Vertical Circle reading to 1 minute; Weight 9 lbs.; Tripod having extension legs. Price (ABOLA) \$340.00

Explorers Model



No. 124 Explorers
Precise Transit

The Explorers Model is the smallest and lightest Gurley Transit, designed to meet the demand for a durable and accurate instrument of light weight and small bulk. It is a complete transit, adapted for meridian and time determination, as well as for topographical and general surveying.

Completely described in New Transit Bulletin

No. 124 Explorers Precise Transit

4" Limb, reading to 1 minute; $6\frac{1}{2}$ " Erecting Telescope, magnifying 16x, 0.7" aperture; Diagonal Prism with darkener glass for eyepiece; $2\frac{1}{8}$ " Waterproof Compass; 4" 2-Vernier Vertical Circle, with Control Level, movable by tangent screw; Weight 6 lbs.; Leather covered case; Tripod, with extension legs closing to 38", canvas case. Price (ABAGU) \$405.00



Note: If transit and tripod are to be carried in a 24" suitcase, as illustrated in the circle, the No. 412 Jointed Extension Tripod should be ordered. Specify by suffix letter "J", as No. 124-J, or add code word *ABAFE* to that of transit.



Gurley Precise Transits



Mining Transit

The mining auxiliary telescope, interchangeable in side and top positions, is extremely useful for vertical and steep slope sighting. The telescope is 6½" long, 0.7" aperture, magnification 16x.

No. 92 Light Mountain Precise Transit, with Mining Auxiliary Telescope.
Price (ABOLA-ABANI) \$440.00



Burt Solar Transit

The Burt Solar Attachment, placed on top of the telescope of any new transit having a vertical arc, is of great service in locating and frequently checking the true meridian.

No. 93 Light Mountain Precise Transit, with Burt Solar Attachment.
Price (ABOLB-ASHIK) \$440.00



Telescopic Solar Transit

("Buff" Patent No. 1,190,719)

The transit with telescopic solar attachment is invaluable for surveys requiring a continued series of solar observations, since the main telescope can be used without disturbing the solar settings.

No. 92 Light Mountain Precise Transit, with Solar Attachment.
Price (ABOLA-ABAOX) \$515.00

Condensed Price List of Gurley Precise Transits

Order by Catalog Number and Code Word

Diameter of Horizontal Limb	Verniers Read to	Length of Telescope	Transits With Compass			Transits Without Compass		
			with Telescope Level	with Tel. Level Full Circle and Guard	with Tel. Level and Half Circle	with Telescope Level	with Tel. Level Full Circle and Guard	with Tel. Level and Half Circle
*7.00 inches	10 seconds	12¾ inches Inverting	Cat.No.11 \$528.00 ABERN	Cat.No.12 \$556.00 ABERO	Cat.No.13 \$556.00 ABERT	Cat.No.16 \$503.00 ABESK	Cat.No.17 \$531.00 ABESU	Cat.No.18 \$531.00 ABETE
7.00 inches	20 seconds	12½ inches	Cat.No.31 \$367.00 ABEUS	Cat.No.32 \$395.00 ABEUY	Cat.No.33 \$395.00 ABEVO	Cat.No.36 \$342.00 ABEWK	Cat.No.37 \$370.00 ABEWL	Cat.No.38 \$370.00 ABEWM
6.25 inches	30 seconds	12½ inches	Cat.No.41 \$347.00 ABFAF	Cat.No.42 \$375.00 ABFAG	Cat.No.43 \$375.00 ABFAL	Cat.No.46 \$322.00 ABFAS	Cat.No.47 \$350.00 ABFAW	Cat.No.48 \$350.00 ABFED
6.25 inches	1 minute	12½ inches	Cat.No.51 \$332.00 ABOPO	Cat.No.52 \$360.00 ABOPS	Cat.No.53 \$360.00 ABOPU	Cat.No.56 \$307.00 ABORN	Cat.No.57 \$335.00 ABORO	Cat.No.58 \$335.00 ABORT
6.25 inches	1 minute	10 inches	Cat.No.61 \$322.00 ABFEN	Cat.No.62 \$350.00 ABFER	Cat.No.63 \$350.00 ABFET	Cat.No.66 \$297.00 ABFIF	Cat.No.67 \$325.00 ABFIG	Cat.No.68 \$325.00 ABFIL
5.65 inches	1 minute	10 inches	Cat.No.81 \$322.00 ABFUN	Cat.No.82 \$350.00 ABFUR	Cat.No.83 \$350.00 ABFUT	Cat.No.86 \$297.00 ABFUZ	Cat.No.87 \$325.00 ABFYA	Cat.No.88 \$325.00 ABFYB
5.65 inches	1 minute	8½ inches	Cat.No.91 \$312.00 ABOKI	Cat.No.92 \$340.00 ABOLA	Cat.No.93 \$340.00 ABOLB	Cat.No.96 \$287.00 ABOLI	Cat.No.97 \$315.00 ABOLM	Cat.No.98 \$315.00 ABOLP
*4.00 inches	1 minute	6½ inches		Cat.No.122 \$325.00 ABAEK	Cat.No.123 \$325.00 ABAEN			

*Also furnished with 2-Vernier Vertical Circle and other special attachments.

Hell Gate Model—No. 14, 7" Limb, etc., with Compass(ABERU) \$725.00
 No. 19, 7" Limb, etc., without Compass(ABETO) 700.00
 Explorers Model—No. 124, 4" Limb, etc., with Compass(ABAGU) 405.00



Gurley Light Weight Transits

For the Engineer

A standard size Transit for accurate work, but weighing only 9½ lbs. Superior telescope. Steady in the wind. Free from traffic vibration. Waterproof compass. Sensitive level vials. Well-lighted, easily read graduations on non-tarnishing circles. Rugged and durable. Stays in adjustment. Contained in a small-size box. Furnished with full size rigid tripod.

Completely described in Bulletin No. 130



No. 132 *Engineers Light Transit*

6¼" Limb, reading to 1 minute; 10" Erecting Telescope, magnifying 22x, 1.37" aperture; 3½" Waterproof Compass; 5" Vertical Circle, reading to 1 minute; Weight 9½ lbs.; Tripod having fixed-length legs.

Price (ABGOH) \$300.00



No. 102 *Reconnaissance Transit*

5⅜" Limb, reading to 1 minute, one vernier only; 8½" Erecting Telescope, magnifying 19x, 1.19" aperture; 3½" Compass; 5" Vertical Circle, reading to 1 minute; Weight 8 lbs.; Tripod with extension legs.

Price (ABGED) \$250.00

For the Surveyor

A small size, compact and rugged Transit for general surveying and construction. Accurately graduated, on non-tarnishing circles. Splendid telescope. Holds adjustment under unusually hard service. Does not vibrate easily. Furnished in mahogany box and with full size extension leg tripod.

Completely described in Bulletin No. 175



Gurley Contractors Instruments



No. 106 Reconnaissance Transit

5 $\frac{1}{8}$ " Limb, reading to 1 minute, one vernier only; 8 $\frac{1}{2}$ " Erecting Telescope, magnifying 19x, 1.19" aperture; Level under telescope with clamp and tangent movement; Weight 8 lbs.; Tripod with extension legs.

Price (ABGEN) \$200.00

Tilting Level

A new idea in levels to enable the most inexperienced user to easily and accurately establish grades, obtain differences in elevation, line up and plumb columns, walls, and forms, and lay off angles to five minutes. A portable instrument for rapid use by engineers on estimates and building construction.

Completely described in Bulletin No. 285

Contractors Transit

An accurate and dependable transit for laying off angles to one minute, for setting grades, for lining and plumbing columns, etc. A transit which will enable the non-technical user to do more accurate work.

Completely described in Bulletin No. 175



No. 385 Tilting Level

10" Telescope, magnifying 22x, 1.37" aperture; tilts vertically through angle of 75°, set to horizontal by clamp and slow motion screw; accurate telescope level; 3 $\frac{1}{2}$ " horizontal circle reading by vernier to 5 minutes; Weight 5 $\frac{1}{2}$ lbs.; Tripod having fixed-length legs.

Price (ABGUZ) \$140.00



Gurley Leveling and Stadia Rods

Gurley Rods are made for accuracy and service. The lumber is selected with the greatest care and is thoroughly seasoned in the Gurley Factory. The rod blanks are carefully finished and covered with a waterproof varnish. The rod faces are painted with a white enamel paint. The leveling

rod graduations are stamped into the wood, the stadia rod markings are stenciled. The fittings are substantial, and convenient to use.

Leveling rods, in the Philadelphia pattern, are made in various lengths, and types of construction. Stadia Rods can be had in a variety of designs, either in one piece or folding. A popular rod for the auto, serving both for leveling and for stadia, is the No. N-517 Lock Joint Rod.

For complete listing and description, send for the Gurley Rod Bulletin No. 500

Philadelphia Leveling Rods

No. N-501 Service Leveling Rod

Philadelphia graduations, 2 ply, 7.3 ft. closed, sliding to 13 ft., graduated to feet, 10ths, and 100ths, with verniers reading to 1000ths, and with oval Plain Target.

Price(ABAYU) \$15.00
With micrometer target(ABIOX) 18.00
Without Target(ABIPA) 12.00

No. N-505 Service Leveling Rod

Philadelphia graduations, 3 ply, 4.5 ft. closed, sliding to 12 ft., graduated to feet, 10ths, and 100ths, without target.

Price(ABIRF) \$16.50

No. N-506 Service Leveling Rod

Philadelphia graduations, 4 ply, 3.3 ft. closed, sliding to 11.3 ft., graduated to feet, 10ths, and 100ths, without target.

Price(ABIRL) \$18.00

No. N-517 Lock-Joint Telemeter Rod

Extra wide, Philadelphia graduations, 12 ft. long, in three sections (two slip joints secured and released by spring catches), graduated in feet, 10ths, and 100ths, with carrying case.

Price(ABBEJ) \$18.00



No. N-501
With
Micrometer
Target



(Left)
No. N-505
(Right)
No. N-506



Gurley Leveling and Stadia Rods



Showing
Hinge Joint
Furnished with
Folding Rods.
Hinges and Brace
Bar bolted
through the wood.



Showing
Lock Joint
on
No. N-517 Rod



No. N-517

Lock-Joint Rod
4 to 12 ft.
3 sections, in case
Without Target
\$18.00

(ABBEJ)



No. N-521

Stadia Rod
12 ft.
One Piece
\$15.00

(ABAYR)



(Left)

Combination
Range Pole
No. N-530, 7 ft.
(AKHON) \$6.25
(Right)
Flagstaff
No. N-535, 8 ft.
(ABAZY) \$3.00

No. N-512
Folding Rod
6 to 12 ft.
Without Target
\$16.00

(ALROB)

For other lengths and graduations, send for
Gurley Rod Bulletin No. 500



Gurley Levels

To the majority of engineers the Gurley Wye Level needs no introduction. The performance of this instrument during the past 80 odd years has been its best recommendation, and so favorably has it established itself that whenever wye levels are mentioned, the Gurley is the standard of comparison.

This favorable position is based entirely upon the ability of the Gurley Level to check accurately in use, to preserve its adjustment for long periods of time and under varying tem-



The absolute approval of a master instrument maker assures the continued reputation of Gurley Levels.

peratures, to its durable construction necessitating infrequent repairs, to the fine resolution of the telescope, to the accuracy of the line of collimation at all positions of the objective slide, to the smooth and uniform grinding of the level vials and to the selection of a practical sensitiveness for getting the most out of the level. In the words of the engineers, "The

Gurley Level stands up and gives results."

The Gurley wye level has been made since 1845. A few of the original model are still in service, still a larger number with records of from 50 to 65 years. Many engineers prefer the wye level because of the convenience in checking and making adjustments. A damaged wye level can usually be adjusted for temporary use to complete the work in hand. It gives confidence to the engineer to know that he can check his instrument so easily.



The Gurley Level Tester measures the sensitiveness and uniform running of the bubble.

The Gurley Dumpy Level is a more recent model, but made with the same accurate and painstaking care as the wye level. Since there are fewer adjustments to the dumpy level, they are less likely to be unsettled, hence the popularity of this type of level for highway and other construction work where rough usage cannot be avoided.



Gurley Levels



Gurley Engineers Wye Levels

- No. 375 22" Telescope, magnifying 42x; weight 14½ lbs.; Tripod having fixed-length legs.
Price (AKARY) \$225.00
- No. 377 18" Telescope, magnifying 32x; weight 13¼ lbs.; Tripod having fixed-length legs.
Price (AKDUL) \$215.00
- No. 378 15" Telescope, magnifying 26x; weight 11½ lbs.; Tripod having fixed-length legs.
Price (AKGUN) \$205.00



Gurley Dumpy Levels

- No. 379 17" Telescope, magnifying 26x; weight 13 lbs.; Tripod having fixed-length legs.
Price (ABGUT) \$175.00
- No. 380 13" Telescope, magnifying 24x; weight 4½ lbs.; Tripod having fixed-length legs.
Price (ABGUX) \$125.00



Gurley Alidades and Plane Tables

Gurley Alidades and Plane Table Outfits have done much to assist the topographer in better and faster mapping. By keeping close contact with the man in the field, Gurley has been able to add many features which give increased service and convenience.

The Alidades are characterized by fine optics, durability, and ease and permanence of adjustment. Every Gurley Alidade is furnished with the quarter-interval stadia wire and with the Beaman Stadia Arc, which greatly increases the efficiency of the Gurley outfit. Stadia reduction is remarkably easy when this device is used.

The Johnson Plane Table Movement, unequalled for convenience in operation, is given a new value by Gurley workmanship. Gurley drawing boards are thoroughly seasoned, and constructed in the best manner to resist warping.

The satisfactory use of Gurley Plane Table Outfits, in all parts of the world and under all kinds of climatic conditions, is the best evidence of their many excellent qualities.

Completely described in the Topographic Bulletin



No. 582 Standard Alidade

Explorers Alidade

The exploring oil geologist, finds this new light weight model desirable because of its fine telescope, accurate level vials, completeness, convenience, compactness, durability and permanence of adjustment.

No. 580 Explorers Alidade,
 $8\frac{1}{2}$ " Telescope, $11\frac{1}{2}$ " Blade
 Price (ABHAT).....\$225.00

Standard Alidade

A large size instrument for the use of topographers, engineers and surveyors in making close contour maps of cities, parks, subdivisions, drainage areas, reservoirs, construction sites, etc.

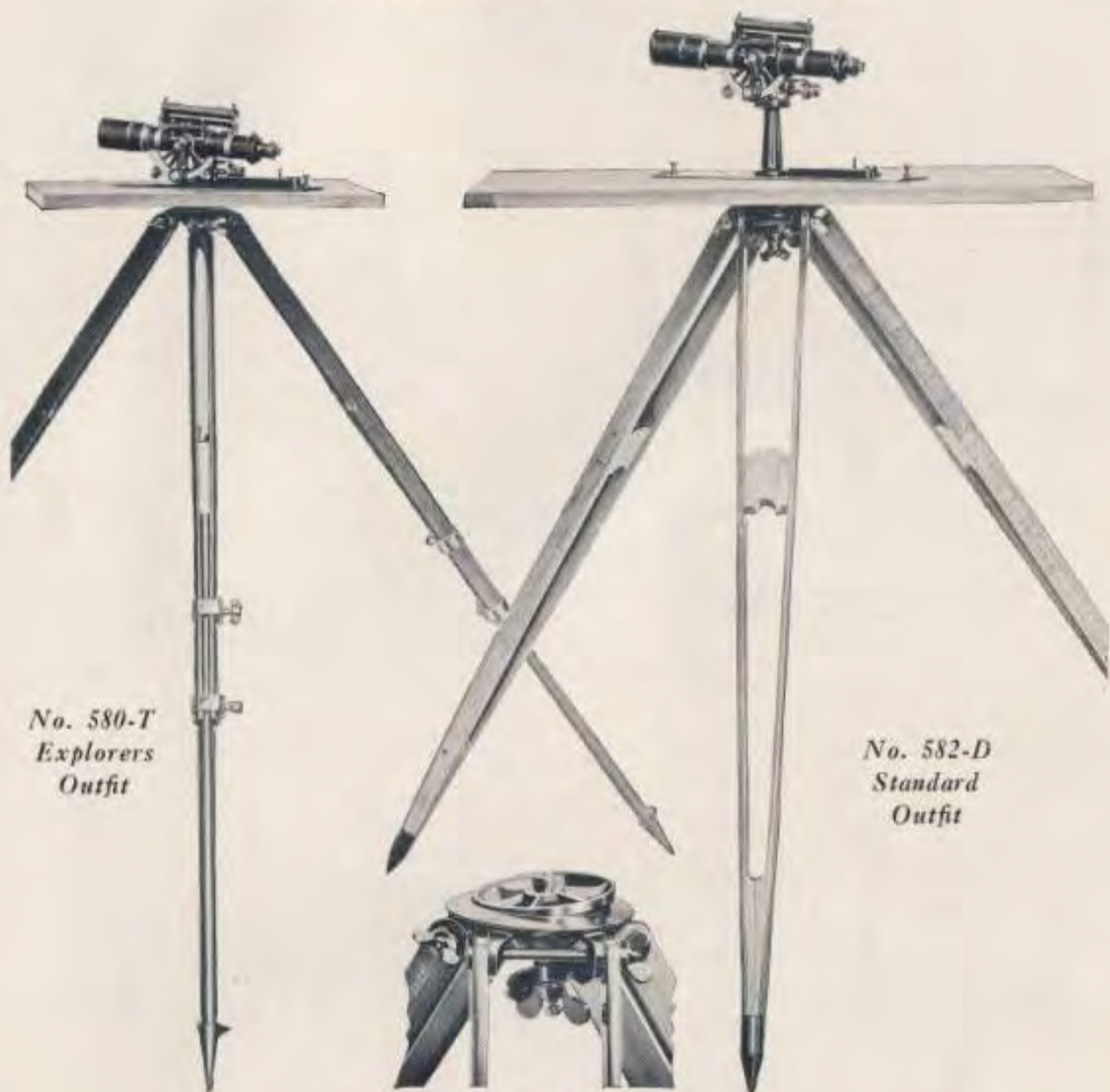
No. 582 Standard Alidade,
 10" Telescope, 15" Blade,
 Price (ABHEB).....\$275.00



No. 580 Explorers Alidade



Gurley Plane Table Outfits



No. 580-T
Explorers
Outfit

No. 582-D
Standard
Outfit

Johnson Movement

No. 570 (ABBIL) \$45.00

No. 571 (ABBIP) 50.00

For the Geologist

No. 580-T Explorers Outfit

- consisting of
- No. 580 Explorers Alidade.
- No. 571 Light Johnson Movement, with extension leg Tripod.
- No. 573 Board, 15" x 15".
- Canvas Case with shoulder strap.
- No. 580-T (ABIBS) \$283.50

For the Topographer

No. 582-D Standard Outfit

- consisting of
- No. 582 Standard Alidade.
- No. 570 Johnson Movement, with fixed-length leg Tripod.
- No. 573 Board, 31" x 24".
- Canvas Case with shoulder strap.
- No. 582-D (ABIGE) \$333.75

Many more sizes of Plane Table Outfits are made which are listed in the Topographic Bulletin. This will be sent on request.



Gurley Compasses

No. 226 Surveyors Vernier Compass



The finest Gurley Compass for re-running old property line surveys. 5" needle, 15" plate, plate levels, removable sights 7 $\frac{3}{4}$ " high, ball spindle and removable socket, staff mountings. (Code word AGWEN)

Price\$65.00

No. 335 Geologists Compass



A pocket Compass for topographic mapping. Can be used on a plane table, tripod or jacob staff. 2 $\frac{5}{8}$ inch needle, circle divided to degrees, 4 inch square base with tangent and inch scales on edge, sighting clinometer, folding sights, jacob staff mountings. (Code word AFNID)

Price\$55.00

No. 304 Surveyors Pocket Compass



A portable Compass for running lines through woods. 4" needle, folding sights, ball spindle and socket, staff mountings. (Code word ABBUZ)

Price\$35.00

No. 350 Dial Compass

A pocket Compass for determining local magnetic declination or for plane table orientation. Same size as No. 350. Hour circle with black silk gnomon. Specify latitude when ordering. (Code word AFIRL)

Price\$60.00



No. 3155 Wood Box Compass



A pocket Compass for topographers, foresters and sportsmen. 2 $\frac{1}{2}$ " needle, wood case 3 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " x 1 $\frac{3}{8}$ ", piano hinge cover. (Code word ABBUT)

Price\$6.00

No. 341-A Dip Needle Compass

A pocket Compass for determining the extent of magnetic ore deposits. Will locate buried water meter boxes. 3" needle, level vial. (Code word AFLAM)

Price\$23.00





Gurley Field Supplies

Tripods



No. 402 Standard Tripod

The sturdy tripod furnished with Gurley Transits and Levels is an important factor in the accuracy of the work done. Wind vibration is reduced and errors caused by residual torque are prevented.

The design, which is the result of hundreds of tests made by Gurley engineers upon leading makes of tripods and numerous alternate models, shows a fifty per cent greater rigidity than any tripod tested.

No. 402 Standard Tripod; fixed-length, I-section ash legs, 57" long; pointed steel shoe pinned to leg; bronze head, large bolts and wing nuts, light metal cap; strap with buckle; weight about 12 lbs.

Price(ABHAH) \$20.00

No. 407 Standard Tripod; extension legs of maple, 57" long closing to 34", pointed steel shoe pinned to leg, points do not project when closed; bronze head, large bolts and wing nuts, light metal cap; strap with buckle; weight about 12 lbs.

Price(ABHAJ) \$25.00



No. 643 Locke Hand Level
(AKPOW) \$7.50

Locke Hand Level

The Gurley Locke Hand Level is a simple and durable instrument with a protected, but adjustable, level vial which will stay in adjustment a long time.

Plummets



Gurley Plummets

6 oz.	10 oz.	14 oz.	18 oz.	24 oz.
\$1.20	\$1.50	\$2.00	\$3.00	\$4.00

Prices on lots of 6 or 12, on application.

Gurley Plummets have a long neck and a long tapered body, which make it easy to see the point without bending. The hardened steel point is replaceable.

Adjusting Pins

The Gurley Adjusting Pin Set, consisting of two transit pins and two level pins in a leather vest pocket case, can be furnished for 25 cents.



Gurley Hydraulic Instruments

The increasing demand for water, for domestic use and generation of power, calls for more accurate measurement and better records as to its availability and flow. Since 1885, Gurley has made instruments for the hydraulic engineer, to be used in measuring the velocity of stream flow and in keeping a record of the varying discharge.

Gurley Current Meters

The Price Pattern Current Meter has long been the standard means of measuring stream velocity, largely because of its adaptability for all kinds of conditions, and the permanence of its rating. Gurley has introduced a new model embodying many improvements, designed to give greater accuracy, durability and convenience.

Complete description in Bulletin 700

No. 622-A Outfit

No. 622-A Cable Suspension Outfit, consisting of new Model Meter with improvements noted above, 35 ft. suspension cable, 10 ft. steel meter cable, 15 lb. lead weight, telephone head set, accessories and spare parts for meter, contained in a 24" canvas bag.

No. 622-A Outfit (ABLAF) \$137.50

No. 627-A Wading Rod Set

Wading measurements are possible by adding the No. 627-A Wading Rod Set to the No. 622-A Outfit.

Price (ABLEK) \$30.00



No. 622-A

Gurley Graphic Recorders

The No. 635 Graphic Water Level Recorder is truly a universal instrument. Daily, Weekly and Semi-monthly time scales, with ranges from natural scale to 40 feet, are options which can be easily furnished. Combined with the long distance attachment, it gives a continuous graphic record of water fluctuations and indicates the elevation at a distant point.

The Recorder is sensitive to slight water level fluctuations, has a durable weight-driven marine clock, and is made of non-corrosive materials.

Complete description in Bulletin 600

No. 635 Graphic Recorder

(Weekly Time Scale)

1 Ft. Range (ABKAN) \$125.00
10 Ft. Range (ABKEC) 160.00



No. 635 Graphic Recorder, 1 foot range, with inset showing worm gear attachment giving 10 foot, or other multiple ranges.



Gurley Hydraulic Instruments



No. 666 Recording Sender

Weekly Chart (Daily optional), 10 foot Range (others optional), 10¼ inch Float, Selsyn Motor transmitter.

No. 668 Indicating Receiver

12 inch Dial, with Pointer, 100 divisions, each tenth figured, Selsyn Motor Receiver.

Gurley Long Distance Outfit

Direct Recording. Remote Indicating. Transmission by Selsyn Motors. Pointer follows slightest movement of float. Immediate synchronism between Sender and Receiver. Resets automatically after line interruption. Accurate and dependable for transmitting water level fluctuations at a distance.

Completely described in Bulletin No. 660.

No. 666 Sender	
(ABLUD)	\$300.00
No. 668 Receiver	
(ABLUN)	150.00

Gurley Testing Standards

Gurley Weights and Measures, used as legal standards by National, State, County and City Governments, are particularly suitable for the testing of industrial weights and weighing devices. Send for descriptive literature.

The Gurley Densometer for Paper Testing

The Densometer is a precision instrument used to measure the compactness and uniformity of the fibre structure of a sheet of paper. The density of the sample paper is measured in terms of the number of seconds required for 100 c. c. of air to pass through its pores, under constant pressure, the test orifice being 1 square inch. The Densometer can be used either in the laboratory or in the mill. All instruments are standardized so as to give comparable results. *Send for descriptive bulletin.*

Price (ABODA) \$45.00



Come to the Gurley Factory

Many visitors come to the Gurley Factory, civil and military engineers, public officials and private surveyors, from all parts of the world—Australia, Canada, China, Cuba, Egypt, India, Japan, Mexico and South America. Troy is only 6 miles by train or by trolley from Albany, N. Y., a main-line stop on the New York Central Railroad. Stop off for a day with us or drop in while touring through.

Visitors to the Gurley Factory receive a warm welcome. A no more convincing demonstration of the care and skill used in making Gurley Instruments can be had than that of witnessing for yourself the resources of the Gurley organization. See in one plant all of the operations—casting, drawing, heat treating, machining, grinding, dividing, lens grinding, painting and lacquering, cabinet making, assembling and inspecting—that go to make up fine instruments. Note the character and ability which is apparent in the Gurley workmen. You will be interested in the modern mechanical equipment which has increased the accuracy of parts. You will go away with the feeling that Gurley can serve you promptly and to your liking.

Gurley Products

Surveying Instruments

Transits, Levels, Compasses, Alidades, Plane Tables, Rods, Plummets, Hand Levels, Chains and Field Supplies.

Hydraulic Engineering Instruments

Daily, Weekly, Graphic and Long Distance Water Level Recorders, Water Level Indicators, Hook Gages, Price Type and Horizontal Axis enclosed type Current Meters.

Standard Weights and Measures

Precision Weights, Measures, Balances and Inspectors Equipment.

Descriptive bulletins sent on request.

W. & L. E. Gurley
Troy, N. Y., U. S. A.

GURLEY TRANSITS

Pages 100 to 199



Gurley adopts a New Standard Tripod Thread

Effective January 1st, 1930

As the first improvement for the year 1930, W. & L. E. Gurley announce the adoption of a New Standard Tripod Thread.

History of the New Thread. This new thread was developed by a simplified practice committee of manufacturers of surveying instruments in cooperation with the National Screw Thread Commission and the National Bureau of Standards. The committee was appointed by the Division of Simplified Practice, Bureau of Standards, U. S. Department of Commerce, at the request of the industry, to consider the adoption of simplification in this field.

While the thread has not been adopted as a national standard, it possesses advantages which appear to us as being desirable and worthy of immediate use.

By taking the initiative in the adoption of this new thread as standard equipment, W. & L. E. Gurley believe they are contributing effectively to the simplification of the industry, and to the convenience and benefit of all users of instruments.

It is believed that the desirability of this improvement will appeal to the users of instruments generally. We will welcome opportunities to confer with any engineers or surveyors as to the most practicable manner of effecting this change in their present equipment of Transits and Levels, so that they may take advantage of the new design, to the benefit of all concerned.

Description and Advantages. The new thread, known as the 8-thread, has a diameter of $3\frac{1}{2}$ inches, with a lead of 8-threads-per-inch. The old Gurley thread has a lead of 18-threads-per-inch, and is known as the 18-thread. The new form has many advantages. It is much coarser, with the threads deeper and thicker at the root. Consequently, they will wear longer, are less likely to be damaged, and can be repaired more readily. Only $2\frac{1}{2}$ turns are required to screw the bottom plate to the tripod. Cross-threading is avoided, and starting the thread is made easier, due to a special machining operation which cuts away the thin starting and finishing ends. There is also less likelihood of jamming the threads when in use, due to the greater helix angle, and to the specified easier fit.

Regular Equipment on all standard-size Transits and Levels. Beginning January 1st, 1930, all Gurley standard-size Transits and Levels are sent out from the Factory equipped with the new 8-thread bottom plates and tripod heads. [The only exceptions* in the line are on Explorers Precise Transits, Series Nos. 121 to 124; Architects Level No. 381; and Explorers Level No. 384.]

Accordingly, unless we are especially instructed, on each order, to supply the old 18-thread, the new 8-thread will be furnished. *Instruments and tripods so equipped will not interchange with the old models.*



How to Change-Over. Many users, recognizing the desirability of having their instruments equipped with this new thread — which will steadily increase in popularity, — will wish to change over their old instruments, so as to make them interchangeable with the new models, and also to gain the advantages of the improved design. This may be accomplished in the following ways.

a—Factory to make the Change-Over.

We are prepared to do this promptly, at a cost of \$10.00 per instrument, the customer to pay the transportation charges. This includes the furnishing of the new parts and the repacking of the instrument in its box. The new parts required consist of a new bottom plate; a new tripod head, with a new metal cap; a new center support—the small, three-pronged casting which is screwed to the bottom of the box and upon which the instrument rests; and a new pair of wooden packing blocks, with the improved adjustable feature, for cradling the instrument against the sides of the box. In addition, the adjustable wooden packing supports in the box lid must be refitted, to press properly upon the tops of the standards when the lid is closed. It is suggested that the above change-over can be accomplished with perhaps the least inconvenience to the owner, in connection with the return of the instrument to the Factory for repairs or servicing.

b—Owner to make the Change-Over.

The new parts specified above will be furnished for \$5.00, delivery charges extra. *For accurate replacement of parts and correct repacking, however, we recommend that the instrument be in our hands.* To aid those who wish to do this themselves, the following directions should be carefully followed:—

To change the Transit Bottom Plate.

1. Unscrew bottom cap with plummet chain.
2. Unscrew the screw which holds the half-ball. It is set partly in the half-ball and partly in the socket.
3. Loosen leveling screws so that bottom plate is free.
4. Unscrew half-ball, which allows bottom plate and shifting center to come off.
5. Replace shifting center in new bottom plate, and half-ball in shifting center.
6. Screw half-ball to end of socket. Loosen all four leveling screws, if necessary, to allow half-ball to be set up to its former position.
7. Replace set-screw and bottom cap.

To change the Level Bottom Plate.

1. Unscrew the screw which holds the half-ball. It is set partly in the half-ball, and partly in the socket.
2. Loosen leveling screws so that bottom plate is free.
3. Unscrew half-ball, so that bottom plate can be removed.
4. Replace half-ball in new bottom plate.
5. Screw half-ball to end of socket, loosening leveling screws, if necessary, to allow half-ball to be set up to its former position.
6. Replace set-screw.

GURLEY TRANSITS

The Gurley Explorers Transit at the South Pole

Pictures of the
Byrd Antarctic Expedition



Lower Left. Gould and Balchen using the Gurley Explorers Transit in the Rockefeller Mountains.

Below: Laying out the foundations of the base camp, Little America.



Above: L. M. Gould examining the frost-covered Transit. "It was the only instrument of its kind that worked in any sort of temperature". See letter, page 130.



Bulletin No. 100

Dated January 1, 1931

Subject to change without notice.

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Main Office and Factory, Troy, N. Y.
New York City Sales Office, 49 Chambers Street



Gurley Transits

Theodolite Precision in an Everyday Working Transit has been the ultimate desire of every instrument user. To see the Modern Gurley Transit is to recognize this characteristic, which after use becomes an acknowledged fact. This is a conservative statement of that which has been accomplished through co-ordination of design, materials and workmanship.

Built to a Standard carries the meaning of a definite aim. Thorough research and careful analysis of the fundamentals have established this standard, which will not suffer by comparison. The guarantee of the Oldest Instrument House in America is your assurance that this standard will be maintained.

Holds Its Adjustment is a complete story in itself. A transit must be accurately made in order to be accurately adjusted. It must be made *right* to retain its adjustment. A transit with this characteristic is always ready for use, and there is an abounding confidence in the result.

Low Maintenance Costs. Standardized parts, quickly replaceable in the field, characterize the design of the new Transits. Owners records show that Gurley Transits cost less for maintenance and repair. If you consider the economy of keeping the instrument in service, as well as first cost, you will select a Gurley.

A Size and Type for Every Purpose. The plain telescope, of which there are a number of sizes and lengths, with half circle, or full circle and guard, may be had with most combinations of limb and telescope. All models can be furnished with either the erecting or inverting telescope and all, excepting the Explorer's Model, may be had with or without compass.

Thus, from the variety offered, each engineer is assured that the Gurley Transit he selects will meet his personal requirements.



Gurley One Piece Truss Standard: The patented One Piece Truss Standard is responsible to a large extent for the permanence of adjustment of Gurley Precise Transits. This Gurley feature is not only a rigid support for the telescope but acts like an inverted truss to re-inforce the top plate which carries the verniers.



*Gurley One Piece Truss Standard
Patented July 25, 1916*

The soundness of principle of this design has been fully demonstrated during ten years of use and it is an outstanding characteristic of Gurley Precise Transits.

Inherently rigid, since it is a single casting; securely held across the top by the telescope axis bar and fitted to it by the Gurley multi-groove bearings, this form of standard is the only one free from lateral movement. It will also stand

more abuse than any other type and, if damaged by accident, it can readily be repaired.

The principle of diagonal cross-bracing is used and the supporting members are carried as far up on the legs as is possible without interfering with the transiting of the telescope. The base is wide and stable.

The axis bearings of the telescope are multi-groove, which keeps dust from working into the bearings and oil from working out. The multi-grooves keep the telescope in perfect alignment, and prevent side-play, or "walk".

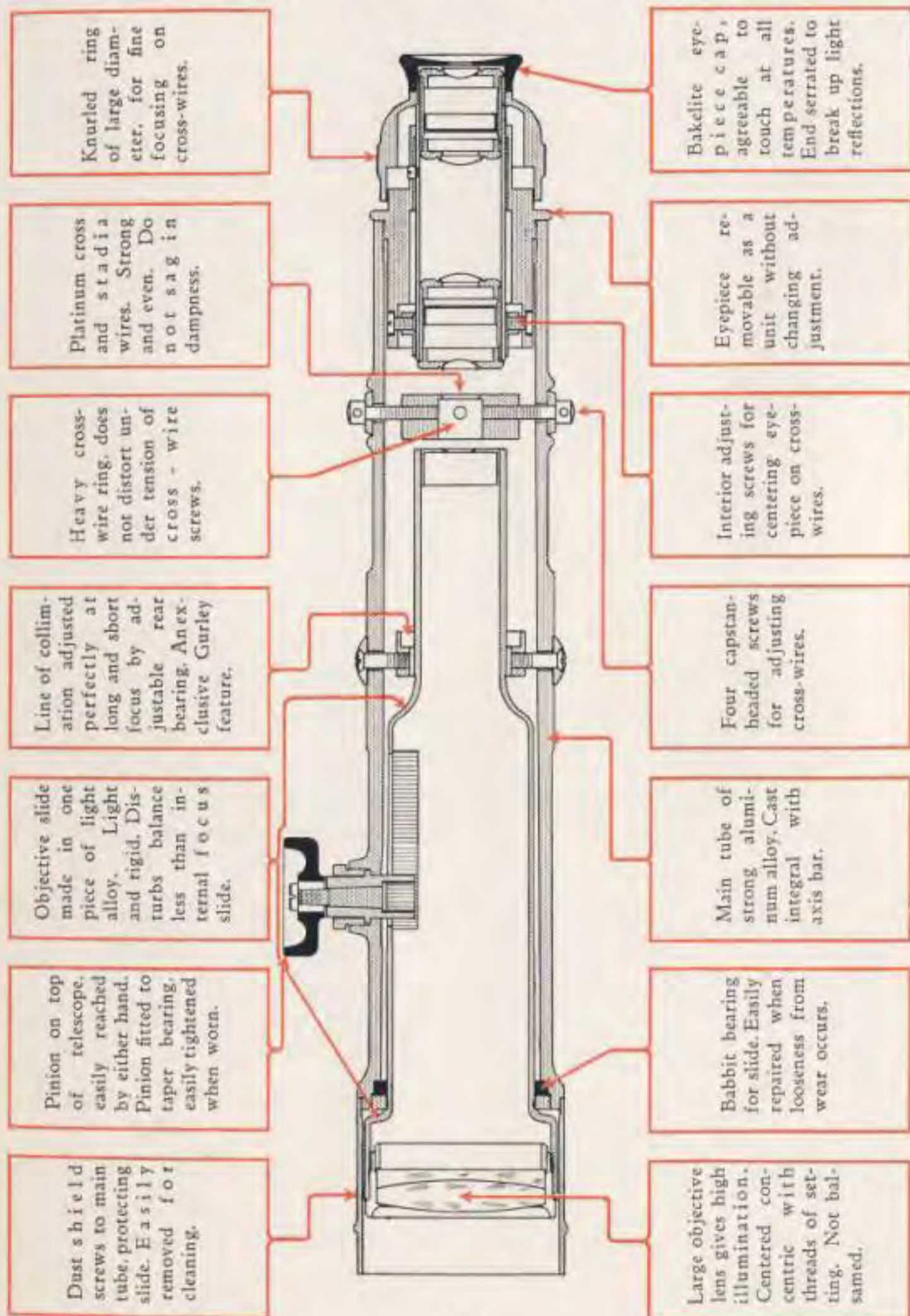


The One Piece Truss Standard Design has *Gurley multi-groove axis bearings*, been developed still further in the new Nos. 100 and 130 Series Transits, by molding the standards, top plate, and spindle in *one piece*. This design not only decreases the number of parts to get out of adjustment, but adds much to the rigidity of the instrument and allows more accurate manufacturing methods.



The Gurley Telescope

Accuracy and Permanence of Adjustment



Knurled ring of large diameter, for fine focusing on cross-wires.

Platinum cross and stadia wires. Strong and even. Do not sag in dampness.

Heavy cross-wire ring, does not distort under tension of cross-wire screws.

Line of collimation adjusted perfectly at long and short focus by adjustable rear bearing. An exclusive Gurley feature.

Objective slide made in one piece of light alloy. Light and rigid. Disturbs balance less than internal focus slide.

Pinion on top of telescope, easily reached by either hand. Pinion fitted to taper bearing, easily tightened when worn.

Dust shield screws to main tube, protecting slide. Easily removed for cleaning.

Bakelite eyepiece cap, agreeable to touch at all temperatures. End serrated to break up light reflections.

Eyepiece removable as a unit without changing adjustment.

Interior adjusting screws for centering eyepiece on cross-wires.

Four capstan-headed screws for adjusting cross-wires.

Main tube of strong aluminum alloy. Cast integral with axis bar.

Babbit bearing for slide. Easily repaired when looseness from wear occurs.

Large objective lens gives high illumination. Centered concentric with threads of setting. Not baled.

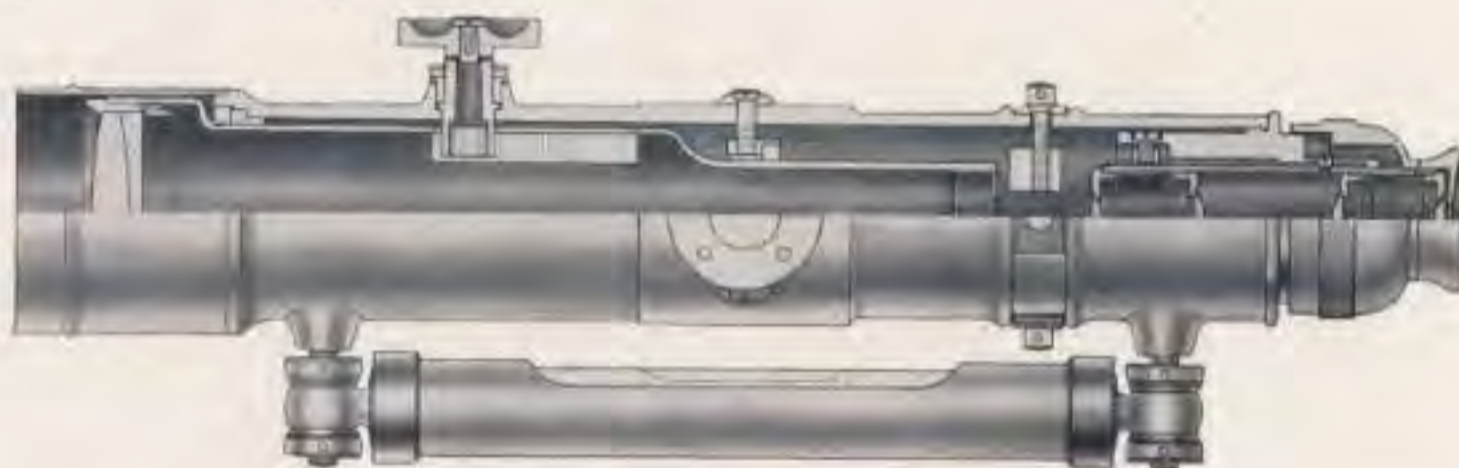


The Gurley Telescope

General Characteristics: Gurley telescopes have a distinctive individuality and engineers comparing specifications should look beyond the usual basis of external length or magnification. In optical ability, ruggedness of construction, permanence of adjustment, accuracy of line of collimation at all distances, close minimum focus, balance, dust and water protection, opaque durable cross-wires, and variety of selection, Gurley telescopes offer many valuable features, at no extra cost, which are not obtainable in any other make.

Optical System: Vision without strain, a wide-angled field of view, accurate pointing ability, sharp definition, a brilliant image, and a short minimum focus — all these qualities, which every Engineer wants, are characteristic of the modern Gurley optical system. Tests show that Gurley lenses measure up to the theoretical possibilities of lens design. Their uniform quality is assured by manufacture in the Gurley Factory by modern equipment, under close supervision and inspection.

Accurate Collimation, Far and Near: No other make of transit will show collimation accuracy equal to the Gurley, on both near and far targets, in both horizontal and vertical planes. This is one reason why construction engineers get better results with Gurley transits when using them not only for line work, but also to set grades. This greater accuracy is made possible by the Gurley objective slide construction, whereby the rear bearing is adjustable to exact position for slide movement.



Quarter-section of Gurley Telescope. Showing protection to objective slide; adjustable rear bearing, making near and far readings accurate; unit eyepiece construction; long, well-anchored level vial.

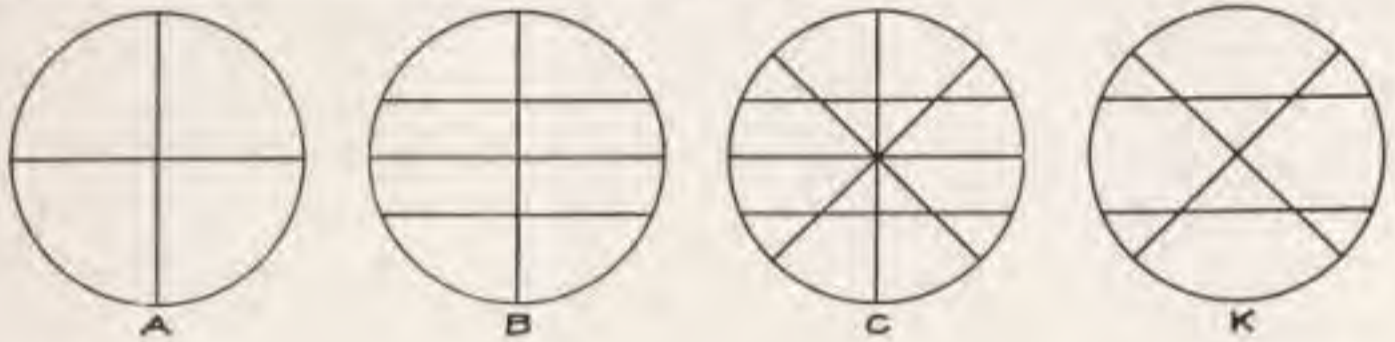
Internal Focusing: In telescopes having the internal focusing, the objective lens is fixed at the end of the main tube and focusing is done by means of an extra lens, sliding within the telescope. With this type of construction the additional lens tends to decrease the illumination and also increases the point of minimum focus. It offers about the same amount of dust and water protection to the interior of the telescope as the regular method of Gurley slide construction, but the problem of cleaning when necessary is not so simple. For stadia work this type of construction gives a zero stadia constant. *Internal focusing may be had on either the No. 60 or the No. 130 Series Transits, without extra charge.*

Telescope Level: The telescope level is long and centered with the axis, so that both ends of the bubble are visible. The adjustment is a positive one, made by opposing capstan nuts. Since the parts are held together without strain or distortion, the adjustment will be held accurately for a long time.



Reticules, Platinum Cross and Stadia Wires: The Cross and Stadia wires in Gurley telescopes are filaments of platinum, one ten-thousandth of an inch in diameter, mounted on a heavy brass ring. They make very desirable reticules, superior to spider web since they do not sag in a humid atmosphere. They show a fine, even black line which makes it easy to take readings.

The use of diagonal wires, as shown by reticule "C", is strongly recommended in all telescopes having stadia wires. The eye naturally follows the diagonal wires to the center cross-wire and prevents errors caused by reading the wrong wire. Diagonal wires are preferable to disappearing stadia wires which require eyepiece refocusing with each reading.



Code	Word	Design	Price
ABELP	A.	Regular cross-wires. Regularly furnished in all Gurley Levels.	\$ 4.50
ABELS	B.	Two fixed stadia wires, ratio 1:100, and regular cross-wires. Regularly furnished in all Gurley Transits, unless otherwise noted in specifications	10.00
ABEMA	C.	Two diagonal wires set on the 45° lines, fixed stadia wires, ratio 1:100 and cross-wires. Diagonals definitely point out cross-wires, preventing errors in reading the wrong wire. Recommended for Transits frequently used for leveling instead of disappearing stadia wires.	20.00
ABELM	D.	Disappearing wires; Combination of "A" and "K" on same ring, but in different focal planes, so that when "A" is visible, "K" does not appear, and vice versa. Furnished to order only. We recommend "C" instead. If the line of collimation is adjusted with "A", we cannot guarantee that "K" will be in adjustment. Difference is slight and unimportant in some kinds of work.	20.00
ABENT	K.	Two diagonal wires set on the 45° lines, two horizontal stadia wires, ratio 1:100. Target not obscured by vertical wire and easily made to bisect angle formed by diagonal wires. May be used in combination with "A" for disappearing stadia.	15.00
		A brass packing box with screw cover, is a useful extra for safely carrying a spare reticule, or for export mailing.	2.50

Easily Read Graduations: The graduations of Gurley Transits are clean cut and easily read, with divisions of uniform width and weight. The horizontal limb is divided to half degrees and read by opposite double verniers to single minutes, (extra charge for reading to 20 or 30 seconds). It is figured 0° to 360° both ways, figures inclined in direction of increase. The vertical limb, which reads to one minute (finer graduations are put on at extra cost) is figured in one row of quadrants, 0° to 90°.

Large vernier openings admit ample light for easy reading. The vernier glasses are set flush with the plate and close to the divided circle, reducing parallax errors from oblique readings.

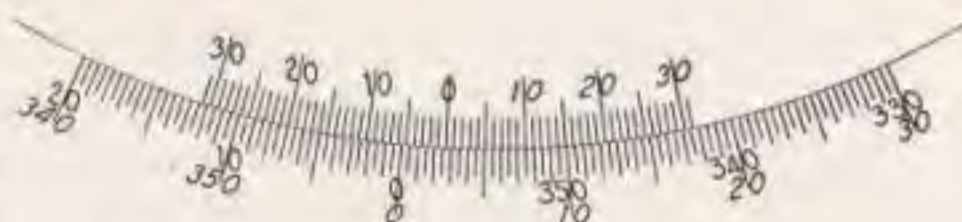
For accuracy and ease of reading, transits divided finer than one minute are equipped with attached microscopes. These have a magnifying power of 9x, and give an unusually brilliant image with a flat field. To prevent parallax errors, so easy with the finer graduations, the field of view is small to limit oblique readings.



Accuracy of Graduations: The mechanical accuracy depends upon the scientific intelligence and precise care used by our Chief Engineer who designed and constructed our present dividing engine. This machine was built after a thorough examination had been made of all the leading types of dividing engines. It embodies their good features and possesses others which are due to the originality and experience of the maker. Each division was checked by many reversals under twelve microscopes located thirty degrees apart.

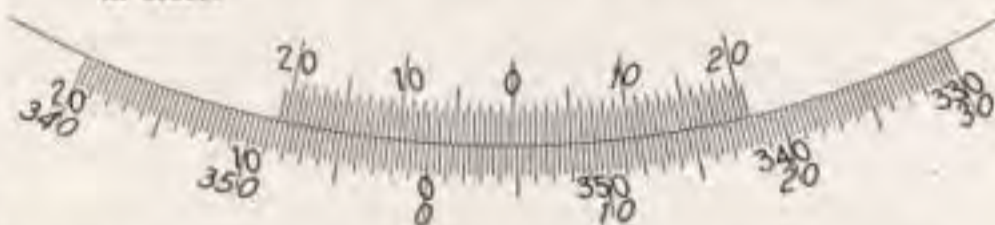
Unusual care is taken in centering the blank circle. A special device acts as a check upon the perfection of the part itself, a powerful microscope detects any error of eccentricity and the whole is coordinated by a master craftsman of fifteen years experience on this particular work.

In assembling the transit, the centering is done under powerful microscopes and checked by the opposite readings of the verniers. There is not a more accurately graduated transit than the Gurley.



Limb divided to 30 minutes, reading to 1 minute. Limb IV (illustrated) is figured in two rows, 0-360 both ways, with inclined figures.

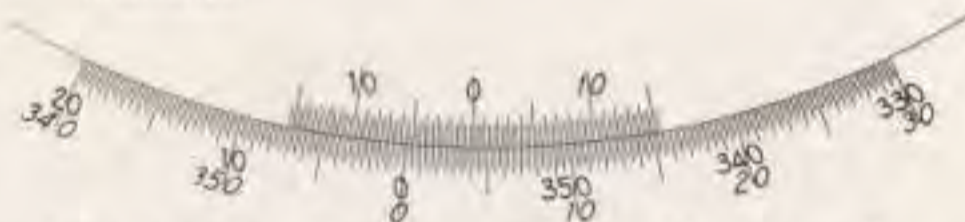
Limb I is figured, outer row, 0-360 clockwise, inner row, 0-90, in quadrants, and is optional if specified in order. Transits having limbs so figured, however, are not carried in stock.



Limb divided to 20 minutes, reading to 30 seconds. Regularly read by attached focusing microscopes. Prices for these graduations, where not regularly supplied:

- Graduation of horizontal limb to read to 30 seconds (ASCOG) \$15.00
- Graduation of vertical limb to read to 30 seconds (ASELS) 10.00

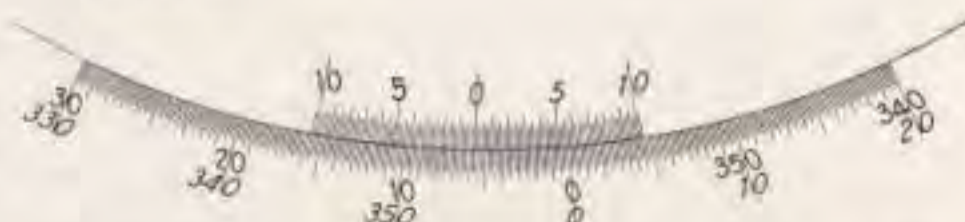
When these graduations are supplied we recommend the addition of microscopes. Price, per pair (ABAMO) ... \$30.00
Limb I figuring is optional. See explanation under first illustration.



Limb divided to 15 minutes, reading to 20 seconds. Regularly read by attached focusing microscopes. Prices for these graduations, where not regularly supplied:

- Graduation of horizontal limb to read to 20 seconds (ABALE) \$25.00
- Graduation of vertical limb to read to 20 seconds (ABAOV) 20.00

When these graduations are supplied, we recommend the addition of microscopes. Price, per pair (ABAMO) ... \$30.00
Limb I figuring is optional. See explanation under first illustration.



Limb divided to 10 minutes, reading to 10 seconds. Read by attached focusing microscopes. Regular on horizontal limb, Hell Gate Series Transits, and horizontal and vertical limbs, Nos. 14, 19, 24, and 29 Hell Gate Transits.

Limb I figuring is optional. See explanation under first illustration.



Sensitive Level Vials: Sensitiveness of level vials is not entirely a matter of curvature. The interior surface of the glass must be smooth and free from any imperfections. Gurley vials are ground all the way around and the graduations are etched on the top. The proper liquid mixture, length of bubble, and diameter of vial are points which have been



Cross-section of level vial mounted in case.

worked out with the greatest care to insure an accurate and workable vial under a wide range of temperatures. Gurley vials are mounted in plaster of paris in brass cases, supported by substantial posts which have properly cut threads. In all cases the adjustment is a definite one made by opposing capstan nuts at each end of the vial. The distance between centers is always as great as circumstances will permit, in order to give fineness of adjustment. All parts are fitted together without strain or distortion, so that they will hold their adjustment. The degree of sensitiveness regularly used on Gurley Transits is commensurate with the fineness of angle reading of the instrument. If requested before shipment is made, the regular vials can be exchanged for extra sensitive ones.

Compass: The metals used in Gurley Transits are carefully tested for freedom from magnetic impurities which might affect the compass needle. The needle itself is of the flat bar type, of uniform cross section throughout, and designed to carry a heavy magnetic flux with a uniform field. It is not forged nor annealed and so does not contain hard spots which set up local magnetic centers counter to the magnetism of the needle itself. The hardened steel bearing is made to uniform shape and polish and brought to a sharper point than the agate or sapphire. The center pin is of hardened steel, sharpened and polished to a needle point. As long as care is taken to raise the needle when not in use, and to lower it gently onto the point, it will continue to maintain its sensitiveness.

The compass glass cover is beveled and fitted into a metal bezel ring which screws onto the compass box. This construction provides a rainproof compass and makes it easy to get at the needle when a change of balance is necessary. Needle circles are divided to 30 minutes and are movable for setting off the magnetic declination.



Long-Wearing Centers: Gurley centers are long, tapering, and perfectly fitted together, to move freely, but without the slightest play or eccentricity. The use of metals of different composition produces a frictionless, velvety, movement in turning angles with the transit. The centers are sufficiently hard for many years of wear, but are without the brittleness which fractures easily in accidents. As long as they are kept clean, they cannot cut or bind.

Leveling Head with Replaceable Screws: The leveling head, of the four-screw type with shifting center, is unique in the ease with which replacement service can be furnished in the field on worn or jammed leveling screws. The leveling screws are fitted into bushings which slip into accurately reamed holes in the four-arm piece. A new leveling screw and bushing can be inserted by the man in the field whenever necessary.

The leveling screws are of nickel alloy on which are molded heads of Bakelite. Bakelite is light and has the advantage over metal in that it does not freeze to the fingers in cold weather. This leveling head fits the Gurley Standard Tripod, such as is furnished with all new Gurley Precise Transits and Engineers Levels.

In this design, the usual objections to the four screw leveling head have been overcome. No longer can the inexperienced instrument man distort or bind the centers by putting unequal pressure on the leveling screws. Furthermore, the holes are accurately located with respect to the half-ball, so that no binding or side slip of the screws takes place when leveling up.

A three screw leveling head can be supplied on order, and at an additional cost of \$25.00. This type is so infrequently called for that they are not carried in stock.



Substituting a new leveling screw and nut for a worn or jammed one is easy with new model Gurley transits. Note new screw and nut at right, ready to be slipped into the four arm piece.



Waterproof Construction: While no design of telescope has yet been made entirely moisture proof, the Gurley design offers the best combination of rain proofness, with accessibility for cleaning and drying if necessary. The dust shield, extending over the objective slide, acts as a continuation of the main tube, and keeps dust and moisture from being drawn in. The dust shield can be removed easily for cleaning the slide.

The platinum cross and stadia wires do not sag in damp weather, like spider web. The compass is waterproofed by its beveled glass cover and screw bezel ring. Vernier glasses are cemented in place and set flush with the plate so that they shed water and make it easy to wipe off the accumulated dust.

Metals: Each of the metals used in Gurley Transits—including bronze, brass, steel, aluminum alloys and nickel alloy—has been carefully analyzed for the purpose for which it is used. The cast parts are made of new, clean metal, cast in the Gurley foundry, and heat treated to remove internal strains and to add strength.

With the development of light alloys of the duralumin type, Gurley has recognized the improvements which can be made in surveying instruments by the use of these new metals. Strong and hard as mild steel, white as silver, light in weight and non-tarnishing, are all characteristics which make drop forged pieces ideal for graduated circles. Increased rigidity and permanence of adjustment result from the simplified, one piece, alloy castings used for two series of transits. The value of these modern metals has been fully demonstrated by eight years of field service, and now three sizes of transits—Nos. 90, 100 and 130 Series—are made largely of these materials.

Heat Treating: The parts of Gurley Transits are scientifically aged before any work is done on them. The buyer now gets as many years as he formerly did months of aging. Heat treating does not decrease the strength or hardness of the metal, but makes possible a degree of molecular stability in Gurley Transits, heretofore achieved only after many years of service.



Electric Furnace for Heat Treating



A Rigid Tripod

For best results, an accurate transit needs a rigid tripod. Tests show the No. 402 Gurley Standard Tripod to be 50% more rigid than any other on the market. It is free from residual torque, and from vibration in the wind.

A Standard Tripod Thread

Since January 1st, 1930, the tripod heads and bottom plates of all standard size Gurley Transits and Levels have been made with a standardized form of screw thread, $3\frac{1}{2}$ " in diameter, 8-threads per inch. This coarse, long-wearing thread was designed by a committee of instrument makers, and the National Screw Thread Commission, at the request of the U. S. Bureau of Standards. Although not universally in use, its advantages are so many that Gurley has adopted it for modern Gurley instruments. Complete details sent on request.



Patent No. 1641592

Features:

- Head made of strong bronze or light alloys.
- Lug and ring a single casting, of rigid cross-section.
- Legs widely spread at top, giving increased stability.
- Pressures evenly distributed by parallel bearing surfaces and large washers.
- Large bolts, tightly fitted, prevent shake.
- Inside face of bolt head knurled, does not turn when clamping.
- Large wing nuts for easy tightening.
- Shoe shrunk, cemented, pinned, to leg.
- Threads fit all standard-size Gurley instruments.
- Instrument quickly and firmly attached, or easily detached.

Spurs on Tripod Legs optional, without extra charge when ordering. Code Word, ABGYM.



No. 402
Standard Tripod
with fixed-length
legs.
Price (ABHAH)
\$20.00



No. 407
Standard Tripod
with extension legs
Price (ABHAJ)
\$25.00



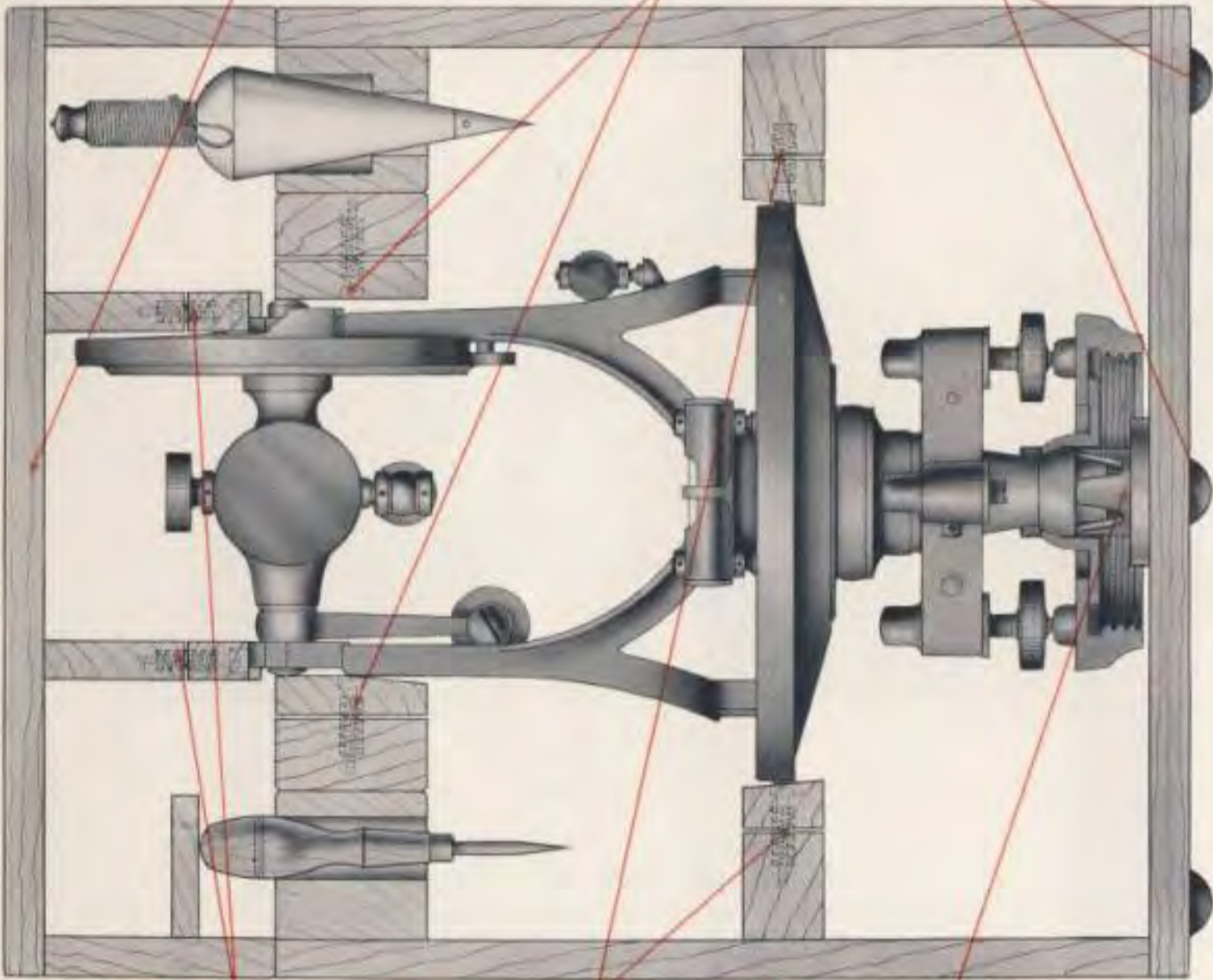
The Gurley Top-Opening Box

Keeps the Transit in Adjustment

Box made of solid mahogany. Strong and light. Does not warp easily.

Tapered adjustable blocks brace instrument against sideward motion

Rubber bumpers absorb vibration



Adjustable spring packing blocks press on tops of standards

Adjustable spring packing blocks cradle transit plate

Metal center rest gives support at end of centers



The Gurley Top-Opening Box

The Gurley top-opening box gives the best possible insurance that the transit will stay in adjustment during transportation. Protection and support are provided for the instrument in whatever position it may be carried. The transit is supported on all sides, and top and bottom, so that no part is free to move, and no part need be clamped. There can be no wear on the bearing parts, or damage to them, in the Gurley box. In addition, the speed of removing or replacing the instrument from the tripod is a real factor in saving time.



Above: Compactness and protection result from the diagonal packing method in the Gurley top-opening box.

Right: The transit is removed or replaced in the box easily and quickly. It should always be lifted by the tops of the standards.



How to Remove and Replace the Transit

Open lid of box. Lift out axis packing blocks, marked FRONT and REAR, and lay them in the cover of the box. (When the lid is closed, the axis packing blocks drop inside.) Grasp standard, with both hands, as shown in above illustration, and raise transit carefully. There is nothing to unscrew and the operation is completed quickly.

To return the transit, grasp the standard as before, holding the instrument vertically over the box. Lower gently. Press the telescope forward in its groove, and use it as a guide. When transit is all way down, swing the base slightly backward and forward until the bottom center rest engages. Replace axis blocks FRONT and REAR, as marked. Close lid of box, but do not force down. Box will shut and lock easily, if transit has been returned properly.

The transit is now packed for the roughest road.



Coast Survey Model

Gurley has recently completed several theodolites for the United States Coast and Geodetic Survey, for use in first order triangulation. These instruments were made in accordance with the specifications of the Survey and the details of their design represent the latest developments in surveying instruments of the highest precision.

The horizontal limb, 9 inches in diameter, reads to 1 second, by micrometer microscopes, provision also being made for approximate setting by hand to single degrees. The vertical circle reads to 10 seconds, by two opposite double verniers, and has a sensitive control level, movable by tangent screw. The level vials, of about 8 seconds sensitivity, are encased in glass tubes, and are chambered to allow adjustment of the length of the bubble. A striding level, with mirror, rests on the telescope axis.

The telescope, like the clamp and tangents, is reversible, and can be removed from the bearings for reading four ways, for checking. It is 15 inches long, carefully balanced, with a 2 inch objective lens, internal focusing, and magnifying 48x. The instrument has a steel spindle, fitted to a double cone socket of cast iron, which is designed to compensate for temperature changes by having both cones slope to a common apex. The limb clamp turns on ball bearings.

Because of their size and cost, these theodolites are designed only for particular work requiring special installation and careful manipulation. The precision methods of manufacture which have made possible their accuracy, however, is reflected in the entire line of Gurley Transits, since they are made by the same men, in the same Factory, and by the same modern machinery and equipment. It is these factors, together with the balanced design and the careful choice of materials, which are responsible for the accuracy, durability, and permanence of adjustment which characterizes all Gurley Transits.



Gurley Theodolites



First-order Triangulation Theodolite, as built for the U. S. Coast and Geodetic Survey



Hell Gate Model



The Hell Gate Transit is a repeating instrument, suitable for the precise control of city mapping, bridges, tunnels, irrigation projects, etc., by means of secondary triangulation, precise traversing and exact meridian determination.

The first Hell Gate model was designed to control the construction of the Hell Gate Bridge. To obtain a record of the elastic deformation of the truss during erection, precise instrument control was maintained by horizontal and vertical angle readings on the bridge panel points as they cantilevered from the abutments toward a meeting three hundred feet above mid-stream. Parallel base lines, one on each shore, ended in concrete piers, from which readings were taken by the transit especially made by W. and L. E. Gurley, for the work.

A feature of the New Hell Gate Transit is the excellence of the telescope. It has a large objective aperture, giving a resolving power of 2.7 seconds and a light-gathering capacity which makes it possible to observe Polaris at noon day. Interchangeable eyepieces giving magnifications of 26x or 16x, make the telescope adaptable for tunnel and subway surveying, as well as surveying under all kinds of light conditions above ground.

The horizontal and vertical limbs read to 10 seconds, with a sensitive control level for the vertical circle. Equipment includes a diagonal prism with darkener, waterproof hood, extra eyepiece, and extra-rigid tripod.

Specifications of No. 19 *Hell Gate* Precise Transits

The No. 19 Hell Gate Precise Transit is a special instrument distinguished from the No. 10 Series Transits, as listed on the next page, by the completeness of its equipment. When the equipment includes a 3½ inch compass, the Cat. No. 14 is applied; or, if an erecting telescope is substituted for the inverting telescope the two transits become No. 24 and No. 29 Hell Gate Precise Transits. This optional change to erecting telescopes is a recent development, and while not possessing quite such great light-gathering power, these telescopes nevertheless possess unusually fine optical properties, with the convenience of an erected image.

Complete specifications of the Hell Gate Transits are on page 118, and these specifications apply in detail to Nos. 14, 19, 24 and 29, with the following exceptions:

VERTICAL LIMB: 5 inches diameter, divided to 10 minutes, reading by two opposite double verniers to 10 seconds, read by movable focusing microscopes. Extra-sensitive control level, adjustable by tangent motion.

TELESCOPE: As in specifications, page 118, but having diagonal cross-wires. Erecting telescope optional.

LEVEL VIALS: Extra sensitive.

EQUIPMENT: As in specifications, page 118, but having diagonal prism with darkener.

WEIGHT: Of Transit only, 22 lbs., in box 36 lbs.; of Tripod, 15 lbs. Shipping weight, domestic, 85 lbs., foreign, 125 lbs.



Gurley Precise Transits



No. 19 Hell Gate Precise Transit

Code word ABETO

Price \$700.00

*No. 14 Hell Gate Precise
Transit same as No. 19,
but with 3½" compass.
Code word ABERU.
Price, \$725.00.*

7" Limb, reading to 10 seconds.

* 12¾" Inverting Telescope, magnifying 26x, 1.93" aperture.

5" 2-Vernier Vertical Circle, reading to 10 seconds, with
sensitive control level movable by tangent screw.

Mahogany box 14" x 9½" x 16".

Weight 22 lbs.; in box 36 lbs.

Extra-rigid tripod having fixed-length legs.

* Nos. 24 and 29 Hell Gate Transits, same as Nos. 14 and 19 but with *Erecting Telescope*, 13½" long, 1.93" aperture, magnifying 31x, (extra eyepiece magnifying 21x) 3 seconds resolution, minimum focus 7½ ft.



Triangulation Model

The *Triangulation Model* is designed for Engineers who are interested in having a super-fine transit for the primary purpose of reading precise horizontal angles, and especially the securing of unusual optical excellence, but who do not require all of the features and attachments of Nos. 14 and 19. It is made up without vertical circle or arc, and is especially suitable for triangulation or precise traversing.

The telescope is the same as supplied on the other Hell Gate Transits. An erecting telescope of the same size is optional without extra charge, however. While the amount of light transmitted by this type is somewhat less, the convenience of the erected image is appreciated by many Engineers. Hell Gate Transits having an erecting telescope are designated by a change in the number of the model from the No. 10 to the No. 20 Series.

Specifications of No. 10 Series *Hell Gate* Precise Transits

CENTERS: Bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: 7 inches diameter, divided to 10 minutes, reading to 10 seconds, figured 0° to 360° both ways, read by movable focusing microscopes.

VERTICAL LIMB: (Not on Nos. 11 or 16) 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

STANDARDS: One Piece Truss Standard, bronze, with multi-groove axis bearings.

TELESCOPE: 12¾ inches long, inverting, magnifying 26x (extra eyepiece magnifying 16x) 2.7

seconds resolution, minimum focus, 9 ft., platinum cross and stadia wires in ratio 1:100.

LEVEL VIALS: Telescope Level, 6 inches long, sensitiveness 10 seconds, side and transverse plate vials 3 inches long, sensitiveness 60 seconds.

FINISH: Durable dark green morocco finish, small parts bright.

EQUIPMENT: Top-opening mahogany box 14" x 9½" x 16" with lock and strap; low power eyepiece, Cox Stadia Computer, waterproof hood, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 402-S extra heavy, extra rigid Tripod with fixed-length legs, 57 inches long.

WEIGHT: Of Transit only, 21 lbs., in box 35 lbs.; of Tripod, 15 lbs. Shipping weight, domestic, 35 lbs., foreign, 125 lbs.

Price List of Gurley *Hell Gate* Precise Transits

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 11 ABERN \$556.00	Cat. No. 12 ABERO \$581.00	Cat. No. 13 ABERT \$581.00	Cat. No. 16 ABESK \$531.00	Cat. No. 17 ABESU \$556.00	Cat. No. 18 ABETE \$556.00
*Cat.No.21 ABSOD \$556.00	*Cat.No.22 ABSOH \$581.00	*Cat.No.23 ABSOJ \$581.00	*Cat.No.26 ABSOR \$531.00	*Cat.No.27 ABSOT \$556.00	*Cat.No.28 ABSOV \$556.00

* No. 20 series *Hell Gate* Transits, same as No. 10 series, but with *Erecting Telescope*, 13½" long, 1.93" aperture, magnifying 31x (extra eyepiece magnifying 21x), 3 seconds resolution, minimum focus 7½ ft.

Useful Extras

For other optional and extra attachments, see page 144

Beam and Stadia Arc, extra \$15.00 Prismatic Eyepiece, extra \$12.00
 Gradienter, extra 18.00



Gurley Precise Transits



**No. 16 Triangulation
Precise Transit**
Code word ABESK
Price \$531.00

7" Limb, reading to 10 seconds.

* $12\frac{3}{4}$ " Inverting Telescope, magnifying 26x, 1.93" aperture.

Mahogany box 14" x $9\frac{1}{2}$ " x 16".

Weight 21 lbs.; in box 35 lbs.

Extra-rigid tripod having fixed-length legs.

* No. 26 Triangulation Precise Transit, same as No. 16 but with *Erecting Telescope* $13\frac{1}{2}$ " long, magnifying 31x, (extra eyepiece magnifying 21x) 1.93" aperture, 3 seconds resolution, minimum focus $7\frac{1}{2}$ ft.



Municipal Model

The Gurley *Municipal* model, reading to 20 seconds, is particularly designed for the City Surveyor engaged in locating city property lines and in subdividing valuable plots within city limits. Likewise the Engineer who is triangulating or needs extra-accuracy in the layout of lines for the construction of dams, bridges, and other structures, can use to advantage the fine reading limb and the extra magnification of the longer telescope. The level vials are extra sensitive and the tripod is extra heavy and rigid.

Specifications of No. 32 *Municipal* Precise Transit

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: 7 inches diameter, divided to 15 minutes, reading to 20 seconds, figured 0° to 360° both ways, figures inclined in direction of increase. Read by movable focusing microscopes, magnifying 9x.

VERTICAL LIMB: 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle, 3½ inches long, in waterproof case, with screw cover and movable variation circle, graduated in half degrees.

STANDARDS: One Piece Truss Standard, multi-groove axis bearings.

TELESCOPE: 12½ inches long, erecting, magnifying 29x, 1.37 inches aperture, 4 seconds resolution, field of view, 1.4°, minimum focus, 9 ft., platinum cross and stadia wires. For optional magnifications, see page 141.

LEVEL VIALS: Telescope Level, 5 inches long, sensitiveness 20 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

FINISH: Durable, dark green morocco, small parts finished bright.

EQUIPMENT: Mahogany box 14" x 9½" x 16" with lock and strap, Cox Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 402-S extra-heavy, extra-rigid Tripod with fixed length legs, 57 inches long.

WEIGHT: Of Transit, 17½ lbs., in box 31 lbs.; of Tripod, 15 lbs. Shipping weight, domestic, 80 lbs., foreign 115 lbs.

Price List of Gurley *Municipal* Precise Transits



With Telescope Level only

No. 31 with Compass
No. 36 without Compass

The No. 30 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle

No. 33 with Compass
No. 38 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 31 ABOS1 \$405.00	Cat. No. 32 ABOSK \$430.00	Cat. No. 33 ABOSU \$430.00	Cat. No. 36 ABOUK \$380.00	Cat. No. 37 ABOUG \$405.00	Cat. No. 38 ABOUF \$405.00

Useful Extras

For other optional and extra attachments, see page 144

Beaman Stadia Arc, extra \$15.00 Interchangeable Eyepiece, extra \$25.00
 Gradienter, extra 18.00 Prismatic Eyepiece, extra 12.00



Gurley Precise Transits



No. 32 *Municipal* Precise Transit

Code word ABOSK
Price \$430.00

If without microscopes,
Price \$400.00

7" Limb, reading to 20 seconds; attached microscopes.
12½" Erecting Telescope, magnifying 29x.
Mahogany box 14" x 9½" x 16".
Weight 17½ lbs.; in box 29 lbs.
Extra-rigid tripod having fixed-length legs.



Master Model

The Gurley *Master* model, reading to 30 seconds, meets the Construction Engineer's need for an extra-fine-reading transit to be used in the layout of master lines on hydro-electric development, water supply systems, irrigation works, industrial plants and large buildings.

Railroad and Highway Engineers who desire a close check on main line or principal route curves, will get better results with the 30 second limb reading.

Specifications of No. 42 *Master* Precise Transits For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: 6 $\frac{1}{4}$ inches diameter, divided to 20 minutes, reading to 30 seconds, figured 0° to 360° both ways, figures inclined in direction of increase. Read by movable focusing microscopes, magnifying 9x.

VERTICAL LIMB: 5 inches diameter, divided to 20 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle, 4 inches long, in waterproof case, with screw cover, movable variation circle, graduated in half degrees.

STANDARDS: Bronze One Piece Truss Standard, multi-groove axis bearings.

TELESCOPE: 12 $\frac{1}{4}$ inches long, erecting, magnifying 29x, 1.37 inches aperture, 4 seconds resolution, field of view 1.4°, minimum focus 6 ft., platinum cross and stadia wires. For optional magnifications, see page 141.

LEVEL VIALS: Telescope Level, 5 inches long, sensitiveness 30 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

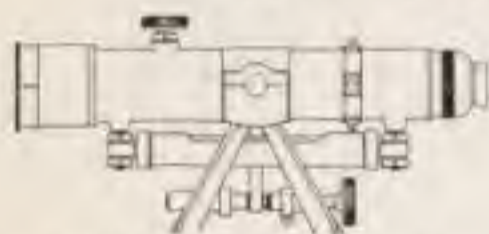
FINISH: Durable, dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening mahogany box 14" x 9 $\frac{1}{2}$ " x 16" with lock and strap, C x Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 402 Standard Tripod with fixed-length legs, 57" long.

WEIGHT: Of Transit, 14 lbs., in box 28 lbs.; of Tripod, 11 $\frac{1}{2}$ lbs. Shipping weight, domestic, 80 lbs., foreign, 115 lbs.

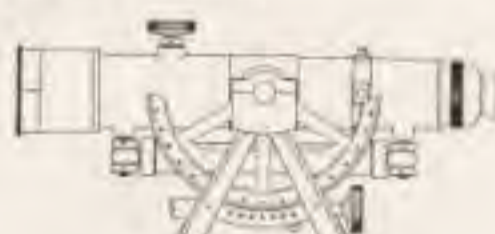
Price List of Gurley *Master* Precise Transits



With Telescope Level only
No. 41 with Compass
No. 46 without Compass

The No. 40 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle
No. 43 with Compass
No. 48 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 41 ABOUP \$380.00	Cat. No. 42 ABOUS \$405.00	Cat. No. 43 ABOYU \$405.00	Cat. No. 46 ABOWK \$355.00	Cat. No. 47 ABOWL \$380.00	Cat. No. 48 ABOWM \$380.00

Useful Extras

For other optional and extra attachments, see page 144

Beaman Stadia Arc, extra	\$15.00	Extension Tripod, extra	\$ 5.00
Gradienter, extra	18.00	Prismatic Eyepiece, extra	12.00



Gurley Precise Transits



No. 42 *Master* Precise Transit

Code word ABOUS
Price \$405.00

If without microscopes,
Price \$375.00

6 $\frac{1}{4}$ " limb, reading to 30 seconds, attached microscopes.
12 $\frac{1}{2}$ " Erecting Telescope, magnifying 29x.
Mahogany box 14" x 9 $\frac{1}{2}$ " x 16".
Weight 14 lbs.; in box 28 lbs.
Tripod having fixed-length legs.



Engineer's Model

The *Engineers* model, reading to 1 minute, brings to the Engineer or Surveyor engaged in general engineering, surveying and construction work, the advantages of the long and powerful telescope.

For work through woods, underground, inside buildings, or in a "boiling" atmosphere, a lower magnification should be selected. For this purpose see the table on page 141. It is so easy to change eyepieces to meet different light and atmospheric conditions, that many customers order an extra low power eyepiece for use under such conditions.

Specifications of No. 52 *Engineer's* Precise Transits

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads fitted into replaceable brass bushings.

HORIZONTAL LIMB: 6¼ inches diameter, divided to 30 minutes, reading to 1 minute, figured 0° to 360° both ways, figures inclined in direction of increase.

VERTICAL LIMB: 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle, 4 inches long, in waterproof case, with screw cover, movable variation circle, graduated in half degrees.

STANDARDS: Bronze One Piece Truss Standard, multi-groove axis bearings.

TELESCOPE: 12½ inches long, erecting, magnifying 29x, 1.37 inches aperture, 4 seconds resolution, field of view 1.4°, minimum focus, 6 ft., platinum cross and stadia wires. For optional magnifications, see page 141.

LEVEL VIALS: Telescope Level, 5 inches long, sensitiveness 40 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

FINISH: Durable dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening mahogany box 14" x 9½" x 16" with lock and strap, Cox Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 402 Standard Tripod with fixed-length legs, 57" long.

WEIGHT: Of Transit, 14 lbs., in box 28 lbs.; of Tripod, 11½ lbs. Shipping weight, domestic, 80 lbs., foreign, 115 lbs.

Price List of Gurley *Engineer's* Precise Transits



With Telescope Level only
No. 51 with Compass
No. 56 without Compass

The No. 50 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle
No. 53 with Compass
No. 58 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 51 ABOPO \$335.00	Cat. No. 52 ABOPS \$360.00	Cat. No. 53 ABOPU \$360.00	Cat. No. 56 ABORN \$310.00	Cat. No. 57 ABORO \$335.00	Cat. No. 58 ABORT \$335.00

Useful Extras

For other optional and extra attachments, see page 144

Beaman Stadia Arc, extra \$15.00 Extension Tripod, extra \$ 5.00
Gradienter, extra 18.00 Prismatic Eyepiece, extra 12.00



Gurley Precise Transits



**No. 52 *Engineer's*
Precise Transit**

Code word ABOPS

Price \$360.00

- 6 $\frac{1}{4}$ " limb, reading to 1 minute.
- 12 $\frac{1}{2}$ " Erecting Telescope, magnifying 29x.
- Mahogany box, 14" x 9 $\frac{1}{2}$ " x 16".
- Weight 14 lbs.; in box 28 lbs.
- Tripod having fixed-length legs.



Standard Model

The *Standard* model embodies the features and dimensions the majority of engineers prefer in a transit. This instrument is often selected for general surveying on railroads, highways, streets, sewers, subdivisions, building construction and for topographic mapping.

The compact, sturdy design of the transit, and its standard size 10" telescope and 6 1/4" limb, combined with its durability, its accuracy, and its ability to preserve adjustments, make it one of the most popular Gurley Transits. The optics of the telescope have been certified to be up to the theoretical limit of lens design.

The *Standard* model is a full size instrument, but compact and light in weight.

Specifications of No. 62 *Standard* Precise Transits

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: 6 1/4 inches diameter, divided to 30 minutes, reading to 1 minute, figured 0° to 360° both ways, figures inclined in direction of increase.

VERTICAL LIMB: 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle, 4 inches long, in waterproof case, with screw cover, movable variation circle, graduated in half degrees.

STANDARDS: Bronze One Piece Truss Standard, multi-groove axis bearings.

TELESCOPE: 10 inches long, erecting, magnifying 22x, 1.37 inches aperture, 4 seconds resolution, field of view, 1.3°, minimum focus, 5 ft., platinum cross and stadia wires. For optional magnifications, see page 141.

LEVEL VIALS: Telescope Level, 6 inches long, sensitiveness 10 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

FINISH: Durable dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening mahogany box 9" x 9" x 14 1/2" with lock and strap, Cox Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 402 Standard Tripod with fixed-length legs, 57" long.

WEIGHT: Of Transit, 13 1/2 lbs., in box 22 1/2 lbs.; of Tripod, 11 1/2 lbs. Shipping weight, domestic, 50 lbs., foreign, 105 lbs.

Price List of Gurley *Standard* Precise Transits



With Telescope Level only
No. 61 with Compass
No. 66 without Compass

The No. 60 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle
No. 63 with Compass
No. 68 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 61 ABFEN \$325.00	Cat. No. 62 ABFER \$350.00	Cat. No. 63 ABFET \$350.00	Cat. No. 66 ABFIF \$300.00	Cat. No. 67 ABFIG \$325.00	Cat. No. 68 ABFIL \$325.00

Useful Extras

For other optional and extra attachments, see page 144

Beaman Stadia Arc, extra	\$15.00	Extension Tripod, extra	\$ 5.00
Gradiometer, extra	18.00	Prismatic Eyepiece, extra	12.00



Gurley Precise Transits



No. 62 *Standard* Precise Transit

Code word ABFER
Price \$350.00

6 $\frac{1}{4}$ " Limb, reading to 1 minute.
10" Erecting Telescope, magnifying 22x.
Mahogany Box, 9" x 9" x 14 $\frac{1}{4}$ ".
Weight 13 $\frac{1}{2}$ lbs.; in box 22 $\frac{1}{2}$ lbs.
Tripod having fixed-length legs.

With Finer Graduations

- No. 62-30 *Standard* Precise Transit, specifications as above, but with horizontal limb reading to 30 seconds, attached microscopes (ABGIF) \$395.00
No. 62-20 *Standard* Precise Transit, specifications as above, but with horizontal limb reading to 20 seconds, attached microscopes (ABGIG) \$405.00



Light Mountain Model

The *Light Mountain* Transits are accurate, precise instruments which embody light weight and compact dimensions with typical Gurley ability to withstand hard use and retain adjustments. They are particularly adapted for mountain and mining work where these characteristics are specially valuable.

They are often ordered equipped so that the Auxiliary Mining Telescope can be added later, which adds \$10.00 to the price of the transit, but is deducted when the auxiliary is purchased (see page 136). The 8½" telescope which has a large aperture and splendid definition, focuses to within 4½ feet, and the 5.65" limb reads to 1 minute.

Specifications of No. 92 *Light Mountain* Precise Transits

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Lynite and bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: 5.65 inches diameter, divided to 30 minutes, reading to 1 minute, figured 0° to 360° both ways, figures inclined in direction of increase.

VERTICAL LIMB: 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle, 4 inches long, in waterproof case, with screw cover, movable variation circle, graduated in half degrees.

STANDARDS: Aluminum alloy One Piece Truss Standard, multi-groove axis bearings in inserted bronze blocks.

TELESCOPE: 8½ inches long, erecting, magnifying 19x, 1.19 inches aperture, 5 seconds resolution, field of view, 1.5°, minimum focus, 4½ ft., platinum cross and stadia wires. For optional magnification, see page 141.

LEVEL VIALS: Telescope Level, 5 inches long, sensitiveness 40 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

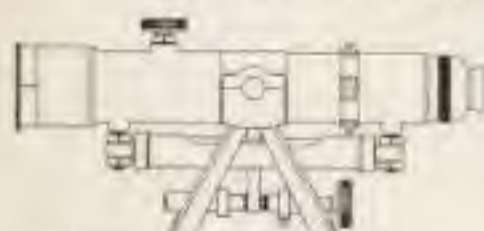
FINISH: Durable, dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening mahogany box 9" x 9" x 14½" with lock and strap, Cox Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 407 Standard Tripod with extension legs, 57 inches long, closing to 35 inches.

WEIGHT: Of Transit, 9¼ lbs., in box 18 lbs.; of Tripod, 11½ lbs. Shipping weight, domestic, 50 lbs., foreign, 110 lbs.

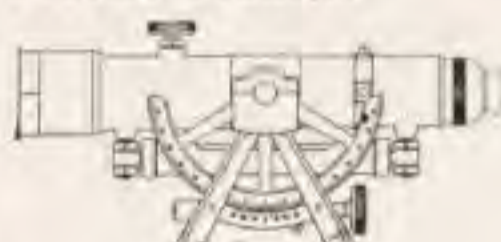
Price List of Gurley *Light Mountain* Precise Transits



With Telescope Level only
No. 91 with Compass
No. 96 without Compass

The No. 90 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle
No. 93 with Compass
No. 98 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 91 ABOKI \$315.00	Cat. No. 92 ABOLA \$340.00	Cat. No. 93 ABOLB \$340.00	Cat. No. 96 ABOLI \$290.00	Cat. No. 97 ABOLM \$315.00	Cat. No. 98 ABOLP \$315.00

Useful Extras

For other optional and extra attachments, see page 144

Beaman Stadia Arc, extra	\$15.00	Interchangeable Eyepiece, extra	\$25.00
Gradienter, extra	18.00	Prismatic Eyepiece, extra	12.00



Gurley Precise Transits



**No. 92 *Light Mountain*
Precise Transit**

Code word ABOLA

Price \$340.00

- 5.65" Limb, reading to 1 minute.
- 8½" Erecting Telescope, magnifying 19x.
- Mahogany box 9" x 9" x 14¼".
- Weight 9 lbs.; in box 18 lbs.
- Tripod having extension legs.



Explorer's Model

The *Explorer's* Precise Transit is the lightest and smallest made by Gurley. It is designed to give the least possible bulk in a complete and accurate transit that will be durable enough to stand up under the hard service to which this kind of instrument is necessarily subjected. It has been used by engineers and explorers in all parts of the world and is a convenience to consulting engineers in preliminary surveying or checking of work already done.

The No. 124 Explorers Precise Transit is a special instrument, adapted for meridian and time determination. It is equipped with a two-vernier vertical circle having a sensitive control level, and with a diagonal prism and darkener which are removable for direct sighting.



If transit and tripod are to be carried in a 24" suitcase, as illustrated in the circle, the No. 412 Jointed Extension Tripod should be ordered. Specify by suffix letter "J", as No. 124-J, or add code word ABAFE to that of transit.

This model has been used in the extreme conditions of heat, humidity, and cold encountered by such recent expeditions as the Byrd Antarctic Expedition; the Asiatic Expedition, under the leadership of Roy Chapman Andrews, which discovered the dinosaur eggs in the Gobi Desert; the Dickey Orinoco River Expedition; the Hobbs Greenland Expeditions; and others. Of its use in Antarctica, Dr. Lawrence M. Gould writes:

"Quite the most marvelous instrument of its kind that I have ever used was the Explorers Precise Transit. I used it exclusively during my field work the first season, and on the great sledge trip of 1500 miles which I took with five companions during the last summer, it was my only instrument for both surveying and mapping. It was the only instrument of its kind that worked in any sort of temperature."

While the Explorers model is a smaller instrument than most Engineers use, its ruggedness and accuracy are characteristic of the entire line of Gurley Transits.

Specifications of No. 122 *Explorer's* Precise Transit

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Bronze, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, bronze leveling screws.

HORIZONTAL LIMB: 4 inches diameter, divided to 30 minutes, reading to 1 minute, figured, outer row 0° to 360°, inner row in quadrants, 0° to 90°.

VERTICAL LIMB: 4 inches diameter, divided to 30 minutes, vernier reading to 1 minute, figured in quadrants, with guard.

COMPASS: Flat needle 2½ inches long, in waterproof case with screw cover. Movable variation circle graduated to degrees, and figured in quadrants.

STANDARDS: Bronze, One Piece Truss Standard, with multi-groove axis bearings.

TELESCOPE: 6¼ inches long, erecting, magnification 16x, aperture 0.7 inch, resolution 8 seconds.

LEVEL VIALS: Telescope level, 3 inches long, sensitiveness 60 seconds. Side and transverse plate vials, 1.1 inches long, sensitiveness 60 seconds.

FINISH: Durable dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening, leather covered mahogany box 8" x 6" x 11" with lock and shoulder strap, 6 oz. plummet, Cox Stadia Computer, and usual tools and accessories.

TRIPOD: No. 411 Extension Tripod with cap and canvas carrying case, closing to 38 inches, opening to 56 inches.

WEIGHT: Of Transit, 6¾ lbs., of Tripod, 6 lbs. Shipping weight, domestic, 40 lbs., foreign, 75 lbs.

For extras and attachments, see page 144



Gurley Precise Transits



(At Left)

No. 122 *Explorer's* Precise Transit

Code word ABAEK

Price . . . \$325.00

4" Limb, reading to 1 minute, $2\frac{1}{8}$ " needle.

$6\frac{1}{2}$ " Erecting Telescope, magnifying 16x.

Leather covered mahogany case, 8" x 6" x 11".

Weight: $6\frac{3}{4}$ lbs.; in case, 11 lbs.

Extension Tripod, closing to 38", in canvas case.



(At Right)

No. 124 *Explorer's* Precise Transit

Code word ABAGU

Price . . . \$405.00

Like No. 122 but with 2-Vernier Vertical Circle reading to 1 minute and Control Level.

Diaphragm "G."

Diagonal Prism with darkener.



Engineer's Light Weight Model

The No. 130 Series Transits are standard engineers' size instruments for all sorts of engineering work. They are suitable for highway, railroad, street, sewer, and subdivision surveys, and for topographic mapping, for the layout of all sorts of construction, and wherever an accurate, durable, standard size transit is needed.

The transit is steady in the wind or traffic and the telescope has unusually fine optical properties. Graduations are well-lighted and easily read on circles that do not tarnish. Transits are regularly supplied with the full-size Gurley Standard Tripod and packed in the usual Gurley top-opening box that makes clamping unnecessary and keeps the instrument in adjustment.

Specifications of No. 132 *Engineers* Light Weight Transits

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Lynite, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: 6 $\frac{1}{4}$ inches diameter, divided to 30 minutes, reading to 1 minute, figured 0° to 360° both ways, figures inclined in direction of increase.

VERTICAL LIMB: 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle, 3 $\frac{1}{2}$ inches long, in waterproof case, with screw cover, movable variation circle, graduated in half degrees.

STANDARDS: Aluminum alloy, cast integral with top plate. Multi-groove axis bearings in inserted bronze blocks.

TELESCOPE: 10 inches long, erecting, magnifying 22x, 1.37 inches aperture, 4 seconds resolution, field of view 1.3°, minimum focus 5 ft., platinum cross and stadia wires. For optional magnification, see page 141.

LEVEL VIALS: Telescope Level, 6 inches long, sensitiveness 40 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

FINISH: Durable dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening mahogany box 9" x 9" x 14 $\frac{1}{2}$ " with lock and strap, Cox Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 402 Standard Tripod with fixed-length legs, 57 inches long.

WEIGHT: Of Transit, 9 $\frac{1}{2}$ lbs., in box 18 $\frac{1}{2}$ lbs.; of Tripod, 11 $\frac{1}{2}$ lbs. Shipping weight, domestic, 45 lbs., foreign, 100 lbs.

Price List of Gurley *Engineers* Light Weight Transits



With Telescope Level only
No. 131 with Compass
No. 136 without Compass

The No. 130 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle
No. 133 with Compass
No. 138 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 131 ABGOD \$275.00	Cat. No. 132 ABGOH \$300.00	Cat. No. 133 ABGOJ \$300.00	Cat. No. 136 ABGOT \$250.00	Cat. No. 137 ABGOX \$275.00	Cat. No. 138 ABGOZ \$275.00

Useful Extras

For other optional and extra attachments, see page 144

Beaman Stadia Arc, extra	\$15.00	Extension Tripod, extra	\$ 5.00
Gradiometer, extra	18.00	Prismatic Eyepiece, extra	12.00



Gurley Light Weight Transits



No. 132 *Engineer's* Light Weight Transit

Code word ABGOH
Price \$300.00

6 $\frac{1}{4}$ " Limb, reading to 1 minute.
10" Telescope, magnifying 22x.
Mahogany box 9" x 9" x 14 $\frac{1}{2}$ ".
Weight 9 $\frac{1}{2}$ lbs.; in box 18 $\frac{1}{2}$ lbs.
Tripod having fixed-length legs.

With Finer Graduations

- No. 132-30 *Engineer's* Light Weight Transit, specifications as above, but with horizontal limb reading to 30 seconds, attached microscopes (ABGIM) \$345.00
- No. 132-20 *Engineer's* Light Weight Transit, specifications as above, but with horizontal limb reading to 20 seconds, attached microscopes (ABGIP) \$355.00



Reconnaissance Model

The Gurley Reconnaissance Transit is a small-size, rugged, compact and light-weight instrument. It is used for building construction, on road and sewer work, for landscape mapping, in industrial organizations having occasional need of a transit, and as superseding the surveyors open-sight Compass. It has been found useful to many engineering offices which have scattered surveys to make, and which need a sturdy extra instrument.

The Transit has a $5\frac{1}{8}$ inch limb with one vernier, a splendid $8\frac{1}{2}$ inch telescope, and has the same characteristics of freedom from vibration, easily-read graduations on non-tarnishable circles, and permanence of adjustment, as is built into the other Gurley Light Weight Transits.

Specifications of No. 102 Reconnaissance Transits

For comparative dimensions of Gurley Transits, see table, page 145

CENTERS: Lynite, repeating, frictionless and non-cutting.

LEVELING HEAD: Four screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

HORIZONTAL LIMB: $5\frac{1}{8}$ inches diameter, divided to 30 minutes, reading to 1 minute, figured 0° to 360° both ways, figures inclined in direction of increase.

VERTICAL LIMB: 5 inches diameter, divided to 30 minutes, reading to 1 minute, figured in quadrants, with removable aluminum alloy guard.

COMPASS: Flat needle $3\frac{1}{2}$ inches long, in waterproof case, with screw cover, movable variation circle, graduated in half degrees.

STANDARDS: Aluminum alloy, cast integral with top plate. Multi-groove axis bearings in inserted bronze blocks.

TELESCOPE: $8\frac{1}{2}$ inches long, erecting, magnifying 19x, 1.19 inches aperture, 5 seconds resolution, field of view, 1.5° , minimum focus, $4\frac{1}{2}$ ft., platinum cross and stadia wires. For optional magnification, see page 141.

LEVEL VIALS: Telescope Level, 5 inches long, sensitiveness 40 seconds, side plate vial 3 inches, transverse plate vial 1.8 inches long, sensitiveness 60 seconds.

FINISH: Durable, dark green morocco, small parts finished bright.

EQUIPMENT: Top-opening mahogany box $9" \times 9" \times 14\frac{1}{2}"$ with lock and strap, Cox Stadia Computer, booklet on adjustment, 14 oz. plummet, and usual tools and accessories.

TRIPOD: No. 407 Standard Tripod with extension legs, 57 inches long, closing to 35 inches.

WEIGHT: Of Transit, 8 lbs., in box, 17 lbs.; of Tripod, $11\frac{1}{2}$ lbs. Shipping weight, domestic, 45 lbs., foreign 100 lbs.

Price List of Gurley Reconnaissance Transits



With Telescope Level only
No. 101 with Compass
No. 106 without Compass

The No. 100 Series illustrated on the opposite page with full circle and guard, may also be furnished as shown by the adjacent drawings.

The catalog number, code word and price of each model are listed in the table below.



With Half Circle
No. 103 with Compass
No. 108 without Compass

With Compass			Without Compass		
With Telescope Level Only	With Full Circle and Guard	With Half Circle	With Telescope Level Only	With Full Circle and Guard	With Half Circle
Cat. No. 101 ABGAW \$225.00	Cat. No. 102 ABGED \$250.00	Cat. No. 103 ABGEH \$250.00	Cat. No. 106 ABGEN \$200.00	Cat. No. 107 ABGER \$225.00	Cat. No. 108 ABGET \$225.00

Useful Extras

For other optional and extra attachments, see page 144

Beam and Stadia Arc, extra \$15.00 Interchangeable Eyepiece, extra \$25.00
 Gradiometer, extra 18.00 Prismatic Eyepiece, extra 12.00



Gurley Light Weight Transits



No. 102

Reconnaissance
Transit

Code word ABGED

Price \$250.00

5 $\frac{1}{8}$ " Limb, reading to 1 minute, one vernier only.

8 $\frac{1}{2}$ " Erecting Telescope, magnifying 19x.

Mahogany box 9" x 9" x 14 $\frac{1}{2}$ ".

Weight 8 lbs.; in box 17 lbs.

Tripod having extension legs.



Gurley Mining Transits

Explorers, Engineers and Light Mountain Sizes



No. 92 Precise Transit, Light Mountain Model, equipped with Interchangeable Side or Top Auxiliary Telescope and Counterpoise. Auxiliary Telescope in side position. Price (ABOLA ABANI) \$440.00.

There are several models of Gurley Precise Transits for mining work. No. 122 Explorers Model, as illustrated on page 130, is the smallest and lightest Gurley Transit. It is particularly useful for low vein mines, where the utmost compactness is necessary. This transit is capable of just as accurate mine surveying as larger instruments.

Where a full-size transit can be used, Gurley offers two models with the 10 inch telescope, and 6 $\frac{1}{4}$ inch limb. No. 60 Series, described on page 126, has the Gurley One Piece Truss Standard. No. 130 Series, listed on page 132 and on the opposite page, is a newer model, increasing in popularity because of its light weight, and its one-piece construction. The graduations of the large instruments are easier to read and the telescope gives more light.

The Light Mountain Model is an old time favorite for mountain and mine surveying. It has a short, brilliant telescope, and a limb larger than the usual mining transit, making the graduations easier to read. No. 93, with half circle, is specially popular in many districts, while No. 92, with full circle and guard, is generally preferred when used with the auxiliary telescope, as illustrated. Other desirable extras are listed below. Complete specifications of the Light Mountain Precise Transit are on page 128.

Extras for Mining Transits

Bottom plate with 3 trivet points	(ABOBE)	\$ 5.00
Diagonal cross wires (making 90° angle)	(ABADO)	10.00
Diagonal prism for eyepieces	(ARWET)	12.00
Elbow eyepiece	(ABOEC)	50.00
Extra eyepieces, for changing magnification. See page 141		25.00
Micrometer shifting center	(ABOEW)	25.00
Interchangeable Side or Top Auxiliary Telescope, and Counterpoise	(ABANI)	100.00
Reflector for illuminating cross wires	(ARTOT)	15.00
Reversion vial in telescope level	(AROBS)	15.00
Rim-graduated vertical circle, replacing side-graduated circle	(ABOJA)	25.00
Short focus attachment (from 20 inches to infinity)	(ABOED)	30.00
Tripods:		
No. 407 Standard Tripod with extension legs, opening to 57", closing to 35"	(ABHAJ)	25.00
No. 409 Mining Tripod with extension legs, opening to 36", closing to 22"	(ABGYM)	25.00
Waterproof hood	(ABBOS)	1.25



Gurley Light Weight Wet Mine Transit

Engineer's Size

The No. 132 Light Weight Transit illustrated on page 133 is particularly well adapted for wet mine use. The telescope and horizontal vernier glasses are waterproof, and a waterproof compass can also be added. The divided circles are made of Lynite, a light weight, white alloy of the duralumin type. Lynite is stronger than silver and will not tarnish in the presence of sulphur, as silver will. The increased hardness of this metal also makes it possible to wipe the divided surfaces clean without damaging the graduations.

This instrument is the next larger size than the Light Mountain Model, on the opposite page. It is, however, only slightly heavier. Where extreme compactness is not an essential characteristic, the ease of reading the graduations on the $6\frac{1}{4}$ " limb, and the splendid optics of the 10" telescope make this a good mining transit. In addition, the simplicity of the design is an important factor in its ability to retain adjustments and to withstand the hard use a mining transit necessarily receives.

No. 132 Gurley Light Weight Transit, for Wet Mine Surveying, as illustrated and described on page 132 (ABGOH) \$300.00

No. 137-M Gurley Light Weight Transit, Special Mining Model, like No. 132, but as illustrated on this page, and with specifications as below (ABOMI) \$480.00

No. 132-M Gurley Light Weight Transit, Special Mining Model, same as No. 137-M above and with $3\frac{1}{2}$ " waterproof compass (ABOMA) \$505.00

Specifications

No. 132-M is like No. 132 on page 132, but with the modifications detailed below.

Leveling Head. Bottom plate screws onto Micrometer Shifting Center, screwing onto tripod head. Transit shifted by turning opposing screws.

Vertical Limb made of heat-treated aluminum alloy, graduated on rim, figured in quadrants and reading to one minute. Vernier fastened to guard.

Telescope fitted with cross and stadia wires, in ratio 1:100, and with diagonal cross wires, preventing errors by reading wrong horizontal wires. Equipped with extra, interchangeable eyepiece, magnifying $14\frac{1}{2}$ x, for use under poor light conditions.

Auxiliary Telescope $6\frac{1}{2}$ inches long, erecting, magnification 16x, aperture 0.7 inch, resolution 8 seconds. Interchangeable on side and top of main telescope, and movable by clamp and tangent screw; balanced by counterweight. Packed in instrument box when not in use.

Reversion Telescope Level Vial. Telescope level fitted with reversion vial, readable when below the telescope or when reversed. Sensitiveness of reversion vial, 40 seconds.

Tripod. No. 407 Standard Tripod with extension legs, 57 inches long when open, closing to 35 inches, regularly furnished. No. 409 Mining Tripod, 36 inches long when open, closing to 22 inches, substituted without extra charge. Code word ABGYL.

Weight of Transit with attachments, about $14\frac{1}{2}$ lbs., of No. 407 Standard Tripod, $11\frac{1}{2}$ lbs., of No. 409 Mining Tripod, 8 lbs.



No. 137-M Mining Transit, Engineer's Model, Equipped with Rim-graduated Vertical Circle, with Guard; Auxiliary Telescope, in top position, and Micrometer Shifting Center.



Burt Solar Attachment

Any transit having a vertical arc* can be equipped with the Burt Solar Attachment. This device consists of a short pivot, the polar axis, mounted on the transit telescope, and adjusted to be perpendicular to the horizontal axis, and to the line of collimation. To the polar axis is fitted a socket, carrying a frame which is free to revolve about the axis. At the base of the socket is a divided drum upon which the hour is indicated

by an index on the frame. An arc, upon which the declination of the sun may be set off, and an arm, pivoting at the point of the frame, and carrying a vernier for reading the declination arc, are supported by the frame. The arm also carries a lens which focuses the image of the sun upon a ruled silver screen at the opposite end.

In using the attachment, the co-latitude is set off upon the vertical arc of the transit and the declination of the sun is set off upon the declination arc of the Burt Solar Attachment. The transit is then turned in azimuth until the polar axis is in the plane of the meridian, or parallel to the axis of the earth. The lens will then follow the diurnal motion of the sun, and, if the hour is set off upon the hour circle, it will focus its image upon the ruled silver screen, where it may be accurately centered. The telescope will then be in a true north and south line.

When not in use, the attachment should be removed from the telescope and packed in the instrument box and the polar axis covered by the protecting sleeve provided.

Because of its small size and simplicity of adjustment and operation, users find this a valuable and rapid means of determining or frequently checking the meridian.

*The Attachment can also be added to an instrument having the full vertical circle. However, this makes it necessary to carry the polar axis much higher to allow the declination arm to rotate clear of the circle, and throws the telescope out of balance.

Specifications

Polar Axis: Adjustable to be perpendicular to horizontal axis and line of collimation. Covered by protecting sleeve when Solar is removed.

Latitude Arc: Regular vertical arc of transit. Lynite, divided to 30 minutes, reading to 1 minute.

Declination Arc: Divided on silver to 30 minutes, reading to 1 minute. Vernier moved by clamp and tangent motion. Vernier arm equipped with 2 sets of lenses and reflecting plates, for north or south declination.

Hour Circle: On drum around base of polar axis, graduated on silver to 5 minutes of time, figured 12 to 1 both ways, read by index on declination arc.

Weight: About 10 ounces.

Price: Code word ASHIK. Price \$100.00.



No. 63 Precise Transit with Burt Solar Attachment

Price (ABFET-ASHIK) \$450.00



Telescopic Solar Attachment

The Telescopic Solar is a device for quickly locating true north with a transit. It consists of an auxiliary telescope mounted on a horizontal axis parallel to, but independent of the axis of the transit telescope. In taking a sun observation with this device, three settings are necessary.

Time is set by rotating the telescope in collars about its own axis, and setting off the hour on a graduated drum around it.

The Declination of the Sun is set on the Declination Arc by a vernier which is moved by a slow motion screw. The arm on which the vernier moves, pivots on the telescope, tilting a mirror at the objective end of the telescope, and reflecting the sun's image into it.

The Latitude in which the survey is made, is set off by vernier on a fixed arc fastened to the telescope and movable by a clamp and tangent.

The telescope contains three parallel horizontal cross-wires, the two outside wires spaced to be just less than the apparent diameter of the sun. Two movable darkeners in the eyepiece make direct observation possible in bright sunlight.

Easy adjustment between the auxiliary and main telescopes is provided for by a triangular shaped mounting, the three adjusting screws being so placed that they make a right angle.

This device is invaluable for surveys requiring frequent checking of azimuth, since once set, the transit may be used independent of the auxiliary telescope, and without disturbing its setting. With the Telescopic Solar, also, the sun may be observed through light clouds, permitting it to be used more of the time than solar attachments requiring bright sunlight.

The Telescopic Solar is a permanent addition to the transit, and cannot be removed without destroying the adjustment. It can only be added to a new transit.

Specifications of Telescopic Solar Attachment

(Buff Patent No. 1,190,719)

Telescope: 7 inches long, with platinum cross wires spaced to be slightly less than sun's image. Focuses by draw motion, eyepiece focuses by spiral motion. Equipped with two darkeners for different intensity of sunlight. Telescope rotates in collars.

Support: Horizontal spindle supported by triangular shaped plate, fastened to transit standards, and readily adjustable by turning opposing capstan head nuts.

Time Scale: Set off by index on silver drum around telescope. Drum reads to 5 minutes, figured 0 to 6 two ways.

Declination Arc: Silver, fastened to telescope, reading by vernier to one minute. Set by clamp and tangent.

Latitude Arc: Moves with telescope. Graduated on silver. Vernier fastened to base plate, reading to one minute. Set by clamp and tangent.

Weight: Of Solar Attachment, 4 lbs., to be added to weight of transit.

Price: Code Word ABAOX. Price \$175.00

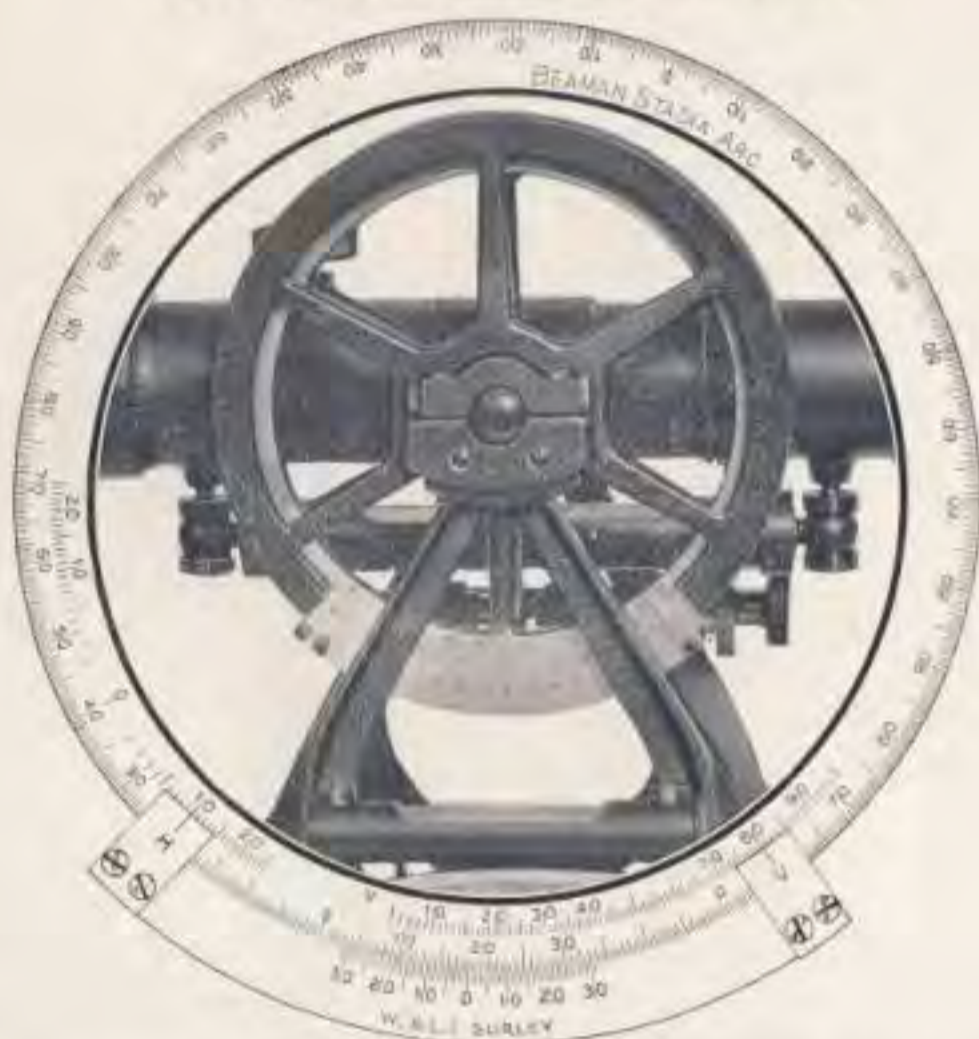


No. 92 Precise Transit with Telescopic Solar Attachment

Price (ABOLA-ABAOX) \$515.00



The Beaman Stadia Arc



*Beaman Stadia Arc, applied to the Vertical Circle of a Transit.
Inset shows No. 62-B Transit with Beaman Arc.*

The Beaman Stadia Arc is a rapid and exact mechanical solution of the stadia problem. By the use of this arc, precise differences in elevation and reduced horizontal distances can be determined with great rapidity and without the intricate calculations heretofore necessary. Since all computations are those of multiplication, addition and subtraction, they can be made in the field at the time of taking the notes and the reduction of stadia measurements by means of tables, slide rules or diagrams is entirely eliminated.

The Beaman Stadia Arc is the original method of mechanical stadia reduction and was devised and patented by W. M. Beaman, a topographer in the United States Geological Survey. It was thus developed out of the needs of practical and experienced men who have used it extensively in the topographical surveys made by this Bureau. The Beaman Stadia Arc has been manufactured by W. & L. E. Gurley, who, in 1906, introduced it on Gurley Transits and Alidades. The simplicity and convenience of this attachment have done much to popularize stadia surveying.

In ordering, specify by adding suffix-letter B, as No. 62-B, or by code word ARPAL. Price \$15.00

Service Booklet, "H" *Stadia Surveying and the Beaman Stadia Arc* sent free on request.



Optional Magnifying Power

An entirely new feature of the new Gurley telescopes is the design of the optical system that makes it possible to interchange any one of four eyepieces of different focal lengths in any erecting telescope. Since magnifying power is the ratio between the focal length of the objective lens and the focal length of the eyepiece, any one of four different magnifications is readily available with any length of telescope.

Low magnification has a usefulness not always realized. Under poor light and atmospheric conditions, targets can be seen better with low-power than with high power telescopes. This is because high magnifying power diffuses the image over a proportionately larger area of the eye, regardless of the light conditions, so that when light is poor, the brilliance of the image is considerably decreased.

Ordering an extra eyepiece with a new Gurley Transit adds greatly to its usefulness. The low magnifying power will be found valuable when the transit is used in the late afternoons, on overcast days, indoors, in the woods, or in work underground. Where sights are taken through heat waves, too, low magnifying power aids vision by reducing the "boiling" effect of the air. High magnification is most useful when light is too strong, as in the snow in winter.



Interchangeable Eyepiece

These eyepieces can be easily interchanged in the field by unscrewing one eyepiece and substituting another. The change does not affect adjustments, though care must be taken to keep wind and dust from the cross-wires. If specified when ordering the instrument, extra eyepieces will be added to the transit equipment for \$25.00 each, or any other eyepiece will be substituted for the one regularly on the instrument. *Erecting eyepieces cannot be used in inverting telescopes, however, nor is it possible to use interchangeable eyepieces in any but new transits.*

The following table lists the magnifications possible with these interchangeable eyepieces. The most generally suitable magnification (regularly supplied with the telescope) is marked by heavy figures.

Erecting Telescopes

Telescope Length (inches)	Focal Length Objective Lens (m/m)	Magnification with Eyepieces of the following focal length			
		(ABRUP) 7 m/m	(ABRUS) 8 m/m	(ABOEF) 10 m/m	(ABOEL) 12 m/m
13½"*	247 m/m	35x	31x	24½ x	20½ x
12½"	232 m/m	33x	29x	23x	19½ x
10"	174 m/m	25x	22x	17½ x	14½ x
8½"	134 m/m	19x	17x	13½ x	11x

* Erecting telescope for *Hell Gate* Transits. Has large aperture.

Inverting Telescopes

Telescope Length (inches)	Focal Length Objective Lens (m/m)	Magnification with Eyepieces of the following focal length		
		(ABHEW) 9 m/m	(ABHIJ) 11 m/m	(ABHID) 18 m/m
12¾"*	285 m/m	31½ x	26x	16x
10"	232 m/m	26x	21x	13x
8¼"	191 m/m	21x	17½ x	10½ x

* *Hell Gate* Transit with Inverting Telescope. Has large aperture.

Price of Extra Eyepieces, each \$25.00



Extras and Attachments

The Gradienter is an attachment which may be added to any transit for measuring distances, establishing grades, or reading the fractional parts of the V scale divisions of the Beaman Stadia Arc.

By turning the Gradienter screw one full revolution, the cross-wires will move over a distance of 1 foot on a vertical rod held 100 feet from the transit. This ratio of 1:100 is used in measuring distances and in setting off the slope of streets, sewers and other graded areas.



The Gradienter screw carries a drum, divided into 100 equal parts, figured each 10th division. Complete revolutions are counted as they pass a fixed index, and fractional parts are read opposite the index on the graduated drum. The Gradienter screw fits into a bushing which is eccentric in its frame, so that by turning the bushing the screw can be raised or lowered, to press upon different points of the axis arm. This adjustment makes possible a high degree of accuracy in the Gradienter.

When ordering, specify by suffix-letter "G," as No. 62-G, or by code word ARRAM. Price \$18.00

The Cross-Wire Reflector is an elliptical-shaped piece of highly polished metal, fastened at 45° to a transit sunshade. The



opening in the center allows full use of the telescope, while the cross wires are illuminated by reflection from a light held to one side of the polished surface.

Price (ARTOT) \$15.00

The Eyepiece Cap with Darkener is a desirable attachment for transits used in taking direct observations on the sun for obtaining the true meridian. The darkener glass is swung over the opening when making observations.

Price (ABOIZ) \$3.00



Eyepiece Cap with Darkener



Extras and Attachments



Diagonal Prism attached to the Eyepiece of a Transit

The Diagonal Prism can be screwed to the eyepiece of a transit in place of the eyepiece cap. It is used when it is necessary to observe greater vertical angles than can be taken with an ordinary telescope. It is particularly useful for sun observations and for this purpose, is equipped with a darkener which swings over the opening, making direct sights possible. The circular plate to which the prism is attached turns easily in the cap, so that the prism may be rotated without unscrewing it.

Price _____ (ARWET) \$12.00

The Elbow Eyepiece is used for zenith observations and for mining work. It is an adaptation of the Diagonal Prism as attached to the eyepiece of a transit for observing greater vertical angles than can be taken with an ordinary telescope. Perpendicular sights may be taken with the Elbow Eyepiece, however, and it possesses the further advantage that telescopes to which it has been attached will reverse at the eye-end on transits having a compass.

Price _____ (ABOEC) \$50.00



Elbow Eyepiece



Price, per pair _____

Gurley Transits reading finer than one minute are regularly equipped with *Attached Focusing Microscopes*. These are aplanatic triple lenses, magnifying 9x, and possessing unusually good optical properties, with the field of view made small to prevent errors in parallax from oblique readings.

(ABAMO) \$30.00



Optional Modifications of New Transits

The following changes will be made without charge, on new Transits at the time they are ordered:

Bakelite Heads to clamp and tangent screws, when not so supplied. Code Word ABAWA.

Graduations: Horizontal Limb figured 0° to 90° in quadrants, inner row, 0° to 360° outer row. Code Word ABAIP.

Internal Focus Telescope: Bringing anallatic point to center of the telescope, for 10" telescope only. Code Word ABMYF.

Inverting Telescope, of same length as erecting telescope regularly supplied. Reverses both ends on Transit without compass, eye end only on Transits with compass. Will not reverse with prismatic eyepiece attachment. Code Word ABACI.

Magnification: See table, page 141. Other eyepieces may be substituted for the one regularly furnished.

Spurs for Tripod Points, replacing straight tripod point. Code Word ABGYM.

Vertical Arc (half circle), replacing full circle and guard. Change indicated by catalog number. Refer to condensed price list on page with description of Transit.

Attachments and Extras for Gurley Transits

The following list of prices applies only to attachments and extras when they are to be added to a new instrument at the Factory.

Beaman Stadia Arc (specify by suffix letter B, as No. 62-B)	(ARPAL)	\$15.00
Burt Solar Attachment (on transit with vertical arc only)	(ASHIK)	100.00
Control Level on Vertical Circle	(ABNIZ)	15.00
Diagonal Cross-wires (making 90° angle)	(ABADO)	10.00
Diagonal Prism, with darkener, for observing sun	(ARWET)	12.00
Elbow Eyepiece (not on Explorer's Model)	(ABOEC)	50.00
Extra, horizontal, quarter-interval wire, placed in upper field	(ABAFT)	2.75
Extra sensitive vial in telescope level or control level	(ABNIX)	10.00
Eyepiece Cap with darkener glass in shutter	(ABOIZ)	3.00
Gradiometer (specify by suffix letter G as No. 132-G)	(ARRAM)	18.00
Magnifier with jointed arm for reading vernier, each	(ASBID)	8.00
Micrometer Shifting Center (see under "Mining Transits")	(ABOEW)	25.00
Microscopes, focusing, 9x, for reading verniers per pair (not on Explorer's Model)	(ABAMO)	30.00
Mining Telescope, interchangeable side or top positions	(ABANI)	100.00
Reflector for illuminating cross-wires	(ARTOT)	15.00
Reversion vial in Telescope Level	(AROBS)	15.00
Rim-Graduated Vertical Circle with guard, in place of side-graduated circle (not on Explorer's Model)	(ABOJA)	25.00
Short Focus Attachment (from 20 inches to infinity)	(ABOEP)	30.00
Sole Leather Carrying Case for instrument box	(ABASP)	25.00
Special Graduations		
Graduation of Horizontal Limb to read to 30 seconds	(ASCOG)	15.00
Graduation of Horizontal Limb to read to 20 seconds	(ABALE)	25.00
Graduation of Vertical Limb to read to 30 seconds	(ASELS)	10.00
Graduation of Vertical Limb to read to 20 seconds	(ABAOV)	20.00
Special Outside Packing Box with hinge cover and padlock	(ABGYI)	20.00
Three Screw Leveling Head replacing 4-screw head	(ABMYC)	25.00
Two Vernier Vertical Circle with control level and guard	(ABNAV)	65.00
Tripods:		
No. 402 Standard Tripod with 57 inch fixed-length legs	(ABHAH)	20.00
Fixed-length leg only	(ABPYC)	4.25
No. 402-S Extra-heavy Standard Tripod, with 57 inch fixed-length legs	(ABGYG)	25.00
No. 407 Standard Tripod with extension legs, opening to 57", closing to 36"	(ABHAJ)	25.00
Extension leg only	(ABPYF)	6.00
No. 409 Mining Tripod with extension legs, opening to 36", closing to 22"	(ABGYL)	25.00
Waterproof Hood	(ABBOS)	1.25



Comparative Dimensions of Gurley Transits

Catalog Numbers	No. 10 Series Precise Transits "Hell Gate"	No. 20 Series Precise Transits "Hell Gate"	No. 30 Series Precise Transits "Municipal"	No. 40 Series Precise Transits "Master"	No. 50 Series Precise Transits "Engineer's"	No. 60 Series Precise Transits "Standard"	No. 90 Series Precise Transits "Light Mountain"	No. 120 Series Precise Transits "Explorer's"	No. 130 Series Light Weight Transits "Engineer's"	No. 100 Series Light Weight Transits "Reconnaissance"
Horizontal Limb—Diameter	7.00"	7.00"	7.00"	6.25"	6.25"	6.25"	5.65"	4.00"	6.25"	5 1/8"
Divided to	10 min.	10 min.	15 min.	20 min.	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.
Reading to	10 sec.	10 sec.	20 sec.	30 sec.	1 min.	1 min.	1 min.	1 min.	1 min.	1 min.
Telescope—Length	12 3/4" Inv.	13 1/2"	12 1/2"	12 1/2"	12 1/2"	10"	8 1/2"	6 1/2"	10"	8 1/2"
Magnification	26x	31x	29x	29x	29x	22x	19x	16x	22x	19x
Aperture of Objective	1.93"	1.93"	1.37"	1.37"	1.37"	1.37"	1.19"	.7"	1.37"	1.19"
Resolution of Objective	2.7 sec.	3 sec.	4 sec.	4 sec.	4 sec.	4 sec.	5 sec.	8 sec.	4 sec.	5 sec.
Focal Length	11.2"	9.8"	8.8"	8.8"	8.8"	7.00"	5.75"	4"	7.00"	5.75"
Field of view	1.5 deg.	1 deg.	1.4 deg.	1.4 deg.	1.4 deg.	1.3 deg.	1.5 deg.	1.8 deg.	1.3 deg.	1.5 deg.
Minimum Focus	9 ft.	7 1/2 ft.	6 ft.	6 ft.	6 ft.	5 ft.	4 1/2 ft.	5 1/4 ft.	5 ft.	4 1/2 ft.
Telescope Level—Length	6.00"	6.00"	5.00"	5.00"	5.00"	6.00"	5.00"	3.00"	6.00"	5.00"
Sensibility	10 sec.	10 sec.	20 sec.	30 sec.	40 sec.	40 sec.	40 sec.	50 sec.	40 sec.	40 sec.
Side Vial—Length	3.00"	3.00"	3.00"	3.00"	3.00"	3.00"	3.00"	1.1"	3.00"	3.00"
Sensibility	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.
Transverse Vial—Length	3.00"	3.00"	3.00"	1.8"	1.8"	1.8"	1.8"	1.1"	1.8"	1.8"
Sensibility	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.
Spacing of All Vial Graduations	2 mm.	2 mm.	2 mm.	2 mm.	2 mm.	2 mm.	2 mm.	2 mm.	2 mm.	2 mm.
Compass—Graduations	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	1 deg.	30 min.	30 min.
Length of Needle	3 3/5"	3 3/5"	3 3/5"	3 3/5"	3 3/5"	4"	4"	2 1/8"	3 3/5"	3 3/5"
Vertical Limb—Diameter	5"	5"	5"	5"	5"	5"	5"	4"	5"	5"
Divided to	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.
No. of Verniers	1	1	1	1	1	1	1	1	1	1
Reading to	1 min.	1 min.	1 min.	1 min.	1 min.	1 min.	1 min.	1 min.	1 min.	1 min.
Movement of Shifting Center	1.00"	1.00"	1.00"	.72"	.72"	.72"	.72"	.43"	.72"	.72"
Tripod Furnished	No. 4025	No. 4025	No. 4025	No. 402	No. 402	No. 402	No. 407	No. 411	No. 402	No. 407
Length of Tripod Legs	57"	57"	57"	57"	57"	57"	34"-57"	34"-56"	57"	34"-57"
Average Weight, with Compass	20 1/2 lbs.	20 1/2 lbs.	17 1/2 lbs.	14 lbs.	14 lbs.	13 1/2 lbs.	9 lbs.	6 3/4 lbs.	9 3/2 lbs.	8 lbs.
Average Weight, without Compass	19 3/4 lbs.	20 lbs.	16 3/4 lbs.	13 3/5 lbs.	13 3/5 lbs.	13 lbs.	8 3/4 lbs.	9 lbs.	7 1/2 lbs.	7 1/2 lbs.
Weight of Tripod	14 1/2 lbs.	14 1/2 lbs.	14 1/2 lbs.	11 1/2 lbs.	11 1/2 lbs.	11 1/2 lbs.	11 1/2 lbs.	6 lbs.	11 1/2 lbs.	11 1/2 lbs.
Shipping Weights:										
Transit and Tripod (2 pkgs.)										
Domestic	85 lbs.	85 lbs.	80 lbs.	80 lbs.	80 lbs.	50 lbs.	50 lbs.	40 lbs.	45 lbs.	45 lbs.
Foreign	125 lbs.	125 lbs.	115 lbs.	115 lbs.	115 lbs.	110 lbs.	110 lbs.	75 lbs.	100 lbs.	100 lbs.



Condensed Price List of Gurley Transits Order by Catalog Number and Code Word

Diameter of Horizontal Limb	Verniers Read to	Length of Telescope	Transits With Compass			Transits Without Compass		
			with Telescope Level	with Tel. Level, Full Circle and Guard	with Tel. Level and Half Circle	with Telescope Level	with Tel. Level, Full Circle and Guard	with Tel. Level and Half Circle
*7.00 inches	10 seconds	12¾ inches Inverting	Cat.No.11 \$556.00 ABERN	Cat.No.12 \$581.00 ABERO	Cat.No.13 \$581.00 ABERT	Cat.No.16 \$531.00 ABESK	Cat.No.17 \$556.00 ABESU	Cat.No.18 \$556.00 ABETE
*7.00 inches	10 seconds	13½ inches Erecting	Cat.No.21 \$556.00 ABSOD	Cat.No.22 \$581.00 ABSOH	Cat.No.23 \$581.00 ABSOJ	Cat.No.26 \$531.00 ABSOR	Cat.No.27 \$556.00 ABSOT	Cat.No.28 \$556.00 ABSOV
7.00 inches	20 seconds	12½ inches	Cat.No.31 \$405.00 ABOSI	Cat.No.32 \$430.00 ABOSK	Cat.No.33 \$430.00 ABOSU	Cat.No.36 \$380.00 ABOUK	Cat.No.37 \$405.00 ABOUG	Cat.No.38 \$405.00 ABOUF
6.25 inches	30 seconds	12½ inches	Cat.No.41 \$380.00 ABOUP	Cat.No.42 \$405.00 ABOUS	Cat.No.43 \$405.00 ABOUY	Cat.No.46 \$355.00 ABOWK	Cat.No.47 \$380.00 ABOWL	Cat.No.48 \$380.00 ABOWM
6.25 inches	1 minute	12½ inches	Cat.No.51 \$335.00 ABOPO	Cat.No.52 \$360.00 ABOPS	Cat.No.53 \$360.00 ABOPU	Cat.No.56 \$310.00 ABORN	Cat.No.57 \$335.00 ABORO	Cat.No.58 \$335.00 ABORT
6.25 inches	1 minute	10 inches	Cat.No.61 \$325.00 ABFEN	Cat.No.62 \$350.00 ABFER	Cat.No.63 \$350.00 ABFET	Cat.No.66 \$300.00 ABFIF	Cat.No.67 \$325.00 ABFIG	Cat.No.68 \$325.00 ABFIL
5.65 inches	1 minute	8½ inches	Cat.No.91 \$315.00 ABOKI	Cat.No.92 \$340.00 ABOLA	Cat.No.93 \$340.00 ABOLB	Cat.No.96 \$290.00 ABOLI	Cat.No.97 \$315.00 ABOLM	Cat.No.98 \$315.00 ABOLP
*4.00 inches	1 minute	6½ inches		Cat.No.122 \$325.00 ABA EK	Cat.No.123 \$325.00 ABA EN			
6.25 inches	1 minute	10 inches	Cat.No.131 \$275.00 ABGOD	Cat.No.132 \$300.00 ABGOH	Cat.No.133 \$300.00 ABGOJ	Cat.No.136 \$250.00 ABGOT	Cat.No.137 \$275.00 ABGOX	Cat.No.138 \$275.00 ABGOZ
5½ inches	1 minute	8½ inches	Cat.No.101 \$225.00 ABGAW	Cat.No.102 \$250.00 ABGED	Cat.No.103 \$250.00 ABGEH	Cat.No.106 \$200.00 ABGEN	Cat.No.107 \$225.00 ABGER	Cat.No.108 \$225.00 ABGET

*Also furnished with 2-Vernier Vertical Circle and other special attachments

Hell Gate Model—No. 14, 7" Limb, etc., with Compass	(ABERU)	\$725.00
No. 19, 7" Limb, etc., without Compass	(ABETO)	700.00
No. 24, 7" Limb, Erecting Telescope, etc., with Compass	(ABSOK)	725.00
No. 29, 7" Limb, Erecting Telescope, etc., without Compass	(ABSOZ)	700.00
Explorers Model—No. 124, 4" Limb, etc., with Compass	(ABAGU)	405.00



How to Order and Other Information

Address Main Office, Troy, N. Y.

Address all correspondence and orders to our Main Office and Factory, Troy, N. Y.

An extensive stock of instruments and supplies is maintained at Troy so that prompt service can be given.

A New York City Sales Office is located at 49 Chambers Street, where a stock of the most popular instruments is available for inspection and immediate delivery.

All orders are immediately acknowledged, showing how we expect to fill your order. Do not confuse this order acknowledgment with the invoice, which is mailed at time of shipment.

If further correspondence relative to your order is necessary, always refer to our order number.

Order Blanks

An order blank is sent out with each catalog. Additional blanks, if wanted, will be sent upon request. If at any time you have no order blanks, write your order on any paper.

Orders by individuals sent on firm stationery, should state whether the charge is to be made against the firm or against the individual.

Orders by firms should be made out on the regular firm order forms, and signed by an authorized individual. If invoices on your own special forms are required, kindly send forms with your order.

Telegraph Orders

Many parts and attachments have corresponding code words. Add these code words to the code word of the instrument, when such parts and attachments are desired.

Confirm all telegraph and cable orders with a written order.

Order by Catalog Number and Name

Written orders should give the catalog number and name of the instrument. Where no catalog number exactly covers what you want, give us full particulars as possible, so as to avoid the delay of writing you for further information.

The wide variety of Gurley Instruments and the interchangeability of many of their parts, offers opportunity for "special purpose" instruments to be made up. When ordering such instruments, give complete description and sketches. Orders for special instruments, which cannot be made from standard parts, cannot be accepted.

No Charge for Packing

Special attention is paid to the packing of all goods for shipment. Instruments should reach their destination in perfect adjustment. The instrument cases are carefully wrapped and are packed in corrugated board cartons lined with excelsior. This type of packing is nearly damage-proof and greatly reduces shipping charges. Export shipments which go by steamship have the instrument cases wrapped in water-proof paper and packed in wire-bound and cleated boxes stuffed with excelsior. Instructions regarding private markings are carefully followed.

Terms of Payment

CASH WITH ORDER: Customers who have not established their credit with us, should send their remittance (including postage and insurance), with their order. Remittance can be sent in any of the following ways:

1. Post Office Money Order.
2. Express Money Order.
3. Bank Draft.
4. Cash by Registered Mail.

If on a rural route, give letter containing order and money to the carrier who will buy a money order at the post office and forward it with your order.

C. O. D. SHIPMENTS: When the money does not accompany the order, and when credit information is not available to us, goods will be shipped C. O. D. A small charge is made by the post office or express company for returning money on such shipments. Such charges for orders amounting to less than \$20.00 are to be paid by the customer; over this amount we pay the charges. Shipments made C. O. D. are no reflection on the credit of the customer, but in the absence of sufficient credit information, this method enables us to give more prompt service.

HOW TO OPEN AN ACCOUNT: Those desiring to open an account with us should write stating the approximate amount of credit desired, and give the names of three firms with whom they are doing business, also the name of the bank handling their account. As time is required to investigate such references, this should be considered when placing your order. For prompt action on urgent orders, furnish the above data by wire. Customers who have established their credit with us, will be billed 30 days net cash.

Transportation Charges

All transportation charges are to be paid by the customer.

When goods are to be shipped by parcel post, be sure to include with your remittance to pay for goods, additional money to pay for postage. Do not send stamps for this purpose.

When goods are to be shipped by express and there is no express agent at your nearest railroad station, it is necessary that you state the nearest town at which there is an agent. You pay the charges when the shipment reaches you. Be sure to give your shipping point if it is different from your post office address.

We do not recommend shipping instruments by freight.

Special Shipping Instructions

If you want goods shipped to someone else, or if your shipping point is not the same as your post office, be sure that this information is clearly noted on your order.

Change of Address

Customers who contemplate changing their address will confer a favor by sending us both their old and new addresses, so that our mailing files may be revised accordingly.

Guarantee

No transaction is ever considered closed where any dissatisfaction is known to exist on the part of the customer, who is assured of courteous and fair treatment without regard to the extent of his business.

Come to the Gurley Factory

Many visitors come to the Gurley Factory, civil and military engineers, public officials and private surveyors, from all parts of the world—Australia, Canada, China, Cuba, Egypt, India, Japan, Mexico and South America. Troy is only 6 miles by train or by trolley from Albany, N. Y., a main-line stop on the New York Central Railroad. Stop off for a day with us or drop in while touring through.

Visitors to the Gurley Factory receive a warm welcome. A no more convincing demonstration of the care and skill used in making Gurley Instruments can be had than that of witnessing for yourself the resources of the Gurley organization. See in one plant all of the operations—casting, drawing, heat treating, machining, grinding, dividing, lens grinding, painting and lacquering, cabinet making, assembling and inspecting—that go to make up fine instruments. Note the character and ability which is apparent in the Gurley workmen. You will be interested in the modern mechanical equipment which has increased the accuracy of parts. You will go away with the feeling that Gurley can serve you promptly and to your liking.

Gurley Products

Surveying Instruments

Transits, Levels, Compasses, Alidades, Plane Tables, Rods, Plummets, Hand Levels, Chains and Field Supplies.

Hydraulic Engineering Instruments

Daily, Weekly, Graphic and Long Distance Water Level Recorders, Water Level Indicators, Hook Gages and Price Type Current Meters.

Standard Weights and Measures

Precision Weights, Measures, Balances and Inspectors Equipment.

Descriptive bulletins sent on request.

W. & L. E. Gurley
Troy, N. Y., U. S. A.

GURLEY LEVELS

Pages 200 to 299

GURLEY LEVELS



**SOMETHING
NEW**

**IN
LEVELS!**

*Announcing a new Gurley Level for precise work.
Of especial interest to Municipal Engineers.*

See pages 206 - 207.

Bulletin No. 200

Revised November 1, 1930

Subject to change without notice.

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Main Office and Factory, Troy, N. Y.

New York City Sales Office, 49 Chambers Street



Gurley Levels

STANDARD! Used by preference by Engineers everywhere. Regardless of the type or make of transit a man uses, he owns, works with, and depends upon his Gurley Engineers Level. This liking for the Gurley instrument is not at all a matter of prejudice, it is based on service given. The Gurley Level *stands up*, it takes



49 years of service in the inspecting of Gurley Levels is the record of William A. Bastedo. A real reason for their unquestioned reputation.

the hard knocks of average use and stays accurate, holds its adjustment. The proof is most convincingly demonstrated by the great number of engineers who come back time and again. If their instruments had given anything less than perfect satisfaction, another make might have been worthy of trial — but no, once a Gurley user, always a Gurley enthusiast.

There are very definite reasons for the superiority of the Gurley Level. Balance of design and the experience gained in 85 years of fine instrument making are responsible for their quality. Beyond the matter of design, however, and of even greater importance, is the value of the inspection and adjustment of every instrument. Every Gurley Level must meet the absolute approval of a master instrument maker who is satisfied to release an instrument only when he knows from personal inspection that every part is exactly "right". His final adjustment has the fineness that comes only from years of experience.

There is nothing new about the superiority of the Gurley Level. Its performance for 85 years is the best recommendation any instrument could have. It has long been the standard by which others are judged.

You have the right to expect real service from your instrument. You may expect to get it if you have chosen the Gurley Level.



Details of Construction



Cross-section of the Gurley Wye Level

TELESCOPE: When you first look through the new Gurley telescopes, you will notice at once the clearness and distinctness of the image, and the fact that the field is sharp and clear up to the very edge. The ability to distinguish fine detail, and the high illumination when light is poor, make it easy to use the telescope under all conditions.

These optical qualities were basic in designing the lens system, with the purpose of making a telescope which could be kept in continued use without eyestrain. Since the lenses are completely manufactured in the Lens Department of the Gurley Factory, they can be tested at each step, so that every lens will be up to these high optical standards.

Sights at short focus are as accurate as distant ones, due to the telescope construction. The objective slide runs in two babbitt bearings, the front one fixed, the rear, adjustable so that the line of collimation is correct in any position in which the slide is run. Another reason for accuracy is given by heat-treating the slide to remove the internal strains from the metal before any machining is done on it. This prevents warping after the parts have been assembled.

The cross-wires are platinum, which gives a fine, even, black line, and does not sag in damp weather.

TELESCOPE LEVEL: Permanence of adjustment is assured by the



The Gurley Level Tester measures the sensitiveness and uniform running of the level bubble.

design of the telescope level. The vial is set in a brass case, supported by substantial posts, and positively adjusted by opposing capstan nuts. Since the parts are fitted together without strain or distortion, the adjustment is likely to be held accu-



ately for a long period of time. The selection of a level vial which is of practical sensitiveness, but with a bubble which will stop moving reasonably quickly, has been worked out with great care and is the result of the experience of many engineers. Diameter and curvature of vial, the liquid mixture, the fineness of grinding, and the selection of a workable length of bubble under a wide range of temperatures, are all combined to produce a level vial which makes it easy to get the best results with the instrument. The sensitiveness selected is commensurate with the size and purpose of the instrument.

Although extra-sensitive vials are sometimes ordered, work with such an instrument is necessarily slower, since the more sensitive the vial, the longer it will take for the bubble to stop moving.

CENTERS: The Gurley Wye Level has been made since 1845. A few of the original model are still in service, still a larger number have records of from 50 to 65 years. Although most engineers prefer to modernize their equipment more often, this is an indication of the service which can be expected if reasonable care is taken.

Accuracy over a long period of use results from the long tapering form of the spindle and socket, the materials used, and the care used in fitting them together.

LEVELING HEAD: You can adjust the level to micrometer exactness with the leveling screws. This is possible because of the distance between the leveling screws, the diameter of their heads, and the pitch of the threads. In addition, cramping of the centers by using unequal pressure is impossible with this leveling head, since the shape of the four-arm piece gives great rigidity and bending resistance. There can be no side slip or distortion when set up at an angle, since the opposing pairs of leveling screws are accurately aligned with the half ball.



Electric Furnace for Heat Treating

HEAT TREATING: The parts of Gurley Levels are scientifically aged before any work is done on them. In order to assure the permanence of adjustment of the instrument, the metals must have reached molecular stability. This process, which formerly took months to accomplish, is now finished overnight in an electric heat treating furnace which removes the internal

strains, and insures that the parts will not change their shape after they have been machined. This contributes an additional reason for the ability of the Gurley Level to retain adjustments for a long period of time, and under hard service.

W. & L. E. GURLEY, TROY NEW YORK



METALS: In selecting the metals to be used, Gurley enlisted the cooperation of skilled metallurgists having extensive laboratory facilities, who, with the best American makers of non-ferrous alloys, specified a new alloy as being best suited for the manufacture of precise instruments. This exceedingly tough and long wearing metal is cast in the Gurley Foundry. Some pieces which receive special wear are made of Everdur, a new alloy having unusual hardness and high strength.

The No. 380 Dumpy Level and No. 385 Tilting Level are made largely of Lynite, a light weight, high strength alloy of aluminum, which has had eight years of field service in the more recent models of Gurley Transits.

PACKING: With the Gurley method of packing, you can be sure that the instrument will be in adjustment and ready to use, even after it has been carried in all positions and over rough roads. This method of packing means individually fitting each instrument into a top-opening mahogany box, which supports each part, leaving no part free to move. It is not necessary to clamp the set screws when the instrument is packed this way. The box provides the safest and best place to carry the instrument.

FINISH: Telescope, bar, and leveling head are finished a durable, dark green morocco, which does not reflect sunlight; the screws and small parts are finished bright yellow lacquer.

TRIPOD: The No. 402 Standard Tripod furnished with all Levels except the Architects model, is a recent design, which tests show to be 50% more rigid than any other on the market. The tripod legs are made of ash, and are fastened to the head by large diameter bolts, and large wing nuts, for easy clamping. An extension tripod can be furnished for \$5.00 extra. Spurs on the tripod legs will be furnished free of charge, if requested.

The tripod thread is a new, coarse, long-wearing form, which allows detaching the instrument with only $2\frac{1}{2}$ turns. Since January 1st, 1930, all new Gurley Transits and Levels, except the Explorers and Architects sizes, have been equipped with this improved thread, which will not interchange with older models. Engineers who wish to take advantage of this improvement, by changing over their present instrument equipment, will receive full particulars on request.



No. 402 Standard Tripod with insert showing connection of leg to head.



Gurley Micrometer Reversible Level

A Simplified Instrument for Precise Work



*15" Telescope, 36x
(24x or 41x optional)
Code Word, ABGUD
Price, \$325.00*

*Accurate
Self-checking
Rapid, simple operation*

No. 370 Gurley Micrometer Reversible Level



Gurley Micrometer Reversible Level

A Simplified Instrument for Precise Work

Precise leveling, such as required for the accurate setting of bench marks on large construction projects, and for municipal leveling, has created a need for more accurate instruments than the usual wye or dumpy level. The No. 370 Gurley Level is a new instrument, developed especially for this class of work. It possesses several features of design which make it an unusually rapid and accurate instrument in use.

The telescope can be leveled independently of the centers, by means of a slow motion micrometer screw which tilts the bar and telescope. In use, therefore, the leveling screws are used for approximate leveling only. The remaining adjustment of the telescope is made for each sight, by turning the micrometer screw at the eyepiece end of the bar. The micrometer drum is divided into 50 parts, two full revolutions indicating one percent of grade, so that gradients can be set with the level.

Ease of making and checking the level vial adjustment results from mounting a reversion vial at the side of the telescope. The image of the bubble is reflected by a hinged mirror over the vial, so that it can be observed for each sight, without moving from the eyepiece end of the instrument. The adjustment can be checked very easily by leveling the telescope, rotating it 180° in its wyes, and noting the position of the bubble on the other side of the vial. Even if the vial is not in adjustment, accurate work can be done by reading the rod both before and after rotating the telescope, the correct reading being the mean of the two.

Engineers engaged in all sorts of accurate leveling will appreciate the speed and ease of use, the accuracy of results, and the convenience, compactness and moderate weight of the Gurley Micrometer Reversible Level.

Specifications

CENTERS: Lynite spindle in bronze socket. Frictionless, non-cutting and long wearing.

LEVELING HEAD: Four-screw type, nickel alloy screws with Bakelite heads, fitted in replaceable brass bushings.

TELESCOPE: 15 inches long, erecting, magnifying 36x (24x, or 41x, optional), 1.37 inches aperture, minimum focus 6½ feet. Platinum cross-wires. Adjustable stops allow rotating telescope exactly 180° in bearings.

LEVEL VIALS: Telescope level mounted on side of telescope, having lateral and vertical adjustment by opposing capstan nuts. Reversion level vial 5 inches long, graduated every 2 mm., on top and bottom, sensitiveness 10 sec. per graduation. Hinged reading mirror mounted above vial. Small circular level mounted on leveling head, serving for approximate leveling of instrument.

PRICE: No. 370 Micrometer Reversible Level.

BAR: Telescope supported in fixed wye bearings. Bar pivoted in center, can be tilted by micrometer screw. Micrometer screw drum divided into 50 parts, two full revolutions indicating one percent of grade.

CLAMP AND TANGENT: New balanced clamp, moves with telescope. Flat leaf type tangent spring. Clamp and tangent screw heads of Bakelite.

FINISH: Durable, dark green morocco; small parts dull nickeled.

EQUIPMENT: Side-opening mahogany box, 17" x 10½" x 6", with lock and handle, adjusting pins, screw driver and instructions for adjustment and care.

TRIPOD: No. 402-S extra heavy, extra rigid tripod, with fixed length legs, 57" long.

WEIGHT: Of level, 9 lbs.; in box, 16½ lbs.; of tripod, 15 lbs. Shipping weight, level and tripod (2 pkgs.) domestic, 60 lbs.; foreign, 90 lbs.

(Code Word ABGUD) \$125.00



Made in Three Sizes

No. 375, 22" Telescope, 42x
Price, (AKARY) \$225.00

No. 377, 18" Telescope, 32x
Price, (AKDUL) \$215.00

No. 378, 15" Telescope, 26x
Price, (AKGUN) \$205.00

*Accurate
Durable
Retains Adjustments*

Gurley --- The Standard Wye Level



Gurley Engineers Wye Levels

To most Engineers, the Gurley Wye Level is so well known as to need no introduction. The performance of this instrument during the past 85 years has been its best recommendation.

The Gurley Wye Level is made in three sizes. Each model is distinguished by the fine optics of the telescope, the accuracy of the line of collimation, and the practical sensitiveness of the level vials and by the general accuracy and durability of construction, and permanence of adjustment.

No. 377 is the 18-inch telescope, 32 power instrument which most Engineers use. It is the model we recommend for all-around municipal, railroad, highway and construction work.

No. 375, with a 22-inch, 42 power telescope, is frequently preferred for very exacting work.

No. 378, with a short, 15-inch telescope, having a magnifying power of 26x, serves a useful purpose for building construction. The telescope of this instrument does not have the dust guard, and the eyepiece focuses by spiral, rather than by pinion movement.

The principal dimensions of each instrument are listed in the table below. Every level is individually-fitted into a top opening mahogany box, and the prices include a No. 402 Gurley Standard Tripod.

Principal Dimensions of Gurley Engineers Wye Levels

CATALOG NUMBER	375	377	378
Telescope-Length	22"	18"	15"
Magnification	42x	32x	26x
Aperture of Objective	1.37"	1.37"	1.37"
Minimum Focus	12 ft.	8 ³ / ₄ ft.	8 ¹ / ₂ ft.
Centers-Spindle	Steel	Steel	Steel
Socket	Bronze	Bronze	Bronze
Telescope Level-Length	10 ¹ / ₄ "	8 ³ / ₈ "	8 ³ / ₈ "
Sensibility	15 sec.	25 sec.	30 sec.
Tripod Furnished	No. 402	No. 402	No. 402
Weight-Level only	14 ¹ / ₂ lbs.	13 ¹ / ₄ lbs.	11 ¹ / ₂ lbs.
Tripod	11 ¹ / ₂ lbs.	11 ¹ / ₂ lbs.	11 ¹ / ₂ lbs.
Shipping Weight, Level and Tripod (2 pkgs.) Domestic	75 lbs.	65 lbs.	60 lbs.
Foreign	110 lbs.	100 lbs.	90 lbs.
Code Word	AKARY	AKDUL	AKGUN
Price	\$225.00	\$215.00	\$205.00



*The ideal instrument
for highway and con-
struction work.*

*17" Telescope, 26x
Code Word, ABGUT
Price \$175.00*

No. 379 Gurley Dumpy Level



No. 379 Gurley Dumpy Level

The dumpy type of level is being used in increasingly large numbers for highway and other construction work where an instrument is likely to receive unavoidably hard usage. This design, while it does not have the convenience of the wye level in making or checking adjustments, is compensated by the simpler construction, which makes the adjustments more permanent.

In accuracy, durability, and permanence of adjustment, the Gurley Engineers Dumpy Level lives up to the reputation established by the Gurley Wye Level.

Specifications

<p>CENTERS: Steel spindle fitted to bronze socket. Frictionless and non-cutting.</p> <p>LEVELING HEAD: Four-screw type, non cramping. Dust caps to leveling screws.</p> <p>BAR: Trough-shaped, protecting the level vial. Telescope fastened to bar. Ventilating and rain-drain holes in bottom.</p> <p>TELESCOPE: 17 inches long, erecting, magnifying 26x, 1.37 inches aperture, minimum focus, 8½ ft., field, 1½°. Platinum cross-wires.</p> <p>FINISH: Durable, dark green morocco, small parts bright.</p> <p>PRICE</p>	<p>LEVEL: 8¾" long, graduated every 2 mm., sensibility, 25 sec. Positive adjustment by opposing capstan nuts.</p> <p>TRIPOD: No. 402 Standard Tripod, with fixed length legs, 57" long.</p> <p>WEIGHT: Of Level, 13 lbs., of Tripod, 11½ lbs. Shipping Weight, domestic, 65 lbs., foreign, 100 lbs.</p> <p>EQUIPMENT: Top-opening mahogany box, 19½" x 5¼" x 9¾", with lock and strap, adjusting pins, screw driver, and booklet on adjustment.</p>
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(Code Word ABGUT) \$175.00

Attachments and Modifications for Gurley Engineers Levels Nos. 375, 377, 378 and 379

Some of the following *attachments* for Gurley Engineers Levels can be supplied independent of the instrument. The prices for *modifications*, involving changes to the Level, apply only when they are to be added to a new instrument at the Factory.

<i>Level Vial</i> , extra sensitive, value ten seconds to two millimeters (instead of regular vial), extra	(ABEOB)	\$10.00
<i>Horizontal Limb</i> , full circle, 4 in. diameter, graduated to degrees, reading by vernier to 5 minutes, extra	(ABEOC)	25.00
<i>Compass</i> , with needle circle graduated to half degrees, needle 3½ in. long, with stop. Attached on top of telescope and secured with two clamp screws	(ABEOF)	25.00
<i>Mirror</i> , for observing level bubble from eyepiece end of instrument	(ABEOG)	15.00
<i>Reflector No. 166</i> , for illuminating cross wires	(ARVIT)	15.00
<i>Fixed Stadia</i> (added to new level)	(ABADU)	No charge
<i>Disappearing Stadia</i> , extra	(ABELM)	10.00
<i>Waterproof Hood</i> , extra	(ABEOM)	1.25
<i>Sole Leather Carrying Case</i> , to enclose mahogany box	(ABATA)	\$25.00 to 26.00
<i>Special Outside Packing Box</i> with hinged cover and lock, lined inside with rubber cushions, for convenience in reshipping, extra	(ABEOL)	20.00
<i>Extension Leg Tripod</i> , instead of split leg tripod, extra	(ABHAJ)	5.00
<i>Spurs on tripod legs</i>		No extra charge
<i>Sole Leather Case</i> , for extension tripod, extra	(ABAVA)	25.00
<i>Canvas Case</i> with leather mountings, for extension tripod, extra	(ABAVY)	15.00
Tripods:		
No. 402 Gurley Standard Tripod, 1-section legs, with cap, weighing about 11½ lbs.	(ABHAH)	20.00
No. 407 Gurley Standard Tripod, Extension legs, with cap, weighing about 11½ lbs.	(ABHAJ)	25.00



Gurley Dumpy Level

*A Sturdy, Light Weight Level,
for General Engineering or Construction.*



*No. 380
Dumpy Level*

*13" Telescope, 29x
Code Word, ABGUX
Price\$125.00*

This moderate-priced, accurate instrument fills the need for a small, light weight, durable level required for any work where the use of the usual large Wye or Dumpy Level is inconvenient or unnecessary.

The clearness and brilliance of the optical system, with the fact that objects as close as 6 1/2 feet can be focused sharply, adapts this level for use indoors or wherever light is poor.

Engineers engaged on construction work, such as foundations, abutments, retaining walls, piers, track laying, grading for streets and highways, setting steel or reinforcing in buildings or on highways, or in setting machinery, will find a ready use for this new light weight Level.

Specifications

CENTERS: Nickel alloy spindle in Lynite socket. Frictionless and non-cutting.

LEVELING HEAD: Four-screw type, nickel alloy screws with Bakelite heads, fitted into replaceable brass bushings.

TELESCOPE: 13 inches long, erecting, magnifying 29x, 1.37 inches aperture, minimum focus 6 1/2 ft., field 1 1/2°. Platinum cross-wires.

LEVEL: 6 inches long, graduated every 2 mm., sensibility 30 seconds. Positive adjustment by opposing capstan nuts.

PRICE: No. 380 Gurley Dumpy Level

BAR: Lynite, trough construction, affording protection to level tube. Ventilating and rain drain holes in bottom.

FINISH: Durable, dark green morocco, small parts finished bright.

EQUIPMENT: Mahogany box 14" x 6" x 8 1/2" with lock and strap, adjusting pins, screw driver, and booklet on adjustment.

TRIPOD: No. 402 Standard Tripod with fixed length legs, 57" long.

WEIGHT: Of Level, 4 1/2 lbs., in box, 10 lbs., of Tripod, 11 1/2 lbs. Shipping weight, domestic, 34 lbs., foreign, 50 lbs.

(Code Word, ABGUX) \$125.00



Gurley Architects Wye Level
A Small Size Wye Level for Construction Work



*No. 381
 Architects Level*

*12" Telescope, 19x
 Code Word, AJROT
 Price.....\$125.00*

The Gurley Architects Level is a popular model which has found wide use by Architects and Contractors on construction and building work. Engineers and Surveyors have found it an accurate, dependable instrument for laying off grades for streets, sewers, irrigation ditches and drains.

The Architects Level brings to the user the advantages of the Wye Level, in the ease of checking adjustments readily and in repairing for temporary use, even if damaged.

The telescope of the Architects Level is 12 inches long. A horizontal circle, reading by vernier to 5 minutes is useful for laying off angles. The bottom plate is drilled for trivet points so that the instrument may be set up on beams or girders in construction work where it is impossible to use a tripod.

Specifications

- CENTERS:** Long bronze spindle and socket.
- LEVELING HEAD:** Four-screw type, non cramping. Dust caps for leveling screws.
- HORIZONTAL CIRCLE:** 3 inches diameter, graduated to degrees, figured in quadrants, 0 to 90 each way, and reading by vernier to 5 minutes. Can be revolved independently on friction plate.
- BAR AND WYES:** Bar of bronze, shaped for greatest strength in parts most subject to strain. Wyes with adjustable nuts. One wye clip fitted with stop to maintain cross wires in true horizontal and vertical position.
- FINISH:** Durable dark green morocco, small parts finished bright.
- TELESCOPE:** 12 inches long, magnifying 19x, 1.19 inches aperture, minimum focus 6½ ft. Platinum cross wires.
- LEVEL:** 5½ inches long, sensitiveness 50 seconds. Positive adjustment by opposing capstan-head nuts.
- EQUIPMENT:** Mahogany box, 13¾" x 5¼" x 8¼", with lock and strap. Accessories of 6 oz. plummet, screw driver, trivet points, adjusting pins, and booklet on adjustment.
- TRIPOD:** No. 431 Tripod with fixed-length, round legs, 57" long.
- WEIGHT:** Of Level, 7 lbs., in box, 12 lbs.; of Tripod, 7½ lbs. Shipping weight, domestic, 45 lbs., foreign, 65 lbs.

PRICE: No. 381 Gurley Architects Level..... (Code Word, AJROT) \$125.00



Gurley Tilting Level



(Left) A simple turn of a slow-motion screw centers the bubble for running level lines.

(Below) The telescope tilts through 75° for plumbing, or can be clamped for setting grades.



The new Gurley Tilting Level has been designed to supply Contractors and Construction Engineers with an unusually high grade instrument, and has also been extensively used for laying out tracks, pipe line construction, lining up telephone poles, and for laying out sewers and other graded areas.

Since the telescope is not shifted from its bearings, when changing from transit to level work, "Line" and "Grade" can be set from the same point, an advantage in speed and accuracy. A horizontal circle, reading to 5 minutes, makes it possible to lay off the occasional angles called for in construction work.

The Gurley Tilting Level is an accurate, sturdy, light weight instrument, which will give as satisfactory results on construction work as higher priced instruments.

Specifications

CENTERS: Long nickel alloy spindle in Lynite socket. Frictionless and non-cutting.

LEVELING HEAD: Four-screw type, nickel-alloy screws with Bakelite heads, fitted into replaceable brass bushings. Bottom plate drilled for trivet points.

HORIZONTAL CIRCLE: 3½ inches diameter, graduated to degrees, figured in quadrants, 0 to 90 each way, and reading by vernier to 5 minutes. Circle movable on friction plate.

TELESCOPE: 10 inches long, magnifying 22x, 1.37 inches aperture, minimum focus 5½ ft. Optical properties certified to be up to theoretical limit of lens design. Platinum cross wires.

PRICE: No. 385 Gurley Tilting Level

LEVEL VIALS: Telescope level, 6 inches long, sensitiveness 40 seconds. Transverse plate vial, 1.8 inches long. Sensitiveness 60 seconds. Positive adjustment by opposing capstan-nuts.

FINISH: Durable dark green morocco, small parts finished bright.

EQUIPMENT: Mahogany box, 11½" x 6¼" x 10", containing sunshade, screw driver, adjusting pins, trivet points and booklet on adjustment.

TRIPOD: No. 402 Standard Tripod with standard 8-thread tripod head. Fixed length legs, 57" long.

WEIGHT: Of Level, 5½ lbs., in box, 10¾ lbs.; of Tripod 11½ lbs. Shipping weight, domestic 34 lbs., foreign, 50 lbs.

(Code Word ABGUZ) \$140.00

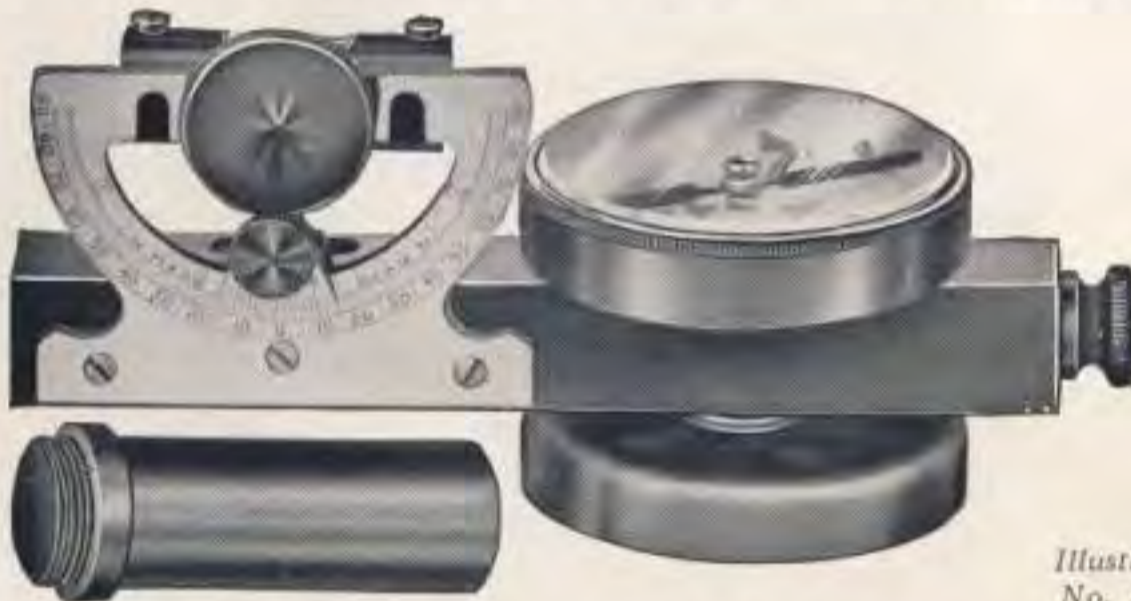


Gurley Hand Levels



Gurley Locke Level

The Gurley Locke Level is simple and durable. It is entirely sealed and is dust-proof. The tube is of brass, finished a dark green morocco. The lens is carefully focused on the bubble for a normal eye, making a draw slide unnecessary. The level vial is adjustable, if ever needed. It is placed partly within the tube, which is a protection and convenience in carrying. No. 643 Gurley Locke Hand Level, in Leather Pouch (AKPOW) \$7.50



*Illustrating
No. 648*

Abney Hand Level with Clinometer

The Abney Level is a modification of the Locke Level combining with it an excellent Clinometer for reading vertical angles. It can be held in the hand or, the main tube being square, it can be applied to any surface. It is graduated in quadrants, 0 to 90 both ways from the horizontal, and is read by vernier to 5 minutes. The inner row of graduations read either in slope ratios or in percentages of grade, as desired. These are read on the side of the index. The Level is furnished with sole-leather sling case. The present models are not made by Gurley.

- No. 646-T Abney Level, reading to 5 min., and with slope ratios (AKSOY) \$21.50
- No. 647-T Abney Level, reading to 5 min., and percent of grade (ABCIM) 21.50
- No. 648 Abney Level, with Compass and Revolving Base, reading to 5 min., and with slope ratios (ABCUV) 30.00

Stadia Hand Level

- No. 649 Stadia Hand Level, 10" telescope, 1" object lens, adjustable eyepiece, magnifying 7x, stadia hairs, ratio 1:100, with ball joint and socket, weight about 1½ lbs., in leather sling case (not made by Gurley) (AKTYE) \$43.00

Gurley Leveling Rods

For the most satisfactory results an accurate Level deserves a good rod. Gurley Rods are made for accuracy and service. The lumber is selected with the greatest care and is thoroughly seasoned in the Gurley Factory. The rod blanks are carefully finished and covered with a waterproof varnish and the rod faces are painted with a white enamel paint. The leveling rod graduations are stamped into the wood. The fittings are substantial, and convenient to use.

Leveling rods, in the Philadelphia pattern, are made in various lengths, and types of construction. Stadia Rods can be had in a variety of designs, either in one piece or folding.

*For complete listing and description,
send for the Gurley Rod Bulletin
No. 500*

No. N-501 2-ply Phila. Rod

Philadelphia graduations, 2 ply, 7.3 ft. closed, sliding to 13 ft. graduated to feet, 10ths, and 100ths, with verniers reading to 1000ths, and with oval Plain Target.

Price (ABAYU) \$15.00
With micrometer target (ABIOX) 18.00
Without Target (ABIPA) 12.00

No. N-505 3-ply Phila. Rod

Philadelphia graduations, 3 ply, 4.5 ft. closed, sliding to 12 ft., graduated to feet, 10ths, and 100ths, without target.

Price (ABIRF) \$16.50

No. N-506 4-ply Phila. Rod

Philadelphia graduations, 4 ply, 3.3 ft. closed, sliding to 11.3 ft., graduated to feet, 10ths, and 100ths, without target.

Price (ABIRL) \$18.00



(Left)
No. N-505
(Right)
No. N-506



No. N-501

Gurley Compasses
Pages 300-399

Gurley Compasses



Bulletin No. 300

Revised October 1, 1930

Subject to change without notice.

Copyright 1929



Main Office and Factory, Troy, N. Y.
New York City Sales Office, 49 Chambers Street



Gurley Compasses

The compass affords the quickest and easiest method of running a traverse in rolling country or through the woods. It is light and portable, and it can be set up, sighted, and read in less time than the transit. Although not so accurate as the transit, good results can be obtained with the compass if used under favorable conditions, and if care is taken to keep the needle sensitive.

Gurley compasses were popular when practically all of the land surveying was done with this type of instrument. They earned an enviable reputation for accuracy, sensitiveness of needle and fine workmanship, qualities which today are characteristic of the present line of Gurley compasses.

The Gurley needle is of the flat bar type, sharply tapering to a vertical edge at each end. It is of uniform cross-section throughout its length, carries a heavy magnetic flux, and has a uniform magnetic field from one end of the needle to the other. The axis of the magnetic field is parallel to the geometrical axis of the needle, so that all needles will read closely alike. Since the needle is neither forged nor annealed, it does not contain numerous hard spots



Gurley needles and center pins are finished by a craftsman of 40 years experience.

which set up local magnetic centers counter to the magnetism of the needle itself, and it is made of hard chrome magnet steel remarkable for its magnetic retentivity. The needle carries a hardened steel "jewel" or bearing which can be made to a uniform shape and polish and also brought to a sharper point than the agate or sapphire. The center pin is of hardened steel, sharpened and polished to a needle point. As long as care is taken in lowering the needle on the center pin and in raising the needle when carrying the compass, the needle will continue to maintain that quivering sensitiveness which is evidence to the surveyor of an accurate needle.

Gurley compasses are made of non-magnetic alloys free from impurities which might affect the direction of the needle. The graduations are accurately and clearly cut by a dividing engine. They are black-filled, making them easily readable against the silvered face of the compass circle. The divisions, usually to half degrees on the larger compasses and to degrees on the smaller, are figured in quadrants from opposite zeros to 90 degrees. The sights are aligned with the zeros of the circle. On large compasses the needle circle is movable for setting off the magnetic declination. The cardinal points of the compass are marked by the letters N, S, E and W, the zeros being N and S. North is sometimes marked with an arrow or fleur-de-lis rather than with the letter N. Since these are surveyors compasses, the letters E and W are interchanged, to enable the surveyor to read the bearing of the line directly.

The compass plate is mounted on a vertical spindle allowing it to turn in azimuth. Plate levels and a ball and socket joint are used for leveling up, and a jacob staff mounting, without staff, is furnished, unless a tripod mounting is ordered specially.



Gurley Vernier Compass

The Vernier Compass is recommended especially for the Surveyor engaged in re-running property line surveys. It has the longest needle of any compass now made by Gurley, and includes all of the features which add to the convenience and accuracy of compass surveying.

No. 226 Vernier Compass

5" Needle; 15" plate; declination arc movable by rack and pinion, and reading by vernier to 1 min.; two plate levels; out-keeper; removable sights $7\frac{3}{4}$ " high, north sight divided by tangent scale to read angles of elevation or depression by half degrees up to 25 degrees; ball spindle and removable socket, staff mountings; mahogany box with lock and carrying strap.

Price (AGWEN) \$65.00



No. 241 Leveling Adopter

No. 242 Leveling Head

Extra Attachments and Parts for No. 226 Compass

No. 241	Leveling Adopter, used with Tripods Nos. 415, 425.....	\$10.00
No. 242	Leveling Head, used with Tripods Nos. 415, 425.....	25.00
No. 415	Solid Round Leg Tripod.....	10.00
No. 425	Extension Leg Tripod.....	22.00
	Needle 5" long.....	4.25
	Center Pin.....	.75
	Cover Glass in Bezel Ring.....	2.50
	Plate Level Vial in Case.....	2.50
	Plate Level Vial only.....	.60
	Clamp Screw (for clamping either sight vane or socket and spindle).....	.65

The extra parts listed are those which are frequently lost or damaged. The surveyor, when buying a new compass, should provide himself with spare parts to guard against delaying important work.



Dip Needle Compass



Dip Needle Compass
No. 341-A 3" Needle
(AFLAM) \$23.00

The Dip Needle Compass is used for determining the extent of magnetic ore deposits. It is also used by waterworks engineers in locating buried meter boxes, etc. It consists of a suspended magnetic needle, which, when held in the plane of the magnetic meridian, "dips" from the horizontal, the amount of dip being indicated on the needle circle, graduated to degrees.

Pipe cannot be detected readily with a dip needle, and then when not more than a foot under the surface. Other pipe finding devices are available today which are much more satisfactory. We also discourage in every way, attempts to use the dip needle for locating buried treasure. Precious metals are not magnetic, and even if buried in an

iron pot or chest, the size of the container would be so small that no satisfactory results are likely.

No. 341-A Miners Dip Compass, 3" Needle with stop, black graduations on whitened circle, divided to degrees, figured $+20^{\circ}$ to -70° , attached spirit level with positive adjustment, knob handle, glass faces and brass covers..... (AFLAM) \$23.00

Surveyors Pocket Compass

The Pocket Compass is an excellent and portable instrument for running lines through woods. It has the same needle as is furnished with Gurley Precise Transits. It is durably constructed, slips easily into the pocket, or can be carried over the shoulder in its leather case.

No. 304 Pocket Compass

4" Needle, with needle release; movable circle to set off variations; two folding sights; two levels, enclosed; jacob staff mountings; sole leather pouch with shoulder strap.

Price (ABBUZ) \$35.00





Geologists and Dial Compasses

Both No. 335 and No. 350 Compasses are suitable for topographic mapping and can be used on a plane table, or with a tripod or jacob staff.

The instruments are much alike in their construction, the difference being in the modifications of the No. 350 for special geological mapping.

These compasses are small, compact, and light in weight, and are made largely of aluminum alloys. They have a $2\frac{5}{8}$ " needle, with movable needle circle. Magnetic variation can be set off to 5 minutes, by means of a vernier. The compass is practically dust-proof and water-proof.

A beveled, divided, movable circle above the cover glass has quadrant slits cut into it at each 90° angle, and can be used for sighting, or setting angles in azimuth. A ball spindle and socket with jacob staff mountings is provided with each compass. The staff cap is slotted to allow vertical angles to be read by means of the clinometer pendulum in the Compass, when it is on the staff or tripod. The slot in the mounting allows the spindle and socket to be turned horizontal, so that the base of the Compass will be vertical and the clinometer pendulum can swing freely. A sole leather pouch, with shoulder strap and belt loops, contains the Compass and staff mountings, when carrying.

No. 335 Compass is designed particularly for forestry and topographic mapping. It has two folding sights, and a sighting clinometer for reading vertical angles. All four edges of its base are beveled and graduated, two in inch scales, and the other two as a protractor reading to half degrees, the zero being at the south-west corner of the Compass base.

No. 350 Compass has found wide use by Geologists. It can be used to determine local magnetic attraction, and particularly the presence of magnetic ore. It is the same size as No. 335 Compass but has the following special features for geological surveying:

Meridian determination is made easy by use of the solar dial. This is a celluloid circle above the cover glass, divided to serve as a sun dial. A silk thread, extending from the celluloid dial to the folding sight on the north side of the compass base, makes an angle with the plane of the hour circle equal to that of the latitude of the place where the compass is used. The hour circle is graduated to any desired latitude between 20 and 50 degrees, as a sun dial, the thread serving as a gnomon to give apparent time with the sun.

In ordering No. 350 Dial Compass, be sure to state where it will be used, as each dial must be graduated specially for each latitude. Extra dials can be furnished for other latitudes, at \$6.00 each.



No. 335



No. 350

Specifications

$2\frac{5}{8}$ " Needle contained in glass covered waterproof and dust proof compass box, compass circle movable for setting off magnetic declination by vernier to 5 minutes, 4" square base, with graduated edges, two with tangent scale, one with inch scale divided to eighths (omitted on No. 350), and one with inch scale divided to tenths, two levels, township plat on underside of base, pendulum clinometer, folding sights with ball spindle, removable socket and staff mountings, leather pouch.

No. 335 Geologists Compass with sole leather pouch	(AFNID)	\$55.00
No. 350 Dial Compass* with sole leather pouch	(AFIRL)	60.00
Extra Hour Circles for No. 350, graduated for any latitude between 20° and 50° , each		6.00
Special sight, required for latitudes above 50 degrees.....		12.00

*When ordering, specify latitude in which compass will be used.



Wood Box Pocket Compasses

The wood box compass, so called because the needle and circle are contained in a mahogany box, is a valuable pocket instrument for many uses. Foresters, timber cruisers, military topographers, tourists, and sportsmen, appreciate the accuracy, sensitiveness and fine construction of this practical pocket compass.

Several features of the construction of this compass set it apart from the usual pocket compass. The needle is of the same form as the other Gurley compasses, square in cross-section, and carrying a heavy magnetic charge. A coiled wire on the south end serves for balancing the needle. The needle center is made of steel, hardened, ground and polished to a uniformly smooth, long wearing surface, and superior to the older jeweled needle center. The center pin is fitted to a screw holder, making it possible to insert a new screw and pin when the old one becomes dulled. While this is ordinarily a job for an instrument maker, it is sometimes well to carry an extra center pin, in case of accident. When not in use, the delicate needle point is protected by the design of the box, the needle being automatically lifted when the cover is closed.

The box is made of finished Honduras mahogany. A line on the inside of the cover is convenient in sighting. The needle circle and dial are made of white celluloid on which the graduations appear sharp and distinct.

There are two models of the Gurley Wood Box Compass, the difference being in the figuring of the needle circle. No. 3155 is figured in quadrants, from 0 to 90, No. 3156 being figured from 0 to 360. The compass face is marked like all surveyors compasses, the letters E and W being interchanged, so that the bearings of the line can be read off directly.



Wood Box Compass
No. 3155, 2½" Needle, \$6.00

No. 3155	Pocket Compass, 2½" Needle, with steel center, needle automatically lifted when cover is closed, needle circle graduated on raised ring to degrees and figured 0 to 90 each way. Contained in mahogany case with piano hinged cover, 3½" wide by 3¼" deep by 1⅜" thick. Weight 6 oz.	(ABBUT) \$6.00
No. 3156	Pocket Compass, like No. 3155, but with needle circle figured 0 to 360	(ABBUX) 6.00
	Clinometer Attachment, for Nos. 3155 or 3156, extra	5.00
	Township Diagram on inside of cover of Nos. 3155 or 3156, extra	1.00
	"A Manual for Northern Woodsmen," by Austin Cary, Assistant Professor of Forestry in Harvard University. 16 mo., canvas, illustrations and maps, 250 pages.	3.00

Metal Pocket Compasses

No. 3160	"Leedawl", 1 7/16" diameter, white metal open face case, with jeweled needle and stop	\$1.25
No. 3175	"Aurapole", 1 7/16" diameter, white metal hunting case, thin model, with jeweled needle and stop.	4.00
No. 3200	Pocket Compass, watch pattern, 2½" diameter, hunting case, raised ring, agate center, stop to needle, folding sights	6.00



Brunton Pocket Transit



No. 3215

Brunton Pocket Transit, as used for taking courses or horizontal angles.

Price, Compass only, \$30.00

No. 3215 Brunton Pocket Transit, $2\frac{1}{4}$ " Needle, movable needle circle for setting off magnetic declination, graduated to degrees and figured 0 to 90 each way, two levels, pendulum clinometer reading vertical angles to single minutes, folding sights, aluminum alloy case, $2\frac{3}{4}$ " square by $1\frac{1}{2}$ " deep, rounded edges. (ABEHT) \$30.00



No. 3215

Brunton Pocket Transit, as used for taking vertical angles.

Price complete with compass, tripod head, tripod and leather sling case, \$47.50

This is a convenient and compact pocket instrument made for preliminary surveying on the surface or underground, by civil and mining engineers, mine managers and geologists. It can be used as a prismatic compass, sighting compass, clinometer and Abney Level.

Used as a hand instrument, sighting and reading are accomplished simultaneously, thereby rendering unnecessary the use of a staff or tripod.

The improved type with folding sight on cover has been adapted to a light camera tripod, which further increases its scope by enabling the running of long tangents by fore and back sighting, independently of the needle.

Extra Attachments for Brunton Transit

Ball and Socket Tripod Head.	\$6.00
Tubular Extension Tripod.	6.50
Plain Leather Case, for instrument only.	1.75
Leather Case with belt loop, for instrument only.	2.00
Leather Case with sling strap, for instrument only.	2.50
Leather Case for instrument, tripod head, and tripod, with sling strap.	5.00

The Compass Outfit

The following equipment is listed briefly as a suggestion to surveyors who are in need of the field supplies which go to make up a complete compass outfit.

Hand Levels

No. 643	Gurley Locke Hand Level, 5¼" long, in leather pouch	(AKPOW)	\$ 7.50
No. 646-T	Abney Hand Level, with arc for reading vertical angles to 5 min., and with slope ratios. (Not made by Gurley)	(AKSOY)	21.50
No. 649	Stadia Hand Level, 10" telescope, 1" objective lens, adjustable eyepiece, stadia hairs, ratio 1:100, with ball joint and socket, weight about 1½ lbs., in leather sling case. (Not made by Gurley).	(AKTYE)	43.00

Surveyors Chain Tapes

One-quarter inch heavy steel tapes, having deeply etched graduations, hardwood reel with folding handle. Now used in place of surveyors chains.

No. 774	100 links, marked in links and poles, end links graduated 10ths of links.....	(ABDAZ)	\$ 7.80
No. 776	100 feet, marked in feet, end feet, in 10ths and 100ths	(ABDEC)	9.00
No. 887	Eureka Tape Repair Outfit, with one dozen repair sleeves	(ABEGS)	.60

Marking Pins

In sets of 11 pins each, pins 14" long.

No. 741	¼" brass wire, bright.....	(ABCYI)	\$3.00
No. 742	No. 6 steel wire, nickel plated	(ABCYS)	2.50
No. 743	⅜" steel wire, japanned red and white, alternating each inch	(ABDAH)	2.00
No. 749	Spring steel carrying ring for marking pins....	(ABDAV)	.35

Flagstaffs or Ranging

Poles

Made of wood, with steel shoe. Painted red and white, each alternate foot.

No. 534	6 ft. long. (ABAZI)	\$2.50
No. 535	8 ft. long. (ABAZY)	3.00
No. 536	10 ft. long. (ABBAC)	4.00

Plummets

Brass, long-neck, replaceable point, accurately centered.

No. 450	6 oz....	(ABAPH)	\$1.20
No. 452	10 oz....	(ABAPT)	1.50
No. 454	14 oz....	(ABAPY)	2.00
No. 456	18 oz....	(ABARB)	3.00
No. 457	24 oz....	(ABARC)	4.00

Send for Service Booklet "D"
Adjustments of Gurley Compasses

W. & L. E. GURLEY

Established 1845

TROY, N. Y., U. S. A.

Gurley Topographic Instruments
Pages 400-500

Gurley Topographic Instruments



A Gurley Standard Plane Table Outfit in use in the Gobi Desert, by members of the Fourth Asiatic Expedition of the American Museum of Natural History, under the leadership of Roy Chapman Andrews.

Bulletin No. 400

Dated April 1, 1930

Subject to change without notice

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Main Office and Factory, Troy, N. Y.
New York City Sales Office, 49 Chambers Street.



Plane Table Surveying

The plane table method of topographic mapping, used for many years by Military Engineers, the U. S. Coast and Geodetic Survey and the U. S. Geological Survey, is growing in popularity with Civil Engineers and Surveyors. Geologists and Surveyors engaged in oil reconnoissance have used the plane table extensively during the past decade. Topographic maps of cities, park areas and drainage areas, and of large construction projects, are being made in increasing numbers by the plane table method, because of the accuracy, freedom from errors, speed, and low cost made possible in this way.



On the Third Asiatic Expedition of the American Museum of Natural History, the Topographer used a Gurley Explorer's Plane Table Outfit. It was on this expedition that the dinosaur eggs were discovered.

Improvements in mapping have come with improved instruments. Gurley has done much to assist in this development, and the new Gurley Plane Table Outfits, described in this bulletin, represents years of experience in their manufacture.

The New Gurley Alidades

The new line of Gurley Alidades is the result of field investigation and field service. In 1925, Gurley engineers spent weeks in visiting representative geologists and topographers. Authorities on topographic mapping were consulted. Instruments received actual field tests before being finally approved, and the final design, which has been only slightly modified by five years of field service, is the standard instrument wherever Alidades are used. It represents an earnest and conscientious endeavor to furnish to Alidade users the best instrument it is possible to make.



Gurley Plane Table Outfits Used for
Many Kinds of Mapping



A U. S. Geological Survey Party using a Gurley Plane Table Outfit in mapping the Grand Canyon of the Colorado.



City Maps are being made in increasing numbers by the plane table method.



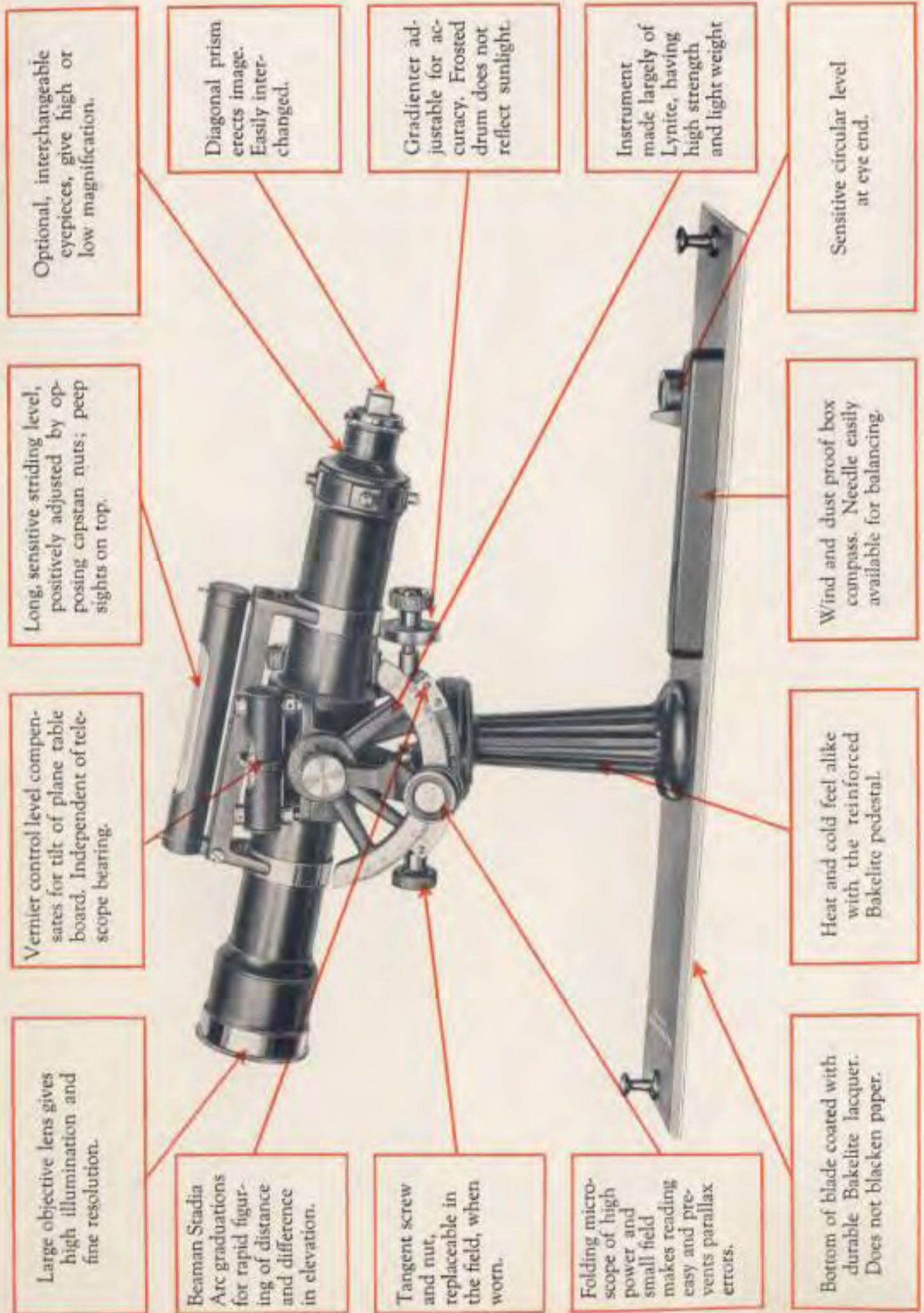
A topographer mapping mountainous country in Alaska.



Plane table method produces accurate, rapidly-made maps showing all topographic features.



Features of the New Gurley Alidade



Optional, interchangeable eyepieces, give high or low magnification.

Diagonal prism erects image. Easily interchanged.

Gradienter adjustable for accuracy. Frosted drum does not reflect sunlight.

Instrument made largely of Lynite, having high strength and light weight.

Sensitive circular level at eye end.

Long, sensitive striding level, positively adjusted by opposing capstan nuts; peep sights on top.



Wind and dust proof box compass. Needle easily available for balancing.

Vernier control level compensates for tilt of plane table board. Independent of telescope bearing.

Heat and cold feel alike with the reinforced Bakelite pedestal.

Large objective lens gives high illumination and fine resolution.

Beam Stadia Arc graduations for rapid figuring of distance and difference in elevation.

Tangent screw and nut, replaceable in the field, when worn.

Folding microscope of high power and small field makes reading easy and prevents parallax errors.

Bottom of blade coated with durable Bakelite lacquer. Does not blacken paper.



The New Gurley Alidades *General Specifications*

Catalog Numbers	580, 581	582	583
<i>Telescope</i> — Image	Inverting	Inverting	Erecting
Length	8½"	10"	12½"
Aperture	1.37"	1.37"	1.37"
Focal Length	7½ in.	9¼ in.	9¼ in.
Minimum Focus	5½ ft.	6 ft.	6 ft.
Magnification — low	10½x	13x	
— high	17½x	21x	23x
Field — low power	3°	2½°	
— high power	2¼°	2¼°	1.4°
Used on — low power	No. 580, 581	No. 582	
— high power	No. 580-A, 581-A	No. 582-A	No. 583
<i>Blade</i> — length	11½"	15"	15"
<i>Weight</i>	4¾ lbs.	5¼ lbs.	5¾ lbs.
Shipping Weight — Domestic	15 lbs.	16 lbs.	17 lbs.
— Foreign	30 lbs.	30 lbs.	30 lbs.

TELESCOPES: New improved telescopes giving detail and distance. Extra diagonal prism, which erects image of inverting telescopes. Platinum cross and stadia wires, fixed ratio 1:100. Quarter-interval wire in upper field, in all models. Objective slide focusing by rack and pinion. Eyepiece focusing by spiral movement. Dust shield protecting objective slide at all foci. Detachable sunshade. Gurley type of objective slide, adjusted accurate at all distances. Telescope can be rotated 180° in bearing for checking collimation.

STRIDING LEVEL: 4½" long, detachable, ground and graduated vial, sensitive to 1 minute each 2 mm spacing, rotating cover, positive adjustment at each end by capstan nuts.

FINDER SIGHTS: Plain Sights placed at each end of striding level permit approximate orientation of Alidade before looking through telescope.

VERTICAL LIMB: Increased accuracy is given to reading of vertical angles by use of a side graduated VERTICAL ARC, 2" radius. This is attached to telescope and is movable by the right hand tangent screw which is combined with the GRADIENTER. An eccentric bushing to the gradiator provides means of accurate adjustment. The gradiator point impinges on a hard-metal replaceable plug held by the axis arm. The vertical arc VERNIER reads to single minutes and is movable, by means of the left hand tangent screw, to a level position indicated by a CONTROL LEVEL attached to the vernier arm. The Control Level is ground to the same sensitiveness as the striding level, and compensates for the tilt of the plane table board. Range of angles of elevation about 25 degrees with Pedestal and about 15 degrees without Pedestal, and of depression about 25 degrees. All angles are positively read, the arc being graduated from 0° to 65° and the vernier reading 30° when the telescope is level.

BEAMAN STADIA ARC: Part of vertical arc is graduated with the Beaman Stadia divisions which permit the rapid figuring of distance and difference in elevation without the use of slide rule, tables or chart. These graduations can be omitted, if desired.

ATTACHED MICROSCOPE: For reading any part of vertical limb, folds out of way when not in use, magnifies 9x.

PEDESTAL: 3¾" high, fluted, made of bakelite, non-tarnishing. Reinforced by brass rod through its center. (Not used on Explorers Size).

COMPASS: Box Compass, 4" needle, windproof detachable cover, easily removable from blade.

BLADE: 11½" or 15" long, 3¼" wide, both edges beveled, but not graduated unless specially ordered and for which there is an extra charge. Lifting Knob on each end, with extra hole in left side of blade to shift knob, for convenience of left-handed men. Sensitive, hermetically sealed Circular Level on eye-end of blade. Durable, non-tarnishing, transparent Bakelite lacquer on base of blade.

CARRYING CASE: Suitable case containing adjusting pins, instrument oil, screw driver, and adjustment booklet.

WEIGHT: Of No. 580 and No. 580-A Alidade about 4¾ lbs., in case about 7¼ lbs. Of No. 581 and No. 581-A about 5 lbs., in case about 10½ lbs. Of No. 582 and No. 582-A Alidade about 5¼ lbs., in case about 13 lbs. Of No. 583 Alidade about 5¾ lbs., in case about 13½ lbs. To obtain shipping weight, add 10 lbs. for domestic shipments and 25 lbs. for export shipments.



No. 580
Explorer's Alidade

Code Word, ABHAT

Price \$225.00

8½" Inverting Telescope
Magnifying 10x
(17½x optional)
11½" Blade
Weight, 4¾ lbs.

The Explorers type of alidade, first designed by Mr. H. S. Gale of the U. S. G. S. in 1909, has achieved world-wide use by oil geologists, topographers, and exploration parties because of its compactness and accuracy.

The latest Gurley design gives to this instrument a splendid telescope with optional interchangeable high and low magnification, a great permanence of adjustment through more rugged construction, and a greater ease and convenience of operation.

It is completely equipped with all of the extra features, such as Beaman Stadia Arc, Folding Microscope, Gradienter, Control Level, and quarter interval wire, making the instrument adaptable for the various surveying methods employed.

See page 405 for general specifications.

Gurley Explorers Plane Table Outfits

The Plane Table Outfits listed below include a No. 580 Explorer's Alidade, a Plane Table Movement with tripod, and a Plane Table Board in canvas case.

Plane Table Movement with Tripod	Plane Table Board, with clamp screws for holding down paper, brass screw plate on under side, contained in a flexible canvas case with shoulder strap.			
	No. 573 24" x 31"	No. 573-A 18" x 24"	No. 573-C 18" x 18"	No. 573-B 15" x 15"
No. 570 Johnson Head with Split Tripod	No. 580-D \$283.75 ABLAB	No. 580-E \$281.00 ABIAC	No. 580-F \$281.00 ABIAF	No. 580-G \$278.50 ABIAG
No. 570-A Johnson Head with Extension Tripod	No. 580-H \$295.75 ABIAL	No. 580-K \$293.00 ABIAP	No. 580-L \$293.00 ABIAS	No. 580-M \$290.50 ABIAW
No. 571 Light Johnson Head with Light Extension Tripod		No. 580-R \$286.00 ABIBA	No. 580-S \$286.00 ABIBI	No. 580-T \$283.50 ABIBS

If the No. 580-A Alidade, magnifying 17½x, but with reduced field, is desired with a Plane Table Outfit, specify by adding the letter A to the Catalog number of the Outfit, as No. 580-AD, or by adding the code word ABHAV, as ABLAB-ABHAV.

The tropical Plane Table Boards are cleated to prevent warping. If this type is wanted, specify by adding the letter X, as No. 580-DX, and add \$2.00 to the price.



No. 581
Service Alidade
 Code Word, ABHAX
 Price \$250.00

8½" Inverting Telescope, 10x
 (17½x optional)
 11½" Blade
 Weight, 5 lbs.

The Gurley Service Alidade combines the convenience of the Explorer's Model with the ability to sight over larger vertical angles. It is well suited for rapid reconnoissance in mountainous country.

See page 405 for general specifications.

Gurley Service Plane Table Outfits

The Plane Table Outfits listed below, include a No. 581 Service Alidade, a Plane Table Movement with Tripod, and a Plane Table Board in canvas case.

Plane Table Movement with Tripod	Plane Table Board, with clamp screws for holding down paper, brass screw plate on under side, contained in a flexible canvas case with shoulder strap.			
	No. 573 24" x 31"	No. 573-A 18" x 24"	No. 573-C 18" x 18"	No. 573-B 15" x 15"
No. 570 Johnson Head with Split Tripod	No. 581-D \$308.75 ABIDE	No. 581-E \$306.00 ABIDO	No. 581-F \$306.00 ABIDU	No. 581-G \$303.50 ABIED
No. 570-A Johnson Head with Extension Tripod	No. 581-H \$320.75 ABIEH	No. 581-K \$318.00 ABIEJ	No. 581-L \$318.00 ABIEK	No. 581-M \$315.50 ABIEN
No. 571 Light Johnson Head with Light Extension Tripod		No. 581-R \$311.00 ABIER	No. 581-S \$311.00 ABIET	No. 581-T \$308.50 ABIEX

If the No. 581-A Alidade, magnifying 17½x, but with reduced field is desired with a Plane Table Outfit, specify by adding the letter A to the catalog number of the Outfit, as No. 581-AD, or by adding the code word ABHAZ, as ABIDE-ABHAZ.

The tropical Plane Table Boards are cleated to prevent warping. If this type is wanted, specify by adding the letter X, as No. 581-DX and add \$2.00 to the price.



No. 582
Standard Alidade
 Code Word, ABHEB
 Price \$275.00

10" Inverting Telescope, 13x
 (21x optional)
 15" Blade
 Weight, 5¼ lbs.

The Standard Model is capable of doing extremely accurate plane table mapping. It is recommended for the taking of topography to be used in establishing grades, computing "cuts" and "fills", and mapping drainage areas, park development, and city cultures.

The optical system has splendid definition, a wide angled field of view, and plenty of light, making it easy to use the telescope without effort on the part of the observer.

See page 405 for general specifications.

Gurley Standard Plane Table Outfits

The Plane Table Outfits listed below include a No. 582 Standard Alidade, a Plane Table Movement with Tripod, and a Plane Table Board in canvas case.

Plane Table Movement with Tripod	Plane Table Board, with clamp screws for holding down paper, brass screw plate on under side, contained in a flexible canvas case with shoulder strap.			
	No. 573 24" x 31"	No. 573-A 18" x 24"	No. 573-C 18" x 18"	No. 573-B 15" x 15"
No. 570 Johnson Head with Split Tripod	No. 582-D \$333.75 ABIGE	No. 582-E \$331.00 ABIGH	No. 582-F \$331.00 ABIGN	No. 582-G \$328.50 ABIGO
No. 570-A Johnson Head with Extension Tripod	No. 582-H \$345.75 ABIGU	No. 582-K \$343.00 ABIHI	No. 582-L \$343.00 ABIHL	No. 582-M \$340.50 ABIHM
No. 571 Light Johnson Head with Light Extension Tripod		No. 582-R \$336.00 ABIHS	No. 582-S \$336.00 ABIHY	No. 582-T \$333.50 ABIIB

If the No. 582-A Alidade, magnifying 21x, but with reduced field, is desired, specify by adding the letter A to the Catalog number of the Outfit, as No. 582-AD, or by adding the code word ABHEF, as ABIGE-ABHEF.

The tropical Plane Table Boards are cleated to prevent warping. If this type is wanted, specify by adding the letter X, as No. 582-DX, and add \$2.00 to the price.



No. 583
Engineers Alidade
 Code Word, ABHEG
 Price \$285.00

12½" Erecting Telescope
 Magnifying 23x
 15" Blade
 Weight, 5¾ lbs.

The Engineers Model meets the needs of the Engineer, who, accustomed to using a transit, prefers the erecting telescope when using an alidade.

This instrument is similar in every way to the Standard Model, except the telescope, which is slightly longer, erecting, and with a magnifying power of 23x. Like the other Gurley alidades, the Engineers model has the dust and water protection to the objective slide furnished by the dust shield; the line of collimation is adjusted to be correct at short, as well as at long focus; and the telescope can be rotated 180° in its bearing for checking the collimation adjustment.

See page 405 for general specifications.

Gurley Engineers Plane Table Outfits

The Plane Table Outfits listed below include a No. 583 Engineers Alidade, a Plane Table Movement with Tripod, and a Plane Table Board in canvas case.

Plane Table Movement with Tripod	Plane Table Board, with clamp screws for holding down paper, brass screw plate on under side, contained in a flexible canvas case with shoulder strap.			
	No. 573 24" x 31"	No. 573-A 18" x 24"	No. 573-C 18" x 18"	No. 573-B 15" x 15"
No. 570 Johnson Head with Split Tripod	No. 583-D \$343.75 ABIKE	No. 583-E \$341.00 ABIKS	No. 583-F \$341.00 ABIKU	No. 583-G \$338.50 ABILD
No. 570-A Johnson Head with Extension Tripod	No. 583-H \$355.75 ABILE	No. 583-K \$353.00 ABILO	No. 583-L \$353.00 ABILT	No. 583-M \$350.50 ABILU
No. 571 Light Johnson Head with Light Extension Tripod		No. 583-R \$346.00 ABILY	No. 583-S \$346.00 ABIME	No. 583-T \$343.50 ABIMO

The tropical Plane Table Boards are cleated to prevent warping. If this type is wanted specify by adding the letter X, as No. 583-DX, and add \$2.00 to the price.



Johnson Plane Table Movement



This portable plane table movement, a product of the experience of the U. S. Geological Survey, combines in a most satisfactory manner the characteristics listed below.

The movement consists of two cups accurately fitted together and arranged so that the plane table board can be readily leveled and rotated in azimuth. Large wing nuts clamp the board in position.

The movement, complete with tripod, weighs about nine pounds. The split tripod legs are made of straight-grained, second-growth hickory. The construction of the entire tripod insures strength and rigidity, and it is capable of standing rough usage without getting out of order.

Features

- Rigid Support
- Light Weight
- Quickly Leveled
- Easily Oriented
- Accurate
- Convenient
- Durable Parts
- Standardized
- Steady in Wind

No. 570

Johnson Plane Table Movement and Split Leg Tripod, \$45.00

Plane Table Movements

No. 570	Johnson Plane Table Movement and split leg tripod (ABBIL) ..	\$45.00
No. 570-A	Johnson Plane Table Movement and extension leg tripod (ABBIM)	57.00
No. 571	Johnson Plane Table Movement, special light weight model, with special light weight extension leg tripod (ABBIP)	50.00

Accessories for Johnson Movements Nos. 570, 570-A or 571

Bolt with Wing Nut and Washer, for tripod head, each	\$ 1.10
Canvas Case, leather trimmed, for No. 571	15.00
Clamp Screw and Socket for paper, complete, each .....	.40
Clamp Screw only, each .....	.20
Extension Tripod Legs for No. 570-A, each	7.50
Extension Tripod Legs, special light weight model, for No. 571, each	5.25
Extra Board Plate, each	3.30
Keeper Screw, C, each .....	.20
Leather Hood to protect Johnson Head	3.00
Socket only, each .....	.20
Split Tripod Legs for No. 570, each	3.30
Upper or Lower Wing Nut Clamp Screw, A or B, each	1.60
Wing Nut for tripod bolt, each .....	.45
Wooden Cap for Johnson Tripods Nos. 570, 570-A or 571	1.25



Plane Table Drawing Boards
Canvas Cases and Drawing Paper



Cross-Section of Gurley Plane Table Board

Gurley Plane Table Drawing Boards are made up in narrow sections, connected by glued tongue and grooved joints and reinforced on each end by a hardwood strip. The wood is thoroughly seasoned and the construction is such as to prevent warping except under extreme climatic conditions. For tropical use, cleats are screwed to the underside, the screws passing through oblong slots which allow the board to expand or contract freely.

The paper is held firmly by brass screws passing through the paper into brass sockets set into the edges of the board. These are slightly below the surface of the board so that there is no obstruction to the movement of the Alidade when used at the edge of the board.

The following listed Drawing Boards may be used with either of the Plane Table Movements, excepting the 31" x 24" size, which we recommend should not be used with the No. 571 Special Light Weight Johnson Movement. All Boards are fitted with brass screw plate on under side and with eight clamp screws and sockets for holding down the paper, except No. 573-B, which has four.

Boards having a catalog number with suffix "X", as No. 573-X, are especially constructed for use in tropical climates, having expansion battens or cleats to prevent warping. These are regularly carried in stock in two sizes, 24" x 31" and 18" x 24", as listed below, but the cleated board can be made to order in the other sizes at an extra price of \$2.00.

Catalog Number	Size, Inches	Board, with Screw Plate Fitted	Carrying Case		Drawing Paper			
			Waterproof Canvas Covered Basswood	Flexible Canvas, with Shoulder Strap	White		Buff	
					Single Mounted	Double Mounted	Single Mounted	Double Mounted
573	24 x 31	\$9.00	\$8.00	\$4.75	\$.85	\$1.30	\$.75	\$1.20
573-X	24 x 31	11.00	not made	4.75	.85	1.30	.75	1.20
573-A	18 x 24	8.00	6.25	3.00	.55	.85	.45	.75
573-AX	18 x 24	10.00	not made	3.00	.55	.85	.45	.75
573-B	15 x 15	6.00	6.00*	2.50	.35	.55	.30	.50
573-C	18 x 18	8.00	6.25*	3.00	.40*	.65*	.35*	.60*
573-D	19 x 19*	8.00*	6.25*	3.00*	.45*	.70*	.40*	.70*
573-E	20 x 20	8.00	6.25*	3.00	.50*	.75*	.45*	.80*
573-F	22 x 22	9.00	8.00*	4.75	.60*	.85*	.55*	.95*
573-G	24 x 24*	9.00*	8.00*	4.75*	.70*	.95*	.65*	1.10*

*Indicates special sizes of Boards, Covers, and Paper not regularly carried in stock. It requires about two weeks in which to make shipment of them.

Green drawing paper, both single mounted and double mounted, can be furnished to order, at prices approximately 25% higher than the buff.



Extras for New Gurley Alidades

Extra Eyepiece, giving low magnification	\$25.00
Extra Eyepiece, giving high magnification	25.00
Graduation of Blade to 50ths of an inch, per edge.....	15.00
Graduation of Blade to scale, 4 inches = 1 mile, per edge.....	15.00
Graduation of Blade to special scale, per edge.....	25.00
Parallel Ruler for new model Alidades.....	25.00
Extra Striding Level Vial	3.50
Extra Control Level Vial	1.25
Extra Circular Level Vial	3.85
Circular Level, complete	5.50
Box Compass, complete	10.00
Striding Level, complete	20.00
Needle, 4" long, with Center Pin	5.00
Deductions for Attachments Omitted	
Gradiometer, deduct	10.00
Beaman Stadia Arc, deduct	15.00
Vernier Control Level, deduct	15.00
Attached Microscope, deduct	15.00

Books on the Use of the Plane Table

"Topographic Mapping" by L. B. Roberts, Chief Topographer, 3rd Asiatic Expedition, size 4¼" x 6¾", 148 pages, is a practical treatise for the young topographer. Executives find it useful in reducing the necessity for personal instruction in the field. Price, post-paid, \$1.60.

"The Plane Table", by C. H. Birdseye, former Chief Topographic Engineer, U. S. Geological Survey, is an interesting article on the use of the Plane Table. It is published as Gurley Service Booklet "G" and distributed upon request.

Instruction Booklet "C", on the Adjustment and care of Gurley Alidades, is one of a series of Service Booklets published by Gurley, and distributed free upon request.

Geologists and Dial Compasses

For Topographic Mapping

The No. 335 and No. 350 Compasses are both suitable for topographic mapping, whether used on a plane table, tripod or jacob staff. The No. 335 has a sighting clinometer with folding sights. The No. 350 has a base clinometer with one sight folding and one sight removable. In addition the No. 350 has a solar dial consisting of hour circle and black silk gnomon, which makes this instrument particularly useful for determining local magnetic declination or for plane table orientation.

Specifications

25/8" Needle contained in glass covered waterproof and dust proof compass box, compass circle movable for setting off magnetic declination by vernier to 5 minutes, 4" square base, with graduated edges, two with tangent scale, one with inch scale divided to eighths (omitted on No. 350), and one with inch scale divided to tenths, two levels, township plat on underside of base, pendulum clinometer, folding sights with ball spindle, removable socket and staff mountings, leather pouch.



No. 350



No. 335

No. 335 Geologists Compass with sole leather pouch	(AFNID) \$55.00
No. 350 Dial Compass* with sole leather pouch	(AFIRL) 60.00
Extra Hour Circles for No. 350, graduated for any latitude between 20° and 50°, each	6.00
Special sight, required for latitudes above 50 degrees....	12.00

*When ordering, specify latitude in which compass will be used.



Gurley Pocket Sight Alidades



Pocket Sight Alidade, with folding sights

These Alidades consist of a brass ruler, graduated on one beveled edge and having at each end hinged sights which fold close to the surface of the ruler. One sight has a full length slit, the other is open with center wire. The Alidade is furnished with a leather pouch.

- No. 589 Ruler Sight Alidade, 10" long, graduated $\frac{1}{40}$ of an inch (ANOBY) \$15.00
- No. 590-A Ruler Sight Alidade, 6" long, graduated to read $\frac{1}{90}$ and $\frac{1}{45}$ of a mile for ratios of 1/90,000 and 1/45,000 respectively, middle part divided to read $\frac{1}{80}$ and $\frac{1}{100}$ of a mile, respectively (ANPAD) 9.50
- No. 590-C Ruler Sight Alidade, 6" long, flat boxwood scale with two white beveled edges, graduated to order, with folding sights like No. 590-A, in leather sheath (ABBYC)..... 10.00

Gurley Traverse Movement



Traverse Plane Table Movement, showing the tripod head and legs and the plunger clamp screw. Insert shows how spring board plate attaches to plunger clamp screw.

In the Gurley Traverse Movement the tripod legs are attached to a head which has a plunger clamping screw passing through its center, compressing a concealed spring, and holding the board to the tripod head when oriented to position.

- No. 585-A Gurley Traverse Movement, consisting of head and tripod, without board and board-plate (ABBYL).....\$10.50

The board is 15 inches square, and has on its under side a strong brass flange with spring, in which the plunger clamp of the tripod head engages, allowing the board to be clamped or oriented as desired. Small clamp screws with sockets for holding the paper are placed at the corners of the board. Inserted in one edge of the board is a small box compass with needle about 4 inches long.



Gurley Traverse Plane Table Outfit



No. 586
Traverse Plane Table Outfit, \$41.00

The illustration No. 586 represents a simple form of Plane Table and Alidade first made by us for the U. S. Geological Survey, and in its present improved form used extensively for traverse work. While not capable of as accurate work as the larger Plane Tables, it constitutes a light and portable instrument for topography.

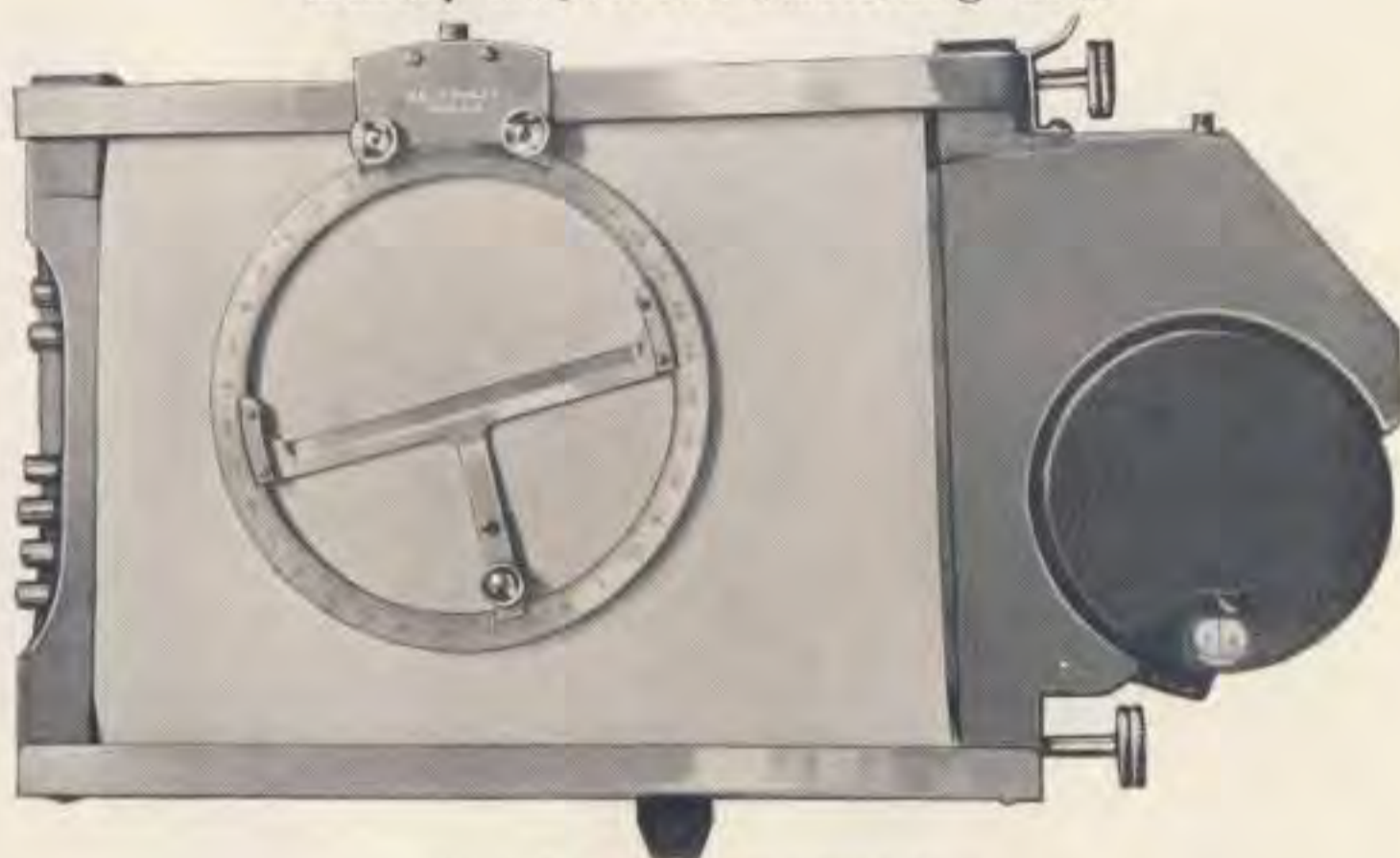
No. 586 Traverse Plane Table Outfit, consisting of Traverse Movement No. 585-A, with solid round tripod legs; No. 573-T Drawing board, 15 x 15 in., with spring board plate, Box Compass No. 588 inserted in one edge, and four clamp screws and sockets for paper; Flexible Canvas Case with Shoulder Strap; Ruler Sight Alidade No. 589, with graduated edge, folding sights and leather pouch; complete as shown (ANKUD)..... \$41.00

Extras and Accessories for Traverse Plane Table Outfit

No. 587	Traverse Plane Table Movement, with solid round leg tripod; Drawing Board, 15 x 15 inches, with spring board plate, and four clamp screws and sockets for paper (ANLIC).....	\$16.50
No. 573-T	Drawing Board, 15 x 15 in., with spring plate fitted, and with four clamp screws and sockets for paper (ABBOT).....	6.00
No. 588	Box Compass, rectangular metal case, 4 in. needle (ANMID).....	10.00
	Extension Leg Tripod, instead of Solid Round Leg Tripod, extra.....	10.00
	Jointed Extension Leg Tripod, closing to 23 in., with canvas case, instead of Solid Round Leg Tripod, extra.....	25.00
	Flexible Canvas Case with shoulder strap, for Drawing Board No. 573-T extra.....	2.50
	Eggshell Drawing Paper, single mounted, 15 x 15 in., per sheet.....	.40
	Eggshell Drawing Paper, double mounted (muslin between), so that drawings can be made on both sides, 15 x 15 in., per sheet.....	.75
	Spring Plate for Drawing Board, each.....	2.50
	Center Plunger Clamp Screw, complete, each.....	3.00
	Clamp Screw and Socket for paper, complete, each.....	.40
	Clamp Screw only, each.....	.20
	Socket only, each.....	.20
	Solid Round Tripod Legs, each.....	1.75
	Extension Tripod Legs, each.....	5.00
	Bolt, with wing nut and washer, for tripod head, each.....	1.00
	Wing Nut for tripod bolt, each.....	.45



Gurley *Explorers* Sketching Case



No. 595 Explorers Sketching Case

The new Explorers Sketching Case is a modification of the Batson-Cavalry and the Smith-Army Sketching Cases, embodying the best features of each, together with suggestions made by users of both cases.

The case is of wood, about $7\frac{1}{2}$ " high by 14" wide. It provides a mapping space 8" wide and 5" along the roll. Brass rolls provide storage space for 4 feet of celluloid (longer of paper) and permit the movement of the sheet either forward or backward.

Directions are taken by rifle sights and read on a 3" diameter floating-dial compass, with thumb release, graduated into 360 degrees. Sights are plotted on the sheet by means of a $4\frac{1}{4}$ " brass protractor, graduated into 360 degrees, with ruler Alidade. The protractor can be rotated and clamped so that traverses of fairly constant direction can be plotted lengthwise of the sheet. The Alidade rotates and clamps to any desired azimuth and the entire protractor, with Alidade, can be moved across the sheet until the Alidade meets the point on the sheet from which the sight is to be drawn.

The Explorers Sketching Case can be furnished with either a sole-leather case or a waterproof canvas case, the latter being preferable for tropical work, since it does not mould inside.

- No. 595 Explorers Sketching Case, with 3" Compass, $4\frac{1}{4}$ " movable Protractor and Alidade, 6 colored Pencils, roll of Translucent Celluloid, 8" x 50", bottom plate with camera thread, screw swivel with strap for wrist, waterproof canvas case with compartments for Case, extra sheets and folding tripod (tripod omitted) (ABHUF).....\$65.00
- No. 595-A Explorers Sketching Case, contained in sole-leather case having two compartments, one for case and other for extra sheets, notes, etc. (ABHUG) 75.00

Extras for Explorers Sketching Case

- Canvas Case, with 3 compartments and sling strap.....\$ 5.00
- Sole-leather Case, with 2 compartments and sling strap..... 15.00
- Tripod, tubular metal extension..... 6.50
- Leather Case, with sling strap, for tripod..... 2.50
- Vellum Tracing Paper, in rolls, 8" x 36", per roll..... .10
- Translucent Celluloid, in rolls, 8" x 50", per roll..... .75

Gurley Stadia Rods



4" wide, $\frac{7}{8}$ " thick, $3\frac{1}{2}$ " Recessed Face

CONSTRUCTION: Gurley Stadia Rods are made of thoroughly seasoned lumber. The fittings are made sufficiently heavy to be rigid and durable, and the rods are brass bound, top and bottom. The hinge and brace of the folding rods is bolted through the wood.

PATTERNS: The Gurley Stadia Rod patterns illustrated are suitable for most stadia surveying. The graduations are stenciled on the white-painted face of the rod, and covered with a waterproof spar varnish. In ordering, specify graduations wanted, by adding the letter to the catalog number of the rod, as No. N-520-N. Type N, the most popular pattern is furnished when not otherwise specified.

MADE IN THREE WAYS: One Piece, 10 and 12 feet long; Folding, hinged in the middle, in 12 and 14 foot, and 4 meter lengths; and Flexible pocket rods which can be tacked to any piece of light board, made in 12 and 14 foot, and in the 4 meter lengths.

Length	One Piece	Folding Hinged in Middle	Flexible Furnished in Metal Container
10 ft.	No. N-520 \$12.50 ABAYE		
12 ft.	No. N-521 \$15.00 ABAYR	No. N-522 \$20.00 ABIUD	No. N-526 \$5.50 AMRID
14 ft.		No. N-523 \$23.00 ABIUJ	No. N-527 \$7.00 AMTAD
4 meters		No. N-524 \$24.00 ABIUK	No. N-527-Y \$7.50 ABIUN

* Pattern Y is furnished for metric lengths only.

GURLEY RODS

Pages 500 to 599

GURLEY RODS

Announcing

A New Gurley Rod for Accurate Leveling

The new Gurley Invar Leveling Rod, which brings Geodetic Rod accuracy within the reach of every Engineer, is described on page 504. Be sure to read about it.

Bulletin No. 500

Revised January 1, 1931

Subject to change without notice.

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Main Office and Factory, Troy, N. Y.
New York City Sales Office, 49 Chambers Street



Gurley Rods

A GOOD ROD is as important a part of accurate surveying as a good Transit or Level, and it should be selected as carefully.

For the best results in the speed and accuracy of the survey, a rod should be selected with several factors in mind. The nature of the topography, whether hilly or flat, wooded or bare, the clarity of the atmosphere, the magnifying and resolving power of the telescope, and the precision of the survey, all have an important bearing on the length, width, and type of graduations selected. General utility and serviceability very often determine the rod construction, and the kind of wood used. The instrument man or the instrument itself are often blamed for errors caused by using an inaccurate or inappropriate rod.

Gurley Rods are a part of the Gurley line of engineering instruments which have had such an enviable reputation for accuracy, dependability, and fine workmanship for over 85 years. You can choose a Gurley Rod with the same confidence in its quality as you would any Gurley instrument, knowing that they are good rods, with accurate graduations, free from warping, easy to read and easy to handle, and so sturdily made that they will continue to give good service for years.

There is a Gurley Rod for every purpose, in lengths from 3 to 16 feet, folding rods, one piece rods, sliding rods in two, three, or four sections, sectional rods which slip and lock together, flexible pocket rods, precise leveling rods, range poles, and line rods, all with a uniform and guaranteed accuracy.

For the engineer who prefers to mark his own graduations, finished rods having blank faces can be supplied, or we can apply special individual designs at the regular price, plus a charge of \$5.00 for cutting the special stencil.

Although there are undoubtedly many jobs where any rod is good enough, why not use Gurley Rods on all your work? They cost no more, and you get the benefit of standardized, guaranteed accuracy and fine workmanship, together with a wide selection, prompt delivery, and a fair price.



Gurley Geodetic Rod

Tests instituted by Gurley have shown the error of the generally-held belief that wooden rods varied with humidity changes across the grain only, and not with it, and have demonstrated that the length of rods varies appreciably with average changes in humidity.

Many engineers are therefore adopting a rod which is not affected in this way, for work where a high degree of precision is necessary. Gurley offers such a rod in the Gurley Geodetic Rod, made after the specifications of The U. S. Coast and Geodetic Survey. This rod is not affected by humidity changes, and temperature corrections are negligible.

The fine graduations are painted on an invar metal strip which is supported by a pine rod, about $3\frac{1}{8}$ " wide and $1\frac{1}{8}$ " thick. The invar strip is $1\frac{1}{2}$ " wide, about .035" thick and 130" long. The invar strip fits in a recess in the wood to which it is held by side washers and which prevents warping of the wood from straining the invar. It is permanently attached to the rod shoe and sagging is prevented by keeping the strip under a continuous spring tension.

The graduations comprise alternate black and white centimeter spaces on each half of the width of the strip. The wooden part of the front face of the rod is painted alternately black and white over spaces one decimeter long, the half decimeter being indicated by a white diamond on each black background, each decimeter line being marked with its correct decimeter number from the bottom of the rod. The figures are upside down for use with inverting telescopes. The face of the rod is beveled to protect the graduations on the invar strip.

The back of the rod is painted with black characters on a white background, divided to feet and tenths.

The fittings of the rod include a malleable iron shoe, case hardened on the end, wooden carrying handle, centigrade thermometer, and circular level.

The shipping box is a substantial wooden box with hinged cover, handles and padlock. As it is customary to order the Geodetic Rods in pairs, the shipping box has a capacity of two rods. When rods are carried singly, the canvas carrying case offers excellent protection to the rod graduations. The canvas case or shipping box is not included with the rod unless specially ordered.

No. 529	Gurley Geodetic Rod, graduated in meters, decimeters and centimeters	(ABIUT)	\$135.00
No. 529 A	Gurley Geodetic Rod, graduated in yards, 10ths and 100ths of yards	(ABIYE)	135.00
	Shipping box, capacity two rods, for Gurley Geodetic Rod	(ABIUV)	30.00
	Canvas Case, of 10 oz. dark brown, waterproof duck, for Gurley Geodetic Rod	(ABIUX)	10.00



No. 529
Front



No. 529
Rear



Gurley Invar Leveling Rod

U. S. Patent No. 1,783,507

Gurley introduces in this bulletin a new design of leveling rod, the Invar Tape Rod. It consists of a continuous strip of invar steel tape, 12 ft. long and 1 inch wide, supported and protected by the usual 2-section sliding wooden leveling rod.

Surveyors discarded wooden rods for horizontal measurements about 150 years ago when the steel chain was introduced. The Government precise rod using an invar strip, is the only attempt which has been made to improve on vertical rod measuring. The Gurley Invar Tape Rod thus marks an epoch in leveling rod manufacture, since it provides a rod of unchanging accuracy that is convenient for ordinary use.

INVAR TAPE UNAFFECTED BY HUMIDITY: Unless wooden rods are used under the same conditions of humidity as when divided, they will change in length. Authorities on wood have been unable to suggest any remedy for this, so Gurley has brought out the Invar Tape Rod which is unaffected by humidity changes.

TEMPERATURE CHANGE NEGLIGIBLE: The linear coefficient of expansion, which does not exceed .0000011 per degree Fahrenheit, eliminates errors due to temperature changes.

CONSTANT TENSION ON TAPE: A spring exerts a constant tension on the invar strip and eliminates errors caused by the expansion or contraction of the wood due to moisture, since the movement of the invar tape is independent of the wood. A tension adjusting screw in the top plate of the rod can be turned by a screw driver, the proper tension being secured when the two sections of the rod slide easily.

OTHER ADVANTAGES: Jarring the rod when fully extended introduces no errors since the graduated face of the rod is a single section of tape, reading continuously from the base. And since it is necessary to raise the top section only far enough for the desired reading, the Gurley Invar Rod can be used indoors, in the woods, or wherever the headroom is limited, far more conveniently than any other.

GRADUATIONS: The usual Philadelphia graduations, reading to feet, tenths, and hundredths, are marked on the invar tape, with the same accuracy accorded to Geodetic Precise Rods. The graduated tape is replaceable when the graduations become so marred as to require it.

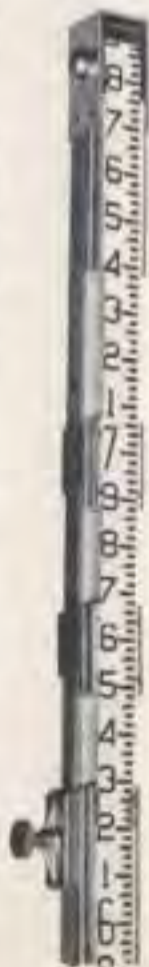
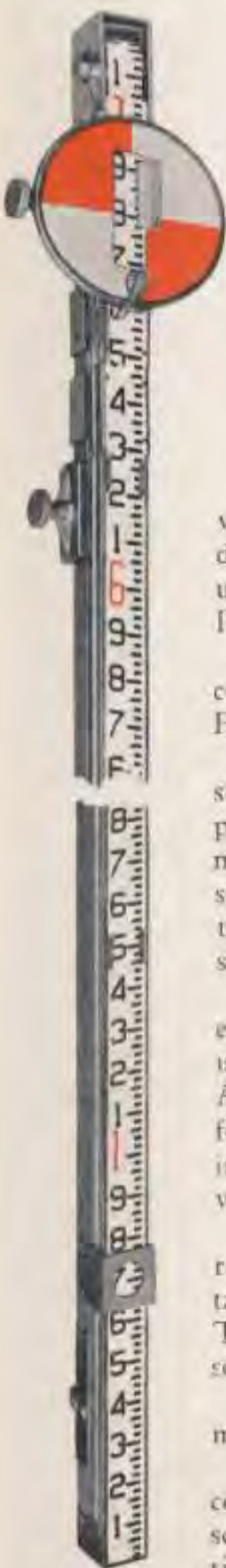
TARGET: Regularly furnished with oval target having micrometer setting; optional with plain target, or without target.

SPECIFICATIONS: The Gurley Invar Rod is of 2-ply construction, 7.3 ft. closed, extending to 12 ft. It is made of selected, straight-grained maple, carefully finished, with substantial fittings. The graduated invar tape is one inch wide.

No. 507 Gurley Invar Leveling Rod, 2 ply, 7.3 ft. closed, extending to 12 ft., with Micrometer Target

(ABMEV) \$25.00
 (ABMIC) \$22.00
 (ABMIF) \$19.00

Showing
 tape brace
 blocks and
 adjustable



No. 507
 Invar Tape
 Leveling Rod
 Micrometer
 Target
 (ABMEV)
 \$25.00

As above, but with Plain Target
 As above, but without Target



Gurley Philadelphia Leveling Rods

HERE are rods built for hard service and lots of it. Materials, construction, and reasonable price, all combine to make the Gurley Leveling Rod an economical investment that will convince you of the economy of buying only the best.

MATERIAL: The Gurley Philadelphia Rods are made of thoroughly seasoned, carefully selected, straight-grained maple. The rod is $1\frac{1}{2}$ " wide, with a $1\frac{1}{8}$ " recessed face, and is $\frac{3}{8}$ " thick.

FINISH: Gurley Rods are given an exceptionally fine and durable finish. The surfaces are carefully sand-papered both before and during the different shellac coatings, of which there are three. The maple rods are left in the natural color. The recessed face of the rod is painted with one coat of white lead and oil, one coat of flat white, and after graduating, by a coat of colorless, waterproof varnish, which does not turn yellow.

FITTINGS: Gurley Rods are brass-bound, top and bottom, the brass shoes being riveted, not screwed, to the wood. Slide bands keep the rod straight when extended. The clamp is of a recent improved design, and is made of strong light alloy, with a set-screw which can be easily handled, with or without gloves. A steel friction spring in the clamp keeps the rod from slipping too freely when unclamped.



The Gurley rod clamp is strong, light, and easy to use.

TARGETS: The face of the target is oval, with a rim for strength and protection. It is made of strong light alloy, with an easily-manipulated set-screw, and having a friction spring which keeps the target from falling when unclamped.

CANVAS CASE: These are not regularly supplied, but can be furnished, extra charge, as listed. They are made of heavy, durable, waterproof duck, leather-bound. The use of a canvas case will greatly prolong the life of a rod.

DELIVERY: Immediate shipment from stock of any Philadelphia Rod shown in the table, with the exception of rods having type I graduations, which generally take three days to supply, in other than the No. N-501 Model.

Cross-section of Leveling Rod



$1\frac{1}{2}$ " wide, $\frac{3}{8}$ " thick
 $1\frac{1}{8}$ " Recessed Face
 Can be graduated
 Types A, I, C or D



Gurley Philadelphia Leveling Rods

GRADUATIONS: Permanence of graduations is secured by impressing them into the fibre of the wood with accurately cut steel dies, inked with a lamp-black preparation. The marks are sharply defined, and, contrasted against the white background, add to the distance the rod can be read without target. The rod is figured to tenths of a foot in black, and to feet in red, except on rods having 1 graduation, when the foot mark is also indicated between each



Stamping the graduations into Gurley Leveling Rods.

tenth-of-a-foot numeral. (On metric rods, each decimeter rectangle is black, half decimeters being indicated by a red circle. The figuring is to decimeters in red, and meters in black). The graduations are self-reading to feet, tenths and hundredths, with verniers on the back of the rod clamp, and on the target, for reading to thousandths. The Philadelphia graduations, type A, are generally furnished, though type C is optional without extra cost. Type I, with "instantaneous" graduations are furnished for \$2.00 extra. Type D is for metric rods only. Rods graduated in feet and inches are available at no extra cost.

They are carried in stock in the N-501 model only.

METRIC GRADUATIONS: Metric Rods are made in lengths approximately equal to English lengths. They are graduated like type D and are self-reading to meters, decimeters, and centimeters and, by vernier, to millimeters. For lengths and prices of Metric Leveling Rods, see table, page 513.

LENGTHS AND PRICES OF PHILADELPHIA LEVELING RODS: Regular type A graduations, type C graduations optional at same price. Specify in ordering whether rod is wanted without Target, with plain Target, or with Micrometer Target. Order by Code Word for positive designation.

Catalog Number	Length Overall Closed	Reading Fully Extended	Number of Sections	PRICE			Price Canvas Case Extra
				Without Target	With Oval Plain Target	With Oval Micrometer Target	
N501	7.3 ft.	13 ft.	2	\$12.00 ABIPA	\$15.00 ABAYU	\$18.00 ABIOX	\$4.00 ABIUZ
N502	6.8 ft.	12 ft.	2	\$12.00 ABIPI	\$15.00 ABIPH	\$18.00 ABIOR	\$4.00 ABIVI
N503	5.3 ft.	9 ft.	2	\$11.00 ABIPY	\$14.00 ABIPT	\$17.00 ABION	\$3.50 ABIVY
N504	3.3 ft.	5 ft.	2	\$9.00 ABIRC	\$12.00 ABIRB	\$15.00 ABIOK	\$3.00 ABIWA
N505	4.5 ft.	12 ft.	3	\$16.50 ABIRF	*	*	\$3.50 ABIWI
N506	3.3 ft.	11.2 ft.	4	\$18.00 ABIRL	*	*	\$3.00 ABIXE

* Self-reading Rods which cannot be furnished with Target.



Gurley Philadelphia Leveling Rods

Types of Graduations



A I C D

Gurley Philadelphia Rods can be graduated as illustrated. In ordering rods having type I graduations, add \$2.00 to the price. Type D graduations are for metric rods only.

Special Targets



No. N-547

Micrometer Target
(ABJAH) \$7.00



No. N-549

Angle Micrometer Target
(ABJAK) \$9.00

No. N-548 Plain Target, as illustrated
on No. N-501 Rod . . . (ABJAJ) \$4.00



No. N-505 Leveling Rod Without Target 3 Ply \$16.50
No. N-506 Leveling Rod Without Target 4 Ply \$18.00

No. N-501 Leveling Rod, Service Model Plain Target, 2 ply \$15.00



Gurley Narrow Stadia Rods

One Piece — Folding — Sectional

Easier to read than the Leveling Rod, and not so cumbersome as the Stadia Rod, the Gurley Narrow Stadia Rod is finding increasingly wide use for many kinds of work. Their construction, graduations, and the three Gurley models made, make them well-adapted for a long period of satisfactory service for many kinds of surveying.

MATERIAL: Gurley Narrow Stadia Rods are made of straight-grained basswood, which has been carefully selected, and thoroughly seasoned. Basswood is used because it is light in weight and seasons well without warping.

FINISH: The face of the rod is painted white, the back and sides being stained mahogany, and coated with shellac and lacquer.

FITTINGS: Gurley Rods are heavily brass-bound, top and bottom. The Folding Rods are held open by a rigid bronze bar which is anchored at each end to brass strips imbedded in the wood. The hinges are bolted (not screwed) through the wood. On the Lock-Joint Rods, the connection is made of hard drawn brass tubing, closely fitted to prevent shake, and with a spring catch which holds the sections together.

TARGET: An oval plain target, slightly larger than the regular one, can be furnished for leveling rods when it is desired to read by vernier to thousandths of a foot. This target can be moved easily on the One-Piece, and Lock-Joint Rods but will not pass the joint on the Folding Rods.

Cross-section of Narrow Stadia Rod



2½" wide, 7/8" thick
2" Recessed Face
Can be graduated
Types E, F, H or J



No. N-551

Target for Narrow Stadia Rod (ABJAR) \$5.00



Gurley Narrow Stadia Rods

One Piece — Folding — Sectional

GRADUATIONS: The graduations are in red and black, on the white-painted face of the rod, and are covered with colorless, water-proof lacquer. The patterns and figuring are as illustrated. Type E graduations, suitable for leveling and for short stadia reading, are furnished unless otherwise specified, though other types are optional without extra charge. Type J graduations are for metric rods only. In ordering a rod, specify graduations wanted by adding the graduation letter to the catalog number of the rod, as No. N-517-F.

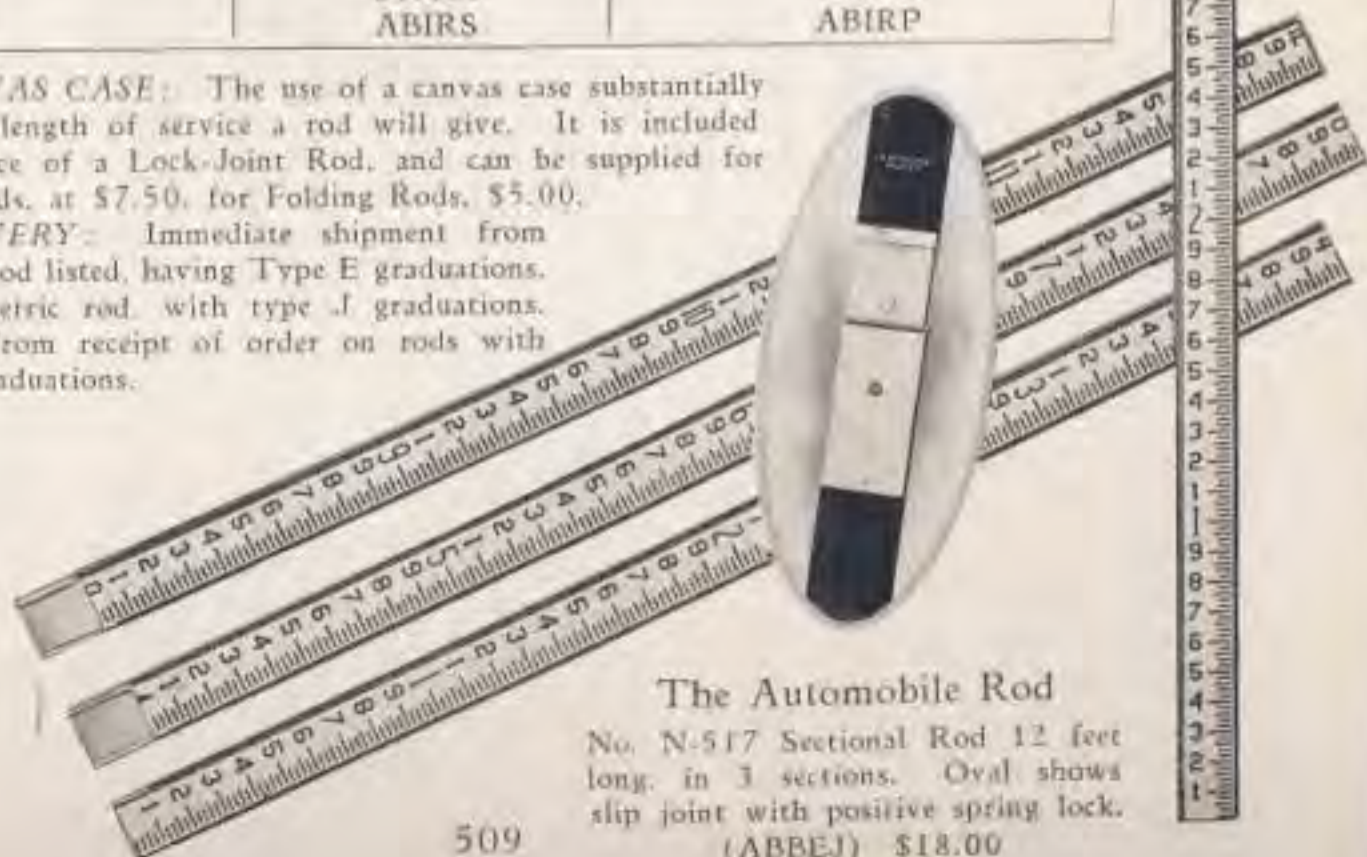
METRIC GRADUATIONS: All metric rods are furnished with type J graduations, having each decimeter in red, and half-decimeters indicated by a red circle. The figuring is to decimeters in red, and meters in black. No. N-517-J Sectional Rod is made in four one-meter lengths.

Lengths and Prices of Gurley Narrow Stadia Rods

Length	One Piece	Folding Hinged in Middle	Sectional with Slip Lock Joints 4 ft. Sections. With Canvas Case
10 ft.	No. N-510 \$10.00 ABISO		
12 ft.	No. N-511 \$12.00 ABISP	No. N-512 \$16.00 ALROB	No. N-517 \$18.00 ABBEJ
14 ft.		No. N-513 \$18.00 ALSAY	
16 ft.			No. N-518 \$24.00 ABITA
3.00 meters	No. N-510-J \$11.00 ABIRX		
4.00 meters		No. N-513-J \$19.00 ABIRS	No. N-517-J \$21.00 ABIRP

CANVAS CASE: The use of a canvas case substantially increases the length of service a rod will give. It is included with the price of a Lock-Joint Rod, and can be supplied for One-Piece Rods, at \$7.50, for Folding Rods, \$5.00.

DELIVERY: Immediate shipment from stock of any rod listed, having Type E graduations, or of any metric rod, with type J graduations. Three days from receipt of order on rods with other type graduations.



The Automobile Rod

No. N-517 Sectional Rod 12 feet long, in 3 sections. Oval shows slip joint with positive spring lock. (ABBEJ) \$18.00





Gurley Stadia Rods

One Piece — Folding — Flexible



K L W N P R S T X Y



Gurley Stadia Rods

One Piece — Folding — Flexible

THERE is a Gurley Stadia Rod for every purpose and all conditions, encountered in Stadia Surveying. Each Gurley Stadia Rod is characterized by the usual Gurley accuracy, durability, and ease of reading.

MATERIAL: Gurley Stadia Rods are made of thoroughly seasoned bass-wood, with a $3\frac{1}{2}$ inch recessed face to protect the graduations.

FINISH: The graduations are stenciled on the white-painted face of the rod. The back and sides are thoroughly sand papered, stained mahogany, and given a triple coat of waterproof shellac.

GRADUATIONS: Protected by a coat of colorless waterproof lacquer. The graduations range from fine to coarse, as illustrated, and are stenciled in red and black on the face of the rod. Any stadia design illustrated (except pattern Y, which is for metric rods only) is optional with any Gurley Stadia Rod, but type N, the most popular pattern, is furnished unless otherwise specified. In ordering, specify by adding letter to catalog number of rod, as No. N-520-N.

METRIC GRADUATIONS: Type Y is furnished for metric rods only, types N, P, and R are available in both English and Metric lengths. One Piece Metric Stadia Rods are made only in the 3 metric length; Metric Folding and Flexible Rods are made only in 4 meter lengths.

Cross-section of Stadia Rod



4" wide, $\frac{3}{8}$ " thick

$3\frac{1}{2}$ " Recessed Face

Can be graduated

Types K, L, W, N, P, R, S, T, X or Y

For other details, see next page

Lengths and Prices of Gurley Stadia Rods

Length	One Piece	Folding Hinged in Middle	Flexible Furnished in Metal Container
10 ft.	No. N-520 \$12.50 ABAYE		
12 ft.	No. N-521 \$15.00 ABAYR	No. N-522 \$20.00 ABIUD	No. N-526 \$5.50 AMRID
14 ft.		No. N-523 \$23.00 ABIUJ	No. N-527 \$7.00 AMTAD
3 meters	No. N-525 \$14.00 ABIYR		
4 meters		No. N-524 \$24.00 ABIUK	No. N-527-Y \$7.50 ABIUN



Gurley Stadia Rods

One Piece — Folding — Flexible



*Hinge and
Brace Bar.
Rod Open*

FITTINGS: Gurley Stadia Rods are heavily brass-shod, top and bottom, to protect their accuracy and serviceability. The fittings are made heavy enough to be rigid and durable. The Folding Rods are held rigidly open by a bronze bar and heavy brass hinges, and are strapped together when folded. The bar is anchored at each end to a heavy brass strip which is imbedded in the wood and bolted through from the face of the rod. The wing nut fits snugly in a recess in the end of the bar, and holds the rod firm. The hinges are bolted together through the wood.



*Hinge and
Brace Bar.
Rod Closed*

CANVAS CASE: A canvas case offers valuable protection to rods, especially when they are liable to rough treatment during transportation. Gurley cases are made of loose fitting, brown waterproof duck. For One-Piece Rods, the price is \$7.50; for Folding Rods, \$5.00. When ordering by telegraph, add the code-word ABJAX to the code-word of the rod.

FLEXIBLE POCKET RODS: Carried rolled up in the pocket. Can be tacked through eyeletted holes, to any piece of light board. Convenient and sufficiently accurate for most work. $3\frac{1}{2}$ " wide, made of chart cloth, a closely woven fabric remarkable for its constancy and durability. Regularly furnished with Type K graduations in English, and Type Y in Metric. Other types, as illustrated, furnished to order.

DELIVERY: Immediate shipment from stock of the following rods. No. N-522, 12 feet long, Folding, in any graduation shown; No. N-524, 4 meters long, Folding, in types N or Y, metric; Nos. N-526 or N-527 Flexible Rods, 12 or 14 feet long, in type K, English; No. N-527, 4 meters long, in type Y, metric. Three days from receipt of order on all other lengths or stadia designs listed for wooden rods, one week from receipt of order on other designs of Flexible Rods.



No. N-526
Flexible Pocket
Stadia Rod



Gurley Mining Rod

This Stadia Rod has been specially designed for strip mining work. It is 15 feet long, with graduations like Type F. The rod is made with a softwood center, $1\frac{7}{8}$ " wide by $\frac{3}{4}$ " thick, reinforced the full length by tongue and grooved hardwood strips on the sides. These strips are $1\frac{1}{8}$ " wide by $\frac{3}{8}$ " thick, furnishing a rigid support for the rod, and forming the recess for the front and back faces. The rod is entirely painted white, the graduations black and the foot figures red. It is brass-shod top and bottom, the bottom shoe extending 8" upward along side of rod.

No. N-528 Gurley Mining Rod, 15 feet, one piece (ABIUR) \$30.00

Gurley Rod Levels

No. 545 Rod Level

Detachable and folds up for carrying in pocket. Held against rod or temporarily attached by rubber band.

(AMNEZ) \$5.00

No. 546 Rod Level

Permanently attached to rod. Level folds against rod to protect bubble, when not in use.

(AMNIT) \$6.00



No. 545 Rod Level



No. 546 Rod Level

Parts for Gurley Rods

Target Clamp Screw	\$.75	Rod Clamp Screw (old style) . . . . .	.75
Target Clamp Spring . . . . .	.25	Rod Clamp Vernier with screws (reads	
Target Clamp Spring with rollers	1.00	down) . . . . .	.50
Target Vernier with screws (reads up) . . . . .	.50	Rod Ends, each . . . . .	.35
Rod Clamp Complete	2.50	Rod Guide . . . . .	.35

Lengths and Prices of Metric Leveling Rods

Type D graduations (see Fig. 1). Specify when ordering whether rod is wanted without Target, with plain Target, or with micrometer Target. Order by code word for positive designation. Refer to pages 506 and 507 for illustrations and descriptions.

Catalog Number	Length Overall Closed	Reading Fully Extended	Number of Sections	PRICE			Price Canvas Case Extra
				Without Target	With Oval Plain Target	With Oval Micrometer Target	
N501D	2.1 meters	3.70 meters	2	\$13.20 ABIMP	\$16.50 ABIMS	\$19.80 ABIMU	\$4.00 ABIUZ
N503D	1.6 meters	2.70 meters	2	\$12.10 ABINA	\$15.40 ABINI	\$18.70 ABINK	\$3.50 ABIVY
N504D	1.1 meters	1.70 meters	2	\$9.90 ABINS	\$13.20 ABINY	\$16.50 ABIOD	\$3.00 ABIWA
N505D	1.37 meters	3.65 meters	3	\$18.15 ABIOH	*	*	\$3.50 ABIWI
N506D	1 meter	3.30 meters	4	\$19.80 ABIOJ	*	*	\$3.00 ABIXE

* Self-reading Rods which cannot be furnished with Target.



Gurley Flagstaffs or Ranging Poles

Gurley Flagstaffs or Ranging Poles are made in a variety of lengths, forms and materials. All poles are graduated to feet which are painted red and white alternately. They also can be painted, without extra charge, in metric divisions of alternate red and white markings, two decimeters apart.

Combined Leveling Pole and Flagstaff

The combined Leveling Pole and Flagstaff has one face graduated to feet, tenths and hundredths, giving the added feature of a plain self-reading rod.

No. 530	Wooden Leveling Pole and Flagstaff, 7 ft. long	(AKHON)	\$6.25
No. 531	Wooden Leveling Pole and Flagstaff, 9 ft. long	(AKKIP)	7.50

Wooden Flagstaffs or Ranging Poles

The octagonal wooden Flagstaff is popular with engineers who wish to secure a light weight serviceable sight pole.

No. 534	Wooden Flagstaff, octagonal, 6 ft. long	(ABAZI)	2.50
No. 535	Wooden Flagstaff, octagonal, 8 ft. long	(ABAZY)	3.00
No. 536	Wooden Flagstaff, octagonal, 10 ft. long	(ABBAC)	4.00

Screw-Jointed Wooden Flagstaffs

Another wooden staff designed for convenience in carrying is the sectional flagstaff which is extended by screwing together the separate sections.

No. 537	Jointed Wooden Flagstaff, round, 6 ft. long, in 2 sections	(ABBAF)	5.50
No. 538	Jointed Wooden Flagstaff, round, 9 ft. long, in 3 sections	(ABBAS)	9.50
	Canvas Case for No. N-537	(ABBAL)	3.25
	Canvas Case for No. N-538	(ABBAW)	3.50

Iron and Steel Ranging Poles

Metal range poles are made of solid hexagonal steel or iron tubing. The former is usually selected for precise work. Metal range poles must be carefully handled in the field to prevent permanent damage to them.

No. 540-A	Steel Ranging Pole, solid, hexagonal, 6 ft. long, $\frac{1}{2}$ in. diameter	(ABBED)	4.50
No. 540-B	Steel Ranging Pole, solid, hexagonal, 8 ft. long, $\frac{3}{4}$ in. diameter	(ABBEH)	4.75
No. 541	Iron Tubular Ranging Pole, 6 ft. long, $\frac{1}{2}$ in. diameter	(ABBEK)	3.50
No. 543	Iron Tubular Ranging Pole, 8 ft. long, $\frac{3}{4}$ in. diameter	(ABBEN)	4.25
No. 544	Iron Tubular Ranging Pole, 10 ft. long, $\frac{1}{2}$ in. diameter	(ABBET)	5.25

Canvas Cases

Canvas Cases offer valuable protection to leveling and stadia rods, particularly when they are subjected to rough treatment from transportation, etc. Gurley cases are loose fitting and are made from dark brown waterproof duck, 10 ounce weight.



Gurley Flagstaffs or Ranging Poles



Combined
Leveling Pole
and Flagstaff
No. 530
No. 531



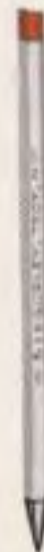
Hexagonal Steel
Range Pole
No. 540-A
No. 540-B



Iron Range Pole
Tubular
No. 541
No. 543
No. 544



Wooden Flagstaff
Octagonal
No. 534
No. 535
No. 536



W. & L. E. GURLEY

Established 1845

TROY, N. Y., U. S. A.



The Gurley Factory

Makers of

Surveying Instruments

Transits, Levels, Compasses, Alidades, Plane Tables, Sketching Cases, Leveling and Stadia Rods, Plummets, Hand Levels, Chains and Field Supplies.

Hydraulic Engineering Instruments

Daily, Weekly, Continuous and Long Distance Water Level Recorders, Water Level Indicators, Hook Gages, Price Type Acoustic and Electric Current Meters.

Standard Weights and Measures

Precision Weights, Measures, Balances and Inspectors Equipment.

Descriptive Bulletins sent on request

**GURLEY FIELD ACCESSORIES
AND SUPPLIES**
Pages 1000 to 1099

Gurley Field Accessories and Supplies

Bulletin No. 1000

Revised June 15, 1929.

Subject to change without notice.

Copyright 1929



Main Office and Factory, Troy, N. Y.

New York City Sales Office, 25 Warren Street



Field Accessories and Supplies

Field Supplies for Engineers and Surveyors round out the Gurley Line of major instruments, such as Transits, Levels, Alidades, Plane Tables, and Hydraulic Measuring Apparatus. Here are offered those smaller items of equipment which need more frequent replacement.

Many of these, such as Rods, Plummets, Rod Levels, Compasses, and Hand Levels, are made by Gurley and, of course, carry the usual Gurley guarantee.

Lufkin Tapes only are listed because of their accuracy and reliability. Other instruments and equipment are by reliable makers, whose recommendation is based upon years of satisfactory trial by our customers.

How to Order and Other Information

Address Main Office, Troy, N. Y.

Address all correspondence and orders to our Main Office and Factory, Troy, N. Y.

An extensive stock of instruments and supplies is maintained at Troy so that prompt service can be given.

A New York City Sales Office is located at 25 Warren Street, where a stock of the most popular instruments is available for inspection and immediate delivery.

All orders are immediately acknowledged, showing how we expect to fill your order. Do not confuse this order acknowledgement with the invoice, which is mailed at time of shipment.

If further correspondence relative to your order is necessary, always refer to our order number.

Order Blanks

An order blank is sent out with each catalog. Additional blanks, if wanted, will be sent upon request. If at any time you have no order blanks, write your order on any paper.

Orders by individuals sent on firm stationery, should state whether the charge is to be made against the firm or against the individual.

Orders by firms should be made out on the regular firm order forms, and signed by an authorized individual. If invoices on your own special forms are required, kindly send forms with your order.

Telegraph Orders

Each catalog number has a corresponding code word which can be used when ordering by telegraph or cable.

Many parts and attachments have corresponding code words. Add these code words to the code word of the instrument, when such parts and attachments are desired.

Confirm all telegraph and cable orders with a written order.

Order by Catalog Number and Name

Written orders should give the catalog number and name of the instrument. Where no catalog number exactly covers what you want, give as full particulars as possible, so as to avoid the delay of writing you for further information.

The wide variety of Gurley Instruments and the interchangeability of many of their parts, offers opportunity for "special purpose" instruments to be made up. When ordering such instruments, give complete description and sketches. Orders for special instruments, which cannot be made from standard parts, cannot be accepted.

No Charge for Packing

Special attention is paid to the packing of all goods for shipment. Instruments should reach their destination in perfect adjustment. The instrument cases are carefully wrapped and are packed in corrugated board cartons lined with excelsior. This type of packing is nearly damage-proof and greatly reduces shipping charges. Export shipments which go by steamship have the instrument cases wrapped in water-proof paper and packed in wire-bound and cleated boxes stuffed with excelsior. Instructions regarding private markings are carefully followed.



How to Order and Other Information

(continued)

Transportation Charges

All transportation charges are to be paid by the customer.

When goods are to be shipped by parcel post, be sure to include with your remittance to pay for goods, additional money to pay for postage. Do not send stamps for this purpose.

When goods are to be shipped by express and there is no express agent at your nearest railroad station, it is necessary that you state the nearest town at which there is an agent. You pay the charges when the shipment reaches you. Be sure to give your shipping point if it is different from your post office address.

We do not recommend shipping instruments by freight.

Parcel Post Insurance

Most of the accessories, repaired parts and replacement parts are small enough to be sent parcel post. They can be insured against damage or loss at a small extra cost, the amount of which should be added to the remittance for the goods and for the postage.

The rates vary according to the value of the package, as follows:

POST OFFICE INSURANCE: Repaired parts, the loss of which we cannot replace, are insured at the post office. Value up to \$5.00—5 cents; \$5.00 to \$25.00—8 cents; \$25.00 to \$50.00—12 cents; \$50.00 to \$75.00—15 cents; \$75.00 to \$100.00—25 cents.

INDEMNITY INSURANCE: For convenience and promptness in adjusting claims, accessories and new parts are insured in a commercial indemnity company. Value up to \$25.00—5 cents; \$25.00 to \$50.00—10 cents; \$50.00 to \$100.00—25 cents.

Special Shipping Instructions

If you want goods shipped to someone else, or if your shipping point is not the same as your post office, be sure that this information is clearly noted on your order.

Claims for Loss or Damage

If goods are not received promptly after receipt of our invoice, notify us at once and, when possible, a duplicate shipment will be made.

If the package is received and shows signs of rough handling note on the carrier's receipt "Received in bad condition." Notify us immediately and, when possible, a duplicate shipment will be made.

Upon your notification that a shipment has been lost or damaged, we will send you the necessary papers to prepare so that we can present the claim.

Change of Address

Customers who contemplate changing their address will confer a favor by sending us both their old and new addresses, so that our mailing files may be revised accordingly.

Return of Merchandise

Any purchase found, upon examination, to be not entirely satisfactory may be returned for exchange or credit, or if preferred, money will be refunded.

Please tell us why the goods you are returning are unsatisfactory. We ask this because we are anxious to improve the quality of our goods and of our service in any possible way. We will appreciate any suggestions from you.

Terms of Payment

CASH WITH ORDER: Customers who have not established their credit with us, should send their remittance (including postage and insurance), with their order. Remittance can be sent in any of the following ways:

1. Post Office Money Order.
2. Express Money Order.
3. Bank Draft.
4. Cash by Registered Mail.

If on a rural route, give letter containing order and money to the carrier who will buy a money order at the post office and forward it with your order.

C. O. D. SHIPMENTS: When the money does not accompany the order, and when credit information is not available to us, goods will be shipped C. O. D. A small charge is made by the post office or express company for returning money on such shipments. Such charges for orders amounting to less than \$20.00 are to be paid by the customer; over this amount we pay the charges. Shipments made C. O. D. are no reflection on the credit of the customer, but in the absence of sufficient credit information, this method enables us to give more prompt service.

HOW TO OPEN AN ACCOUNT: Those desiring to open an account with us should write stating the approximate amount of credit desired, and give the names of three firms with whom they are doing business, also the name of the bank handling their account. As time is required to investigate such references, this should be considered when placing your order. For prompt action on urgent orders, furnish the above data by wire. Customers who have established their credit with us, will be billed 30 days net cash.

Foreign Shipments

Orders for foreign shipment should be accompanied by remittance. Remittance can be made in any one of the following ways:

1. Order on a bank or agent in New York City to pay in funds current at par, against presentation of shipping documents.
2. International Money Order.
3. American Express Money Order.
4. American Bank Notes.

An additional remittance must be sent when foreign shipments are to be made directly to the customer. This covers transportation from the Factory, at Troy, N. Y., to port of shipment, ocean freight to destination, insurance and documentary fees.

This additional charge amounts approximately to 10 per cent on orders amounting to \$250.00; 8 per cent on orders from \$250.00 to \$500.00; 6 per cent on orders from \$500.00 to \$1000.00.

If the amount sent to us is more than enough to cover these expenses, the balance will be returned to the purchaser, with our receipted bill and the Bill of Lading, unless we are directed to hold it to his credit.

Guarantee

No transaction is ever considered closed where any dissatisfaction is known to exist on the part of the customer, who is assured of courteous and fair treatment without regard to the extent of his business.



Gurley Leveling and Stadia Rods

Gurley Rods are made for accuracy and service. The lumber is selected with the greatest care and is thoroughly seasoned in the Gurley Factory. The rod blanks are carefully finished and covered with a waterproof varnish. The rod faces are painted with a white enamel paint. The leveling

rod graduations are stamped into the wood, the stadia rod markings being stenciled. The fittings are substantial, and convenient to use.

Leveling rods, in the Philadelphia pattern, are made in various lengths, and types of construction. Stadia Rods can be had in a variety of designs, either in one piece or folding. A popular rod for the auto, serving both for leveling and for stadia, is the No. N-517 Lock Joint Sectional Rod.

For complete listing and description, send for the Gurley Rod Bulletin

Gurley Leveling Rods

No. N-501 2-ply Phila. Rod

Philadelphia graduations, 2 ply, 7.3 ft. closed, sliding to 13 ft., graduated to feet, 10ths, and 100ths, with verniers reading to 1000ths, and with oval Plain Target.

Price(ABAYU) \$15.00
With micrometer target(ABIOX) 18.00
Without Target(ABIPA) 12.00

No. N-505 3-ply Phila. Rod

Philadelphia graduations, 3 ply, 4.5 ft. closed, sliding to 12 ft., graduated to feet, 10ths, and 100ths, without target.

Price(ABIRF) \$16.50

No. N-506 4-ply Phila. Rod

Philadelphia graduations, 4 ply, 3.3 ft. closed, sliding to 11.3 ft., graduated to feet, 10ths, and 100ths, without target.

Price(ABIRL) \$18.00

No. N-517 Lock-Joint Sectional Rod

Extra wide, Philadelphia graduations, 12 ft. long, in three sections (two slip joints secured and released by spring catches), graduated in feet, 10ths, and 100ths, with carrying case.

Price(ABBEJ) \$18.00



No. N-501
With
Micrometer
Target



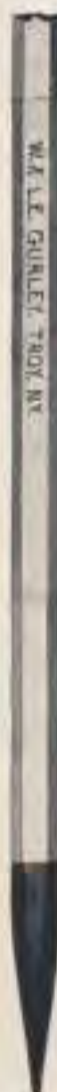
(Left)
No. N-505
(Right)
No. N-506



Gurley Leveling and Stadia Rods



Showing
Hinge Joint
with Folding Rods.
Hinges and Brace
Plates bolted
through wood.



Showing
Lock Joint
on
Sectional Rod

No. N-512
Folding Rod
6 to 12 ft.
Without Target
\$16.00
(ALROB)

No. N-517
Sectional Rod
4 to 12 ft.
3 sections, in case
Without Target
\$18.00
(ABBEJ)

No. N-521
Stadia Rod
12 ft.
One Piece
\$15.00
(ABAYR)

*Combination
Range Pole*
No. N-530, 7 ft.
(AKHON) \$6.25
Flagstaff
No. N-535, 8 ft.
(ABAZY) \$3.00

For other lengths and graduations, send for Gurley Rod Bulletin



Gurley Plummets

Many engineers tell us that Gurley Plummets are the finest made, from the standpoint of accurate centering, low center of gravity and quality of finish.

The point is hardened and can be replaced when worn. The plummets are regularly furnished with the long neck which makes it easy to see the point without bending. A short neck can be furnished if desired.

The prices include a 4 foot plummet cord and a non-magnetic adjuster. Extra points are 25 cents each. Special quantity prices will be quoted upon application.



No. 450
6 oz., \$1.20
(ABAPH)



No. 452
10 oz., \$1.50
(ABAPT)



No. 454
14 oz., \$2.00
(ABAPY)



No. 456
18 oz., \$3.00
(ABARB)



No. 457
24 oz., \$4.00
(ABARC)

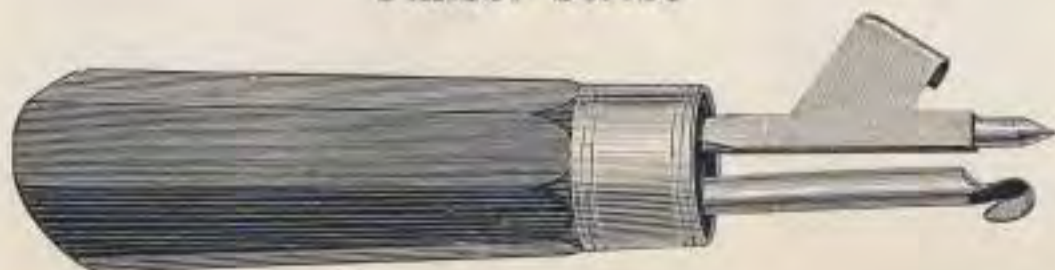
Gurley Plummet Sheath

No. 463 Sewed Leather Sheath, for 10 oz., 14 oz., and 18 oz. Plummets \$1.00

Spads, Stake Tacks, Plummet Cord

No. 471 Steel Spads, 2¼ in. long, for suspending plummets in mines, per 5080
 No. 472 Stake Tacks, galvanized, 2 oz. box10
 No. 473 Stake Tacks, galvanized, 1 lb. box40
 No. 474 Plummet Cord, braided linen, per 25 yards38

Timber Scribe



No. 750 Timber Scribe, for marking trees, posts, or boards \$1.25



No. 462
Chaining
Plummet
\$1.00



Gurley Engineers Leather Field Bag

No. 498 Engineers Field Bag, made of heavy sole leather, with two extra pockets and with shoulder strap. Inside measures 9 inches long, 7 inches high, 2½ inches wide \$12.00

Canvas Bag

No. B1182 Canvas Equipment Bag, 24 inch size, with closing straps and buckles, and leather handles \$7.50



No. 498

Gurley Rod Levels

For the Accurate Plumbing of Leveling and Stadia Rods



No. 545 Rod Level
As applied to a Rod



No. 546 Rod Level
For One Piece, or Folding Rods

No. 545 is adaptable to any rod. It is held in place by the hand or it may be secured by a string or rubber band snapped over hooks attached to each plate of the level. Folds together when not in use.

No. 545 Rod Level, for plumbing any rod..... \$5.00

No. 546 has a circular level vial, which folds against the rod when not in use. This level is attached permanently to the rod and cannot be used where there is a target or clamp band to slide past it. It is intended for rods made of one piece, or for those which fold.

No. 546 Circular Rod Level, with folding joint..... \$6.00

Note: Rod Level No. 546 has a one-piece hermetically sealed vial which, unless broken, will not leak. This feature overcomes a serious defect in circular levels made of two pieces of glass, and which cannot be guaranteed against leakage or evaporation.



Gurley Wood Box Pocket Compasses

The wood box compass, so called because the needle and circle are contained in a mahogany box, is a valuable pocket instrument for military topographers, foresters, timber cruisers, tourists and sportsmen. The cover, having a full width piano hinge, has a white line for sighting when open, and lifts the needle when closed. Unlike a metal compass, the box is not cold to the touch during the winter months.

- No. 3155 Pocket Compass, 2½" Needle, with jeweled center, needle automatically lifted when cover is closed, needle circle graduated on raised ring to degrees and figured 0 to 90 each way. Contained in mahogany case with piano hinged cover, 3½" wide by 3¼" deep by 1⅛" thick. Weight 6 oz. \$6.00
- No. 3156 Pocket Compass, like No. 3155, but with needle circle figured 0 to 360 6.00



Wood Box Compass
No. 3155 2½" Needle
\$6.00

- Clinometer Attachment, for Nos. 3155 or 3156, extra \$5.00
- Township Diagram on inside of cover of Nos. 3155 or 3156, extra 1.00
- "A Manual for Northern Woodsmen," by Austin Cary, Assistant Professor of Forestry in Harvard University. 16 mo., canvas, illustrations and maps, 250 pages. 3.00

Metal Pocket Compasses

- No. 3160 "Leedawl", 1 7/16" diameter, white metal open face case, with jeweled needle and stop. \$1.25
- No. 3175 "Aurapole", 1 7/16" diameter, white metal hunting case, thin model, with jeweled needle and stop. 4.00
- No. 3200 Pocket Compass, watch pattern, 2½" diameter, hunting case, raised ring, agate center, stop to needle, folding sights. 6.00

Steel Magnets

- No. 3850 2 inches \$.20
- No. 3852 3 inches35
- No. 3854 4 inches65
- No. 3856 5 inches 1.00
- No. 3858 6 inches 1.30
- No. 3860 7 inches 2.25



Brunton Pocket Transit



No. 3215

Brunton Pocket Transit, as used for taking vertical angles.

Price complete with compass, tripod head, tripod and leather sling case, \$47.50

This is a convenient and compact pocket instrument made for preliminary surveying on the surface or underground, by civil and mining engineers, mine managers and geologists. It can be used as a prismatic compass, sighting compass, clinometer and Abney Level.

Used as a hand instrument, sighting and reading are accomplished simultaneously, thereby rendering unnecessary the use of a staff or tripod.

The improved type with folding sight on cover has been adapted to a light camera tripod, which further increases its scope by enabling the running of long tangents by fore and back sighting, independently of the needle.



No. 3215

Brunton Pocket Transit, as used for taking courses or horizontal angles.

Price, Compass only, \$30.00

No. 3215 Brunton Pocket Transit, $2\frac{1}{4}$ " Needle, movable needle circle for setting off magnetic declination, graduated to degrees and figured 0 to 90 each way, two levels, pendulum clinometer reading vertical angles to single minutes, folding sights, aluminum alloy case, $2\frac{3}{4}$ " square by $1\frac{1}{8}$ " deep, rounded edges..... \$30.00

Extra Attachments for Brunton Transit

Ball and Socket Tripod Head.....	\$6.00
Tubular Extension Tripod.....	6.50
Plain Leather Case, for instrument only.....	1.75
Leather Case with belt loop, for instrument only.....	2.00
Leather Case with sling strap, for instrument only.....	2.50
Leather Case for instrument, tripod head, and tripod, with sling strap.....	5.00



Hand Levels

Monocular Hand Level

Made by W. & L. E. Gurley



No. 640
Monocular Hand Level
\$20.00

Monocular Hand Level No. 640 consists of a tube to which are fitted lenses, and which also contains a reflecting prism, a cross wire, and a level vial, the latter being seen in the open part of the tube.

The eye lens is composed of two separate pieces, the larger one being the usual concave eye lens and the smaller a segment of a plano-convex lens having its focus on a cross wire under the level vial and above the reflecting prism.

The observer holds the tube horizontal with the level opening uppermost, and observes the object to which the instrument is directed, and the position of the level bubble with reference to the cross wire on the under side of the level vial.

When the hand level is held truly horizontal the cross wire will bisect the bubble, and will determine the level of any object seen through the telescope, thus securing

to the observer a clear view of the object, magnified by the telescope.

The hand level is adjusted by sliding the prism tube back and forth until the line given is the same as that given by a Wye Level. The prism in the tube can be reached by removing the cap from the closed end of the tube, and it is clamped by a small screw on the lower side.

No. 640 Monocular Hand Level, in morocco case..... \$20.00

Locke Hand Level

Made by W. & L. E. Gurley

This new and improved pattern is an especially well made instrument, consisting of a brass tube $5\frac{1}{4}$ inches long, with a level vial on top near the object end, as shown. Beneath the vial is an opening in the tube, through which the bubble can be seen as reflected by a prism directly underneath. Both ends of the tube are closed by discs of plain glass, to exclude dust. In the interior is a half lens that magnifies the vial with its etched cross line, while the other half allows a clear image of the object viewed.



No. 643

Locke Hand Level, \$7.50

The vial is protected by a removable cover. Adjustment is made by comparing with a level line: Loosen the slotted screw on left hand side of level below vial. Move forward or backward as needed and tighten screw. Check against level line and repeat until adjustment is completed.

The Hand Level is beautifully finished in a dark, durable morocco, and is furnished in a convenient leather pouch having a loop for the belt.

No. 643 Locke Hand Level, as described, with leather pouch having belt loop, \$7.50



Abney Hand Level with Clinometer



No. 646-T

The Abney Level is a modification of the Locke Hand Level, combining with it an excellent clinometer.

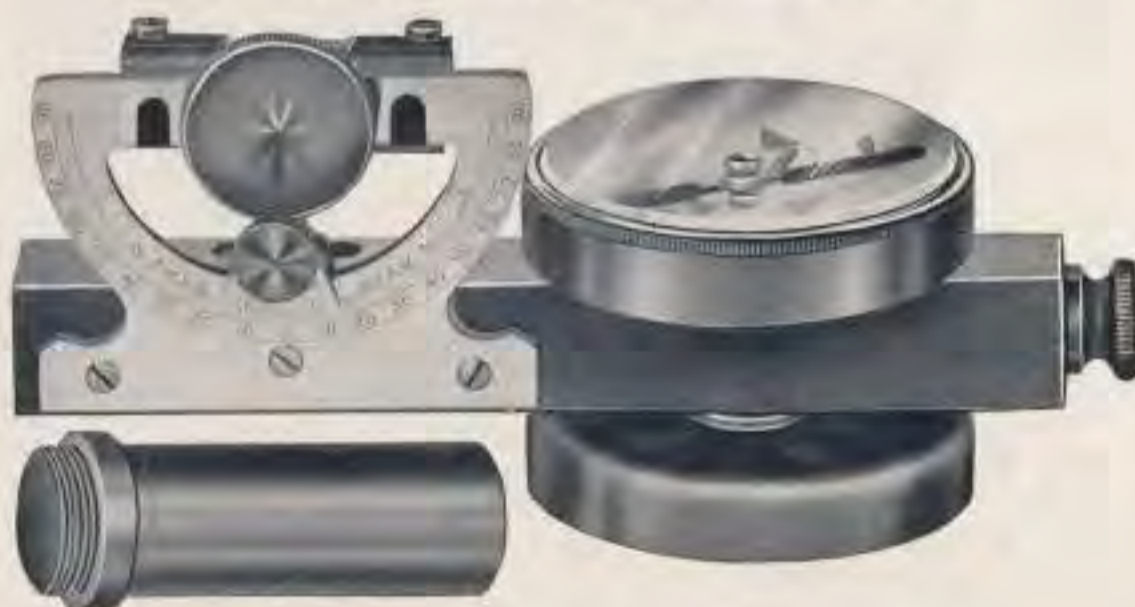
The main tube being square, it can be applied to any surface, the inclination of which is ascertained by bringing the level bubble into the middle, and reading off the angle to ten minutes by the arc and vernier.

When sighted at an object and the bubble brought into the middle, the vertical angle from the height of the eye is indicated. When at zero it indicates a level line.

The inner and shorter arc indicates the lines of different degrees of slope, the left edge of the vernier plate being applied to the lines, and the bubble brought into the middle as usual. When graduated to read percentages of grade, the Abney Level is a serviceable instrument for rapid work in connection with highway construction.

- No. 646-T Abney Level, graduated to degrees to read angles of elevation through 90 deg., vernier reading to 10 min., also to read slopes, as 1 to 1, 2 to 1, etc. With sole-leather pouch having shoulder strap \$21.50
- No. 647-T Abney Level, graduated to degrees, also to read per cent. of grade instead of slopes. With sole-leather pouch having shoulder strap 21.50

Abney Hand Level with Compass



No. 648

- No. 648 Abney Level with Compass, an improved Locke Hand Level similar to No. 646-T, and with revolving circular base by means of which horizontal angles can be measured, and plain staff socket, complete in leather pouch with shoulder strap \$30.00



Stadia Hand Level (Telescopic)



No. 649

- No. 649 Stadia Hand Level, telescope 10 in., with object glass 1 in., adjustable eyepiece, stadia hairs reading 1:100, with ball joint and socket. Useful for preliminary surveys, etc.; weight about 1½ lbs., in leather sling case \$43.00

Gurley Aluminum String Level



Railroad and highway contractors use this Aluminum String Level in transferring grade lines from grade stakes to center line; building contractors use it in setting their foundations and, in fact, it is useful in practically all types of engineering projects, including waterworks, sewerage and drainage problems.

This level, being made of aluminum, does not cause the string to sag toward the level. It is about three inches long and has a sensitiveness which insures accurate work. As indicated in the above illustration, the string hooks at the ends of the level are so designed that they will not become detached from the string in ordinary service. A guard over the center of the level vial protects it from breakage.

- No. 849 Gurley Aluminum String Level..... \$1.25

Pocket Magnifiers

Rubber Case, Oval Form, One Double Convex Lens

- No. 3520 1 inch diameter, mag. power 4 times \$1.00
 No. 3521 1¼ inches diameter, mag. power 3½ times 1.20
 No. 3522 1½ inches diameter, mag. power 3 times 1.50

Rubber Case, Oval Form, Two Double Convex Lenses

- No. 3526 ⅞ and 1 inch diameter, mag. power 4 to 8 times 1.50
 No. 3528 1¼ and 1½ inches diameter, mag. power 3 to 6 times 2.40
 No. 3550 German Silver Case, oval form, one 1 in. double convex lens 1.00



No. 3555

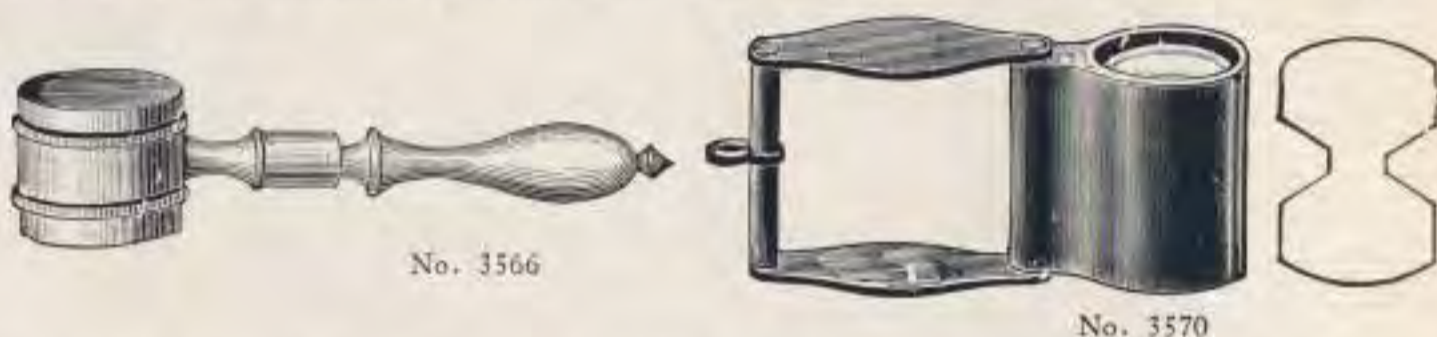
Magnifiers

- No. 3555 Microscope, brass mounted, on three legs, adjustable \$1.00
 No. 3560 Linen Prover, for counting threads in linen fabrics, brass mounted, ¼ inch square open space60



Magnifiers

No. 3566	Coddington Lens, brass mounted, small	\$1.25
No. 3567	Coddington Lens, brass mounted, medium	1.50
No. 3568	Coddington Lens, brass mounted, large	2.00
No. 3570	Coddington Lens, nickeled frame and cover, 1/2 inch diameter	1.50
No. 3571	Coddington Lens, nickeled frame and cover, 3/4 inch diameter	1.70
No. 3572	Coddington Lens, nickeled frame and cover, 1 inch diameter	2.75



No. 3575	Aplanatic Triplet, nickeled frame and cover, superior quality, giving perfect definition and flat field, 1/2 inch focus, power 20 times	\$6.00
No. 3577	Aplanatic Triplet, nickeled frame and cover, superior quality, giving perfect definition and flat field, 1 inch focus, power 10 times	6.00

Lenses Nos. 3566 to 3577 have extra power and definition for examining minerals, ore, rock, flowers, etc.

Reading and Picture Glasses

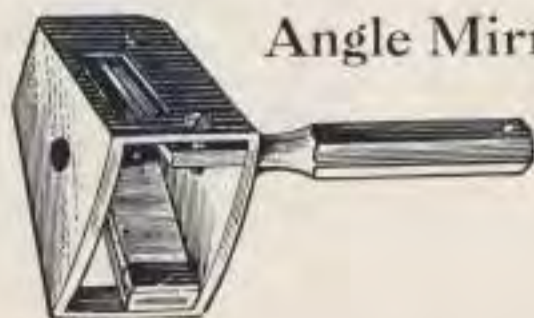
Reading Glass, Metal Frame, Double Convex Lens



No. 3585

No. 3585	2 inches diameter	\$1.25
No. 3586	2 1/2 inches diameter	1.50
No. 3587	3 inches diameter	1.75
No. 3589	4 inches diameter	2.35
No. 3591	5 inches diameter	3.75
No. 3593	6 inches diameter	6.00

Angle Mirrors and Prisms



No. 3256



No. 3260

No. 3256	Angle Mirror, plain, for angles of 90 degrees, in morocco case	\$8.00
No. 3260	Rectangular Prism, for angles of 90 degrees, in morocco case	6.00



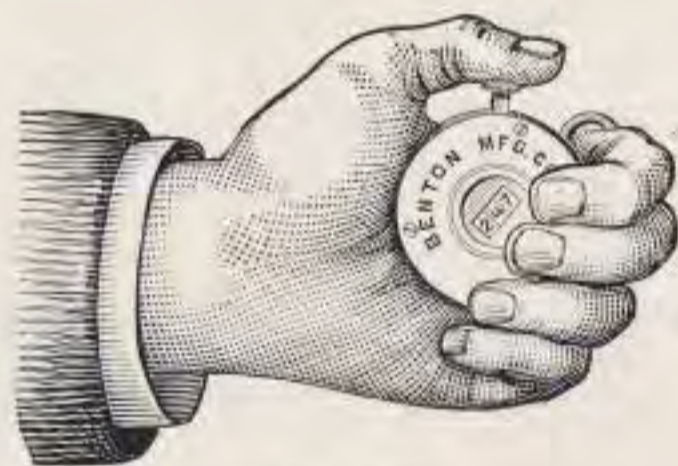
Surveyors Cross Staff Heads

- No. 3265 Surveyors Cross Staff Head, for 45 degree and 90 degree angles, Octagonal, 2½ inches long. With staff sockets \$5.00
- No. 3266 Surveyors Cross Staff Head, for 45 degree and 90 degree angles. Octagonal, 3 inches long. With magnetic compass, 1¼ inch needle, and with staff socket 6.00
- No. 3267 Surveyors Cross Staff Head, for 45 degree and 90 degree angles. Round, 3¾ inches long. With vertical axis graduated to 1 degree and vernier to 2 minutes. With magnetic compass, 2⅛ inch needle, and with staff socket 11.50

Pedometers, Passometers and Tally Registers.



No. 3276



No. 3280

- No. 3270 Pedometer, watch form, with automatic stem attachment to set the pointers to zero. Two dials register distance walked up to 100 miles by each ¼ mile \$5.00
- No. 3276 Passometer, watch form, with automatic stem attachment to set the pointers to zero. Three dials register each step up to 25,000 steps 5.00

With the Passometers, the distance walked is computed by multiplying the number of steps registered by the average length of stride.

- No. 3280 Tally Register, for surveyors and others; useful in chaining, for counting persons, cattle, coal, wheat, etc. Registers to 999 and can be set to zero at will..... 4.00
- No. 3281 Tally Register, same as No. 3280, but registering to 10,000 5.00



LUFKIN Measuring Tapes



LUFKIN steel and metallic tapes are marked with *Instantaneous* readings. This consists of repeating the foot mark before each inch, as shown in the illustration, which brings the total reading directly before the eye, eliminating all possibility of error.

NUBIAN finish is the style of finish designated on steel tapes. The ribbon is given a dead black finish and the graduations and figures appear in the bright and natural color.

"Reliable" Steel Tapes

Cases are made of finest grade russet leather closely handstitched and are metal lined. Nickel plated trimmings double folding flush handle.



Three-Eighth Inch Steel Tapes

		Each
No. 795	33 ft. marked 10ths or 12ths with links on back.....	\$6.30
No. 796	50 ft. marked 10ths or 12ths with links on back.....	8.60
No. 797	66 ft. marked 10ths or 12ths with links on back.....	10.90
No. 798	100 ft. marked 10ths or 12ths with links on back.....	15.00

"Reliable, Jr." Steel Tapes

Cases made of russet leather, metal lined nickel plated trimmings, double folding flush handle. A convenient vest pocket steel tape. Same as "Reliable", but one half its size and weight.



One-Quarter Inch Steel Tapes

		Each
No. 800	25 ft., marked 10ths or 12ths.....	\$5.10
No. 801	50 ft., marked 10ths or 12ths.....	7.70

Engineers Pattern Steel Tapes

An ideal tape for the engineer and one that we highly recommend. Metal lined hard leather cases nickel plated trimmings. The steel is heavier and stronger than used in regular steel tapes.



One-Quarter Inch Steel Tapes

		Each
No. 820	33 ft. marked 10ths or 12ths.....	\$7.50
No. 821	50 ft. marked 10ths or 12ths.....	8.75
No. 822	66 ft. marked 10ths or 12ths.....	11.30
No. 823	75 ft. marked 10ths or 12ths.....	12.50
No. 824	100 ft. marked 10ths or 12ths.....	15.60

Tapes listed above can also be furnished in metric or vara measurements, on reverse side, at an additional cost of two cents per foot added to list price.



Steel Tapes

"Rival" Steel Tapes

Nickel plated steel cases. Folding flush handle recommended for use around steel mills or such places where the tape comes in contact with oil or grease.

Three-Eighth Inch Steel Tapes

	Each
No. 809 33 ft. marked 10ths or 12ths	\$4.80
No. 810 50 ft. marked 10ths or 12ths	5.40
No. 811 66 ft. marked 10ths or 12ths	6.85
No. 813 100 ft. marked 10ths or 12ths	9.25



"Wolverine" Steel Tapes

Open metal reel, nickel plated brass, folding handles. Leather strap on reverse side by which tape can be firmly held when winding.

One-Quarter Inch Steel Tapes

	Each
No. 814 50 ft. marked 10ths or 12ths	\$11.10
No. 815 66 ft. marked 10ths or 12ths	13.50
No. 816 75 ft. marked 10ths or 12ths	15.00
No. 817 100 ft. marked 10ths or 12ths	19.00



Engineers Pattern Frame Steel Tapes

Metal frames and trimmings, hardwood handles, two detachable rings. Tape can be detached from frame and frame carried conveniently in pocket. Tapes less than 100 ft. long are put up on two arm frames; tapes 100 ft. and longer are put up on four arm frames.

One-Quarter Inch Heavy Steel Tapes

	Each
No. 890 50 ft. marked 10ths or 12ths	\$8.35
No. 891 75 ft. marked 10ths or 12ths	11.90
No. 892 100 ft. marked 10ths or 12ths	14.20
No. 893 200 ft. marked 10ths or 12ths	27.80



Lock Handle Frame Steel Tapes

Metal frames and trimmings fitted with lock handle which folds over the tape enabling one to stop it at any desired length.

Three-Eighth Inch Steel Tapes

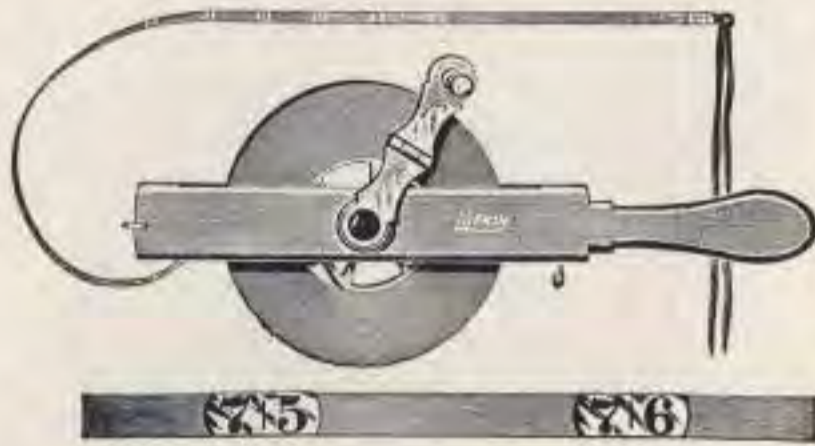
	Each
No. 894 50 ft. marked 10ths or 12ths	\$7.15
No. 895 100 ft. marked 10ths or 12ths	12.25

One-Half Inch Steel Tapes

No. 851 50 ft. marked 10ths or 12ths	8.35
No. 853 100 ft. marked 10ths or 12ths	14.20



Tapes listed above can also be furnished in metric or vara measurements, on reverse side, at an additional cost of two cents per foot added to list price.



Style of Graduation

One-Quarter Inch Heavy Steel Tapes

Marked in feet. End feet in 10ths and 100ths.

With Reel

Without Reel

		Each			Each
No. 776	100 ft.	\$9.00	No. 0776	100 ft.	\$6.00
No. 777	200 ft.	14.10	No. 0777	200 ft.	10.50
No. 778	300 ft.	21.25	No. 0778	300 ft.	15.90

Marked in links and poles. End links graduated 10ths of links.

No. 774	100 links	\$7.80	No. 0774	100 links	\$4.80
No. 775	200 links	12.00	No. 0775	200 links	8.40

Marked first decimeter in millimeters, first meter in centimeters, balance of tape in decimeters.

No. 25M	25 meters	\$8.70	No. 025M	25 meters	\$5.70
No. 30M	30 meters	9.90	No. 030M	30 meters	6.90
No. 50M	50 meters	15.00	No. 050M	50 meters	11.40
No. 100M	100 meters	27.00	No. 0100M	100 meters	21.00

Tapes Nos. 25M to 0100M can also be furnished with vara measurements instead of meters, at the same prices as listed above.

Steel Tapes

Surveyors Chain Tapes

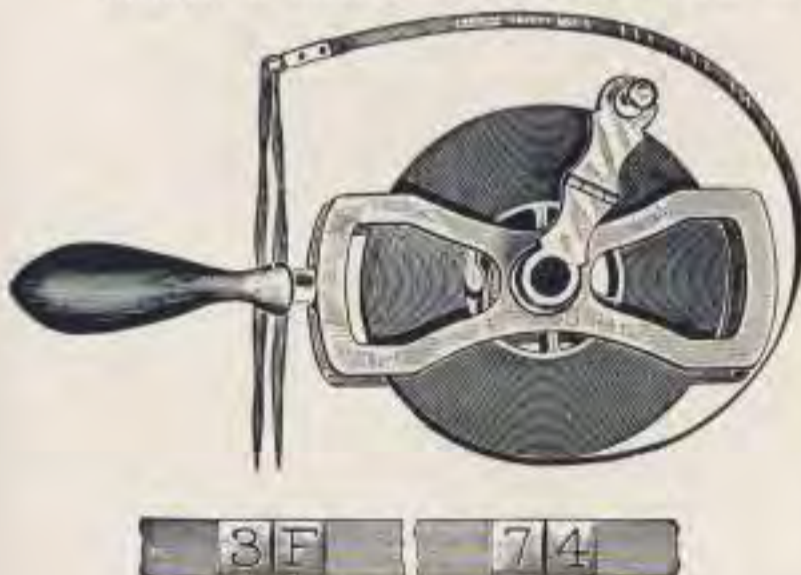
Etched Graduations

Nicely finished hardwood reel with large metal folding handle, nickel plated trimmings. Graduations deeply etched. A convenient, strong and durable chain tape for heavy field work. Tape is furnished with two heavy rawhide thongs.

Surveyors Chain Tapes

Babbitt Graduations

We recommend these tapes for use in highway and railroad construction, as they will withstand a great deal of rough usage. Made of practically unbreakable steel, heavily coated with white metal to prevent rusting and corrosion. Nickel plated metal frame with folding, winding handle, graduations stamped in babbitt metal, and furnished with rawhide thongs.



Style of Graduation

Five-Sixteenths Inch Steel Tapes

Marked feet. End feet in 10ths
Marked links. End links in 10ths

With Reel

Without Reel

		Each			Each
No. 974	100 links	\$7.80	No. 0974	100 links	\$4.80
No. 975	200 links	12.00	No. 0975	200 links	8.40
No. 976	100 ft.	9.00	No. 0976	100 ft.	6.00
No. 977	200 ft.	14.10	No. 0977	200 ft.	10.50
No. 978	300 ft.	21.25	No. 0978	300 ft.	15.90



Metallic Tapes

Metal lined hard leather cases, folding handles, nickel plated trimmings. Tape is made of best woven linen reinforced with metallic warp. Particularly recommended for use when an ordinary degree of accuracy is desired and where the use of a steel tape is not practical.

Five-Eighths Inch Woven Tapes

No.	Length	Markings	Each
No. 780	33 ft.	marked 10ths or 12ths	\$3.60
No. 782	50 ft.	marked 10ths or 12ths	4.50
No. 784	75 ft.	marked 10ths or 12ths	5.60
No. 786	100 ft.	marked 10ths or 12ths	7.00

Metallic Tapes Only—Without Cases

No. 790	33 ft.	marked 10ths or 12ths	\$1.80
No. 791	50 ft.	marked 10ths or 12ths	2.50
No. 793	75 ft.	marked 10ths or 12ths	3.25
No. 794	100 ft.	marked 10ths or 12ths	4.70



Pocket Steel Tapes

In nickel silver cases, spring wind-center stop

No.	Length	Markings	Each
No. 860	3 ft.	in 10ths or 12ths	\$1.00
No. 863	6 ft.	in 10ths or 12ths	1.25
No. 866	12 ft.	in 10ths or 12ths	2.75
No. 870	6 ft.	in 10ths one side and 12ths reverse side	1.50
No. 873	12 ft.	in 10ths one side and 12ths reverse side	3.10
No. 875	3 ft.	in 10ths or 12ths and meters	1.10
No. 877	6 ft.	in 10ths or 12ths and meters	1.50
No. 879	12 ft.	in 10ths or 12ths and meters	3.10



Stainless Steel Tapes

The lines of these tapes are of standard weight and of Genuine Stainless Steel, rust proof and non-corrosive. They are ideal for use wherever conditions commonly causing rust or corrosion are present.

The cases are of selected genuine leather, hand-stitched, and steel lined with folding flush handle opened by pressing pin on opposite side.

Three-Eighths Inch

No. 980	25 ft., marked 10ths or 12ths	\$6.65
No. 981	50 ft., marked 10ths or 12ths	10.00
No. 982	75 ft., marked 10ths or 12ths	12.90
No. 983	100 ft., marked 10ths or 12ths	15.00

Clamp Handles

For attaching to any part of a long steel tape, thus enabling one to stop it at any desired length. Brass, nicely nickel plated.

No. 846 Clamp Handle, each ... \$2.65





Tape Hooks

For attaching to steel tapes. Measures from inside of hook.

- No. 847 for $\frac{1}{4}$ inch tape, each.... \$0.60
- No. 848 for $\frac{3}{8}$ inch tape, each.... .60



Spring Balance

For applying exact tension at which a steel tape is standard. Brass, nickel plated indicating tension up to 20 pounds by half pounds.

- No. 844 each \$5.25



The Farrand Rapid Rule

An amazingly flexible six-foot rule which can be used for measuring circumferences and around irregular shapes like a steel tape, but which becomes rigid enough to be extended without support, like a yard stick. It is accurate, durable, convenient for taking short measurements when partly extended, and it coils up in a metal case which fits into a vest pocket.

- No. 1750 Farrand Rapid Rule, divided inches and sixteenths \$5.00
- No. 1751 Farrand Rapid Rule, divided tenths and hundredths of a foot. \$5.00
- No. 1752 Farrand Rapid Rule, 2 meters long, divided to millimeters \$5.00



- No. 1750 \$5.00

Flexible Spring Joint Wooden Rules

Brass plated trimmings, concealed joints, marked feet, 10ths and 100ths, one side. Feet and inches other side.



Yellow Enameled

- | | |
|-----------------------|--------|
| | Each |
| No. 1755-A 4 ft. | \$0.30 |
| No. 1755-V 5 ft. | .40 |
| No. 1755-C 6 ft. | .50 |

White Enameled

- | | |
|-----------------------|--------|
| | Each |
| No. 1755-B 4 ft. | \$0.35 |
| No. 1755-W 5 ft. | .45 |
| No. 1755-D 6 ft. | .55 |

Aluminum Folding Rules

These Rules are especially popular where folding wood Rules are often broken. They are light and accurate with sunken graduations in black showing up distinctly. Marked feet, 10ths and 100ths, one side. Feet, inches and 16ths other side.

- No. 1755E 6 ft. Aluminum Rule \$1.80
- No. 1755EH 6 ft. Aluminum Rule, with folding hook 1.90

Punch and Riveter for Repairing Tape Lines

This Punch cuts a clean hole in steel tapes of the usual thickness, and the eyelet is then inserted and quickly and neatly riveted. The punch is $7\frac{3}{4}$ inches long. For the repair of all tapes except heavy ribbon chain tapes.



- No. 885 Punch and Riveter, with two packages of eyelets..... \$4.50
- No. 886 Extra Eyelets, two lengths, two packages of 500 each length..... 1.25



The Eureka Tape Repairer

This outfit consists of thin sheet metal sleeves coated with a combination of solder and flux so sensitive that it will make a perfect adhesion with the tape by the heat of a lighted match. The repair can be made in the field in one minute. Complete directions accompany each outfit.



No. 887

No. 887 Eureka Tape Repair Outfit, complete with

One Dozen sleeves	\$0.60
Half-Dozen sleeves .....	.40

When ordering, be sure to specify width of tape and if heavy or light.

Gurley Brazed Steel Chains

No. 670	33 ft., 50 links, No. 12 tempered steel wire, brazed links and rings	\$15.00
No. 671	50 ft., 50 links, No. 12 tempered steel wire, brazed links and rings	18.00
No. 672	66 ft., 100 links, No. 12 tempered steel wire, brazed links and rings	25.00
No. 673	100 ft., 100 links, No. 12 tempered steel wire, brazed links and rings	30.00

Steel Snaps fitted to make 66 or 100 ft. chains into half chains, without extra charge, if ordered with the chain.

Marking Pins or Arrows

No. 740	Set of 11 Pins, No. 4 Iron Wire, nickel-plated, 14 in. long.....	\$1.45
No. 741	Set of 11 Pins, $\frac{1}{4}$ in. Brass Wire, 14 in. long.....	1.50
No. 742	Set of 11 Pins, No. 6 Steel Wire, nickel-plated, 14 in. long.....	1.75
No. 743	Set of 11 Pins, $\frac{3}{8}$ Steel Wire, 14 in. long, japanned red and white, alternating each inch. Quickly located in brush or grass.....	2.00
No. 749	Spring Steel Carrying Ring for marking pins.....	.35



Thermometers

Portable or Pocket Case Thermometer



No. 3935 Open



No. 3935 Closed

Polished Mahogany or Oak Case, with Reversible Cover

No. 3935 4 inches, Mercury "Open Air" range \$3.25

Asphalt or Tar Testing Thermometer



No. 3956

No. 3956 Asphalt or Tar Testing Thermometer, for highway engineers and road builders, in nickel-plated case \$6.00
 Extra tube fitted to case 4.00

Tape Testing Thermometer

No. 3957 Thermometer for tape line testing, in metal case, similar to No. 3956 \$2.50

U. S. Weather Bureau Set of Maximum and Minimum Thermometers



No. 3970

No. 3970 U. S. Weather Bureau Set of Maximum and Minimum Thermometers, 12 inches, aluminum scales, mounted together on one wood back \$16.50



Aneroid Barometers

Mountain Aneroid Barometers, compensated for temperature, with gilt cases and silvered dials, in morocco cases.

With the exception of No. 3336, all the Barometers mentioned are furnished with a rating card, showing the result of tests in comparison with our standard mercurial barometer.

A Leather Sling Case for Barometers Nos. 3310 to 3332, and omitting the morocco case, costs extra, \$5.00.

"The Aneroid Barometer; Its Construction and Use." A 126 page illustrated treatise by Geo. W. Plympton, C. E.; 16 mo., boards, 11th edition. Price, 75 cents.



No. 3316

No. 3300	Pocket Aneroid, 1¾ inches diameter, altitude scale to 3,000 feet, by each 10 feet	\$35.00
No. 3301	Pocket Aneroid, 1¾ inches diameter, altitude scale to 5,000 feet, by each 20 feet	34.00
No. 3302	Pocket Aneroid, 1¾ inches diameter, altitude scale to 10,000 feet by each 100 feet	35.00
No. 3303	Pocket Aneroid, 1¾ inches diameter, altitude scale to 16,000 feet, by each 100 feet	37.00
No. 3310	Pocket Aneroid, 2½ inches diameter, altitude scale to 3,000 feet, by each 10 feet	36.00
No. 3312	Pocket Aneroid, 2½ inches diameter, altitude scale to 5,000 feet by each 20 feet	35.00
No. 3314	Pocket Aneroid, 2½ inches diameter, altitude scale to 10,000 feet, by each 50 feet	36.00
No. 3315	Pocket Aneroid, 2½ inches diameter, altitude scale to 12,000 feet, by each 50 feet	37.00
No. 3316	Pocket Aneroid, 2½ inches diameter, altitude scale to 16,000 feet, by each 50 feet	38.00
No. 3318	Pocket Aneroid, 2½ inches diameter, altitude scale to 20,000 feet by each 100 feet	39.00
No. 3329	Pocket Metric Aneroid, 2½ inches diameter, altitude scale to 1,500 meters, reading to 5 meters, and pressure scale reading to ½ millimeter	36.00
No. 3330	Pocket Metric Aneroid, 2½ inches diameter, altitude scale to 3,000 meters, reading to 10 meters, and pressure scale reading to 1 millimeter	36.00
No. 3332	Pocket Metric Aneroid, 2½ inches diameter, altitude scale to 5,000 meters, reading to 20 meters, and pressure scale reading to 2 millimeters	38.00
No. 3336	Plain Aneroid, no altitude scale, 5 inches diameter, with thermometer and open face to show mechanism, for parlor use	18.00



Surveying and Mining Aneroids

Aluminum Cases, Silvered Dials, with Revolving Magnifier, Compensated for Temperature, in Leather Sling Cases



No. 3360

The Surveying and Mining Aneroid has been constructed especially for the use of surveyors and engineers, for ascertaining slight variations in gradients, levels, etc., and from its extreme sensitiveness will be found of considerable utility in mining and surveying work generally.

The Vernier Scale is moved by rack and pinion, and the magnifier which rotates on the outer circumference of the instrument facilitates the reading of the vernier.

Three-Inch Aneroids

No. 3350	Surveying Aneroid, altitude scale to 6,000 feet, by each 20 feet, and by vernier to 2 feet	\$75.00
No. 3352	Surveying Aneroid, with altitude scale to 10,000 feet, by each 20 feet, and by vernier to 2 feet.....	80.00
No. 3354	Surveying Aneroid, with altitude scale to 16,000 feet, by each 50 feet, and by vernier to 5 feet	85.00

Five-Inch Aneroids

No. 3360	Surveying Aneroid, with altitude scale to 5,000 feet, by each 10 feet, and by vernier to 1 foot	88.00
No. 3362	Surveying Aneroid, with altitude scale to 10,000 feet, by each 20 feet, and by vernier to 2 feet	93.00
No. 3364	Surveying Aneroid, with altitude scale to 16,000 feet, by each 20 feet, and by vernier to 2 feet	98.00
No. 3366	Surveying Aneroid, with altitude scale to 20,000 feet, by each 50 feet, and by vernier to 5 feet	97.00



Engineers Blank Field Books

Superior Quality and Very Durable, with Fabrikoid Binding and Rounded Corners
Made especially for W. & L. E. Gurley



No. 2725 Level Books, $4\frac{1}{2} \times 7\frac{1}{4}$ inches, 60 leaves, with Tables, per dozen, \$10.00; or single \$0.85



No. 2728 Transit Books, $4\frac{1}{2} \times 7\frac{1}{4}$ inches, 60 leaves, with Tables, per dozen, \$10.00; or single \$0.85



No. 2731 Field Books, $4\frac{1}{2} \times 7\frac{1}{4}$ inches, 60 leaves, with Tables, per dozen, \$10.00; or single \$0.85
 No. 2738 Cross Section Books, $4\frac{1}{4} \times 7\frac{1}{4}$ inches, 80 leaves, ruled 10 spaces per inch, per dozen, \$13.85; or single 1.25
 No. 2742 Cross Section Books, $6\frac{1}{2} \times 8\frac{1}{2}$ inches, 80 leaves, ruled 10 spaces per inch, per dozen, \$20.40; or single 1.75
 No. 2744 Earthworks Books, $5 \times 7\frac{3}{4}$ inches, 80 leaves, with printed headings and tables for railroad engineers, per dozen, \$17.00; or single 1.50

Continuous Profile Books

These books are for field or office purposes, being printed on a tough, thick paper, mounted upon a continuous piece of muslin and bound in book form with flexible morocco covers, convenient for the pocket. Each page will contain a profile of three thousand feet in length, so that each two pages facing will contain an average section of six thousand feet for a road as



Continuous Profile Books

(continued)

usually laid out for construction. Railroad and other engineers will find them very useful. The rulings correspond to our large profile plates, A and B, Plate A ruled 4 x 20 per inch, Plate B ruled 4 x 30 per inch.

No. 2715	Plate A, about 8½ x 6 inches, profile 12 miles	\$5.25
No. 2716	Plate A, about 8½ x 6 inches, profile 25 miles	7.50
No. 2717	Plate A, about 8½ x 6 inches, profile 50 miles	12.00
No. 2718	Plate A, about 8½ x 6 inches, profile 100 miles	21.00
No. 2720	Plate B, about 8 x 5¼ inches, profile 12 miles	5.25
No. 2721	Plate B, about 8 x 5¼ inches, profile 25 miles	7.50
No. 2722	Plate B, about 8 x 5¼ inches, profile 50 miles	12.00
No. 2723	Plate B, about 8 x 5¼ inches, profile 100 miles	21.00

Engineers Loose Leaf Field Books

The advantages of the Loose Leaf Books, are that the engineer working in the field can send any of his notes to the office, daily or weekly, and at the same time continue to use the books. It also permits filing any notes of any particular survey together.

Size of covers, 4⅞ x 7 inches, 50 leaf capacity with three rings, furnished in two bindings, Fabrikoid and Black Morocco.

No. 2745	Loose Leaf Cover only, Fabrikoid binding, each	\$1.50
No. 2746	Loose Leaf Cover only, Black Morocco binding	2.00
No. 2747	Loose Leaves, No. 2725 ruling, 50 leaves in set	.50
No. 2748	Loose Leaves, No. 2728 ruling, 50 leaves in set	.50
No. 2749	Loose Leaves, No. 2731 ruling, 50 leaves in set	.50
No. 2750	Loose Leaves, No. 2738 ruling, 50 leaves in set	.50
No. 2750A	Transfer Binder for loose leaves, each	.80

Lead Pencils

No. 2751	Eldorado Pencils, hexagon, Nos. 2B to 8H. The highest grade drawing pencil, per dozen	\$1.00
No. 2758	Ticonderoga Office Pencil with rubber tip, No. 2 Soft, per dozen	.50
No. 2759	Ticonderoga Office Pencil with rubber tip, No. 2½ Medium, per dozen	.50
No. 2760	Ticonderoga Office Pencil with rubber tip, No. 3 Hard, per dozen	.50
No. 2768	Leads, H to 6H, 6 in box. These leads fit the pencil legs of modern drawing compasses; per box	.50
No. 2778	Hardtmuths Koh-i-noor Pencils, hexagon, superfine, 2B to 8H, per dozen	1.20
No. 2784	Pencil Point Protector, with rubber tip	.05

Colored Pencils

No. 2785	Round, Red, Blue, Green and Yellow Pencils, per dozen	\$1.25
No. 2790	Round, Wax Crayon Pencils, 6 in box, assorted colors, per box	.75
No. 2791	Round, Wax Crayon Pencils, 12 in box, assorted colors, per box	1.50

Dixon Lumber Crayons

For Marking Stakes and Boards

These crayons are superior quality and do not soil the hands.

No. 2797	Lumber Crayons, waterproof, best quality, red, blue, black or yellow, per dozen	\$1.20
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Prism Binoculars
American Make, Finest Quality



The Prism Binocular, in design and construction, is simple, compact, of light weight and fine finish. It combines large field of view with great magnifying power and clear definition. One eye piece cap is graduated and can be adjusted for normal, near-sighted and far-sighted eyes. The metal body is covered with fine black morocco and each Binocular has a leather case with strap.

Nos. 3458 to 3461

No.	Magnifying Power	Diameter of Objective	Width of Field 1000 Yards	
3458	6 x	25 mm.	143 yds.	\$58.00
3460	8 x	25 mm.	114 yds.	62.00
3461	8 x	30 mm.	114 yds.	75.00

Telescopes

Morocco-covered Body and Burnished Draw Tubes

No. 3475	Telescope, with 3 draws, 17 $\frac{1}{4}$ inches drawn out, 6 $\frac{1}{2}$ inches shut, objective 1 $\frac{1}{8}$ inches in diameter, power 12 times	\$5.00
No. 3477	Telescope, with 3 draws, 23 $\frac{3}{4}$ inches drawn out, 8 $\frac{1}{2}$ inches shut, objective 1 $\frac{1}{2}$ inches in diameter, power 20 times	9.00
No. 3478	Telescope, with 3 draws, 31 inches drawn out, 10 $\frac{3}{4}$ inches shut, objective 1 $\frac{5}{8}$ inches in diameter, power 25 times	14.00
No. 3479	Telescope, with 4 draws, 37 inches drawn out, 11 inches shut, objective 2 inches in diameter, power 30 times	25.00



No. 3485

No. 3485	Telescope, with oxidized draw tubes and brass body covered with morocco; three draws, 17 inches drawn out, 6 inches shut; objective 1 $\frac{1}{4}$ inches in diameter; sun shade; leather caps to cover eyepiece and objective, and shoulder strap. Power 20 times	\$12.00
No. 3486	Telescope, same as No. 3485, but is 21 inches drawn out, 7 inches shut; objective 1 $\frac{5}{8}$ inches diameter. Power 25 times	15.00
No. 3487	Telescope, same as No. 3485, but is 24 inches drawn out, 9 inches shut; objective 1 $\frac{3}{4}$ inches diameter. Power 30 times	22.00
No. 3488	Telescope, same as No. 3485, but has four draws, 36 inches drawn out, 10 inches shut; objective 2 inches in diameter. Power 35 times	35.00



Anemometers and Air Meters

Anemometers and Air Meters are used for registering the pressure and velocity of air currents in mines, tunnels, sewers, the ventilators of public buildings, etc. They can also be used outside in meteorological work, for determining the true direction of surface winds.

The indications are obtained by means of a delicately poised fan wheel, the record being commenced by the long hand, which travels the extreme outer circumference of the main dial, and is continued by a series of smaller dials.

Placed in an air passage, the instrument registers automatically the linear feet of air passing. Timing the readings will give the rate of flow, which multiplied by the area of the passage gives the quantity rate of discharge.

The Anemometer is the portable Birams Model. The Air Meter is designed for permanent mounting in an air passage, either on a shelf or projecting rod.

All instruments are provided with a special device whereby all the indices, or hands, can be set back to the zero, or starting point. A chart of corrections for different velocities is also supplied.

Two-dial instruments will stand velocities up to 1,000 feet a minute. Four-dial and six-dial instruments will stand velocities up to 3,000 feet a minute. Higher velocities called for by strong blast currents require instruments made exceptionally strong. These are not listed, but will be quoted on, when requested.



No. 3386



No. 3395

Anemometers

- | | | |
|----------|--|---------|
| No. 3380 | Birams Anemometer, 3 inches diameter, reading to 1,000 ft., with disconnecter and zero setting arrangement in sole leather carrying case | \$45.00 |
| No. 3383 | Birams Anemometer, 4 inches diameter, reading to 100,000 ft., with disconnecter and zero setting arrangement in sole leather carrying case | 40.00 |
| No. 3386 | Birams Anemometer, 6 inches diameter, reading to 100,000 ft., with disconnecter and zero setting arrangement in sole leather carrying case | 43.00 |

Air Meters

- | | | |
|----------|---|---------|
| No. 3395 | Portable Air Meter, with fan wheel $2\frac{3}{4}$ inches diameter, four dials, recording to 100,000 feet, and disconnecter. The pointer can be set to zero at will by a setting attachment and key, with case | \$40.00 |
| No. 3397 | Portable Air Meter, with fan wheel $2\frac{3}{4}$ inches diameter, six dials, recording to 10,000,000 feet, and disconnecter, but without setting attachment, with case | 40.00 |



The Gurley Factory

W. & L. E. GURLEY

Established 1845

TROY, N. Y., U. S. A.

Makers of

Surveying Instruments

Transits, Levels, Compasses, Alidades, Plane Tables, Sketching Cases, Leveling and Stadia Rods, Plummets, Hand Levels, Chains and Field Supplies.

Hydraulic Engineering Instruments

Daily, Weekly, Continuous and Long Distance Water Level Recorders, Water Level Indicators, Hook Gages, Price Type Acoustic and Electric Current Meters.

Standard Weights and Measures

Precision Weights, Measures, Balances and Inspectors Equipment.

Descriptive Bulletins sent on request

**DRAWING INSTRUMENTS
AND OFFICE SUPPLIES**

Pages 1100 to 1199

Drawing Instruments and Office Supplies

Bulletin No. 1100

Revised April 1, 1930

Subject to change without notice

Copyright 1930



Main Office and Factory, Troy, N. Y.
New York City Sales Office, 49 Chambers Street



Drawing Instruments and Office Supplies

In order that Gurley may furnish complete service to Engineers and Surveyors, a selected line of Drafting Instruments and Engineering Office Supplies is carried in stock. These supplies are not made by Gurley, with a few exceptions, but are furnished by reliable makers of such equipment. Based upon years of satisfactory trial by our customers, we recommend them to you.

For the convenience of our customers, we will furnish any articles not listed in this catalog, but which are described in the catalog of any American maker or dealer of mathematical instruments.

Many articles, particularly those of foreign manufacture, fluctuate in price. All prices are correct at the time of sending out this catalog, but are subject to change without notice.

How to Order and Other Information

Address Main Office, Troy, N. Y.

Address all correspondence and orders to our Main Office and Factory, Troy, N. Y.

An extensive stock of instruments and supplies is maintained at Troy so that prompt service can be given.

A New York City Sales Office is located at 49 Chambers Street, where a stock of the most popular instruments is available for inspection and immediate delivery.

All orders are immediately acknowledged, showing how we expect to fill your order. Do not confuse this order acknowledgement with the invoice, which is mailed at time of shipment.

If further correspondence relative to your order is necessary, always refer to our order number.

Order Blanks

An order blank is sent out with each catalog. Additional blanks, if wanted, will be sent upon request. If at any time you have no order blanks, write your order on any paper.

Orders by individuals sent on firm stationery, should state whether the charge is to be made against the firm or against the individual.

Orders by firms should be made out on the regular firm order forms, and signed by an authorized individual. If invoices on your own special forms are required, kindly send forms with your order.

Telegraph Orders

Many catalog numbers have a corresponding code word which can be used when ordering by telegraph or cable.

Many parts and attachments have corresponding code words. Add these code words to the code word of the instrument, when such parts and attachments are desired.

Confirm all telegraph and cable orders with a written order.

Order by Catalog Number and Name

Written orders should give the catalog number and name of the instrument. Where no catalog number exactly covers what you want, give as full particulars as possible, so as to avoid the delay of writing you for further information.

The wide variety of Gurley Instruments and the interchangeability of many of their parts, offers opportunity for "special purpose" instruments to be made up. When ordering such instruments, give complete description and sketches. Orders for special instruments, which cannot be made from standard parts, cannot be accepted.

No Charge for Packing

Special attention is paid to the packing of all goods for shipment. Instruments should reach their destination in perfect adjustment. The instrument cases are carefully wrapped and are packed in corrugated board cartons lined with excelsior. This type of packing is nearly damage-proof and greatly reduces shipping charges. Export shipments which go by steamship have the instrument cases wrapped in water-proof paper and packed in wire-bound and cleated boxes stuffed with excelsior. Instructions regarding private markings are carefully followed.



How to Order and Other Information

(continued)

Transportation Charges

All transportation charges are to be paid by the customer.

When goods are to be shipped by parcel post, be sure to include with your remittance to pay for goods, additional money to pay for postage. Do not send stamps for this purpose.

When goods are to be shipped by express and there is no express agent at your nearest railroad station, it is necessary that you state the nearest town at which there is an agent. You pay the charges when the shipment reaches you. Be sure to give your shipping point if it is different from your post office address.

We do not recommend shipping instruments by freight.

Parcel Post Insurance

Most of the accessories, repaired parts and replacement parts are small enough to be sent parcel post. They can be insured against damage or loss at a small extra cost, the amount of which should be added to the remittance for the goods and for the postage.

The rates vary according to the value of the package, as follows:

POST OFFICE INSURANCE: Repaired parts, the loss of which we cannot replace, are insured at the post office. Value up to \$5.00—5 cents; \$5.00 to \$25.00—8 cents; \$25.00 to \$50.00—10 cents; \$50.00 to \$100.00—25 cents.

INDEMNITY INSURANCE: For convenience and promptness in adjusting claims, accessories and new parts are insured in a commercial indemnity company. Value up to \$25.00—5 cents; \$25.00 to \$50.00—10 cents; \$50.00 to \$100.00—25 cents.

Special Shipping Instructions

If you want goods shipped to someone else, or if your shipping point is not the same as your post office, be sure that this information is clearly noted on your order.

Claims for Loss or Damage

If goods are not received promptly after receipt of our invoice, notify us at once and, when possible, a duplicate shipment will be made.

If the package is received and shows signs of rough handling note on the carrier's receipt "Received in bad condition." Notify us immediately and, when possible, a duplicate shipment will be made.

Upon your notification that a shipment has been lost or damaged, we will send you the necessary papers to prepare so that we can present the claim.

Change of Address

Customers who contemplate changing their address will confer a favor by sending us both their old and new addresses, so that our mailing files may be revised accordingly.

Return of Merchandise

Any purchase found, upon examination, to be not entirely satisfactory may be returned for exchange or credit, or if preferred, money will be refunded.

Please tell us why the goods you are returning are unsatisfactory. We ask this because we are anxious to improve the quality of our goods and of our service in any possible way. We will appreciate any suggestions from you.

Terms of Payment

CASH WITH ORDER: Customers who have not established their credit with us, should send their remittance (including postage and insurance), with their order. Remittance can be sent in any of the following ways:

1. Post Office Money Order.
2. Express Money Order.
3. Bank Draft.
4. Cash by Registered Mail.

If on a rural route, give letter containing order and money to the carrier who will buy a money order at the post office and forward it with your order.

C. O. D. SHIPMENTS: When the money does not accompany the order, and when credit information is not available to us, goods will be shipped C. O. D. A small charge is made by the post office or express company for returning money on such shipments. Such charges for orders amounting to less than \$20.00 are to be paid by the customer; over this amount we pay the charges. Shipments made C. O. D. are no reflection on the credit of the customer, but in the absence of sufficient credit information, this method enables us to give more prompt service.

HOW TO OPEN AN ACCOUNT: Those desiring to open an account with us should write stating the approximate amount of credit desired, and give the names of three firms with whom they are doing business, also the name of the bank handling their account. As time is required to investigate such references, this should be considered when placing your order. For prompt action on urgent orders, furnish the above data by wire. Customers who have established their credit with us, will be billed 30 days net cash.

Foreign Shipments

Orders for foreign shipment should be accompanied by remittance. Remittance can be made in any one of the following ways:

1. Order on a bank or agent in New York City to pay in funds current at par, against presentation of shipping documents.
2. International Money Order.
3. American Express Money Order.
4. American Bank Notes.

An additional remittance must be sent when foreign shipments are to be made directly to the customer. This covers transportation from the Factory, at Troy, N. Y., to port of shipment, ocean freight to destination, insurance and documentary fees.

This additional charge amounts approximately to 10 per cent on orders amounting to \$250.00; 8 per cent on orders from \$250.00 to \$500.00; 6 per cent on orders from \$500.00 to \$1000.00.

If the amount sent to us is more than enough to cover these expenses, the balance will be returned to the purchaser, with our receipted bill and the Bill of Lading, unless we are directed to hold it to his credit.

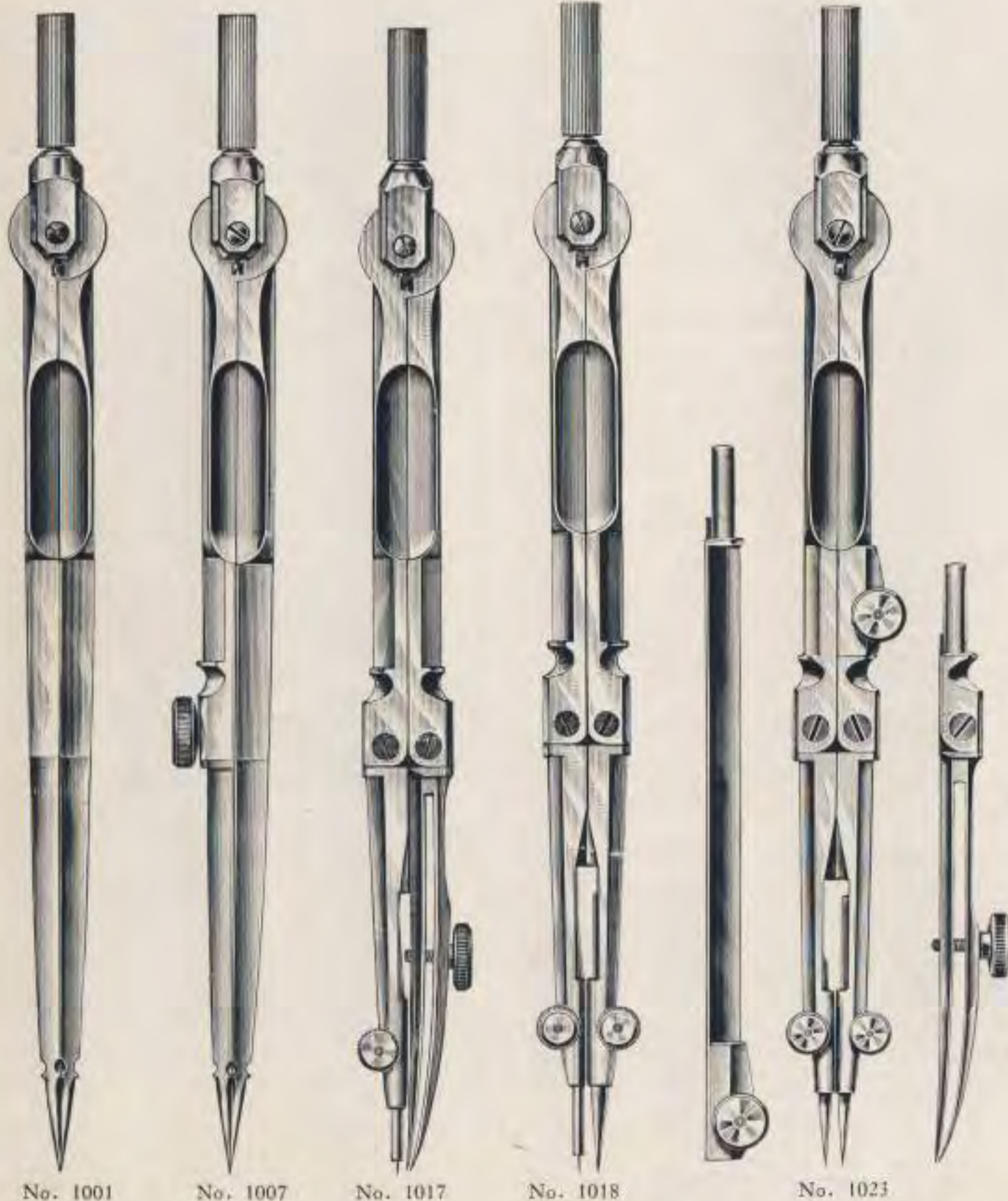
Guarantee

No transaction is ever considered closed where any dissatisfaction is known to exist on the part of the customer, who is assured of courteous and fair treatment without regard to the extent of his business.



Altener's Patent Joint Drawing Instruments

American Make, Finest Quality



No. 1001

No. 1007

No. 1017

No. 1018

No. 1023

Altener Drawing Instruments are the best on the market today. The Engineer who desires a set of Drawing Instruments that will give years of service under continued use, should select "Altener." The excellence of these instruments consists in the joints of the dividers being so constructed as to prevent any irregular motion when the legs are opened or closed, also in the general care with which the instruments are finished. All the pens are carefully ground and pointed, insuring a smooth and velvety drawing surface.



Alteneider's Patent Joint Drawing Instruments

		Price	Postage
No. 1001	Plain Dividers, 4 $\frac{1}{4}$ in.	\$3.50	\$.14
No. 1002	Plain Dividers, 5 $\frac{3}{4}$ in.	4.00	.14
No. 1007	Hairspring Dividers, 4 $\frac{1}{4}$ in.	6.00	.14
No. 1008	Hairspring Dividers, 5 $\frac{3}{4}$ in.	6.50	.14
No. 1017	Compasses, 4 $\frac{1}{4}$ in., with fixed needle and pen points.....	6.50	.15
No. 1018	Compasses, 4 $\frac{1}{4}$ in., with fixed needle and pencil points....	6.50	.15
No. 1019	Compasses, 6 $\frac{1}{4}$ in., with fixed needle and pen points.....	7.75	.15
No. 1020	Compasses, 6 $\frac{1}{4}$ in., with fixed needle and pencil points....	7.75	.15
No. 1023	Compasses, 4 $\frac{1}{4}$ in., with fixed needle point, and pen and pencil points and lengthening bar.....	10.75	.15
No. 1024	Compasses, 4 $\frac{1}{4}$ in., with fixed needle point, with hairspring, and pen and pencil points and lengthening bar.....	12.75	.15
No. 1025	Compasses, 6 $\frac{1}{4}$ in., with fixed needle point, and pen and pencil points and lengthening bar.....	11.75	.16
No. 1026	Compasses, 6 $\frac{1}{4}$ in., with fixed needle point, with hairspring and pen and pencil points and lengthening bar.....	13.75	.16
No. 1035	Steelspring Bow Spacer, metal handle, 3 $\frac{1}{4}$ in.	3.00	.12
No. 1036	Steelspring Bow Spacer, needle points, metal handle, 3 $\frac{1}{4}$ in.	3.75	.12
No. 1037	Steelspring Bow Pen, needle point, metal handle, 3 $\frac{1}{4}$ in....	4.00	.12
No. 1038	Steelspring Bow Pencil, needle point, metal handle, 3 $\frac{1}{4}$ in.	3.75	.12
No. 1039	4 in. Self-adjusting Needle Point Bow Pen.....	6.25	.12
No. 1040	4 in. Self-adjusting Needle Point Bow Pen and Pencil....	7.75	.12
No. 1050	Drawing Pen, with spring blade, ebony handle, 4 $\frac{1}{4}$ in....	2.25	.13
No. 1051	Drawing Pen, with spring blade, ebony handle, 5 in....	2.50	.13
No. 1052	Drawing Pen, with spring blade, ebony handle, 5 $\frac{1}{2}$ in....	2.75	.13
No. 1053	Drawing Pen, 4 $\frac{1}{4}$ in., with patent spring hinge, ebony handle	4.25	.13
No. 1054	Drawing Pen, 5 in., with patent spring hinge, ebony handle	4.50	.13
No. 1055	Drawing Pen, 5 $\frac{1}{2}$ in., with patent spring hinge, ebony handle	4.75	.13
No. 1060	Railroad Pen, ebony handle, 5 in.....	5.50	.13
No. 1062	Swivel Curve Pen, spring blade, hollow metal handle.....	3.00	.13
No. 1064	Pricker, with removable needle point, ebony handle.....	1.50	.12
No. 1066	Tubular Nickel-plated Case, for leads.....	.25	.02



Altener's Patent Joint Drawing Instruments



No. 1050



No. 1035



No. 1036



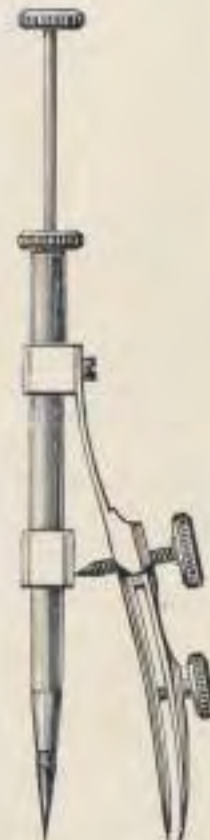
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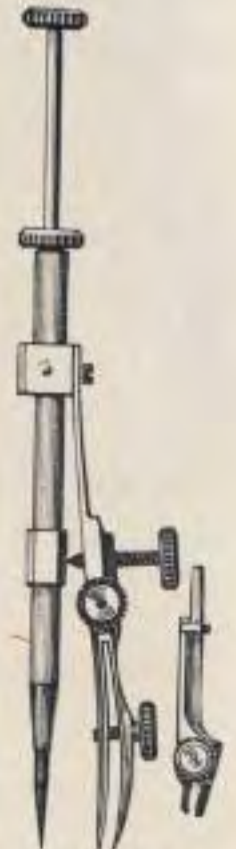
No. 1037



No. 1038



No. 1039



No. 1040



Alteneader's Patent Joint Drawing Instruments
In Morocco Case



No. 1077

		Price	Postage
No. 1075	Morocco Case containing: Compasses, No. 1025; Bow Pen, No. 1037; Drawing Pen, No. 1051; Box of Leads.....	\$22.25	\$.20
No. 1077	Morocco Case, containing: Compasses, No. 1025; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pen, No. 1051; Box of Leads.....	26.00	.22
No. 1079	Morocco Case, containing: Hairspring Dividers, No. 1008; Compasses, No. 1025; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads.....	37.75	.25



No. 1079



Altener's Patent Joint Drawing Instruments In Morocco Case

	Price	Postage
No. 1081 Morocco Case, containing: Hairspring Dividers, No. 1008; Compasses, No. 1026; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads.....	\$39.75	\$.25
No. 1083 Morocco Case, containing: Hairspring Dividers, No. 1008; Compasses, Nos. 1023 and 1025; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads.....	48.75	.30



No. 1085

	Price	Postage
No. 1085 Folding Pocket Case, with flexible flaps and containing same instruments as in Set No. 1079.....	\$39.75	\$.25
No. 1087 Folding Pocket Case, flexible flaps, containing Hairspring Dividers, No. 1008; Compasses, No. 1026; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads.....	41.75	.25

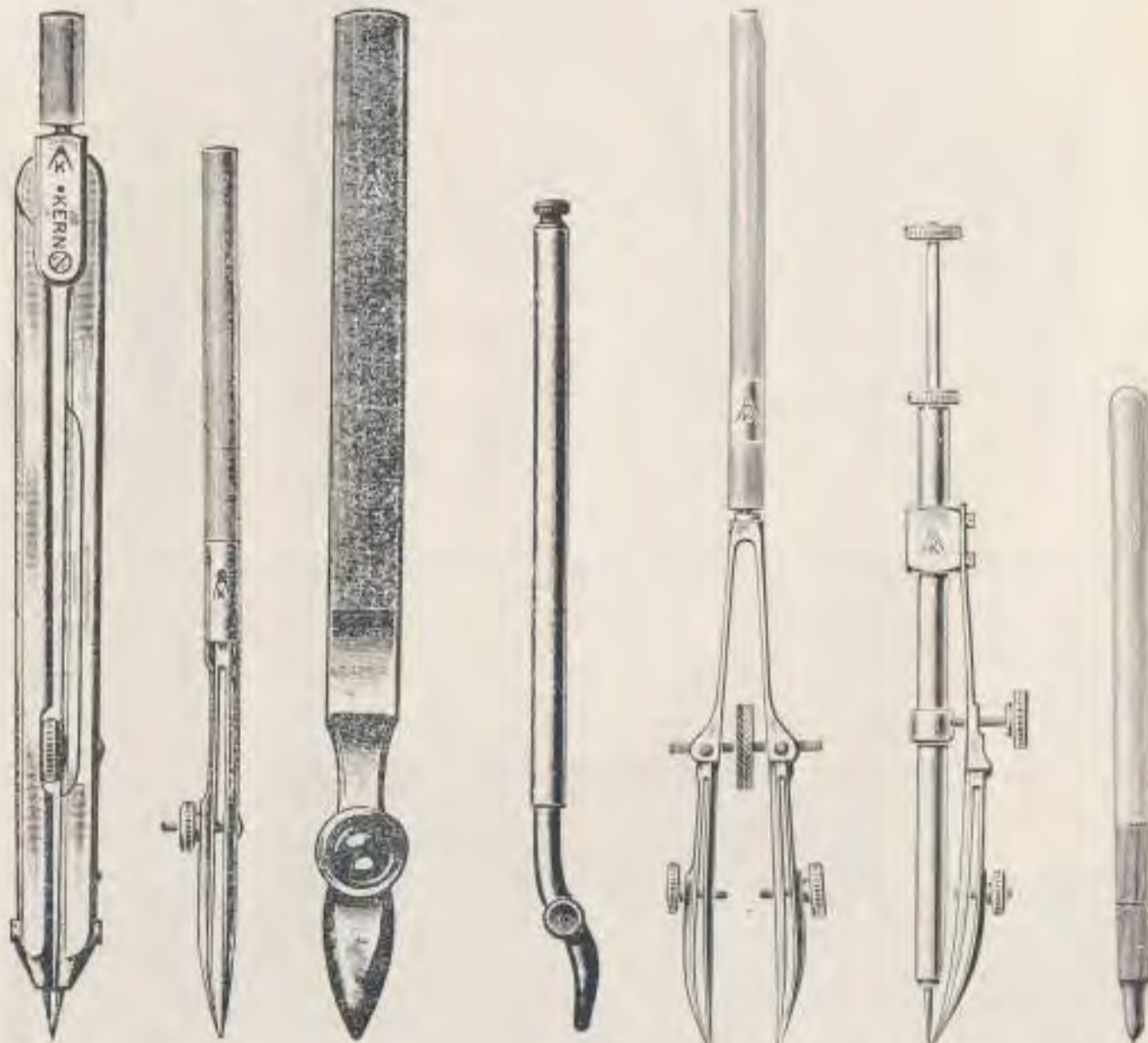
Empty Cases for Altener's Instruments

- No. 1090 Empty Folding Pocket Case, with flexible flaps, and fitted to receive from five to twelve pieces of drawing instruments. Price, according to size of case, \$6.00 to \$8.00; postage..\$0.15 to \$0.30
- Folding Pocket Cases furnished, instead of the usual morocco cases, with Sets Nos. 1075 to 1083, at an extra cost of \$2.00.



Kern's Drawing Instruments — Swiss Make

Kern Drawing Instruments need no introduction to our customers. The old reliable firm of Kern & Co., Ltd., located at Aarau, Switzerland, have been manufacturing Drawing Instruments for a great many years. These instruments are of the finest material and workmanship, and are highly recommended for college use or for the draftsman requiring a moderately priced set.



No.	Description	Price	Postage
No. 1100	4 in. Plain Divider	\$2.70	\$.14
No. 1102	5¾ in. Plain Divider	2.95	.14
No. 1104	5¾ in. Hairspring Divider	3.95	.14
No. 1108	6⅞ in. Compasses, with fixed needle point, pen and pencil point and lengthening bar	6.05	.16
No. 1110	4¾ in. Drawing Pen, with ebony handle	1.20	.13
No. 1112	5 in. Drawing Pen, with ebony handle	1.30	.13
No. 1114	6 in. Drawing Pen, with ebony handle	1.40	.13
No. 1116	5 in. Swedish Pen, with ebony handle	1.90	.13
No. 1118	6 in. Swedish Pen, with ebony handle	2.00	.13
No. 1120	6 in. Border Pen for extra broad lines	3.45	.13
No. 1122	Swivel Curve Pen, metal handle	1.95	.13
No. 1124	Railroad Pen	3.95	.14
No. 1126	Rivet Pen, for small circles	2.95	.12
No. 1128	Rivet Pen, with pen and pencil point	4.40	.12
No. 1130	Pricker	.60	.12



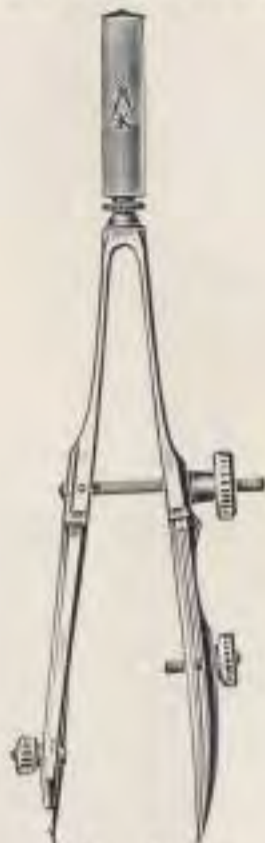
Kern's Drawing Instruments — Swiss Make



No. 1135



No. 1136



No. 1137



No. 1138

Steelspring Bows with Nut and Bolt Movement

		Price	Postage
No. 1135	Steelspring Bow Divider with plain points	\$2.50	\$.12
No. 1136	Steelspring Bow Divider with needle points	2.70	.12
No. 1137	Steelspring Bow Pen with needle point	2.70	.12
No. 1138	Steelspring Bow Pencil with needle point	2.70	.12



No. 1152

Price Postage

No. 1152	Set in Folding Pocket Case, consisting of 6 in. compass with replaceable needle points, pen, pencil, lengthening bar and straightening device; 5¾ in. Hairspring Dividers, 4 in. Bow Pen, Bow Pencil and Bow Dividers, one 5 in. and one 4¼ in. Ruling Pens	\$27.00	\$.25
No. 1150	Same Instruments as above, but in Plain Morocco Case....	25.00	.25



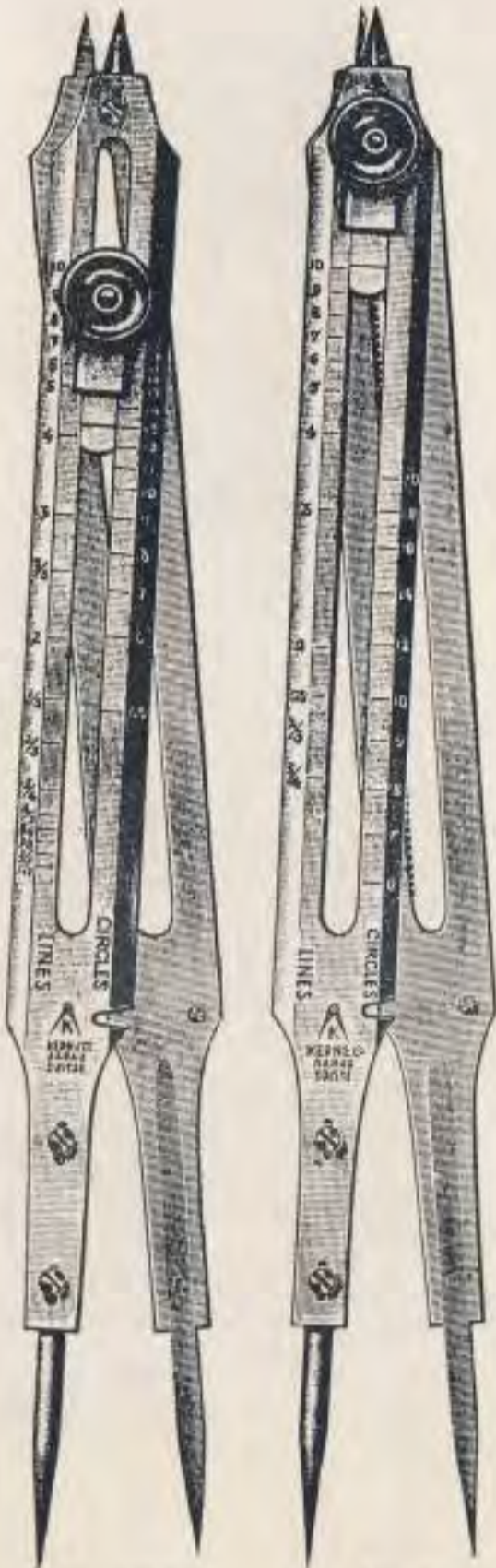
Kern's Drawing Instruments — Swiss Make

Beam Compasses

		Price	Postage
No. 1160	Beam Compass with horizontal adjustment, pen and pencil points in case.	\$11.00	\$.15
No. 1161	Beam Compass with tangent adjustment, pen and pencil points, in case....	12.90	.15

Proportional Dividers

No. 1172	8 in. Proportional Dividers for lines and circles, with movable points....	\$12.80	\$.12
No. 1173	Same as No. 1172, with rack movement.....	18.00	.25
No. 1174	Same as No. 1172, with micrometer adjustment..	18.00	.25
No. 1175	Same as No. 1174 and also divided for planes and solids	20.00	.25



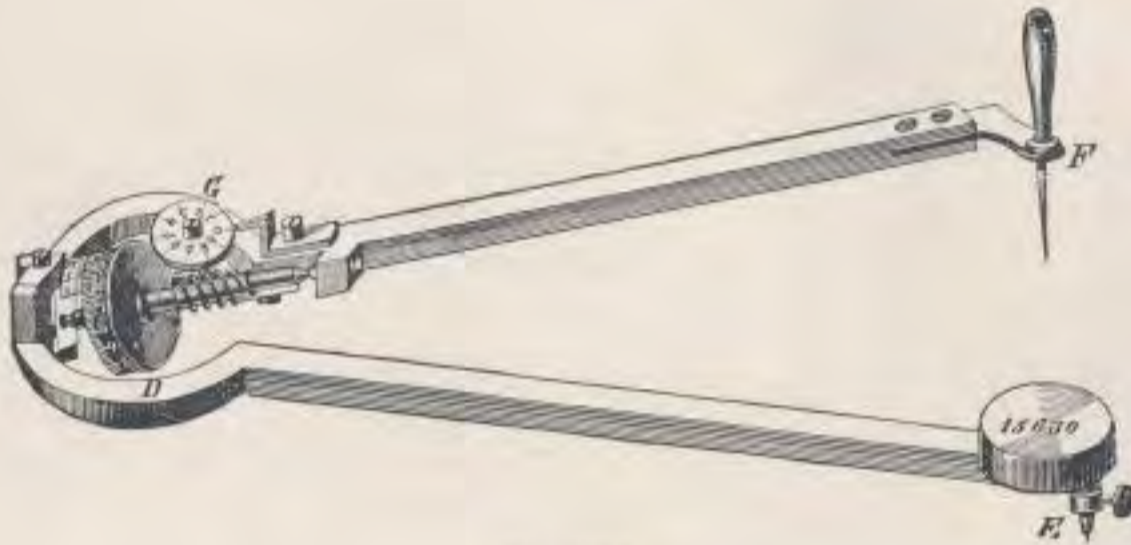
No. 1172

No. 1173



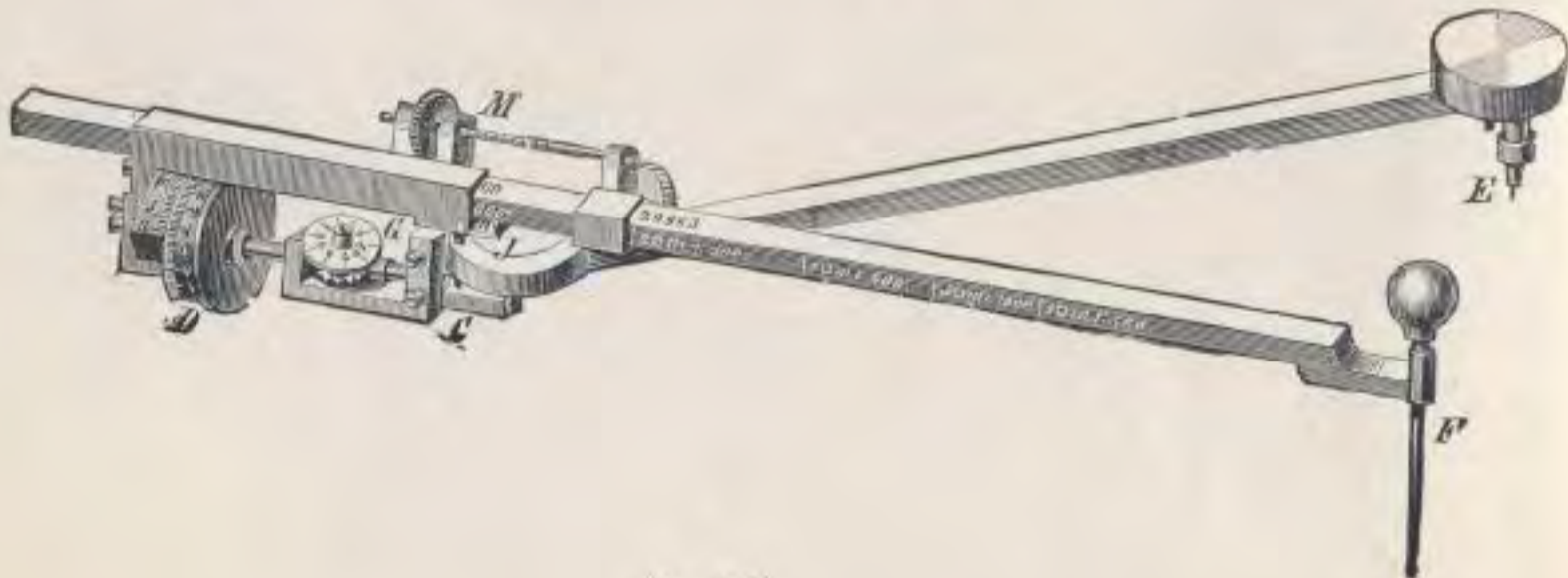
Polar Planimeters

By means of the Polar Planimeter a person can ascertain the area of any planimetric figure more accurately and in less time than the most experienced mathematician could calculate it.



No. 1093

	Price	Postage
No. 1092 Compensating Planimeter, German Silver and brass, measuring up to 100 sq. in. with improved Pole weight and testing rule. This is an excellent, moderate priced Planimeter, suitable for many kinds of work. It is packed in a velvet-lined case, with directions.....	\$27.00	\$.25
No. 1093 Polar Planimeter, German silver, measuring up to 100 sq. in., Swiss make. In morocco case, with printed directions.	\$20.00	\$.25



No. 1094

No. 1094 Polar Planimeter, German silver, measuring up to 450 sq. in., also indicates square feet and square centimeters. Swiss make. In morocco case, with printed directions.....	\$30.00	\$.35
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Polar Planimeters

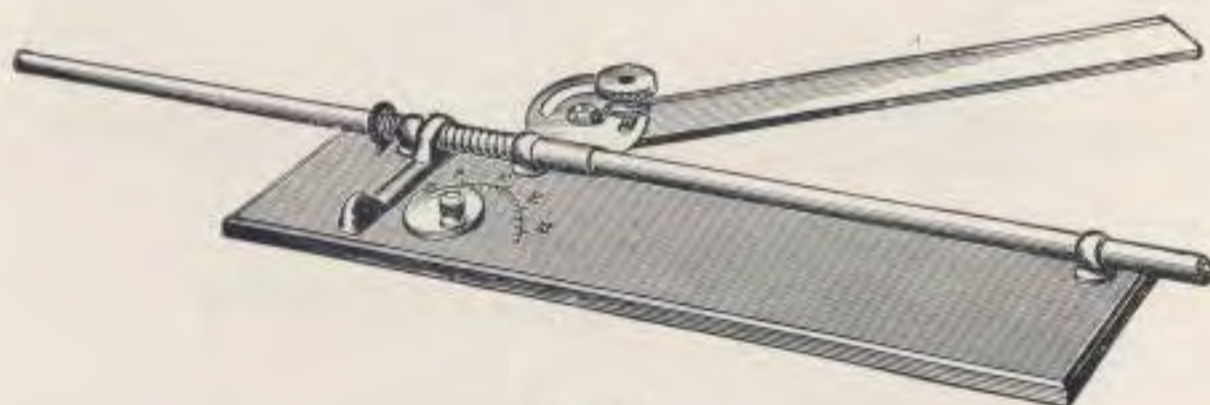


No. 1095

Price Postage

- | | |
|--|-----------------------|
| <p>No. 1095 Compensating Planimeter, German silver and brass, best quality, with adjustable tracer arm fully graduated, improved pole weight and testing rule. Can be set for any scale in U. S. Standard or any foreign measurement; with directions, in case</p> | <p>\$44.00 \$.35</p> |
|--|-----------------------|

Section Liners



No. 2170

- | | Price | Postage |
|---|---------------|---------------|
| <p>No. 2170 Standard Section Liner with transparent celluloid blade. Especially adapted for school use and mechanical sectional drawing</p> | <p>\$3.50</p> | <p>\$.20</p> |
| <p>No. 2170W Standard Section Liner, same as No. 2170 but with hardwood drawing blade in place of celluloid.....</p> | <p>3.00</p> | <p>.20</p> |



Fine Drawing Instruments
German Silver

The Drawing Instruments listed on the following pages are selected from the best German makers and are high grade in every respect. They will appeal to the customer looking for a low priced but serviceable set, especially High School and Trade School students.

		Price	Postage
No. 1203	Plain Dividers, 6 in. pivot joint handle.....	\$1.50	\$.14
No. 1206	Hairspring Dividers, 4¼ in., with handle.....	1.20	.12



No. 1209

No. 1209	Hairspring Dividers, 6 in., pivot joint handle.....	\$1.75	\$.14
No. 1216	Compasses, 4¼ in., with pivot joint handle, pen, pencil and fixed needle point	3.00	.14



No. 1218

No. 1218	Compasses, 6 in., with pivot joint handle, pen, pencil, fixed needle point and lengthening bar.....	\$4.00	\$.17
No. 1228	Proportional Dividers, Nickel silver, 6¼ in., non-adjustable steel points, graduated for lines and circles; in velvet lined case	5.00	.25



No. 1248

No. 1248	Map Measurer, registers inches to miles and centimeters to kilometers	\$2.00	\$.14
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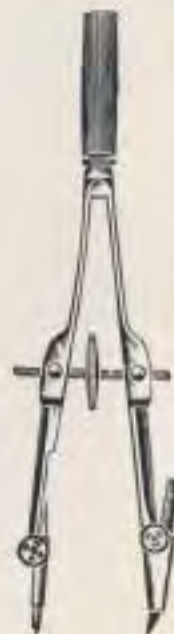
Fine Drawing Instruments



No. 1260

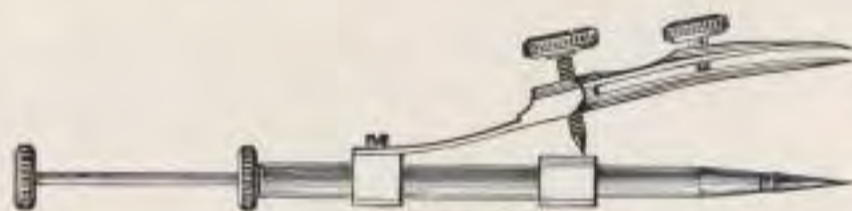


No. 1261



No. 1262

		Price	Postage
No. 1250	Steelspring Bow Spacer, metal handle, 3½ in.....	\$1.00	\$.12
No. 1251	Steelspring Bow Pen, metal handle, 3½ in.....	1.25	.12
No. 1252	Steelspring Bow Pencil, metal handle, 3½ in.....	1.25	.12
No. 1260	Bow Spacer, with wheel adjustment, metal handle, 3½ in....	1.50	.12
No. 1261	Bow Pen, with wheel adjustment, metal handle, 3½ in.....	1.75	.12
No. 1262	Bow Pencil, with wheel adjustment, metal handle, 3½ in....	1.75	.12

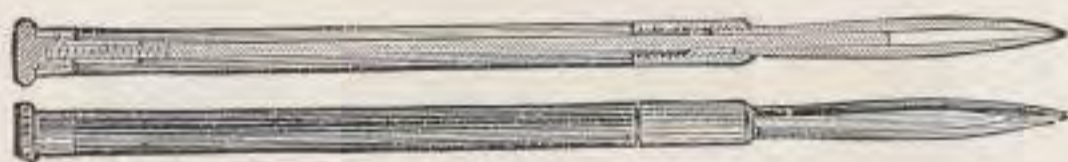


No. 1268

No. 1268	Spring Bow Pen, with adjustable needle point for small circles	2.50	.12
No. 1270	Spring Bow Pen, with pencil leg and adjustable needle point for small circles.....	3.00	.13
No. 1275	Drawing Pen, without joint, ebonized handle, 4½ in.....	.65	.02
No. 1277	Drawing Pen, without joint, ebonized handle, 5½ in.....	.75	.03



Fine Drawing Instruments



No. 1300



No. 1303



No. 1308

		Price	Postage
No. 1287	Drawing Pen, 5 in. slide-catch spring blade, ebonized handle; the upper blade can be instantly opened by means of a slide-catch and the blade cleaned or sharpened without disturbing the adjustment for width of lines.....	\$.95	\$.03
No. 1289	Drawing Pen, like No. 1287, but 5½ in.....	.95	.03
No. 1300	Drawing Pen, without set screw, hollow metal handle, 5½ in.....	1.50	.12
No. 1303	Drawing Pen, Swedish pattern, aluminum handle, 5 in.....	1.25	.03
No. 1304	Drawing Pen, Swedish pattern, aluminum handle, 6 in.....	1.50	.03
No. 1308	Curve Pen, swivel blade, hollow metal handle, 5 in.....	1.25	.12



No. 1314



No. 1321

No. 1314	Railroad Pen, with joints, ebony handle, 5 in.....	\$3.60	\$.13
No. 1321	Railroad Pen and Border Pen to draw two parallel lines of same or different width or one broad line.....	4.50	.14
No. 1323	Dotting Pen, with 6 wheels, in case.....	5.50	.12



Sets of Drawing Instruments



No. 1363

		Price	Postage
No. 1361	Plain Case; 5½ in. Drawing Compasses, one Drawing Pen, extra handle to fit Compass pen, and box of leads.....	\$2.00	\$.10
No. 1362	Folding Pocket Case; 5 in. Plain Dividers, 5 in. Compasses, Bow Pen, Bow Pencil, 5 in. Drawing Pen, and leads.....	5.00	.25
No. 1363	Folding Pocket Case; 5 in. Plain Dividers, 5 in. Compasses, Bow Pen, Bow Pencil, Bow Dividers, 4½ in. and 5½ in. Drawing Pens, and leads.....	7.00	.25
No. 1364	Folding Pocket Case; 5½ in. Hairspring Dividers, 5½ in. Compasses, Bow Pen, Bow Pencil, Bow Dividers, 4½ in. and 5½ in. Drawing Pens, and leads.....	10.00	.25

For higher grade sets than the above, see pages 1107, 1108, 1110,

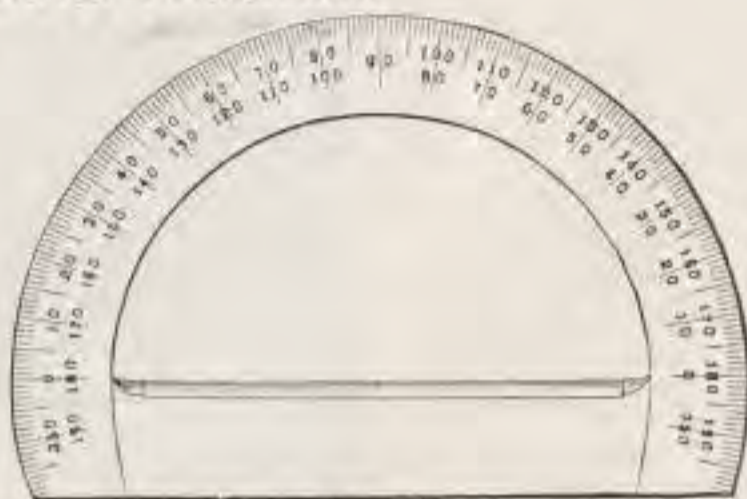


Protractors

Extra Fine German Silver Protractors



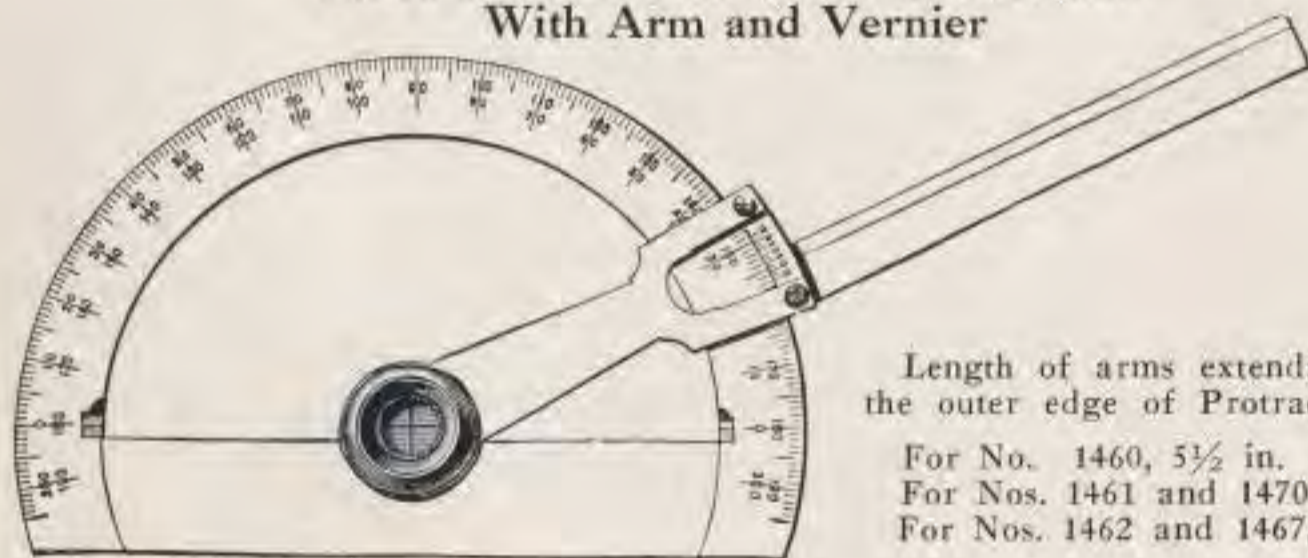
No. 1441



No. 1446

		Price	Postage
No. 1441	Protractor, half circle, 5 in., divided to $\frac{1}{2}$ degree.....	\$2.20	\$.14
No. 1442	Protractor, half circle, 6 in., divided to $\frac{1}{2}$ degree.....	3.00	.16
No. 1443	Protractor, half circle, 6 in., divided to $\frac{1}{4}$ degree.....	3.60	.16
No. 1444	Protractor, half circle, 8 in., divided to $\frac{1}{2}$ degree.....	5.25	.16
No. 1445	Protractor, half circle, 5 in., beveled edge, center on inner edge, divided to $\frac{1}{2}$ degree.....	2.80	.14
No. 1446	Protractor, half circle, 6 in., divided to $\frac{1}{2}$ degree.....	3.80	.16

Extra Fine German Silver Protractors With Arm and Vernier



No. 1461

Length of arms extending over the outer edge of Protractors:

- For No. 1460, $5\frac{1}{2}$ in.
- For Nos. 1461 and 1470, 6 in.
- For Nos. 1462 and 1467, $6\frac{1}{2}$ in.

No. 1460	Protractor, half circle, $5\frac{1}{2}$ in., with horn center and movable arm, divided to $\frac{1}{2}$ degree, vernier reading to 3 min.	\$20.00	\$.20
No. 1461	Protractor, half circle, 8 in., divided to $\frac{1}{4}$ degree, vernier to 1 min.....	25.50	.25
No. 1462	Protractor, half circle, 10 in., divided to $\frac{1}{4}$ degree, vernier to 1 min.....	28.50	.35
No. 1467	Protractor, whole circle, 10 in., divided to $\frac{1}{4}$ degree, vernier to 1 min.....	31.50	.50
No. 1470	Protractor, whole circle, 8 in., with horn center and movable arm, divided to $\frac{1}{4}$ degree, vernier to 1 min., with clamp and tangent to arm.....	56.00	.25

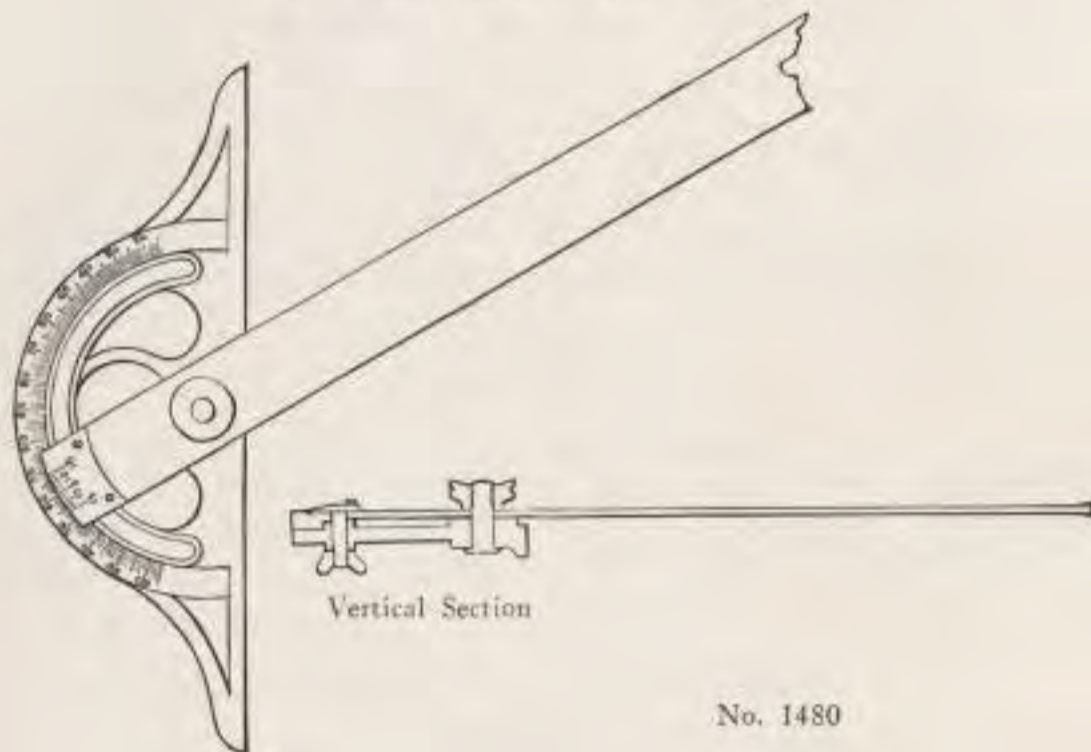
Morocco Cases for Protractors

No. 1476	Case for Protractor No. 1460.....	\$3.50	\$.25
No. 1477	Case for Protractors Nos. 1462 and 1470.....	4.00	.35
No. 1478	Case for Protractor No. 1467.....	5.00	.45



Protractors

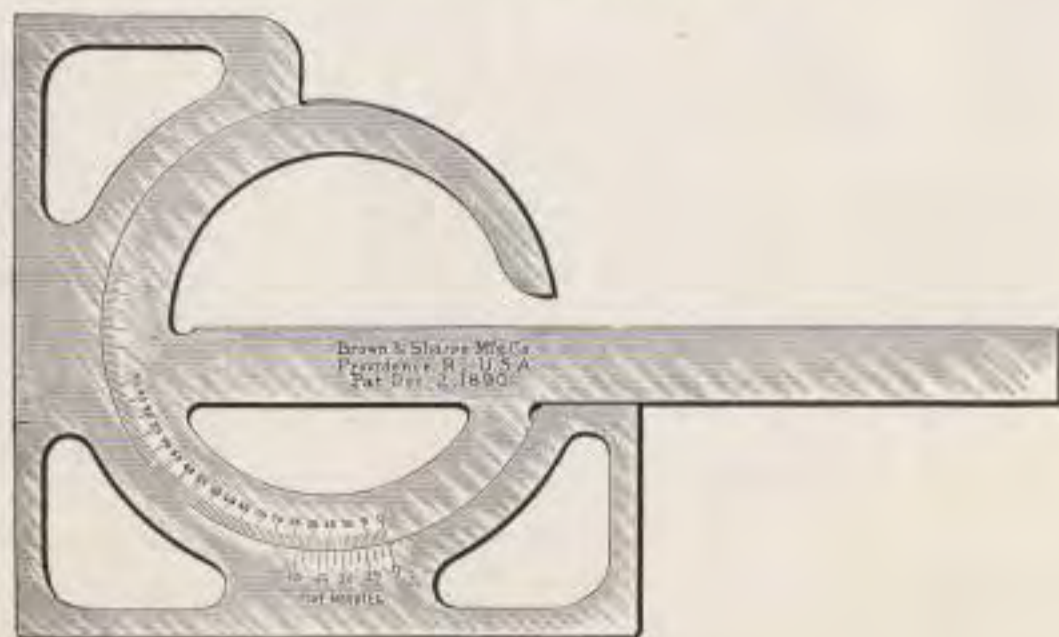
Made by W. & L. E. Gurley



Bronze Head, Steel Blade, Vernier to One Minute

		Price	Postage
No. 1480	Protractor, with blade 24 in.....	\$18.00	\$.25
No. 1481	Protractor, with blade 30 in.....	20.00	.30
No. 1482	Protractor, with blade 36 in.....	22.50	.35
No. 1483	Protractor, with blade 42 in.....	25.00	.40
No. 1484	Protractor, with blade 48 in.....	28.00	.45

Draftsmans Protractors



No. 1486

No. 1486 Steel Protractor, divided to 1 degree, vernier to 5 min., 8½ in. blade. It is used with the T rule or straight edge. Very convenient in dividing circles, transferring angles, laying off angles each side of a line without resetting. In morocco case.....\$12.50 \$.35



Flat Boxwood Chain Scales



No. 1618

No. 1615	Boxwood Scale, 6 in., divided 10 and 50 parts to the inch.	\$1.00	\$.03
No. 1616	Boxwood Scale, 6 in., divided 20 and 40 parts to the inch.	1.00	.03
No. 1617	Boxwood Scale, 6 in., divided 30 and 60 parts to the inch.	1.00	.03
No. 1618	Boxwood Scale, 12 in., divided 10 and 50 parts to the inch.	1.25	.06
No. 1619	Boxwood Scale, 12 in., divided 20 and 40 parts to the inch.	1.25	.06
No. 1620	Boxwood Scale, 12 in., divided 30 and 60 parts to the inch.	1.25	.06
No. 1628	Boxwood Flat White Edge Scale, double bevel, 6 in., divided 10 and 50, and 20 and 40 in leather sheath.....	2.15	.03
No. 1629	Boxwood White Edge Scale, 6 in., divided 10 and 50 parts to the inch.....	1.25	.03
No. 1630	Boxwood White Edge Scale, 6 in., divided 20 and 40 parts to the inch.....	1.25	.03
No. 1631	Boxwood White Edge Scale, 6 in., divided 30 and 60 parts to the inch.....	1.25	.03
No. 1632	Boxwood White Edge Scale, 12 in., divided 10 and 50 parts to the inch.....	2.00	.16
No. 1633	Boxwood White Edge Scale, 12 in., divided 20 and 40 parts to the inch.....	2.00	.16
No. 1634	Boxwood White Edge Scale, 12 in., divided 30 and 60 parts to the inch.....	2.00	.16



Architects Triangular Boxwood Scales

Best Quality



No. 1655

		Price	Postage
No. 1655	Triangular Boxwood Scale, 6 in., divided $\frac{3}{32}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$ and 3 inches to the foot, and one edge inches and 16ths.....	\$1.00	\$.04
No. 1656	Triangular Boxwood Scale, 12 in., divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, and 4 inches to the foot, and one edge inches and 16ths.....	1.50	.16
No. 1657	Triangular Boxwood Scale, 18 in., divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, and 4 inches to the foot, and one edge inches and 16ths.....	4.00	.20
No. 1658	Triangular Boxwood Scale, 24 in., divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, and 4 inches to the foot, and one edge inches and 16ths.....	5.50	.25

Engineers Triangular Boxwood Chain Scales

Best Quality



No. 1660

No. 1660	Triangular Boxwood Scale, 6 in., divided 10, 20, 30, 40, 50 and 60 parts to the inch.....	\$1.00	\$.04
No. 1661	Triangular Boxwood Scale, 12 in., divided 10, 20, 30, 40, 50 and 60 parts to the inch.....	1.50	.16
No. 1662	Triangular Boxwood Scale, 18 in., divided 10, 20, 30, 40, 50 and 60 parts to the inch.....	4.00	.20
No. 1663	Triangular Boxwood Scale, 24 in., divided 10, 20, 30, 40, 50 and 60 parts to the inch.....	5.50	.25
No. 1665	Triangular Boxwood Scale, 12 in., divided 20, 30, 40, 50, 60 and 80 parts to the inch.....	1.75	.16
No. 1670	Triangular Boxwood Scale, 12 in., divided 100, 200, 300, 400, 500 and 600 parts to the foot.....	1.50	.16



Triangular Boxwood Scales

With White Edges

		Price	Postage
No. 1674	White Edge Scale, 6 in., divided same as No. 1655.....	\$1.75	\$.14
No. 1675	White Edge Scale, 12 in., divided same as No. 1656.....	3.50	.16
No. 1678	White Edge Scale, 6 in., divided same as No. 1660.....	1.75	.14
No. 1679	White Edge Scale, 12 in., divided same as No. 1661.....	3.50	.16
No. 1682	White Edge Scale, 12 in., divided same as No. 1665.....	3.75	.16
No. 1684	White Edge Scale, 12 in., divided same as No. 1670.....	3.50	.16
No. 1698	Metal Guard for Triangular Scale (preventing errors).....	.20	.02

Metric Scales and Rules

No. 1700	Flat Boxwood Scale, 20 centimeters, divided to millimeters and half millimeters.....	\$1.25	\$.04
No. 1701	Flat Boxwood Scale, 30 centimeters, divided to millimeters and half millimeters.....	1.50	.06
No. 1702	Flat Boxwood Scale, 50 centimeters, divided to millimeters and half millimeters.....	2.50	.18
No. 1703	Flat White Edge Scale, 20 centimeters, divided to millimeters and half millimeters.....	1.75	.14
No. 1704	Flat White Edge Scale, 30 centimeters, divided to millimeters and half millimeters.....	2.00	.16
No. 1706	Triangular Boxwood Scale, 20 centimeters, divided .01, .02, .03, .05, .025, .0125.....	1.50	.05
No. 1707	Triangular Boxwood Scale, 30 centimeters, divided to .01, .02, .03, .05, .025, .0125.....	1.75	.16
No. 1710	Triangular Boxwood Scale, 30 centimeters, divided to millimeters and half millimeters, also to 10ths, 12ths and 16ths of inches, and 100ths of a foot.....	2.50	.16
No. 1712	Triangular White Edge Scale, 30 centimeters, divided same as No. 1707.....	4.00	.16
No. 1714	Triangular White Edge Scale, 30 centimeters, divided same as No. 1710.....	4.25	.16
No. 1713	Flexible Wood Rule, 4 ft., eight-fold, divided to millimeters and 16ths of inches, spring joints.....	.35	.05
No. 1719	Flexible Wood Rule, same as No. 1718, and with white enamel finish.....	.50	.05



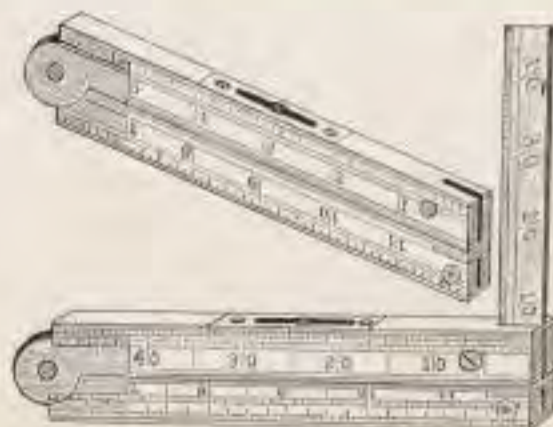
Flexible Wood Rules



No. 1755A to No. 1757A

		Price	Postage
No. 1755A	Flexible Wood Rule, yellow finish, 4 ft., eight-fold, divided to 16ths of an inch and 100ths of a foot, with spring joints	\$.30	\$.05
No. 1755B	Flexible Wood Rule, same as No. 1755A, and with white enamel finish .....	.35	.05
No. 1755V	Flexible Wood Rule, yellow finish, 5 ft., ten-fold, divided same as No. 1755A.....	.40	.06
No. 1755W	Flexible Wood Rule, same as No. 1755V and with white enamel finish .....	.45	.06
No. 1755C	Flexible Wood Rule, yellow finish, 6 ft., twelve-fold, divided same as No. 1755A.....	.50	.08
No. 1755D	Flexible Wood Rule, same as No. 1755C, and with white enamel finish .....	.55	.08
No. 1756A	Flexible Wood Rule, yellow finish, 4 ft., eight-fold, divided alike on both sides to 16ths of inches, and with spring joints .....	.30	.05
No. 1756B	Flexible Wood Rule, same as No. 1756A, and with white enamel finish .....	.35	.05
No. 1757	Flexible Wood Rule, yellow finish, 6 ft., twelve-fold, divided same as No. 1756A.....	.50	.05
No. 1757A	Flexible Wood Rule, same as No. 1757, and with white enamel finish .....	.55	.08
No. 1755E	6 ft. Aluminum Rule.....	2.10	.10
No. 1755EH	6 ft. Aluminum Rule with folding hook.....	2.20	.10

Boxwood Combination Rule



No. 1760

No. 1760	Boxwood Combination Rule, 1 ft., two-fold. It combines in itself a Carpenter's Rule, Spirit Level, Square, Plumb, Level, Indicator, Brace, Scale, Drafting Scale of equal parts, T Square, Protractor, Right Angle Triangle, etc....	\$3.00	\$.17
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Slide Rules



No. 1764B

		Price	Postage
No. 1763	Students Slide Rule, for beginners, 10 inches, with glass indicator and directions.....	\$1.00	\$.15
No. 1764	Engineers Adjustable Mannheim Slide Rule, 5 in., divided on white facings, with glass indicator, sewed leather case and directions.....	5.50	.10
No. 1764A	Engineers Adjustable Mannheim Slide Rule, 8 in., divided on white facings, with glass indicator, sewed leather case and directions.....	6.20	.15
No. 1764B	Engineers Adjustable Mannheim Slide Rule, 10 in., divided on white facings, with glass indicator and directions..	5.50	.15
No. 1764C	Engineers Adjustable Mannheim Slide Rule, 16 in., divided on white facings, with glass indicator and directions..	13.00	.30
No. 1764D	Engineers Adjustable Mannheim Slide Rule, 20 in., divided on white facings, with glass indicator and directions..	14.00	.35
No. 1764E	Magnifier, in metal frame, fitted for 8 in. Mannheim Slide Rule	2.25	.14
No. 1764F	Magnifier, in metal frame, fitted for 10, 16 and 20 in. Mannheim Slide Rules.....	2.50	.15
No. 1767	Polyphase Duplex Slide Rule, 10 in., divided on white facings, with glass indicator and both arithmetical and trigonometrical slides and directions.....	8.50	.20
No. 1767A	Log Log Duplex Slide Rule, adjustable, 10 in., divided on white facings, glass indicator, sewed leather case and directions	10.85	.20
No. 1767B	Mannheim Polyphase Slide Rule, adjustable, 10 in., divided on white facings, glass indicator and directions.....	6.25	.15
No. 1768	Stadia Slide Rule, 20 in., divided on white facings. This rule is designed to solve the equations generally used in stadia measurements	16.00	.35
	Sewed leather case for 10 in. Rule, in place of regular morocco case	1.50	.10
	Sewed leather case for 16 in. Rule, in place of regular morocco case	2.50	.12
	Sewed leather case for 20 in. Rule, in place of regular morocco case	2.75	.15



Straight Edges

Steel Straight Edges, Nickel-plated

Square Edges

		Price	Postage			Price	Postage
No. 1800	15 in.	\$2.30	\$.17	No. 1804	36 in.	\$5.00	\$.45
No. 1801	18 in.	2.60	.20	No. 1805	42 in.	6.00	.50
No. 1802	24 in.	3.00	.25	No. 1806	48 in.	7.20	.60
No. 1803	30 in.	4.00	.30	No. 1807	60 in.	9.60	.70

Steel Straight Edges, Nickel-plated

One Edge Beveled

No. 1810	18 in.	\$3.60	\$.20	No. 1813	36 in.	\$7.25	\$.45
No. 1811	24 in.	4.80	.25	No. 1814	42 in.	8.50	.50
No. 1812	30 in.	6.00	.30	No. 1815	48 in.	11.00	.60

Mahogany Straight Edges, Celluloid Lined

Square Edges

No. 1820	18 in.	\$1.20	\$.06	No. 1823	36 in.	\$2.25	\$.25
No. 1821	24 in.	1.60	.18	No. 1824	42 in.	2.70	.30
No. 1822	30 in.	1.90	.20	No. 1825	48 in.	3.30	.35

Mahogany Straight Edges, Ebony Lined

Square Edges

No. 1830	24 in.	\$0.50	\$.08	No. 1833	42 in.	\$1.00	\$.30
No. 1831	30 in. ....	.60	.10	No. 1834	48 in.	1.35	.35
No. 1832	36 in. ....	.80	.15	No. 1835	60 in.	2.00	.40

Maple Straight Edges

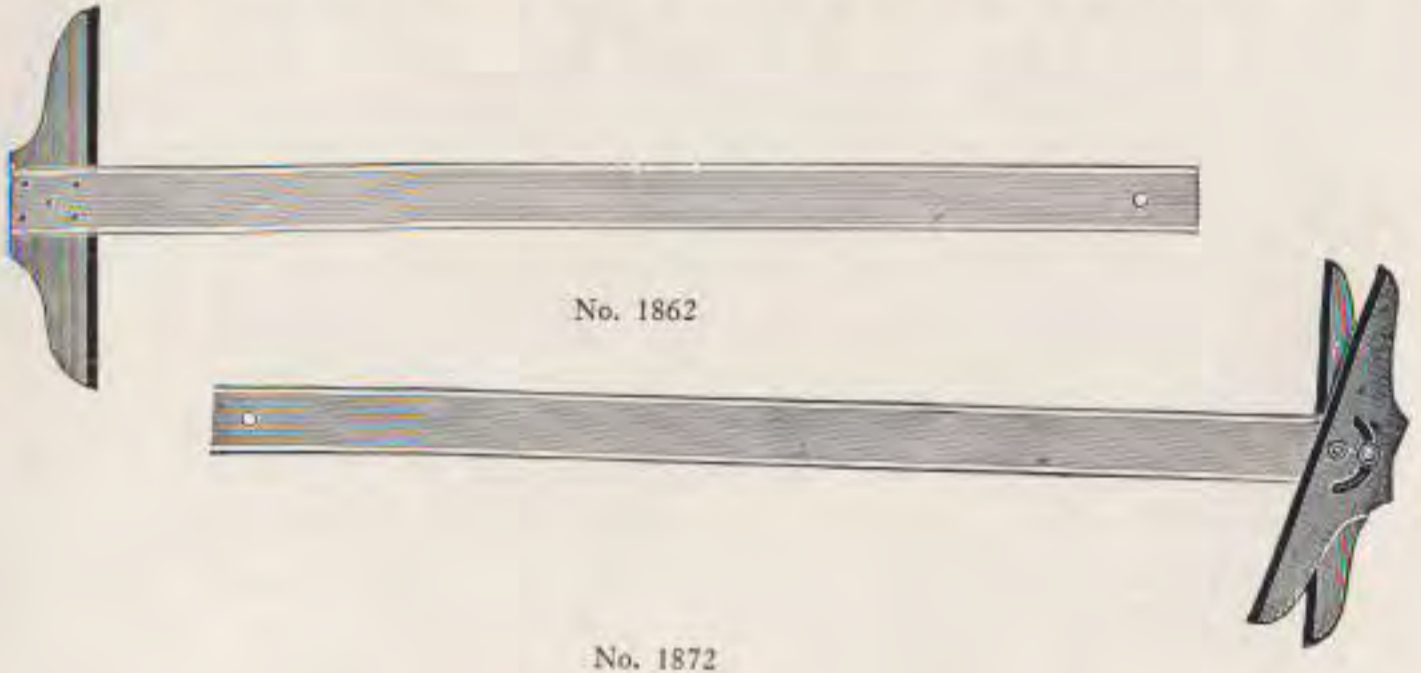
One Edge Beveled

No. 1850	18 in.	\$0.25	\$.06	No. 1854	42 in.	\$0.75	\$.20
No. 1851	24 in. ....	.35	.08	No. 1855	48 in.	1.00	.25
No. 1852	30 in. ....	.40	.10	No. 1856	60 in.	1.50	.40
No. 1853	36 in. ....	.60	.15	No. 1857	72 in.	3.00	.50



T Squares

Mahogany T Squares, with Celluloid Edges and Fixed Head



			Price	Postage				Price	Postage
No. 1860	18 in.	.....	\$1.65	\$.25	No. 1863	36 in.	.....	\$3.25	\$.35
No. 1861	24 in.	.....	2.25	.35	No. 1864	42 in.	.....	3.75	.45
No. 1862	30 in.	.....	2.70	.45	No. 1865	48 in.	.....	4.50	.55

Mahogany T Squares, with Celluloid Edges and Shifting Head

No. 1870	18 in.	.....	\$2.90	\$.30	No. 1873	36 in.	.....	\$4.80	\$.35
No. 1871	24 in.	.....	3.70	.30	No. 1874	42 in.	.....	5.50	.45
No. 1872	30 in.	.....	4.15	.50	No. 1875	48 in.	.....	6.30	.55

Steel Blade T Squares, Nickel-plated, with Fixed Japanned Aluminum Head

No. 1896	18 in.	.....	\$8.00	\$.35	No. 1898	30 in.	.....	\$10.75	\$.45
No. 1897	24 in.	.....	9.00	.40	No. 1899	36 in.	.....	12.50	.55

Steel Blade T Squares, Nickel-plated, with Shifting Japanned Aluminum Head

No. 1902	18 in.	.....	\$10.00	\$.45	No. 1904	30 in.	.....	\$12.75	\$.55
No. 1903	24 in.	.....	11.00	.50	No. 1905	36 in.	.....	15.00	.55

W. & L. E. GURLEY, TROY, NEW YORK



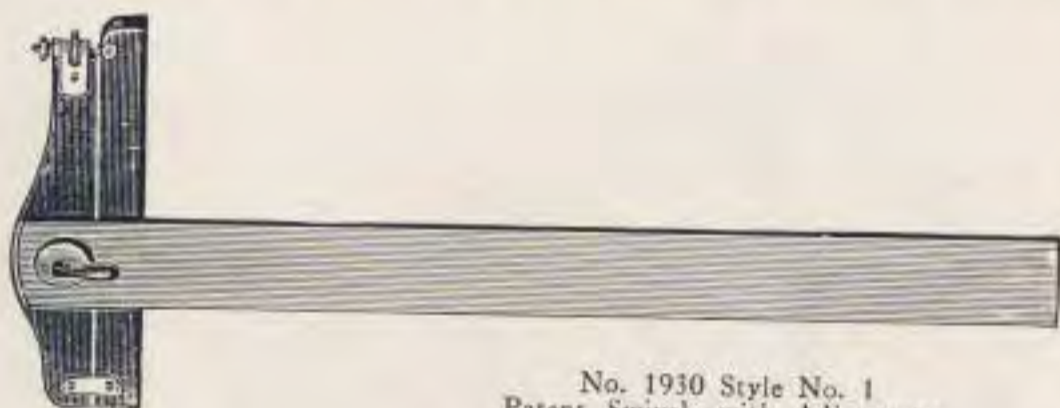
Maple T Squares, Fixed Head

		Price	Postage			Price	Postage
No. 1908	15 in.	\$0.25	\$.15	No. 1911	30 in.	\$0.45	\$.45
No. 1909	20 in. ....	.30	.25	No. 1912	40 in. ....	.65	.50
No. 1910	25 in. ....	.35	.35	No. 1913	50 in.	1.00	.55

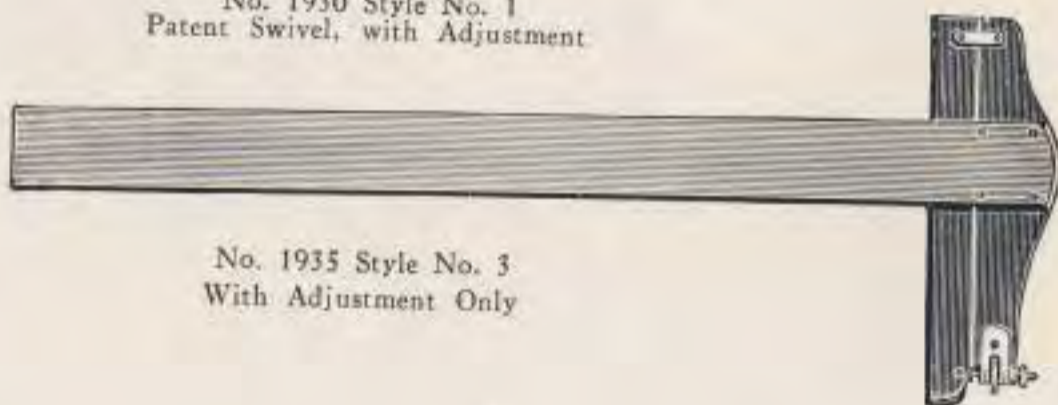
Maple T Squares, Shifting Head

No. 1916	15 in.	\$0.75	\$.20	No. 1919	30 in.	\$1.25	\$.50
No. 1917	20 in. ....	.85	.30	No. 1920	40 in.	1.50	.55
No. 1918	25 in.	1.00	.40	No. 1921	50 in.	2.00	.60

Mahogany T Squares, with Deanes Patent Swivel and Adjustment



No. 1930 Style No. 1
Patent Swivel, with Adjustment



No. 1935 Style No. 3
With Adjustment Only

		Price	Postage
No. 1930	24 in., Style No. 1.....	\$3.25	\$.40
No. 1931	30 in., Style No. 1.....	3.65	.45
No. 1932	36 in., Style No. 1.....	4.25	.50
No. 1935	24 in., Style No. 3.....	2.75	.38
No. 1936	30 in., Style No. 3.....	3.25	.43
No. 1937	36 in., Style No. 3.....	3.75	.50



Worcester Drawing Tables



No. 1947

These tables are adjustable for horizontal and angular motion and for heights about 30 to 44 inches. The shelves and drawers remain level when the top is inclined. They are mounted on an iron stand with casters.

	Price
No. 1945 Drawing Table, hardwood top, 24 x 22 in.....	\$14.50
No. 1946 Drawing Table, hardwood top, 24 x 22 in., and with instrument shelf, 24 x 7 in.....	16.00
No. 1947 Drawing Table, hardwood top, 26 x 22 in., instrument shelf, 26 x 7 in., two instrument drawers.....	20.00
No. 1949 Drawing Table, hardwood top, 26 x 22 in., with instrument shelf and two drawers, and with folding arm and plain shelf.....	25.00



Worcester Drawing Tables



No. 1950

These tables are adjustable for horizontal, angular and vertical movements.

	Price
No. 1950 Drawing Table, with white pine drawing board, 42 x 31 in., and substantial iron stand, adjustable.....	\$50.00
No. 1951 Drawing Table, with white pine drawing board, 55 x 33 in., and substantial iron stand, adjustable.....	52.00
No. 1952 Drawing Table, with white pine drawing board, 60 x 36 in., and substantial iron stand, adjustable.....	55.00
No. 1953 Drawing Table, with white pine drawing board, 42 x 72 in., and substantial iron stand, adjustable.....	60.00

Drawing Boards and Trestles

No. 1962 Drawing Board, 21 x 16 in., tongue and groove ends.....	\$ 2.20
No. 1964 Drawing Board, 26 x 20 in., tongue and groove ends.....	2.60
No. 1966 Drawing Board, 42 x 31 in., expansion cleats.....	9.50
No. 1967 Drawing Board, 55 x 33 in., expansion cleats.....	17.50
No. 1975 Wooden Horses, 37 in. high, 35 in. long, with removable sloping ledge. Per pair	11.50
No. 1977 Folding Trestle, hardwood, 37 in. high, 33 in. long, 26 in. wide....	17.50



Drawing Boards and Trestles

Made by W. & L. E. Gurley



No. 1978

	Price
No. 1978 Folding Trestle, hardwood, 37 in. high, combined with adjustable Drawing Board of pinewood, 42 x 31 in., and hinged to Trestle. All folding compactly.....	\$27.00
No. 1979 Folding Trestle and Drawing Board, same as No. 1978, but with the Drawing Board 55 x 33 in.....	35.00

Drawing Boards and Trestles of any size made to order



Transparent Celluloid Triangles, Open Center



Nos. 2022 to 2034
30° x 60° x 90°



Nos. 2036 to 2048
45° x 45° x 90°

30° x 60° x 90°

		Price	Postage			Price	Postage
No. 2022	4 in.	\$0.25	\$.03	No. 2028	10 in.	\$0.75	\$.08
No. 2024	6 in. ....	.40	.04	No. 2030	12 in.	1.00	.18
No. 2026	8 in. ....	.55	.06	No. 2032	14 in.	1.65	.20
				No. 2034	16 in.	2.50	.25

45° x 45° x 90°

No. 2036	4 in.	\$0.35	\$.04	No. 2042	8 in.	\$0.75	\$.08
No. 2038	6 in. ....	.55	.05	No. 2044	10 in.	1.10	.18
No. 2040	7 in. ....	.65	.07	No. 2046	12 in.	1.65	.20
				No. 2048	14 in.	2.25	.25

Hardwood Triangles, Plain

30° x 60° x 90°

		Price	Postage			Price	Postage
No. 2120	4 in.	\$0.08	\$.03	No. 2124	8 in.	\$0.16	\$.06
No. 2122	6 in. ....	.12	.04	No. 2126	10 in. ....	.20	.08

45° x 45° x 90°

No. 2130	4 in.	\$0.10	\$.04	No. 2132	6 in.	\$0.15	\$.05
No. 2131	5 in. ....	.12	.05	No. 2134	8 in. ....	.20	.08



Celluloid and Hard Rubber Lettering Triangles



No. 2140

- | | | | |
|----------|---|--------|--------|
| No. 2140 | Lettering Triangles, Hard Rubber, for Block Letters, 3½ inches, three in a set. Per set..... | \$1.35 | \$.15 |
| No. 2141 | Lettering Triangles, Transparent Celluloid, for Block Letters, 3½ inches, three in a set..... | 1.75 | .15 |



No. 2145

- | | | | |
|----------|--|--------|--------|
| No. 2145 | Lettering Triangles for Shaded Letters, 3½ inches, three in a set. Per set..... | \$1.20 | \$.15 |
| No. 2146 | Lettering Triangles, Transparent Celluloid, for Shaded Letters, 3½ inches, three in a set..... | 1.50 | .15 |



No. 2147

- | | | | |
|----------|--|--------|--------|
| No. 2147 | Transparent Celluloid Lettering Templets, three in a set. Per set..... | \$2.00 | \$.17 |
|----------|--|--------|--------|



Parallel Rules



No. 2250

Black Hardwood Parallel Rules

		Price	Postage			Price	Postage
No. 2250	6 in.	\$0.75	\$.04	No. 2253	15 in.	\$1.50	\$.20
No. 2251	9 in. ....	.80	.06	No. 2254	18 in.	2.00	.22
No. 2252	12 in.	1.00	.08	No. 2255	24 in.	2.50	.25

Black Amber Parallel Rules

No. 2260	6 in.	\$1.00	\$.04	No. 2262	12 in.	\$2.00	\$.18
No. 2261	9 in.	1.50	.06	No. 2263	15 in.	2.50	.20

Black Hardwood Parallel Rules on Rollers

No. 2270	9 in.	\$2.75	\$.20	No. 2272	15 in.	\$4.00	\$.30
No. 2271	12 in.	3.25	.25	No. 2273	18 in.	5.00	.35

Black Amber Parallel Rules on Rollers

No. 2275	9 in.	\$3.50	\$.20	No. 2277	15 in.	\$5.00	\$.30
No. 2276	12 in.	4.25	.25	No. 2278	18 in.	6.00	.35

Brass Parallel Rules on Rollers

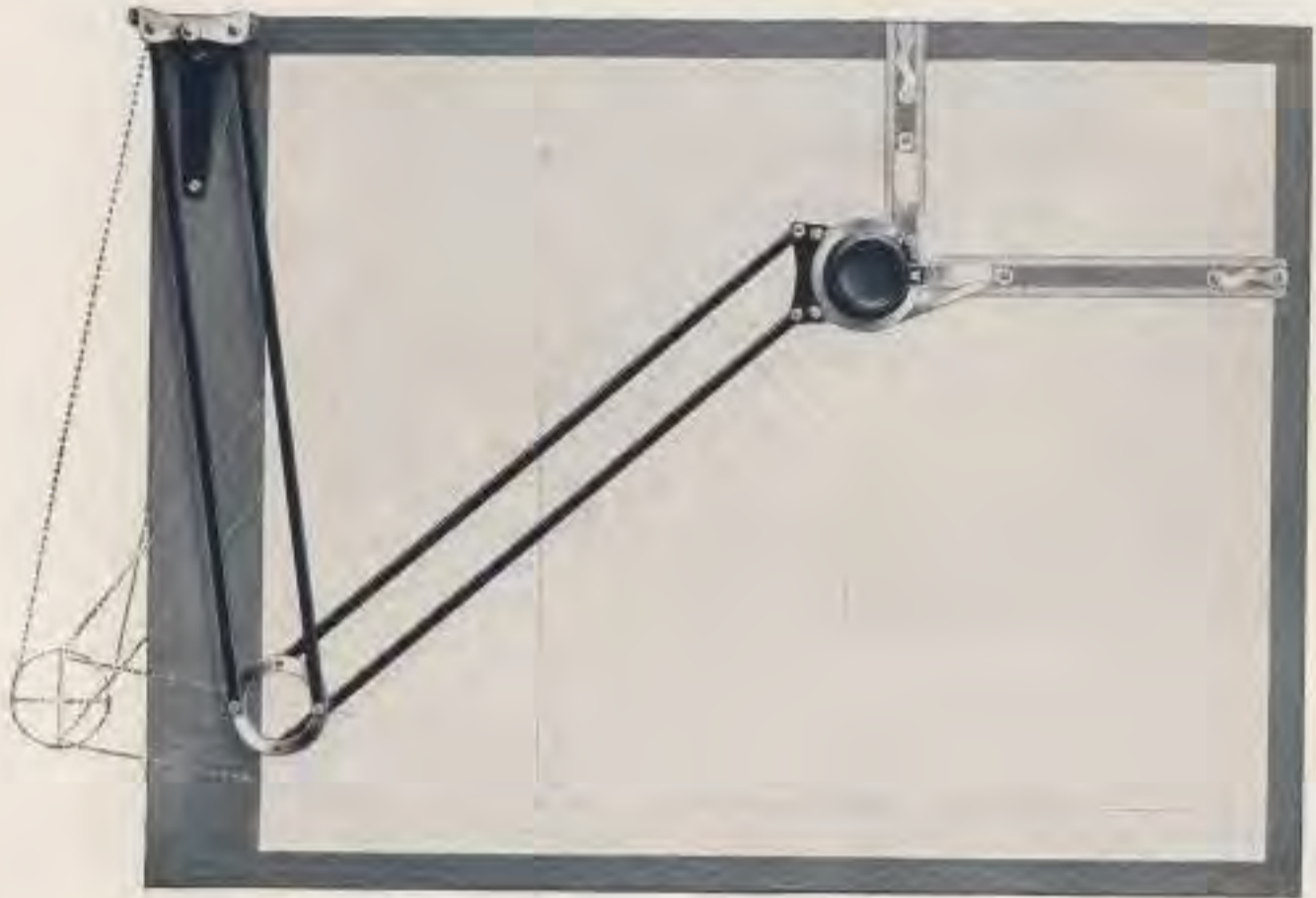
No. 2286	12 in.	\$15.00	\$.40	No. 2288	18 in.	\$20.00	\$.45
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German Silver Parallel Rules on Rollers

No. 2293	12 in.	\$21.00	\$.40	No. 2295	18 in.	\$30.00	\$.45
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Universal Drafting Machine, Corner-Anchor Type



The Universal Drafting Machine is a time-saving device which can be attached to any drawing board for any kind of drafting. It consists of two parallelograms, a protractor, and two graduated rules which can be set by the protractor to any angle desired.

Types: There are two general types, the machine with mid anchor, that has the arms swing to the top of the drawing; and the machine in the corner anchor form, that has the arms swing to the left of the drawing.

Machines: Two types for general drafting, No. 1982 with light weight tubular rods, and ball bearings. No. 1984 with hardened joints and solid rods.

Protractors: Three kinds. The Standard Protractor is divided to degrees, and has automatic stops at the more frequently used angles, zero, 30° , 45° , 60° , and 90° . The protractor for Architectural and Structural work is like the Standard Protractor, but with special graduations, giving one-fifth, one-fourth and one-third roof pitches each way from the zero, and two inches to the foot each way from the zero. In ordering an Architectural and Structural protractor, add the suffix letter A to the catalog number, and add \$2.50 to the price.

The Civil Engineers Protractor is $4\frac{1}{2}$ " in diameter, with an upper and lower motion. It is graduated to half degrees, and has a vernier to minutes. It is equipped with a reading glass. The numbering is ordinarily from zero to 360° clockwise, and quadrants from zero to 90° ; or from zero to 360° each way. The Civil Engineers protractor is extremely useful for transferring field notes direct to maps, and on all kinds of topographic work. The price of a Drafting Machine with Civil Engineers protractor is \$30.00 more than with Standard Protractor.

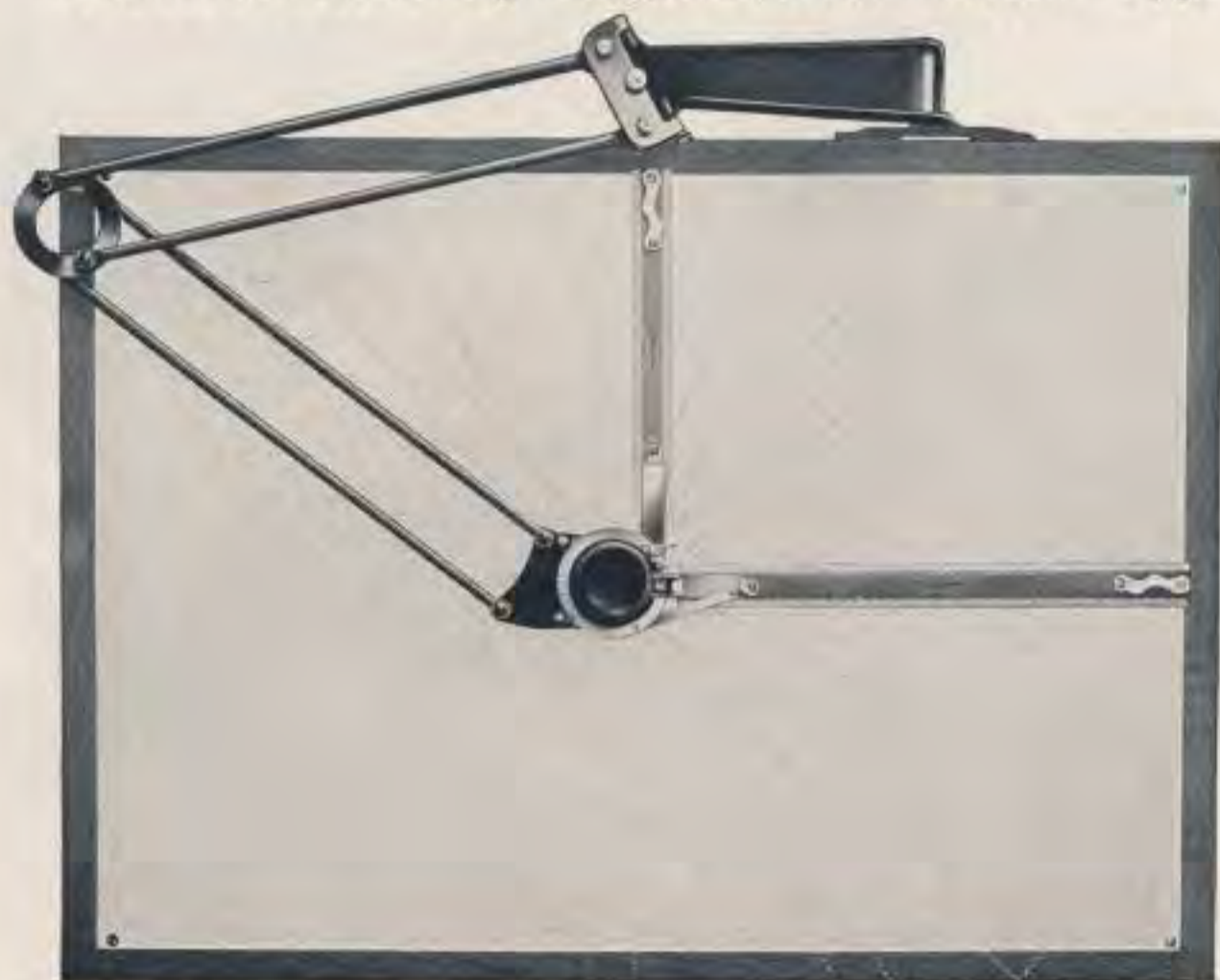
Scales: Because different users require different quantities of scales with their Drafting Machines, the scales and straight edges for inking are listed separately from the Machines. They should be ordered when selecting the Machine. The scales are made of boxwood or white pine, with white celluloid edges. If special graduations are desired on the scales, please send a rough sketch showing the graduations and the numbering. See list of standard graduations on the next page.

Complete catalog of Universal Drafting Machines upon request.

W. & L. E. GURLEY, TROY, NEW YORK



Universal Drafting Machine, Mid-Anchor Type



Type	Size	For Drawings	With Standard Protractor	With Architectural and Structural Protractor	With Civil Engineer's Protractor
MID ANCHOR, Tubular Rods	1	20" x 30"	No. 1982 \$77.50	No. 1982-A \$80.00	No. 1982-B \$107.50
	2	24" x 36"			
	3	30" x 42"			
	4	36" x 50"			
CORNER ANCHOR, Tubular Rods	1	18" x 24"	No. 1983 \$75.00	No. 1983-A \$77.50	No. 1983-B \$105.00
	2	20" x 30"			
	3	24" x 36"			
	4	30" x 42"			
MID ANCHOR, Solid Rods	1	20" x 30"	No. 1984 \$62.50	No. 1984-A \$65.00	No. 1984-B \$92.50
	2	24" x 36"			
	3	30" x 42"			
	4	36" x 50"			
CORNER ANCHOR, Solid Rods	1	18" x 24"	No. 1985 \$60.00	No. 1985-A \$62.50	No. 1985-B \$90.00
	2	20" x 30"			
	3	24" x 36"			
	4	30" x 42"			

Scales for Use with Universal Drafting Machines

Boxwood or white pine with white celluloid edges. Scales are generally used in sets of two, forming a graduated square.

No. 1986 24 inch (60 cm) \$4.25 No. 1988 12 inch (30 cm) \$2.50
 No. 1987 18 inch (45 cm) 3.50 No. 1989 6 inch (15 cm) 2.00

18 inch horizontal scales and 12 inch vertical scales are recommended on all drawings larger than 18" x 24", and 12" horizontal scales and 6" vertical scales on smaller drawings.

Graduations

No. 1 $\frac{3}{8}$, $\frac{1}{2}$, $1\frac{1}{2}$ and 3 inches to the foot.

No. 2 $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and 1 inch to the foot.

No. 3 Full and half size.

No. 4 10-50.

No. 5 20-40.

No. 6 30-60.

No. 7 $\frac{3}{8}$ " and $1\frac{1}{2}$ " to the foot.

No. 8 $\frac{3}{8}$ and $\frac{3}{4}$ inch to the foot.

No. 9 $\frac{1}{2}$ and 1 inch to the foot.

No. 10 $\frac{1}{4}$ x $\frac{1}{8}$ inch to the foot.



WRICO Lettering Instruments



WRICO Lettering Guides

The WRICO Lettering Guides are practical and efficient aids for lettering drawings, maps, bulletins, price cards, etc. They enable the most inexperienced person to do neat lettering, either vertical or slanting, at a greater speed than can be obtained by "free hand".

The Guides consist of a strip of well seasoned, transparent pyralin, with openings for all letters and numbers. The WRICO pens, made special for this work, are moved in contact with the sides of the opening to form the letters. A shift button is inserted in one end to allow correct formation of the characters.



No. 2153-7.

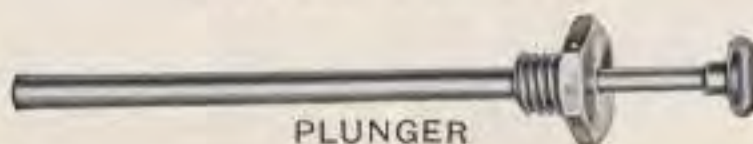
WRICO Lettering Pens

WRICO Lettering Pens are especially designed for use with WRICO Lettering Guides. A tubular point insures ample strength and prevents ink from getting on the edge of the openings in the guides. Large capacity is provided for in the cone shaped reservoir. A spring tempered steel wire at the lower end of the plunger regulates the flow of ink and prevents the point from becoming clogged with dried ink.

WRICO Pen Parts



POINT



PLUNGER



NEEDLE



FERRULE

Send for WRICO Catalog, illustrated in color.



WRICO Lettering Guides and Pens

WRICO Vertical Lettering Guides

Cat. No.	Name	Wrico No.	Description	Height	Each
2150A.	Lettering Guide	(VCN90)	Vertical Letters and Numerals . . .	.090 in.	\$4.00
2150B.	"	(VCN120)	" " " " . . .	.120 "	4.00
2150C.	"	(VCN140)	" " " " . . .	.140 "	4.00
2150D.	"	(VCN175)	" " " " . . .	.175 "	4.00
2150E.	"	(VCN200)	" " " " . . .	.200 "	4.25
2150F.	"	(VN240)	Numerals . . . . .	.240 "	2.75
2150G.	"	(VC240)	Letters . . . . .	.240 "	3.25
2150H.	"	(VN290)	Numerals . . . . .	.290 "	3.00
2150J.	"	(VC290)	Letters . . . . .	.290 "	3.50
2150K.	"	(VN350)	Numerals . . . . .	.350 "	3.25
2150L.	"	(VC350)	Letters . . . . .	.350 "	3.75
2150M.	"	(VN500)	Numerals . . . . .	.500 "	3.75
2150N.	"	(VC500)	Letters . . . . .	.500 "	4.25

WRICO Vertical Condensed Lettering Guides

Cat. No.	Name	Wrico No.	Description	Height	Each
2151A.	Lettering Guide	(CVC185)	Cond. Vertical Letters . . . . .	.185 in.	\$3.00
2151B.	"	(CVL185)	" " Lower Case Letters . . . . .	.185 "	3.00
2151C.	"	(CVN185)	" " Numerals . . . . .	.185 "	2.25
2151D.	"	(CVC250)	" " Letters . . . . .	.250 "	3.25
2151E.	"	(CVL250)	" " Lower Case Letters . . . . .	.250 "	3.25
2151F.	"	(CVN250)	" " Numerals . . . . .	.250 "	2.50
2151G.	"	(CVN375)	" " Numerals . . . . .	.375 "	2.75
2151H.	"	(CVC375)	" " Letters . . . . .	.375 "	3.25
2151J.	"	(CVN500)	" " Numerals . . . . .	.500 "	3.25
2151K.	"	(CVC500)	" " Letters . . . . .	.500 "	3.75
2151L.	"	(CVN625)	" " Numerals . . . . .	.625 "	3.75
2151M.	"	(CVC625)	" " Letters . . . . .	.625 "	4.25

WRICO Slanting Lettering Guides

Cat. No.	Name	Wrico No.	Description	Height	Each
2152A.	Lettering Guide	(SCN90)	Slanting Letters and Numerals . . .	.090 in.	\$4.00
2152B.	"	(SCN120)	" " " " . . .	.120 "	4.00
2152C.	"	(SCN140)	" " " " . . .	.140 "	4.00
2152D.	"	(SCN175)	" " " " . . .	.175 "	4.00
2152E.	"	(SCN200)	" " " " . . .	.200 "	4.25
2152F.	"	(SN240)	Numerals Only . . . . .	.240 "	2.75
2152G.	"	(SC240)	Letters " . . . . .	.240 "	3.25
2152H.	"	(SN350)	Numerals " . . . . .	.350 "	3.25
2152J.	"	(SC350)	Letters " . . . . .	.350 "	3.75
2152K.	"	(SN500)	Numerals " . . . . .	.500 "	3.75
2152L.	"	(SC500)	Letters " . . . . .	.500 "	4.25

WRICO Lettering Pens

Cat. No.											Each
2153-2.	WRICO Lettering Pen.	(See weight of letter made on page 1139)									\$2.00
2153-3.	"	"	"	"	"	"	"	"	"	"	2.00
2153-4.	"	"	"	"	"	"	"	"	"	"	2.00
2153-5.	"	"	"	"	"	"	"	"	"	"	2.00
2153-6.	"	"	"	"	"	"	"	"	"	"	2.00
2153-7.	"	"	"	"	"	"	"	"	"	"	2.00

WRICO Pen Parts

Cat. No.											Each
2154A.	Needles,	for Wrico Lettering Pens (When ordering specify pen size)									\$0.25
2154B.	Points	"	"	"	"	"	"	"	"	"	.75
2154C.	Plungers,	"	"	"	"	(Fits all size pens)					.35
2154D.	Ferrules	"	"	"	"	"	"	"	"	"	.40
2154E.	Barrels,	"	"	"	"	"	"	"	"	"	.25

For samples of WRICO Lettering, see page 1141.



WRICO Lettering Sets

WRICO Lettering Sets are furnished in handsome solid mahogany cabinets with separate compartments provided for each Lettering guide and Pen, facilitating rapid selection and protecting the instruments against damage.



WRICO Vertical Lettering Set No. 2155.

WRICO Vertical Lettering Sets

No. 2155	Wrico Lettering Set (No. M) complete, containing one each Nos. 2150C, D, F, G, K, L, M, and N, and one each Nos. 2153-2, -3, -4, -5, and -6.	Each	\$39.00
No. 2156	Wrico Lettering Set (No. A), containing one each Nos. 2150C, F, G, K, L, M, and N, and one each Nos. 2153-3, -4, -5, and -6.	Each	33.00
No. 2157	Wrico Lettering Set (No. B), containing one each Nos. 2150F, G, K, L, M, and N, and one each Nos. 2153-3, -4, and -5.	Each	27.00
No. 2158	Wrico Lettering Set (No. KV), containing one each Nos. 2150A and B, and No. 2153-7.	Each	10.00
No. 2159	Wrico Lettering Set (No. E), containing one each Nos. 2150C, D, and E, and No. 2153-6.	Each	14.25

WRICO Condensed Vertical Lettering Sets

No. 2160	Wrico Lettering Set (No. D), containing one each Nos. 2151C, B, A, F, E, and D, and one No. 2153-6.	Each	\$19.25
No. 2161	Wrico Lettering Set (No. F), containing one each Nos. 2151G, H, J, K, L, M, and one each Nos. 2153-2, -3, -4, and -5.	Each	29.00

WRICO Slanting Lettering Sets

No. 2162	Wrico Lettering Set (No. SM) complete, containing one each No. 2152C, D, F, G, H, J, K, and L, and one each No. 2153-2, -3, -4, -5, and -6.	Each	\$39.00
No. 2163	Wrico Lettering Set (No. SA), containing one each No. 2152C, F, G, H, J, K, and L, and one each No. 2153-3, -4, -5, -6.	Each	33.00
No. 2164	Wrico Lettering Set (No. SB), containing one each No. F, G, H, J, K, and L, and one each No. 2153-3, -4, and -5.	Each	27.00
No. 2165	Wrico Lettering Set (No. KS), containing one each No. 2152A and B, and No. 2153-7.	Each	10.00
No. 2166	Wrico Lettering Set (No. SE), containing one each No. 2152C, D, and E, and one each No. 2153-6.	Each	14.25
No. 2167	Wrico Lettering Set (No. KVS), containing one each No. 2150A and B, and No. 2152A and B, and one No. 2153-7.	Each	18.00



Samples of WRICO Lettering

Catalog No.	Pen 2153-2	Pen 2153-3	Pen 2153-4	Pen 2153-5	Pen 2153-6	Pen 2153-7
2150N	A	B	C	D	•	•
2150L	E	F	G	H	•	•
2150K	&	2	3	4	•	•
2150G	•	1	J	K	•	•
2150F	•	5	6	7	•	•
2150D	•	•	•	•	L 8	•
2150C	•	•	•	•	M 9	•
2150B	•	•	•	•	•	N 10
2150A	•	•	•	•	•	O 11
2152L	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	•	•
2152C	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	•	•
2152H	<i>&</i>	<i>2</i>	<i>3</i>	<i>4</i>	•	•
2152G	•	<i>1</i>	<i>J</i>	<i>K</i>	•	•
2152F	•	<i>5</i>	<i>6</i>	<i>7</i>	•	•
2152D	•	•	•	•	<i>L 8</i>	•
2152C	•	•	•	•	<i>M 9</i>	•
2152B	•	•	•	•	•	<i>N 10</i>
2152A	•	•	•	•	•	<i>O 11</i>



Irregular Curves of Celluloid and Wood



Nos. 2182 and 2184

		Price	Postage
No. 2182	Transparent Celluloid Curves, Nos. 1, 2, 5, 16, 22, 25 and 26. Each .....	.45	.03
	Transparent Celluloid Curves, Nos. 3, 4, 13, 19 and 20. Each .....	.60	.05
	Transparent Celluloid Curve, No. 24.....	.75	.05
	Transparent Celluloid Curve, No. 27.....	.90	.08
	Transparent Celluloid Curve, Logarithmic, Spiral, No. 29..	2.40	.15
No. 2184	Wood Curves, Nos. 1, 5, 21, 25 and 26. Each.....	.25	.03
	Wood Curves, Nos. 3, 4, 13, 19, 20 and 24. Each.....	.30	.05
	Wood Curve, No. 27.....	.35	.08



Adjustable Curve Ruler



No. 2186

These rulers can be instantly adjusted and retained to any form of curve.

This tool is recommended by architects and draftsmen, and meets a long felt want. It is well made, neatly finished and nickel-plated.

		Price	Postage
No. 2186	Adjustable Curve Ruler, 14½ inches long.....	\$2.25	\$.16
No. 2187	Adjustable Curve Ruler, 30 inches long.....	3.75	.35

Railroad Curves

Sets Nos. 2209 to 2211 consist of 10 Curves, cut to a scale of inches, from 12 to 130 inches radius, varying 12 inches.

No. 2209	Transparent Celluloid Curves, in wood box.....	\$10.50	\$.30
No. 2210	Rubber Curves, in wood box.....	8.50	.30
No. 2211	Wood Curves, in wood box.....	4.50	.30

Sets Nos. 2213 to 2215 consist of 24 Curves, cut to a scale of inches, from 1½ to 24 inches radius varying every ½ inch up to 10 inches, and then every 2 inches up to 24 inches.

No. 2213	Transparent Celluloid Curves, in wood box.....	25.00	.40
No. 2214	Rubber Curves, in wood box.....	20.00	.40
No. 2215	Wood Curves, in wood box.....	12.00	.40

Sets Nos. 2217 to 2219 consist of 10 Curves, cut to a scale of 40 feet to the inch, from 1 degree to 10 degrees, varying every degree.

No. 2217	Transparent Celluloid Curves, in wood box.....	10.50	.30
No. 2218	Rubber Curves, in wood box.....	8.50	.30
No. 2219	Wood Curves, in wood box.....	4.50	.30

Sets Nos. 2221 to 2223 consist of 20 Curves, cut to a scale of 40 feet to the inch, from 1 degree to 20 degrees, varying every degree.

No. 2221	Transparent Celluloid Curves, in wood box.....	20.00	.35
No. 2222	Rubber Curves, in wood box.....	16.50	.35
No. 2223	Wood Curves, in wood box.....	10.00	.35

Sets Nos. 2225 to 2227 consist of 12 Curves, cut to a scale of 100 feet to the inch, from 1 degree to 12 degrees, varying every degree.

No. 2225	Transparent Celluloid Curves, in wood box.....	12.50	.30
No. 2226	Rubber Curves, in wood box.....	10.50	.30
No. 2227	Wood Curves, in wood box.....	6.50	.30

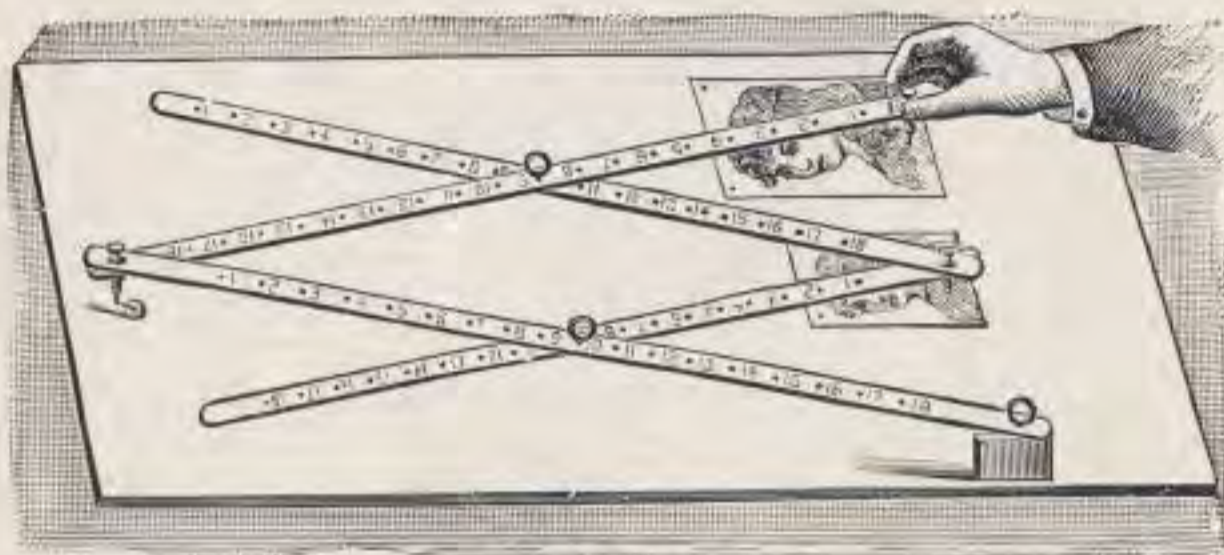
Sets Nos. 2237 to 2239 consist of 20 Curves, cut to a scale of 400 feet to the inch, from 30 minutes to 10 degrees, varying every 30 minutes.

No. 2237	Transparent Celluloid Curves, in wood box.....	20.00	.35
No. 2238	Rubber Curves, in wood box.....	16.50	.35
No. 2239	Wood Curves, in wood box.....	10.00	.35

We list only a few of the most popular sets, but are prepared to furnish on short notice any size sets. Single Curves can also be furnished.



Pantographs for Enlarging or Reducing Drawings



No. 2300

		Price	Postage
No. 2300	Pantograph, hardwood, nickel-plated mountings, adjustable lead, bars 21 inches; for reducing and enlarging drawings in 25 ratios, 8 : 1 to $1\frac{1}{8}$: 1, in plain box, with directions. Each	\$2.00	\$.20
No. 2302	Pantograph, polished hardwood, fancy lined, bars 21 inches, metal foot; tracer and lead point interchangeable, for reducing and enlarging drawings in 34 ratios, from 8 : 1 to $1\frac{1}{8}$: 1 or vice versa, in plain box, with directions. Each	3.25	.25
No. 2306	Pantograph, same as No. 2302, but bars 41 inches, and joints formed by bolts and thumb nuts. Each.....	7.50	.40

Drawing Paper

NOTE. Small quantities of paper must be rolled on a paste-board tube when sent by mail. Several yards can be sent on a single tube, with but little extra for postage. The pound price for papers Nos. 2389 to 2435 applies only to full rolls.

Architects Paper for Plans

White, Strong, Smooth Surface

No. 2350	Medium, 23 x 18 inches, per sheet, 8 cents; per quire.....	\$1.50	\$.48
No. 2352	Super Royal, 28 x 20 inches, per sheet, 10 cents; per quire..	2.00	.60
No. 2355	30 inches wide, per roll of 10 yards.....	1.75	.40
No. 2356	36 inches wide, per roll of 10 yards.....	2.00	.50
No. 2357	42 inches wide, per roll of 10 yards.....	2.25	.60

Whatman's White Drawing Paper

Selected, Best Quality, Grained Surface, Cold Pressed

No. 2360	Demy, 20 x 15 inches, per sheet, 10 cents; per quire.....	\$1.95	\$.28
No. 2361	Medium, 22 x 17 inches, per sheet, 13 cents; per quire.....	2.60	.40
No. 2362	Royal, 24 x 19 inches, per sheet, 17 cents; per quire.....	3.40	.50
No. 2363	Super Royal, 27 x 19 inches, per sheet, 20 cents; per quire..	4.00	.55
No. 2365	Imperial, 30 x 22 inches, per sheet, 28 cents; per quire.....	5.55	.68
No. 2368	Double Elephant, 40 x 27 inches, per sheet, 50 cents; per quire	10.25	1.38



Whatman's Drawing Paper

Mounted on Muslin

		Price	Postage
No. 2372	Imperial, 30 x 22 inches, per sheet.....	\$.90	\$.13
No. 2374	Double Elephant, 40 x 27 inches, per sheet.....	1.60	.18

Bristol Board Drawing Paper, — 3-Ply

No. 2380	Patent Office Bristol Board, 15 x 10 inches, per sheet, 10 cents; per dozen	\$1.10	\$.20
No. 2381	Bristol Board, 20 x 15 inches, per sheet, 20 cents; per dozen	2.15	.50
No. 2385	Patent Office Bristol Board, printed with border, etc., 15 x 10 inches, per sheet, 12 cents; per dozen.....	1.30	.20

Detail Drawing Paper, Cream Buff Tint

Superior Quality in Rolls of 35 to 40 Pounds

No. 2389	30 inches wide, per pound, 37 cents; per yard.....	\$.20	\$.10
No. 2390	36 inches wide, per pound, 37 cents; per yard.....	.25	.12
No. 2391	42 inches wide, per pound, 37 cents; per yard.....	.30	.20

Bleached Manilla Paper

For Workshop Drawings, Best American Make

In Rolls of about 50 Pounds

No. 2395	36 inches wide, medium, per pound, 20 cents; per yard....	\$.15	\$.12
No. 2396	42 inches wide, medium, per pound, 20 cents; per yard....	.18	.14
No. 2397	48 inches wide, medium, per pound, 20 cents; per yard....	.20	.20
No. 2398	54 inches wide, medium, per pound, 20 cents; per yard....	.25	.25

American White Roll Drawing Paper

Very Strong and of Excellent Quality

In Rolls of about 40 Pounds

No. 2410	36 inches wide, smooth surface, per pound, 65 cents; per yd. \$	.40	\$.12
No. 2411	42 inches wide, smooth surface, per pound, 65 cents; per yd.	.50	.14
No. 2413	63 inches wide, smooth surface, per pound, 65 cents; per yd.	.75	.50
No. 2414	72 inches wide, smooth surface, per pound, 65 cents; per yd.	.85	.55

Excelsior White Roll Drawing Paper

In Rolls of about 40 Pounds

No. 2420	36 inches wide, grained surface, per pound, 40 cents; per yd. \$	.50	\$.12
No. 2421	42 inches wide, grained surface, per pound, 40 cents; per yd.	.35	.14

Best White Eggshell Drawing Paper

In Rolls of about 40 Pounds

No. 2430	36 inches wide, pebbled surface, per lb., 75 cents; per yd. \$	.55	\$.13
No. 2431	42 inches wide, pebbled surface, per lb., 75 cents; per yd.	.65	.15
No. 2434	58 inches wide, pebbled surface, per lb., 75 cents; per yd.	.90	.50
No. 2435	58 in. wide, thick, pebbled surface, per lb., 75 cents; per yd.	1.15	.55

NOTE—The pound price for papers Nos. 2389 to 2435 applies to full rolls only



Mounted Drawing Paper White, Mounted on Muslin. In Rolls of 10 Yards

		Price	Postage
No. 2450	American, 36 inches wide, smooth surface, per roll, \$12.50; per yard	\$1.50	\$.25
No. 2451	American, 42 inches wide, smooth surface, per roll, \$15.00; per yard	1.80	.30
No. 2453	American, 63 inches wide, smooth surface, per roll, \$23.00; per yard	2.90	.50
No. 2454	American, 72 inches wide, smooth surface, per roll, \$31.50; per yard	4.00	.55
No. 2460	Eggshell, 36 inches wide, pebbled surface, per roll, \$14.00; per yard	1.70	.25
No. 2461	Eggshell, 42 inches wide, pebbled surface, per roll, \$16.00; per yard	2.00	.30
No. 2463	Eggshell, 58 inches wide, medium thick, pebbled surface, per roll, \$23.50; per yard.....	3.00	.50
No. 2464	Eggshell, 58 inches wide, thick, pebbled surface, per roll, \$26.00; per yard.....	3.25	.50
No. 2467	Paper Cloth, 38 inches wide, smooth surface, per yard.....	1.20	.20

Large pieces for city, county, or state maps, mounted to order.

Tracing Paper

Prima, thin and very transparent, takes ink and pencil perfectly

No. 2470	Width 21 inches, per yard, 10 cents; per roll of 20 yards..	\$1.25	\$.18
No. 2471	Width 42 inches, per yard, 15 cents; per roll of 20 yards..	2.25	.40

Banknote, thin and smooth, white surface

No. 2474	Width 36 inches, per yard, 12 cents; per roll of 20 yards..	1.90	.35
No. 2475	Width 42 inches, per yard, 15 cents; per roll of 20 yards..	2.40	.40

Cardinell-Vellum, strong, very transparent and durable

An excellent substitute for Tracing Cloth

No. 2476	Width 30 inches, per yard, 25 cents; per roll of 20 yards..	4.00	.30
No. 2477A	Width 36 inches, per yard, 25 cents; per roll of 20 yards	4.50	.35
No. 2477B	Width 42 inches, per yard, 30 cents; per roll of 20 yards	5.00	.40

**Orient, very clear and thin. Good for preliminary
sketching**

No. 2479	Width 48 inches, per yard, 12 cents; per roll of 20 yards....	2.00	.40
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Cranes Bond, thin, in sheets

No. 2484	Size 19 x 24 inches, per sheet, 6 cents; per quire.....	1.25	.15
No. 2486	Size 19 x 30 inches, per sheet, 8 cents; per quire.....	1.50	.20

W. & L. E. GURLEY, TROY, NEW YORK



Imperial Tracing Cloth

In Rolls of 24 Yards. Face Glazed and Back Dull

		Price	Postage
No. 2495	30 inches wide, per yard, \$1.15; per roll.....	\$21.50	\$.25
No. 2496	36 inches wide, per yard, 1.25; per roll.....	24.75	.40
No. 2497	42 inches wide, per yard, 1.60; per roll.....	29.50	.50
No. 2498	48 inches wide, per yard, 2.10; per roll.....	37.75	.65
No. 2499	54 inches wide, per yard, 2.60; per roll.....	46.75	.75
No. 2500	Pounce Powder, in tin shaker for Tracing Paper or Tracing Cloth, each.....	.25	.07

Prepared Blue Print Paper

Suitable for Sun Printing or Electric Machine
Best Quality

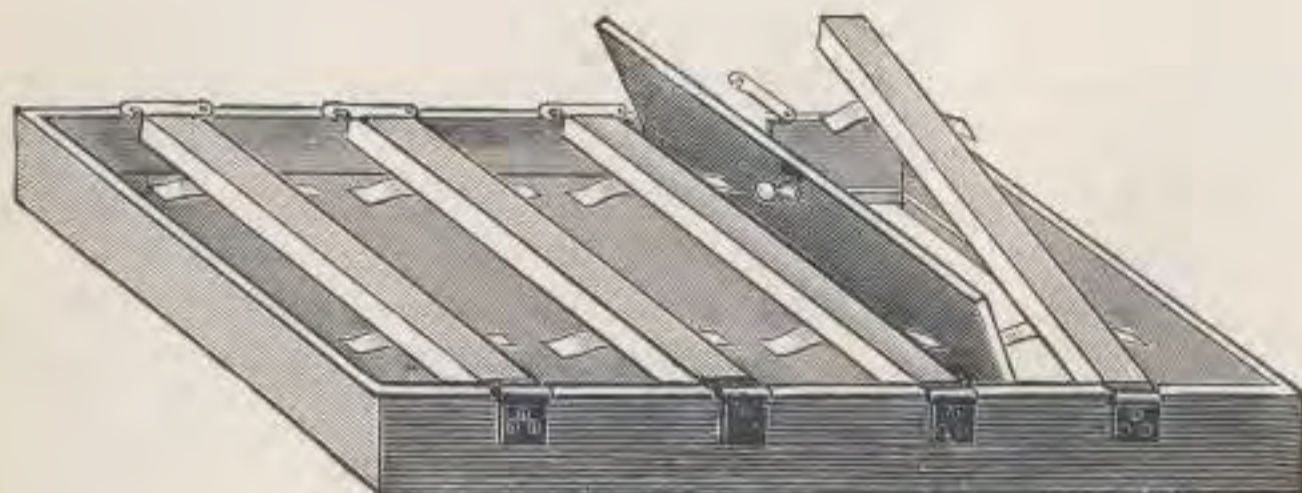
No. 2506	Thin Stock, for Prints that are to be mailed.				
	Width.....	24"	30"	36"	42"
	10 yard rolls.....	\$1.15	\$1.30	\$1.50	\$1.75
	50 yard rolls.....	4.30	5.00	5.85	6.70
No. 2508	Medium Stock, for regular commercial use.				
	Width.....	24"	30"	36"	42"
	10 yard rolls.....	1.05	1.20	1.35	1.50
	50 yard rolls.....	4.00	4.75	5.50	6.25
No. 2510	Thick Stock.				
	Width.....	24"	30"	36"	42"
	10 yard rolls.....	1.25	1.50	1.75	1.95
	50 yard rolls.....	5.00	5.85	6.90	7.95

Colored Inks for Correcting Blue Prints

		Price	Postage
No. 2515W	White Ink for altering blue prints, per bottle.....	\$0.30	\$.06
No. 2515R	Red Ink for altering blue prints, per bottle.....	.30	.06
No. 2515Y	Yellow Ink for altering blue prints, per bottle.....	.30	.06



Print Frames



No. 2534

	Price
No. 2534 Print Frame, complete with plate glass and cushion, 24 x 20 in., clear exposure	\$35.00
No. 2536 Print Frame, complete with plate glass and cushion, 30 x 24 in., clear exposure	45.00
No. 2538 Print Frame, complete with plate glass and cushion, 42 x 30 in., clear exposure	65.75

Galvanized Iron Bath Trays

For Washing Blue Prints in Water Bath

These Trays, of galvanized iron and equipped with a drain pipe, are exceptionally well made. They have a strong wired-rim, and are rigidly braced by wooden cross-bars.

No. 2540 Bath Tray, 20 x 24 x 6 inches.....	\$10.00
No. 2542 Bath Tray, 24 x 30 x 6 inches.....	12.40
No. 2544 Bath Tray, 30 x 42 x 6 inches.....	18.40

Tin Tubes with Pull-off Tops

For Holding Prepared Paper, Tracings, Drawings, Etc.

	Price	Postage
No. 2547 Plain Tin Tube, 30 x 2 $\frac{1}{4}$ inches.....	\$1.25	\$.35
No. 2548 Plain Tin Tube, 36 x 2 $\frac{1}{4}$ inches.....	1.40	.40
No. 2549 Plain Tin Tube, 42 x 2 $\frac{1}{4}$ inches.....	1.50	.45

Township Plotting Paper

No. 2550 Township Plotting Paper, rulings 6 x 6 inches, blocks 1 inch square, per hundred sheets	\$2.30	\$.18
No. 2552 Township Plotting Paper, rulings 12 x 12 inches, blocks 2 inches square, per hundred sheets	4.60	.35
No. 2553 Township Plotting Paper, rulings 18 x 15 inches, per dozen..	3.75	.20

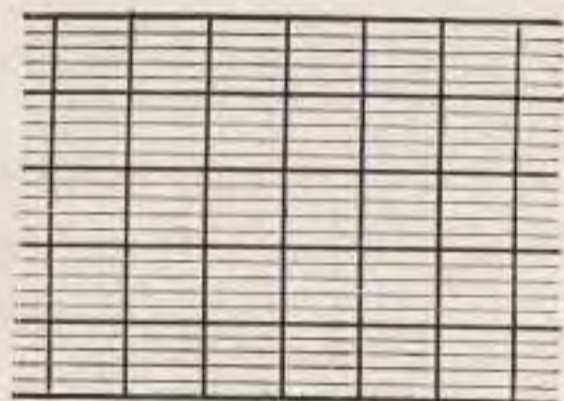


Profile Papers

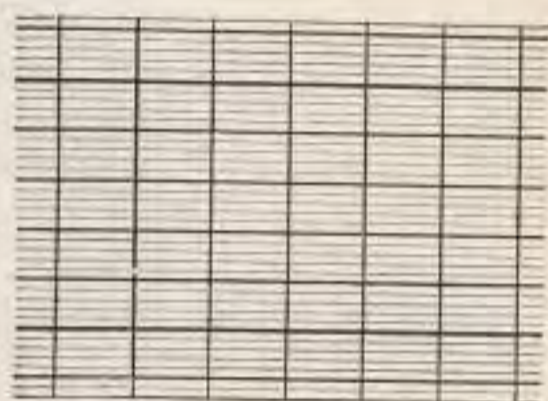
Sheets: Lines printed in green.

Continuous: Lines printed in green or orange.

Continuous on tracing paper or tracing cloth: Lines printed in orange.



No. 2584 Plate A
Rulings 4 x 20 to one inch

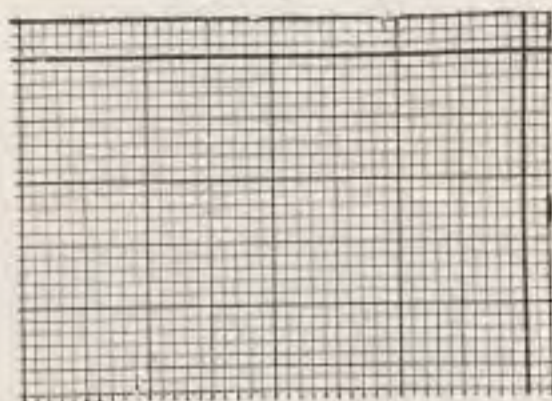


No. 2600 Plate B
Rulings 4 x 30 to one inch

		Price	Postage
No. 2584	Plate A, continuous, 20 inches wide, 50 yards in roll, per roll, \$8.00; per yard	\$0.25	\$.05
No. 2586	Plate A, continuous, 20 inches wide, mounted on muslin, 20 yards in roll, per roll, \$22.00; per yard.....	1.35	.08
No. 2588	Plate A, continuous, 20 inches wide, on tracing paper, 50 yards in roll, per roll, \$6.50; per yard.....	.20	.05
No. 2589	Plate A, continuous, 20 inches wide, on tracing cloth, 20 yards in roll, per roll, \$23.50; per yard.....	1.35	.08
No. 2600	Plate B, continuous, 20 inches wide, 50 yards in roll, per roll, \$8.00; per yard.....	.25	.05
No. 2602	Plate B, continuous, 20 inches wide, mounted on muslin, 20 yards in roll, per roll, \$22.00; per yard.....	1.35	.08
No. 2604	Plate B, continuous, 20 inches wide, on tracing paper, 50 yards in roll, per roll, \$6.50; per yard.....	.20	.05
No. 2605	Plate B, continuous, 20 inches wide, on tracing cloth, 20 yards in roll, per roll, \$23.50; per yard.....	1.35	.08



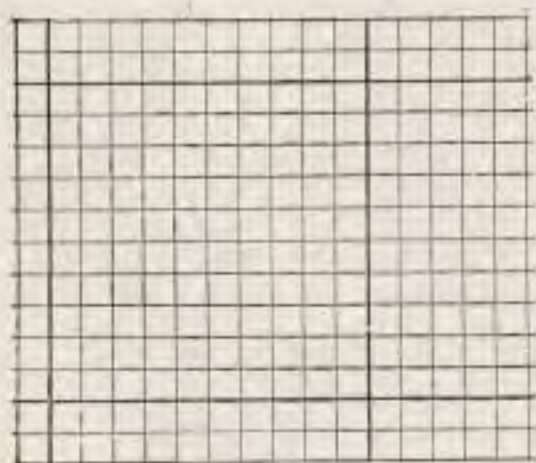
Metric Papers



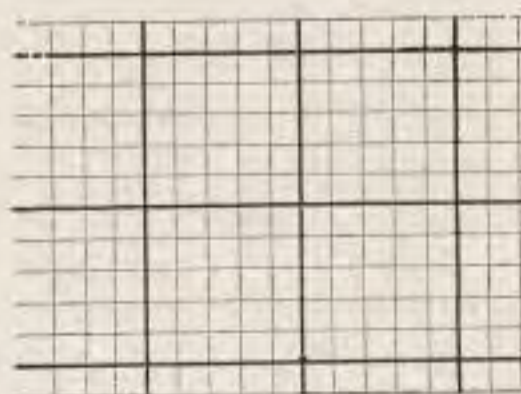
No. 2610

		Price	Postage
No. 2610	Millimeter, sheet 50 x 40 centimeters, rulings every millimeter, per sheet, 20 cents; per quire.....	\$3.75	\$.40
No. 2611	Millimeter, continuous, 50 centimeters wide, ruling in millimeters, in 50 yard rolls, per roll, \$8.00; per yard.....	.25	.05
No. 2612	Millimeter, continuous, mounted on muslin, 50 centimeters wide, ruling in millimeters, in 20 yard rolls, per roll, \$22.00; per yard.....	1.35	.10
No. 2613	Millimeter, continuous, on tracing paper, 50 centimeters wide, ruling in millimeters, in 50 yard rolls, per roll, \$6.50; per yard.....	.20	.05
No. 2614	Millimeter, continuous, on tracing cloth, 50 centimeters wide, ruling in millimeters, in 20 yard rolls, per roll, \$23.50; per yard.....	1.35	.05

Cross Section Papers



No. 2621
10 x 10 to the inch



No. 2624
5 x 5 to the half inch

Sheets: Lines printed in green.

Continuous: Lines printed in green.

Continuous on tracing paper or tracing cloth: Lines printed in orange.

No. 2621	Cross Section Paper, rulings 20 x 16 inches, 10 feet to inch, per sheet, 20 cents; per quire.....	\$3.75	\$.25
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Cross Section Papers Printed from Plates

		Price	Postage
No. 2622	Continuous Cross Section Paper, 20 inches wide, ruled 10 feet to inch, in rolls of 50 yards, per roll, \$8.00; per yard	\$0.25	\$.05
No. 2623A	Continuous Cross Section Paper, 20 inches wide, ruled 10 feet to inch on tracing paper, in rolls of 50 yards, per roll, \$6.50; per yard	.20	.05
No. 2623B	Continuous Cross Section Tracing Cloth, 20 inches wide, ruled 10 feet to inch, in rolls of 20 yards, per roll, \$23.50; per yard	1.35	.08
No. 2624	Cross Section Paper, rulings 20 x 16 inches, 10 feet to inch, every fifth line heavy, per sheet, 20 cents; per quire	3.75	.25
No. 2625	Cross Section Paper, rulings 20 x 16 inches, ruled 10 feet to inch on tracing paper, per sheet, 20 cents; per quire	3.75	.25
No. 2626	Cross Section Paper, rulings 20 x 16 inches, 16 feet to inch, per sheet, 20 cents; per quire	3.75	.25
No. 2627	Continuous Cross Section Paper, 20 inches wide, ruled 16 feet to inch, in rolls of 50 yards, per roll, \$8.00; per yard	.25	.05
No. 2635	Topographical Paper, ruled in blue and red, 400 feet to 1 inch, ruled full 16 x 21 inches, per quire	1.60	.25
No. 2636	Plate printed in blue, on Ledger Paper, 8 x 8 to 1 inch, ruled full 16 x 21 inches, per quire	1.60	.25
No. 2637	Plate printed in blue, on Ledger Paper, 10 x 10 to 1 inch, ruled full 16 x 21 inches, per quire	1.60	.25

Pads of Cross Section Paper

In Letterhead Size, 8½ x 11 in.

No. 2640	Cross Section, ruled in blue, divisions 4 x 4 to the inch, 50 sheets of good quality Ledger Paper, per pad	\$.45	\$.05
No. 2641	Cross Section, ruled in blue, divisions 8 x 8 to the inch, 50 sheets of good quality Ledger Paper, per pad	.45	.05
No. 2642	Cross Section, ruled in blue, divisions 10 x 10 to the inch, 50 sheets of good quality Ledger Paper, per pad	.45	.05

Thumb Tacks, Horn Centers, Etc.

No. 2680	Brass Thumb Tacks, round head, ¾ inch diameter, per doz.	\$.10	\$.02
No. 2682	Brass Thumb Tacks, round head, ½ inch diameter, per doz.	.20	.02
No. 2684	German Silver Thumb Tacks, round head, ¾ inch diameter, per dozen	.25	.02
No. 2685	German Silver Thumb Tacks, round head, ½ inch diameter, per dozen	.30	.02
No. 2686	German Silver Thumb Tacks, round head, ⅝ inch diameter, per dozen	.35	.03
No. 2692	Steel Thumb Tacks, common, ¾ inch diameter, per dozen	.08	.02
No. 2693	Steel Thumb Tacks, common, ¾ in. diameter, per box of 100	.60	.05
No. 2694	Steel Thumb Tacks, common, ⅝ inch diameter, per dozen	.12	.02
No. 2695	Steel Thumb Tacks, common, ⅝ in. diameter, per box of 100	.80	.06
No. 2700	Thumb Tack Lifter and Paper Knife, nickel-plated	.30	.02
No. 2707	Horn Center, plain	.15	.01
No. 2708	Horn Center with German silver rim	.75	.01
No. 2710	Handy Paper Cutter, brass mounted, for cutting drawings from the board	.65	.03

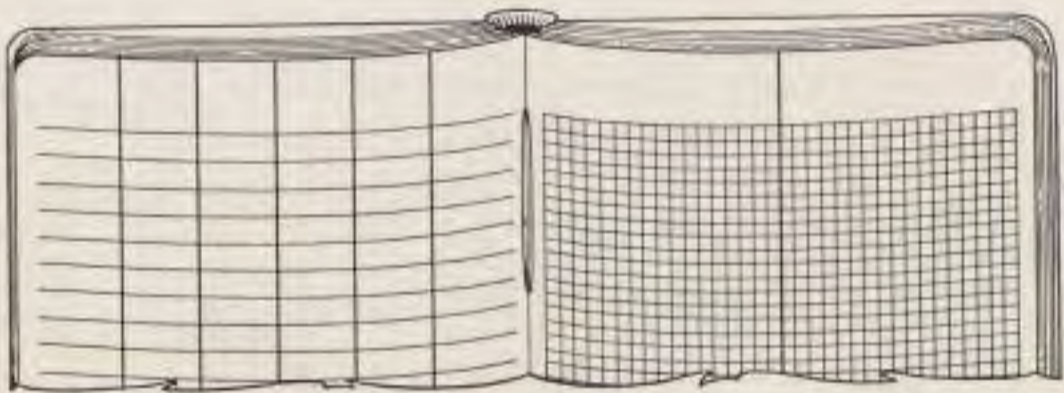


Engineers Blank Field Books

Superior Quality and Very Durable, with Fabrikoid Binding and Rounded Corners
Made especially for W. & L. E. Gurley



No. 2725 Level Books, $4\frac{1}{2} \times 7\frac{1}{4}$ inches, 60 leaves, with Tables, per dozen, \$10.00; or single..... \$0.85 \$.05



No. 2728 Transit Books, $4\frac{1}{2} \times 7\frac{1}{4}$ inches, 60 leaves, with Tables, per dozen, \$10.00; or single..... \$0.85 \$.05



No. 2731 Field Books, $4\frac{1}{2} \times 7\frac{1}{4}$ inches, 60 leaves, with Tables, per dozen, \$10.00; or single..... \$0.85 \$.05



Engineers Blank Field Books

		Price	Postage
No. 2738	Cross Section Books, $4\frac{1}{4} \times 7\frac{1}{4}$ inches, 80 leaves, ruled 10 spaces per inch, per dozen, \$13.85; or single.....	\$1.25	\$.05
No. 2742	Cross Section Books, $6\frac{1}{2} \times 8\frac{1}{2}$ inches, 80 leaves, ruled 10 spaces per inch, per dozen, \$20.40; or single.....	1.75	.08
No. 2744	Earthworks Books, $5 \times 7\frac{1}{4}$ inches, 80 leaves, with printed headings and tables for railroad engineers, per dozen, \$17.00; or single	1.50	.18

Engineers Loose Leaf Field Books

The advantages of the Loose Leaf Books, are that the engineer working in the field can send any of his notes to the office, daily or weekly, and at the same time continue to use the books. It also permits filing any notes of any particular survey together.

Size of covers, $4\frac{7}{8} \times 7$ inches, 50 leaf capacity with three rings, furnished in two bindings Fabrikoid and Black Morocco.

No. 2745	Loose Leaf Cover only, Fabrikoid binding, each.....	\$1.50	\$.10
No. 2746	Loose Leaf Cover only, Black Morocco binding.....	2.00	.10
No. 2747	Loose Leaves, No. 2725 ruling, 50 leaves in set.....	.50	.05
No. 2748	Loose Leaves, No. 2728 ruling, 50 leaves in set.....	.50	.05
No. 2749	Loose Leaves, No. 2731 ruling, 50 leaves in set.....	.50	.05
No. 2750	Loose Leaves, No. 2738 ruling, 50 leaves in set.....	.50	.05
No. 2750A	Transfer Binder for loose leaves, each.....	.80	.10

Lead Pencils

No. 2751	Eldorado Pencils, hexagon, Nos. 2B to 8H. The highest grade drawing pencil, per dozen.....	\$1.00	\$.05
No. 2758	Ticonderoga Office Pencil with rubber tip, No. 2 Soft, per dozen .....	.50	.05
No. 2759	Ticonderoga Office Pencil with rubber tip, No. 2½ Medium, per dozen .....	.50	.05
No. 2760	Ticonderoga Office Pencil with rubber tip, No. 3 Hard, per dozen .....	.50	.05
No. 2768	Leads, H to 6H, 6 in box. These leads fit the pencil legs of modern drawing compasses; per box.....	.50	.04
No. 2778	Hardmuths Koh-i-noor Pencils, hexagon, superfine, 2B to 8H, per dozen	1.20	.14
No. 2784	Pencil Point Protector, with rubber tip.....	.05	.01

Colored Pencils

No. 2785	Round, Red, Blue, Green and Yellow Pencils, per dozen.....	\$1.25	\$.05
No. 2790	Round, Wax Crayon Pencils, 6 in box, assorted colors, per box .....	.75	.05
No. 2791	Round, Wax Crayon Pencils, 12 in box, assorted colors, per box	1.50	.18

Dixon Lumber Crayons

For Marking Stakes and Boards

These crayons are superior quality and do not soil the hands.

No. 2797	Lumber Crayons, waterproof, best quality, red, blue, black or yellow, per dozen	\$1.20	\$.15
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Steel Lettering and Writing Pens

No. 2800	Gillotts Mapping Pens, per dozen.....	\$1.00	\$.03
No. 2801	Gillotts Lithographic Pens, per dozen.....	1.00	.03
No. 2802	Gillotts Crow Quill Pens, per dozen.....	1.00	.03
No. 2806	Gillotts Mapping and Writing Pens, No. 170, per dozen, 20 cents; per gross	2.00	.13
No. 2807	Gillotts Mapping and Writing Pens, No. 303, per dozen, 20 cents; per gross	2.00	.14
No. 2808	Gillotts Mapping and Writing Pens, No. 404, per dozen, 13 cents; per gross	1.25	.14



Round Writing Pens for Ornamental Writing

		Price	Postage
No. 2820	Pens, single pointed, Nos. 1 to 6, assorted, per dozen.....	\$0.15	\$.02
No. 2822	Pens, single pointed, Nos. 1 to 6, assorted, per gross.....	1.25	.15
No. 2824	Pens, double pointed, Nos. 10, 20 and 30, assorted, per dozen	.30	.03
No. 2826	Sample assortment of 25 pens, per box.....	.40	.03
No. 2827	Inkholder, for single pointed round writing pens, per box of 6	.25	.03
No. 2828	Penholders for round writing pens, each.....	.10	.02
No. 2830	Textbook to round writing, with full instructions.....	.75	.05
No. 2831	Copybook for round writing practice.....	.50	.05

Steel Erasing Knives, Erasing Shields,
Pencil Sharpeners and Files

No. 2835	Steel Blade Eraser, cocoa handle.....	\$.45	\$.03
No. 2836	Steel Blade Eraser, bone handle.....	.65	.03
No. 2838	Steel Eraser, long knife blade, cocoa handle.....	.50	.03
No. 2839A	Metal Erasing Shield, nickel-plated, 3¾ x 2¾ inches.....	.20	.02
No. 2839B	Zylonite Erasing Shield, 4½ x 2½ inches.....	.20	.02
No. 2840	Pencil Sharpener, brass with removable steel blade.....	.25	.03



No. 2841

No. 2841	"Chicago" Pencil Sharpener. Points standard size pencils and automatically stops cutting when point has been produced. Cutters good for 25,000 pointings. Can be used in any position. Nickel finish.....	\$1.00	\$.15
No. 2844	Fine Steel Pencil File, with tack lifter at end.....	.60	.03
No. 2846	Pencil Pointer (a pad of flint paper), 1¼ x 4 inches.....	.15	.02

Erasing Rubbers

No. 2850	Pliable Artists Rubber, No. 40.....	\$.06	\$.01
No. 2852	Pliable Artists Rubber, No. 24.....	.10	.02
No. 2854	Pliable Artists Rubber, No. 16.....	.15	.03
No. 2856	Pliable Artists Rubber, No. 12.....	.20	.03
No. 2858	Kneaded Rubber, 1¾ x 1¾ inches.....	.05	.01
No. 2859	Kneaded Rubber, 1⅝ x 1¼ inches.....	.10	.02
No. 2861	Circular Ink Eraser.....	.05	.01
No. 2862	Ink Eraser, 1½ x 1 inch.....	.05	.01
No. 2864	Ink Eraser, 1⅞ x 1½ inches.....	.20	.03
No. 2866	Combined Ink and Pencil Eraser, beveled ends.....	.10	.02

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Erasing Rubbers

		Price	Postage
No. 2868	Typewriter Rubber, $3\frac{1}{4}$ x $\frac{5}{8}$ inches.....	\$0.10	\$.02
No. 2872	Art Gum, for cleaning drawings, $2\frac{1}{4}$ x $1\frac{1}{8}$ x $1\frac{1}{8}$ inches..	.10	.02
No. 2873	Art Gum, for cleaning drawings, 3 x 2 x 1 inches.....	.17	.03
No. 2880	Bevel Rubber, green, oblong, No. 48.....	.05	.01
No. 2881	Bevel Rubber, red, oblong, No. 48.....	.05	.01
No. 2882	Bevel Rubber, green, oblong, No. 24.....	.10	.02
No. 2883	Bevel Rubber, red, oblong, No. 24.....	.10	.07
No. 2884	Bevel Rubber, green, oblong, No. 12.....	.15	.03
No. 2885	Bevel Rubber, red oblong, No. 12.....	.15	.03

Sponge Rubbers For Cleaning Drawings

No. 2895	Sponge Rubber, $2\frac{1}{2}$ x $1\frac{3}{4}$ x $\frac{5}{8}$ inches.....	\$.30	\$.02
No. 2896	Sponge Rubber, 2 x 2 x 1 inches.....	.35	.02
No. 2898	Sponge Rubber, 4 x 2 x 1 inches.....	.80	.04

Higgins Drawing Board Mucilage

No. 2915	Drawing Board Mucilage, fine quality, 3 ounce jar.....	\$.20	\$.13
No. 2916	Drawing Board Mucilage, fine quality, 6 ounce jar.....	.35	.20
No. 2918	Taurine Mucilage, fine quality, 2 ounce bottle, with brush..	.15	.10
No. 2919	Taurine Mucilage, fine quality, 4 ounce bottle, with brush..	.25	.15
No. 2920	Taurine Mucilage, fine quality, pint bottle without brush..	.85	.30

The Drawing Board Mucilage is a semi-fluid paste of great strength.

The Taurine Mucilage is a powerful liquid adhesive.

Drawing Inks

Higgins American Liquid Drawing Inks

		Price	Postage
No. 2925	Waterproof Black Ink, small bottle.....	\$0.25	
No. 2926	Waterproof Black Ink, 8 ounce bottle.....	2.00	
No. 2928	General Black Ink (not waterproof), small bottle.....	.25	
No. 2929	General Black Ink (not waterproof), 8 ounce bottle.....	2.00	
No. 2930	Waterproof Carmine .....	.25	
No. 2931	Waterproof Scarlet .....	.25	
No. 2932	Waterproof Vermilion .....	.25	
No. 2933	Waterproof Blue .....	.25	
No. 2934	Waterproof Indigo .....	.25	
No. 2935	Waterproof Violet .....	.25	
No. 2936	Waterproof Green .....	.25	
No. 2937	Waterproof Yellow .....	.25	
No. 2938	Waterproof Brown .....	.25	
No. 2939	Waterproof Orange .....	.25	
No. 2940	Waterproof Brick Red .....	.25	
No. 2941	Waterproof White .....	.25	
No. 2942	Waterproof Ink, any of the above colors, per 8 ounce bottle.....	2.00	
No. 2943A	Higgins Eternal Black Writing Ink, small bottle.....	.15	

Postage on the above inks, 7 cents each small bottle, and 30 cents each 8 ounce bottle.

Miscellaneous Liquid Drawing Inks

No. 2955	Devoes White Ink, per bottle.....	\$0.25	\$.08
No. 2956	Bourgeois Black India Ink, per bottle.....	.40	.06



The Gurley Factory

W. & L. E. GURLEY

Established 1845

TROY, N. Y., U. S. A.

Makers of

Surveying Instruments

Transits, Levels, Compasses, Alidades, Plane Tables, Sketching Cases, Leveling and Stadia Rods, Plummets, Hand Levels, Chains and Field Supplies.

Hydraulic Engineering Instruments

Daily, Weekly, Continuous and Long Distance Water Level Recorders, Water Level Indicators, Hook Gages, Price Type Acoustic and Electric Current Meters.

Standard Weights and Measures

Precision Weights, Measures, Balances and Inspectors Equipment.

Descriptive Bulletins sent on request

