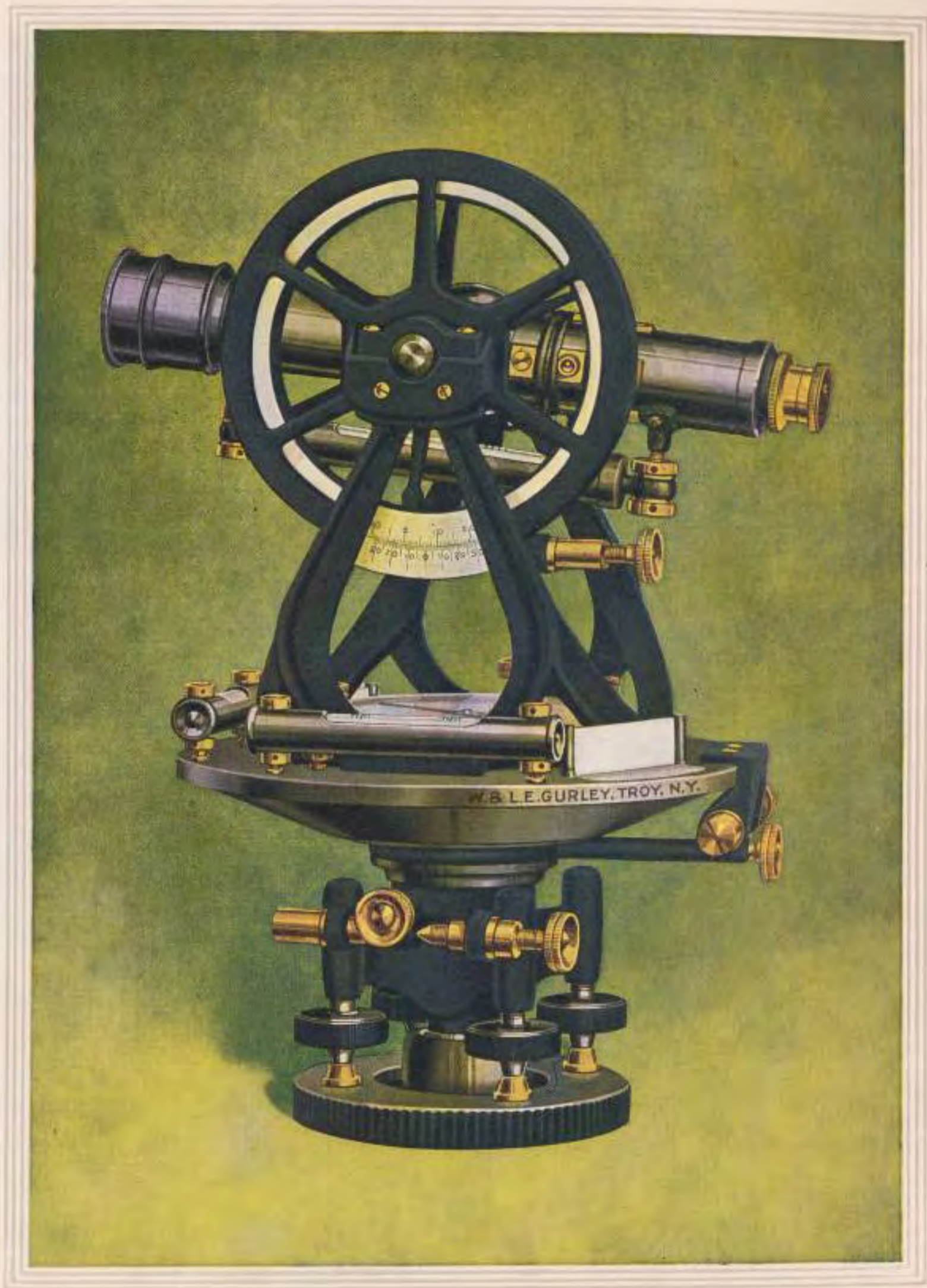


GURLEY

*ENGINEERING
INSTRUMENTS*

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



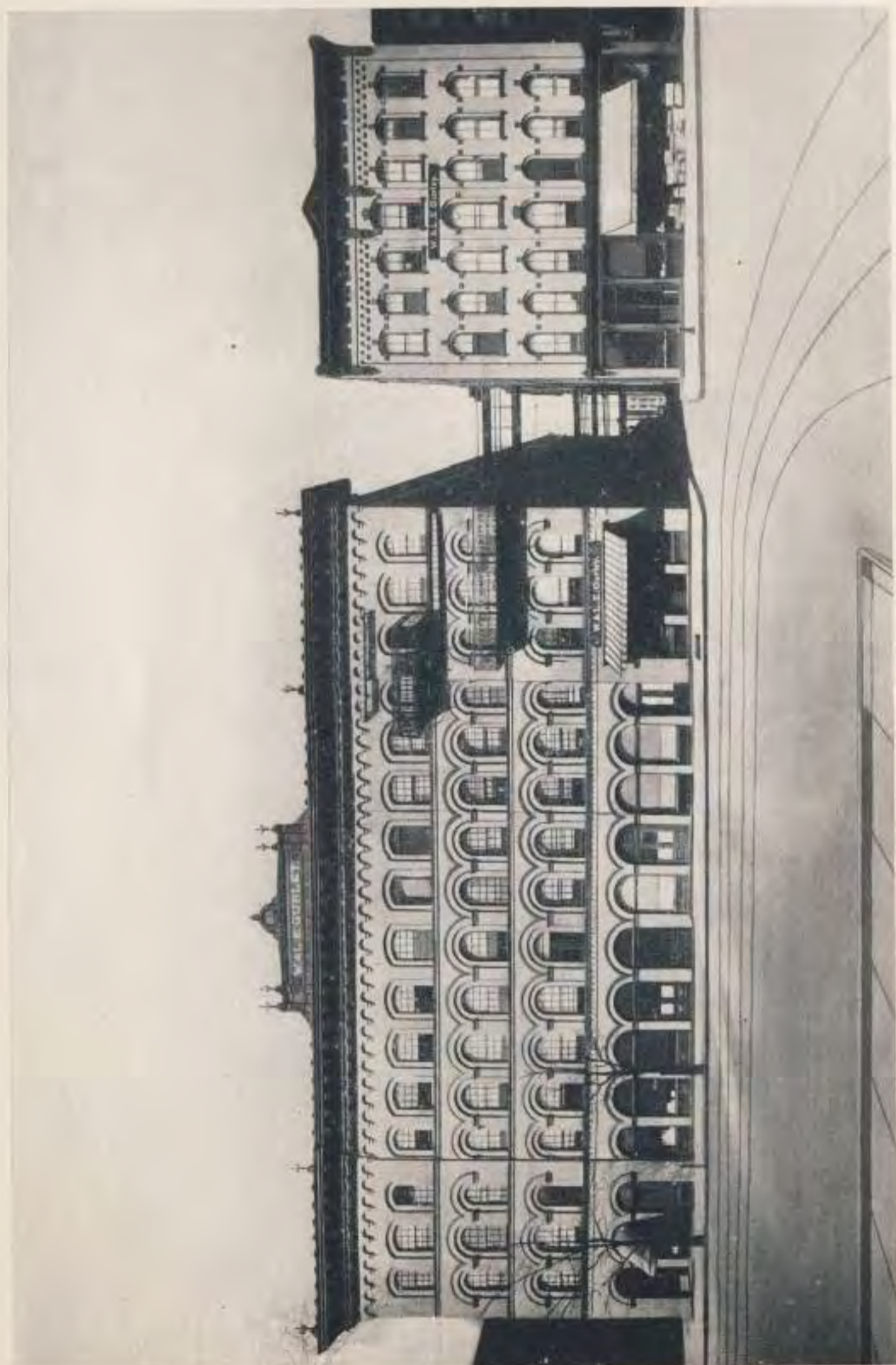
Gurley Precise Mountain Transit

Gurley Engineering Instruments

Thirty-second Edition

Copyrighted 1922
by
W. & L. E. Gurley
Troy, N. Y.

W. & L. E. GURLEY
Established 1845
TROY, N. Y., U. S. A.



THE GURLEY FACTORY, TROY, NEW YORK



Foreword

As this new catalogue goes to press, it is fitting that we take account of our product as it stands today.

Some new things have been added to the Gurley line — many improvements have been made in existing designs — and yet we must be candid with ourselves, as these several things pass in review, and declare as our honest belief, that in the main, the early Founders of the Gurley business, builded well indeed.

How well they laid the foundation, more than 75 years ago, is perhaps best indicated by the fact, that the business today is in sound body and growing in size and following, more rapidly than ever.

Is it then, too much to believe, that Gurley Engineering Instruments possess those sterling qualities which make for utmost satisfaction to the man who uses them ?

To continue to enjoy the confidence of the Engineering Profession is our endeavor, and just so long as a good product and fair treatment invite preference, just so long will our business endure.

GENERAL INFORMATION



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GENERAL INFORMATION



Extent of Our Business

For many years our facilities for the manufacture of Engineering and Surveying Instruments have been far superior to those of any other similiar establishment in the world. They are being constantly enlarged by the introduction of new machinery and tools.

We make in our own factory the lenses for the telescopes of our instruments, the platinum filament for the cross wires and stadia wires, the glass vials for the levels, the wooden boxes in which the instruments are carried, the leather cases and straps for these boxes, as well as the castings and all other metal parts of the instruments themselves.

Thousands of our instruments have been distributed to all parts of the United States, Canada, Mexico, Central America, West Indies, South America, China, Japan, Australia, Africa, India and other foreign countries.

Our Guarantee

All instruments of our own make are examined and tested before being shipped, and are sent to the purchaser adjusted, ready for immediate use. They are warranted correct in all their parts — we agreeing in the event of any original defect appearing after reasonable use, to repair or replace with new and perfect instruments, promptly at our own cost, express charges included; or we will refund the money and the express charges paid by the purchaser.

It sometimes happens in a business as large and widely extended as ours that instruments reach our customers in bad condition, owing to careless transportation, or to defects escaping the closest scrutiny of our inspectors. We consider the retention of such instruments by the purchaser an injury very much greater to us than to himself. We also consider that a sale is not completed until the purchaser is satisfied in every detail.

Trial of Instruments

If requested to do so, we will ship to the express station, nearest the person giving the order, and will instruct the express agent to collect the amount of our bill and hold the money three days. This will give the purchaser an opportunity to test the instrument in the field and if it is not found as represented, he may return it to the express agent who will refund the full amount paid, including transportation charges.

This privilege of trial applies only to our large instruments such as Transits, Levels, Compasses, etc., is not given unless requested, and is allowed only in the United States. Privilege of trial is not allowed by the Great Northern or Southern Express Companies. All express companies, however, will allow examination of instruments at their offices, if the shipper requests it for the purchaser.

This Catalogue supersedes all previous editions.

All prices are subject to change without notice.

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



Ordering

In ordering always give the Catalogue Numbers of the instruments and accessories selected.

To avoid delay please be sure to give full particulars concerning each item on your order.

In the absence of shipping directions we will understand that we are authorized to ship by the method which in our judgment is quickest and safest.

In the case of articles which can be sent safely by mail, and it is desired that we do so, please include in your remittance the approximate cost of postage printed in the catalogue. Should the amount sent exceed the actual postage, the balance will be returned.

All articles can be insured at an extra cost which varies according to the value of the package. For details ask your Postmaster.

Packing and Delivery

Each of our Transits, Levels and Surveyors Compasses, is packed in a well finished mahogany case, equipped with lock and key, and leather strap for convenience in carrying.

When sent to the purchaser the mahogany cases are carefully enclosed in outside packing containers, made a little larger on all sides to receive elastic packing material.

We make no charge for packing boxes or packing, and our instruments are delivered F. O. B. Troy, N. Y., to the express company or freight house.

Charges for transportation are in all cases to be paid by the purchaser, we guaranteeing the safe arrival of our goods at the destination indicated at the time of shipment.

Terms of Payment and Methods of Shipping

Terms of payment are *uniformly cash*, and in-as-much as we have but one price, the purchaser is assured of uniform treatment. Our instruments are of first quality and are sold at the lowest price, consistent with the maintenance of this quality.

Remittances may be made by a cashier's bank draft, payable to our order, or by Express Company or Post Office money order, payable at Troy, N. Y. These may be sent by mail with the order for the instrument, and if lost or stolen enroute can be replaced by a duplicate, and without additional cost.

The customer may also send the money in advance by registered mail, or by the express agent, or instruct us to forward the shipment C. O. D. Goods ordered for shipment to foreign countries must be paid for in advance of shipment.

Customers ordering instruments and desiring *changes in construction* from our regular patterns, must make a payment of fifty per cent. of the price, in advance *when ordering*.

We pay the express companies' return charges on C. O. D. Shipments amounting to \$20 and over. The cost of returning the money on bills of amounts under \$20 collected by express will be charged to the customer.

GENERAL INFORMATION



Instruments for Foreign Countries



Instruments packed for foreign shipment, which are to have ocean passage, are wrapped in waterproof material and enclosed in strong packing boxes which are strengthened and protected by special band wire.

Cash must accompany all orders for foreign shipments by steamship. If it is desired that we attend to the shipment of the instruments, an additional amount must be included in customer's remittance as follows; 10% more than catalogue price on orders amounting to \$250 or less. 8% more than catalogue price on orders amounting to from \$300 to \$500. 6% more on orders \$600 or over.

This extra remittance is to cover shipping charges, freight and insurance, which must always be paid in advance on all shipments except those consigned to Canada and some parts of Mexico.

If the amount remitted is more than necessary to cover these expenses, the balance will be returned to the purchaser with the receipted bill and bill of lading, unless we are directed to hold it to his credit.

Remittances must be made by bank draft on New York City or London, England. Such drafts can be purchased in any of the large cities of the different countries.

Our registered cable address is "GURLEY, TROY, N. Y." Use Western Union, A. B. C. Fifth Edition, Bentley's, or Lieber's Codes. See *Private Cable Code* on pages 143 to 145.

Repair of Instruments

Each year we receive hundreds of instruments of our own and other makes sent to us for refitting and repairs.

We advise our customers who have instruments in need of repairs to send them directly to us, as our facilities enable us to do the work economically and promptly.

They should always be placed in their own boxes, and then enclosed in an outside packing case, at least an inch larger in all its dimensions, and the space between the two filled with paper wadding, hay or shavings.



The owner's name and address should always appear on the package and a note specifying the repairs wanted should accompany the instrument. A letter should also be sent by mail, giving not only directions as to the repairs, but also stating when the return of the instrument is required, and the precise location to which it should be forwarded.

As each instrument is made to fit its own spindle, and no other, the leveling head complete (centers and spindle) should always be sent with it.

The tripod legs and brass head in which they are inserted need not be sent unless in need of repairs.

When requested to do so, we will furnish an estimate of the cost of the repairs on any instrument sent us, before starting work.

Selection of Instruments

For ordinary land surveying, the Vernier Compass is required where the variation of the needle is to be allowed, as in retracing the lines of an old survey, etc.

When, in addition to the variation of the needle, local attraction must be taken into account and angles taken independently of the needle, an instrument with a graduated limb must be used, and for this purpose the Compass with Limb is required. See No. 294.

For municipal engineering, railroad and highway construction, bridge building, drainage and irrigation work, selection should be made from our Precise Transits Nos. 6-A to 10-A, 26-A to 29-A; Light Mountain Transits Nos. 26 to 29; and Engineers Wye Levels Nos. 375 to 378.

The Light Mountain Transits (regular and Precise types) are also ideal instruments for surveys of mining claims, especially in rough country, and for surveys of mines in general.

For United States Public Land Surveys an instrument with the Solar Attachment is required and the Solar Transit is used; see Nos. 30-A, 32-A, 23-A and 30.

No. 18-A "Hell Gate Model" Precise Transit is recommended for executing triangulation surveys demanding the highest degree of accuracy and refinement.

The various Plane Table Outfits are favored by many Engineers and Geologists for their utility in topographical surveying and map drawing.

The Current Meters have found wide application in measuring the velocity of the flow of water in harbors, rivers, small streams and irrigation ditches.

The Automatic Water Stage Registers are used for determining the variations in the height or stage of the water, in connection with water power developments, flood control, tidal measurements and at reservoirs. They also find extensive application in irrigation work and in the determination of sewage discharge.

The Hook Gage is the most accurate instrument for ascertaining the head of water flowing over weirs, and for the accurate setting of Water Stage Registers, etc.

The Architects Level is employed in laying out buildings, determining the level of their floors, sills and windows, and in the general work of the builder and contractor.

GENERAL INFORMATION



The Explorers Transit, the Reconnoissance Transit, the Explorers Level and the various forms of Pocket Compasses, are designed for preliminary surveys where extreme lightness and portability are required.

When iron ores are to be traced, the Dip Compass and the Dial Compass are used.

We do not make any instrument by which veins of gold and silver can be traced, nor the presence of these metals detected.

Instruments Made of Aluminum

Since 1876 we have made to order, Civil Engineers and Surveyors Instruments of aluminum.

The principal advantage which instruments of aluminum have over those of the ordinary metals is their light weight; but as all the bearing parts must be made of bronze the total weight can be reduced only about fifty per cent.

We finish aluminum instruments in the natural color, and the result is more satisfactory from an artistic standpoint than when an artificial coloring is used, although it entails extra expense.

We will quote price on application for any of our instruments of regular pattern, made of aluminum.

Exchanging Old Instruments

Correspondence is solicited relating to the exchange of old instruments of our make for those of the latest patterns.

We are constantly making such exchanges, to the entire satisfaction of our customers, and if the old instruments are salable as second-hand, after being rebuilt and refinished, a liberal allowance is made.

Invitation to Visit Our Factory

A cordial invitation is extended to our customers to visit our Factory in Troy, N. Y. Opportunity is given to examine the various instruments which we make, and to observe their manufacture. In the course of the year we are honored by many visitors, who are agreeably surprised at the size of our establishment, and its intricate precision equipment, much of it developed within our own Factory, to insure the accuracy and quality of the finished product.

Literature

We publish a variety of attractive circulars containing special information relative to our products. They will be supplied to our correspondents who express an interest in or a desire for some particular instrument.

Copies of our Manuals, Catalogue, Solar Ephemeris and any other literature which we issue can be obtained from our Main Office in Troy, N. Y.

Gurley Solar Ephemeris

The Solar Ephemeris is published annually. It is an abridgment of the Nautical Almanac, issued by the United States Government, and contains a Table of Mean Refractions in Declination and Tables of Times of Elongation, Culmination and Azimuths of Polaris. It can be conveniently carried in the vest pocket. A copy will be sent postpaid, to any engineer or surveyor, on request.



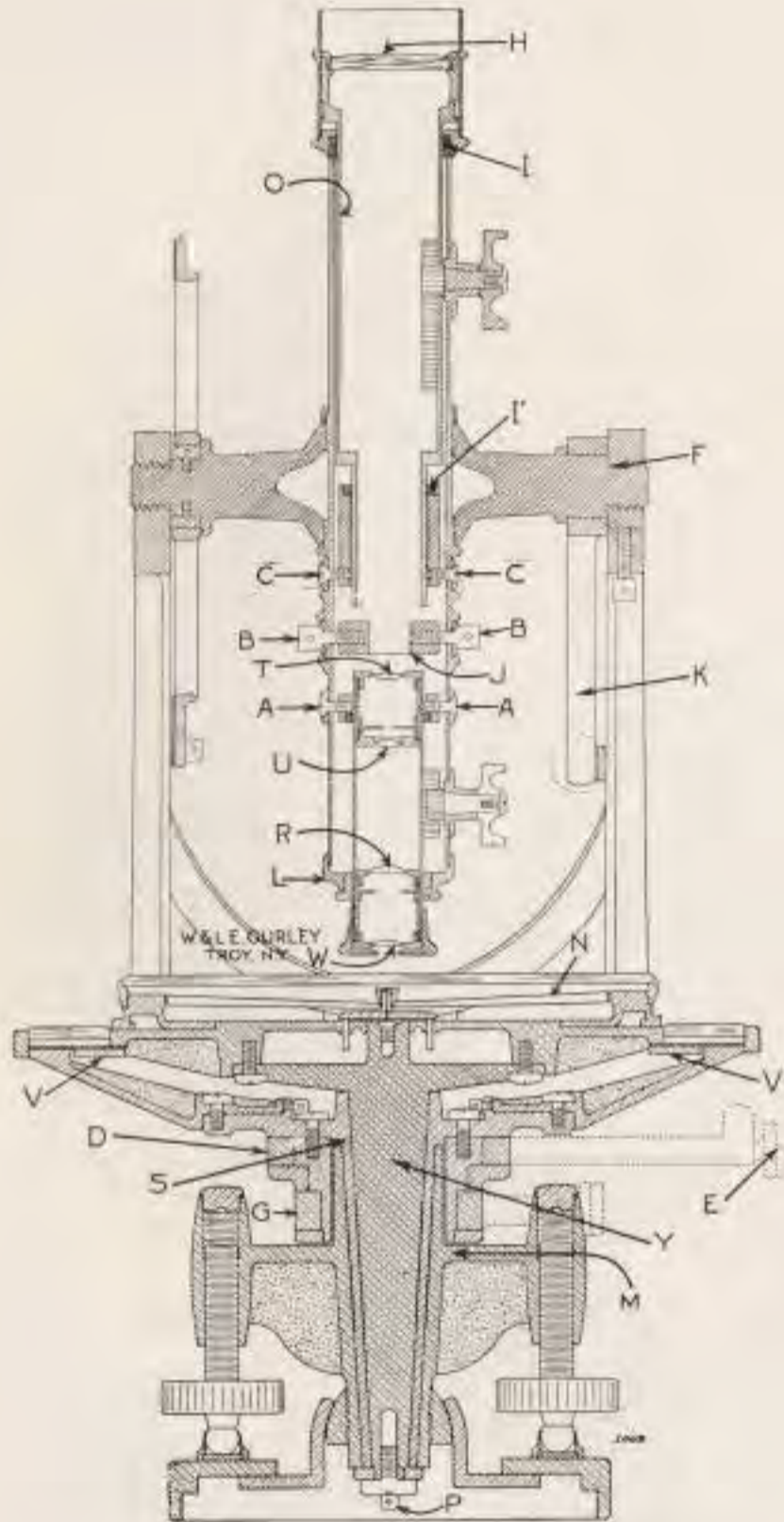
Gurley Engineering Instruments

IN every line of endeavor, some one person and some one achievement stand out in sharp contrast to all others.

For more than 75 years our efforts have been continuously directed toward the problem of better, more accurate and more convenient instruments for the Civil Engineer, the Mining Engineer, the Hydraulic Engineer, the Surveyor, the Geologist, the Topographer and many other professional groups, whose work demands the utmost precision.

Our sympathetic understanding of requirements, together with a continuously growing knowledge of designing and manufacturing, enable us to produce instruments which meet the most exacting demands.

As a result, Gurley Engineering Instruments stand out as the undoubted standard of excellence.



Sectional View of a Gurley Transit

This sectional view shows the babbitt bearings I, I', which make the Gurley telescope permanently accurate for all positions of the objective. Elimination of side play in the horizontal axis is insured by the multi-grooved bearings at F. Note the strongly ribbed and conical construction of the plates, the greatest depth being at the center where the most strength is needed. The spindle, Y, is long and tapering, making certain an accurate fit. The leveling head is ribbed, combining great strength with minimum weight.



Gurley Precise Transits

General Design and Construction

The Gurley Precise Transits, with One Piece Truss Standard, dished limb and other refinements, were introduced to the engineering profession in 1915. The new features represented such a marked advance in the greater stability and durability which they afforded, that the instruments met with instant favor.

The Truss Standard is cast of toughest bronze, in one piece, of angle cross section, giving the greatest rigidity with least weight. The principle of diagonal cross bracing is used and the supporting members are carried as



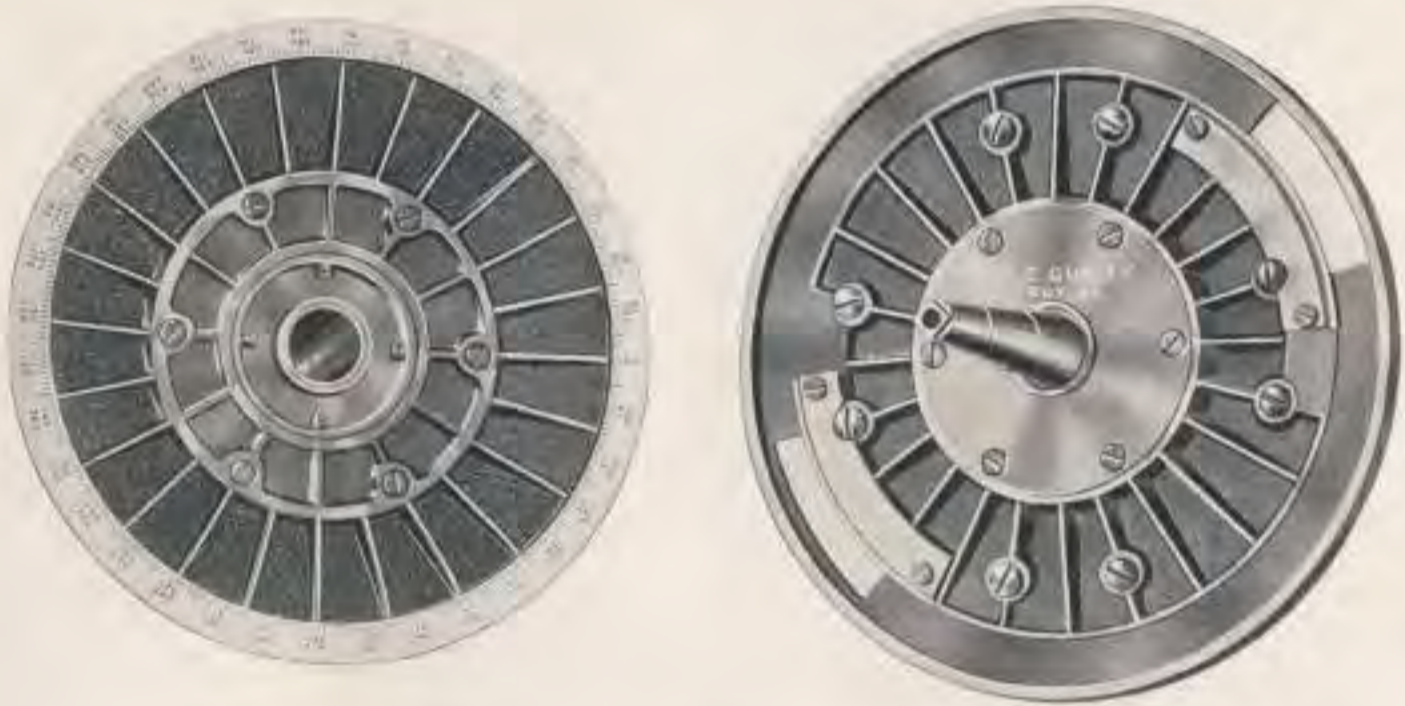
Gurley One Piece Truss Standard
Patented July 25, 1916

far up on the legs as is possible without interfering with the use of the instrument. The base is wide and its attachment to the top plate by eight large screws, allows the development of the full strength of the deeply ribbed plate for support and reinforcement, making the whole structure mechanically one piece, for withstanding stress.



The finish of the standard is a beautiful and very durable morocco, applied directly to the surface of the casting, which thus retains its skin intact. The internal stresses in the casting are relieved by a process of artificial aging in which the standard assumes its permanent shape without any loss in the tenacity of the material.

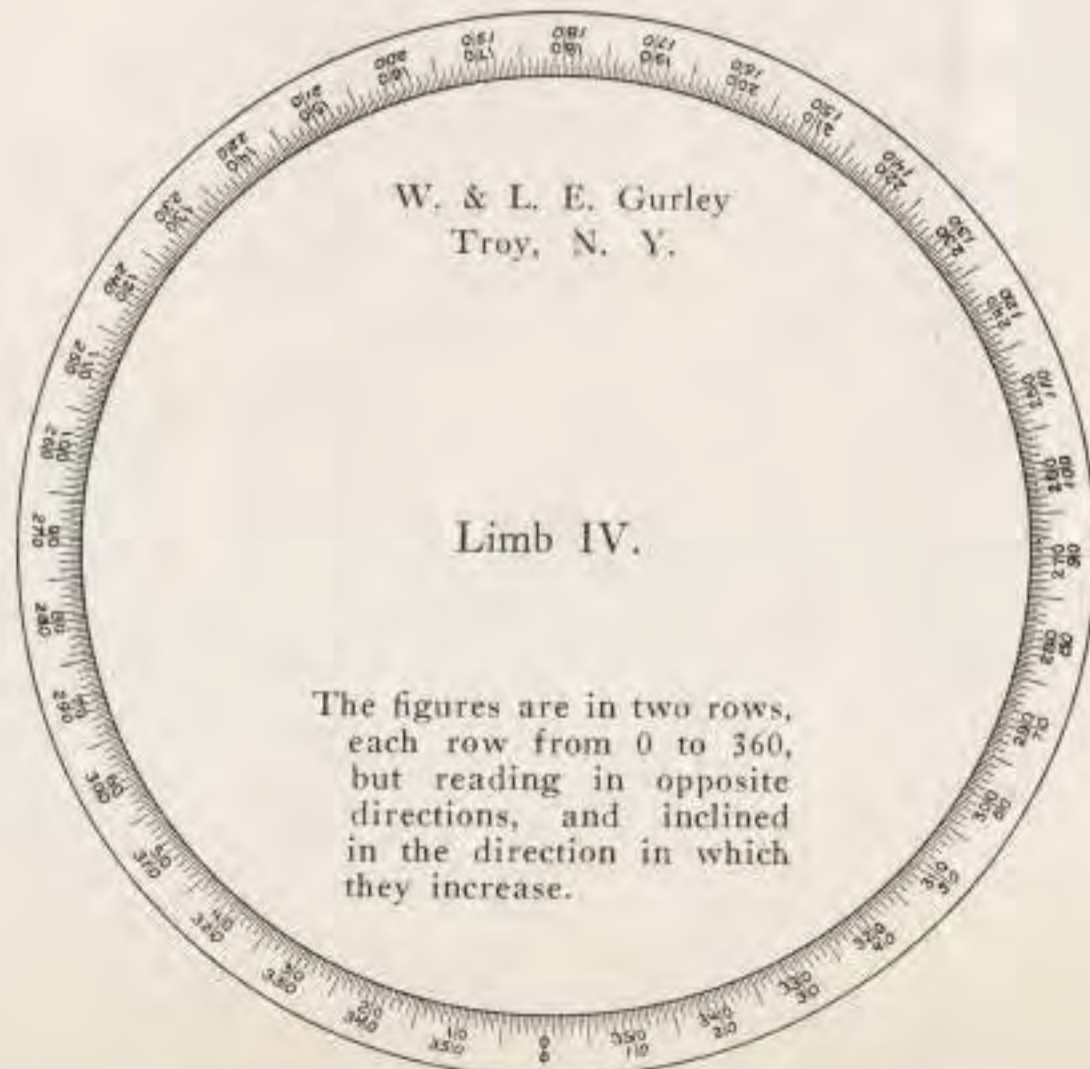
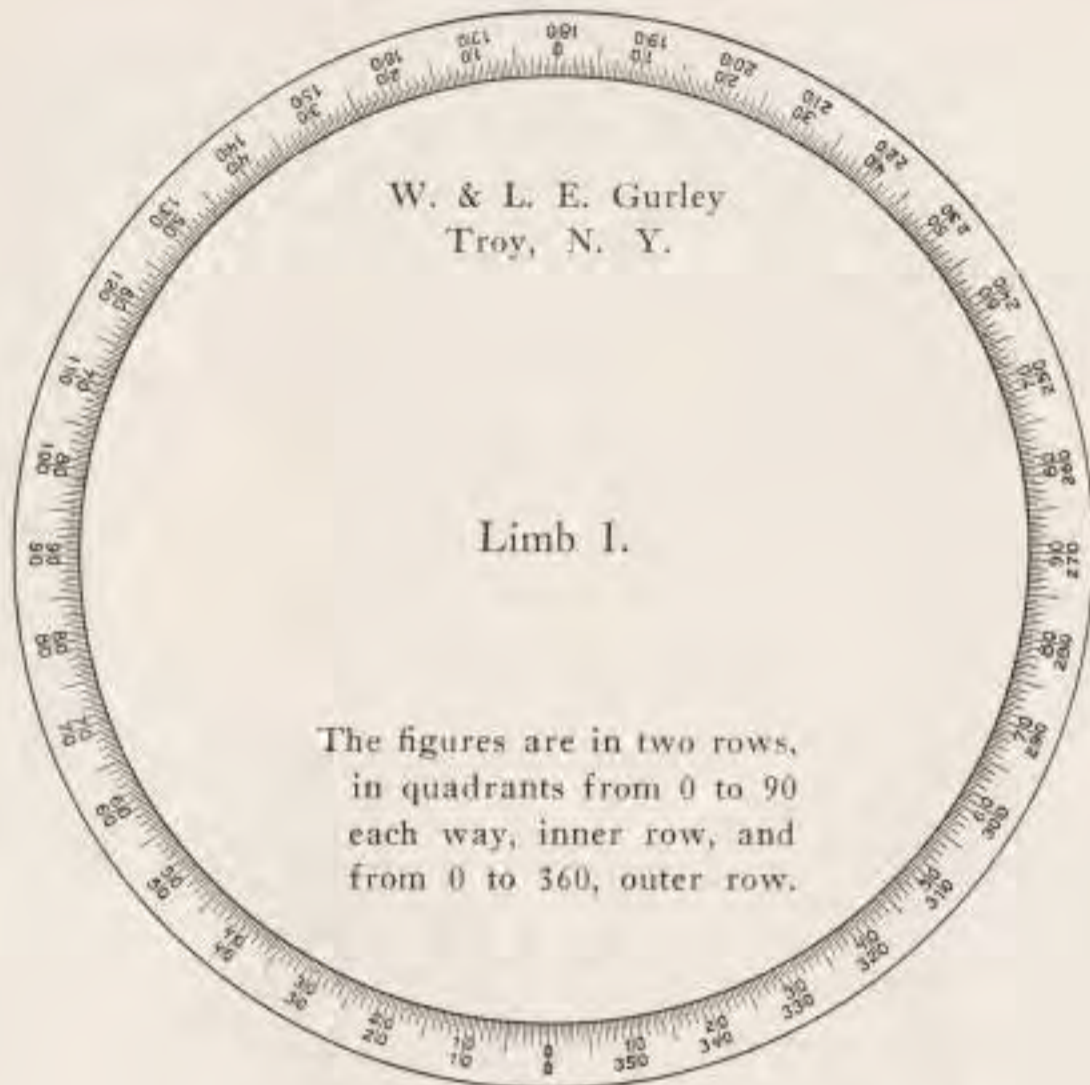
Another important feature is the design of the horizontal limb. The deep ribs of the top plate make a conical form desirable and this naturally strong shape is also reinforced. The needle lifter is placed above the flange of the spindle so that the entire space between the top plate and the limb is available for strengthening ribs, leaving only a small clearance for free motion.



Gurley Radially Ribbed and Dished Limb and Plate, and Tapered Centers

The spindle and socket are of generous diameter and length and have a strong taper. They are of material chosen to give the greatest rigidity and wearing quality and to have practically the same expansion, with change in temperature.

Too much emphasis cannot be placed on the accuracy and legibility of our graduations and the ease with which they are read. Our graduating engines are of our own design and manufacture, embodying refinements which make perfect work a certainty.



Figuring of Limbs of Gurley Transits



Top Plate of Gurley Light Mountain Transit

Note the easy reading verniers, with reflectors. The glasses covering these openings are flush with the plate, thus they are easy to clean and there are no frames or rims to cast shadows or collect dust.

The illustration shows graduations on the face of the needle circle only, but the inner or vertical edge is also graduated to degrees.

All Gurley Transits having compasses are regularly equipped with a variation arc, as shown above.

The levels, at the edge of the plate, are more accessible than if placed inside the compass.

Centesimal Graduations

If specified in the order, the horizontal or vertical limbs of our Transits will be graduated to 400 grads, with 4 sub-divisions to each grad, and reading by vernier to 100ths of a grad.

Likewise, if specified, needle circles will be graduated to 400 grads, with 2 sub-divisions to each grad.



The Leveling Head

The outer socket has four ribbed arms that bear the nuts for the leveling screws. At its lower end there is a hemispherical nut fitting in a corresponding cup in the shifting center, which is the center of movement when leveling. The leveling screws are nicely fitted with long bearings in the nuts and are protected from dust by covers. The lower ends of the screws rest in cup bearings fitted with fiber bushings to eliminate friction. The cups avoid marring the plate when shifting the instrument from side to side on the tripod. To prevent cramping, the centers of the lower ends of the leveling screws are in line with the center of the hemispherical nut, even when the leveling head is tilted far to one side.

Shifting Center

The base plate is in two parts. The outer part is threaded to screw on the metal head of the tripod and the inner part encircles the hemispherical nut of the leveling head. When the leveling screws are loosened the whole instrument can be moved so that the plummet may be precisely suspended over a desired point. The action of the leveling screws on the base plate, as the instrument is leveled, serves as a clamp, thus preventing any inadvertent shift after it is once set.



View of the Telescope of a Gurley Transit

Transit Telescope

The Stadia, or Micrometer, is a cross wire ring or diaphragm, as shown, having three horizontal wires, and one vertical wire. The upper and lower horizontal wires constitute the stadia wires which are accurately attached so as to indicate a given space, as one foot on a rod one hundred feet distant.

These wires will, in the same manner, include two feet on a rod two hundred feet distant, or a half foot at a distance of fifty feet, and so on in the same proportion, thus furnishing a means of measuring distances, especially over broken ground, more easily and even more accurately than with a tape or chain. When metric measurements are used, the same ratio equals 1 meter to 100 meters.

We regularly furnish stadia wires with every new Transit having a vertical limb. They will be supplied with all other new Transits and with new Engineers Wye Levels without extra charge, if requested when the instrument is ordered. The stadia wires are fixed permanently on the same ring with the cross wires.

If specified in the order, we will substitute, without extra charge, a special diaphragm on which the cross wires and stadia wires are placed in different focal planes. When the eyepiece is focused on the cross wires, the stadia wires seem to disappear (or vice versa). Hence the designation, "disappearing stadia" as mentioned in our specifications of Transits and Levels.

We are successfully drawing platinum wires from one eight-thousandths to one fifty-thousandths of an inch in diameter, and are using them in all the telescopes of our instruments. They are opaque, unaffected by moisture, and universally preferred to spider web.



Gurley Precise Transits

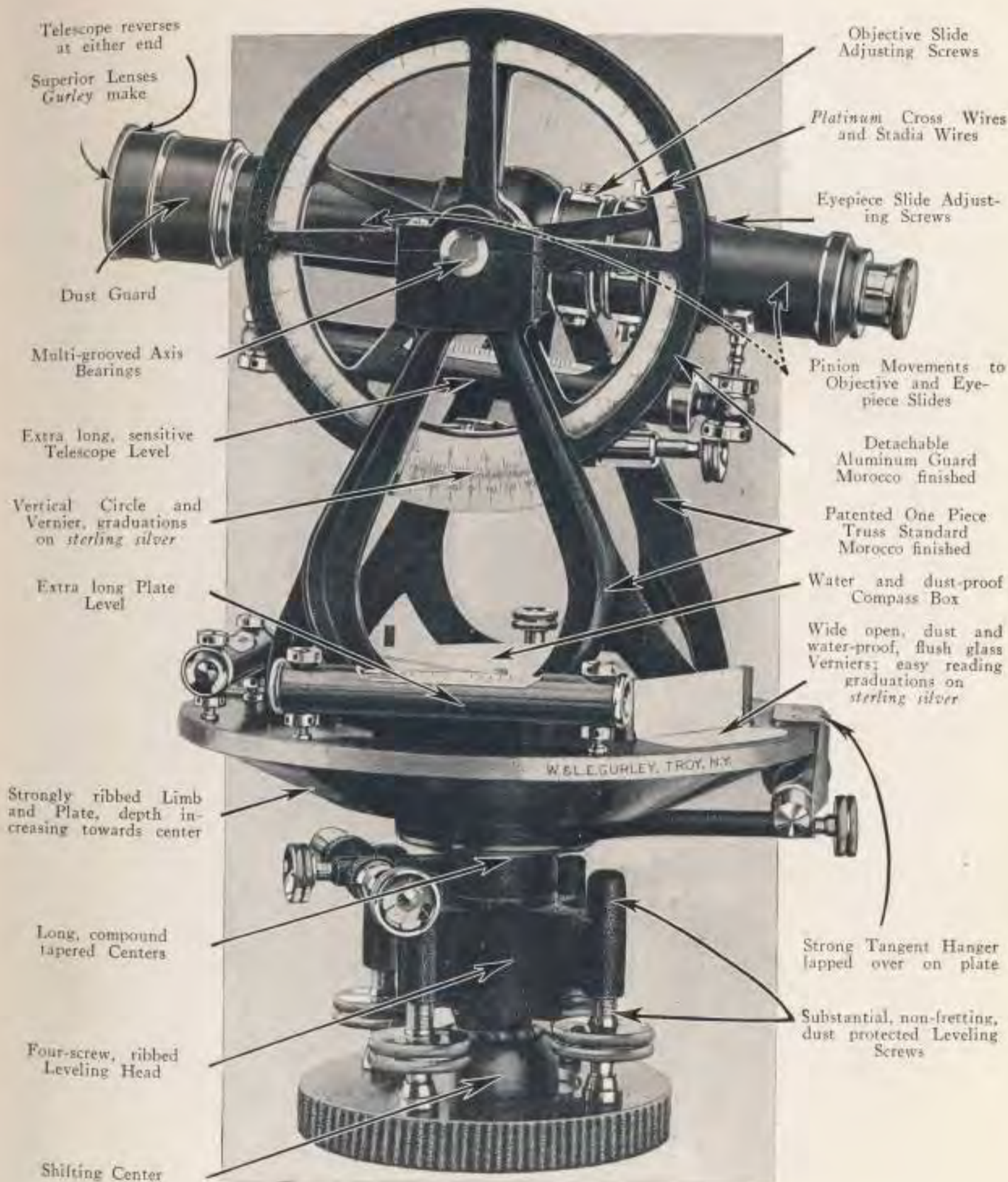
Engineers who have long prided themselves upon their record of accomplishment, look upon this type of transit as typifying their ideal of a real, high grade, service-giving instrument.

In the design and construction of the Gurley Precise Transit, there has been crystallized all the knowledge and experience gained by the Gurley Organization, working in close harmony with the engineering profession.

Realizing that no one instrument can entirely meet the varying needs of engineering conditions, we offer the Precise Transit in three distinct sizes, namely — the "ENGINEERS SIZE", the "LIGHT MOUNTAIN SIZE", and the "EXPLORERS SIZE".

Each of these sizes may be had with various attachments. The engineer, therefore, has a wider range of choice and need not handicap himself by the use of an instrument unsuited to the job in hand.

T R A N S I T S



Distinctive Features of Gurley Precise Transits

This illustration shows the No. 27-A Light Mountain Size



Gurley Precise Transits

Two Sizes

Specifications of Precise Transits Nos. 6-A to 35-A

	Nos. 6-A to 10-A Engineers Size	Nos. 25-A to 35-A Light Mountain Size
Diameter of Horizontal Limb....	6.25 in.	5.65 in.
Length of Needle.....	3.5 in.	3 in.
Needle Circle graduated to.....	30 min.	1 deg.
Variation Arc graduated to.....	30 min.	1 deg.
Variation Arc reads by vernier to	1 min.	5 min.
Length of Telescope.....	11 in.	8 in.
Power of Telescope.....	26 diameters	20 diameters
Aperture of Objective.....	1.19 in.	1 in.
Length of Telescope Level.....	7.2 in.	5 in.
Tripod, with Cap.....	No. 405, with split legs	No. 410, with extension legs
Weight of Instrument.....	15.5 to 16.5 lbs.	11 to 13 lbs.
Weight of Instrument including box and accessories.....	23 to 24 lbs.	20 to 21 lbs.
Weight of Tripod.....	11 lbs.	10 lbs.
Domestic Shipping Weight, In- strument and Tripod in two boxes, about.....	75 lbs.	70 lbs.
Export Shipping Weight, about..	110 lbs.	100 lbs.

Centers: Compound.

Leveling Head: Of one-piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.

Horizontal Limb: Strongly ribbed, depth increasing toward center. Graduated on *sterling silver* to 30 min., reading by two opposite double verniers to 1 min. Figured like Limb IV, see page 16; two rows 0 to 360, reading in opposite directions and inclined in direction of increase. (If specified in the order, will be figured like Limb I; 0 to 90 each way, inner row, 0 to 360, outer row.) Verniers at 30 deg. to line of sight; with reflectors.

Plate: Strongly ribbed, depth increasing towards center. Needle circle figured 0 to 90 each way, with beveled plate glass cover, waterproof. Variation arc with pinion movement, and clamp. Flush vernier covers, waterproof. Two graduated plate levels, the one parallel to line of sight of extra length. Clamp and tangent.

Standard: One Piece Truss pattern (patented), with extra wide base. Multi-grooved axis bearings.

Telescope: Balanced; transits either end; center point on top. Erecting eyepiece. Pinion movement to eyepiece and objective slides. *Platinum* cross and fixed stadia wires, ratio 1:100. (Disappearing stadia furnished, if specified in the order.) Dust guard to objective slide, detachable sunshade, and cap. Clamp and tangent to telescope axis.

Telescope Level: With graduations on vial. Middle point of vial is under telescope axis. (Not furnished with Nos. 6-A or 25-A.)

Finish: Bronze; screws and small parts bright. Morocco finish on standard and leveling head.

Equipment: Mahogany box, with reading glass, 10 oz. plummet, etc.

Tripod: As specified above.



Modifications and Extras for Precise Transits Nos. 6-A to 35-A

Vertical Limb on Transit No. 8-A is a full circle 5 in. in diameter, and on Nos. 27-A and 32-A is a full circle 4.5 in. in diameter, graduated on *sterling silver* to 30 min. and reads by one double vernier to 1 min.

Vertical Limb on Transits Nos. 9-A and 10-A is an arc of 3 in. radius, and on Transits Nos. 28-A, 29-A and 30-A is an arc of 2.5 in. radius. All arcs are graduated on *sterling silver* to 30 min. and read by one double vernier to 1 min.

Detachable Aluminum Guard, morocco finished, is regularly furnished with Transits Nos. 8-A, 27-A and 32-A.

A Beaman Stadia Arc attached to Transits Nos. 8-A to 10-A, or 27-A to 32-A, costs \$22.00 extra.

Sole Leather Carrying Case (outside dimensions 10 x 9.5 x 14.5 in.) with handle and shoulder straps, to enclose the mahogany box of the Light Mountain sizes, Nos. 25-A to 32-A, costs \$22.00 extra.

Sole Leather Carrying Case with handle and shoulder straps, to enclose the mahogany box of the Engineers sizes, Nos. 6-A to 18-A, costs \$25.00 extra.

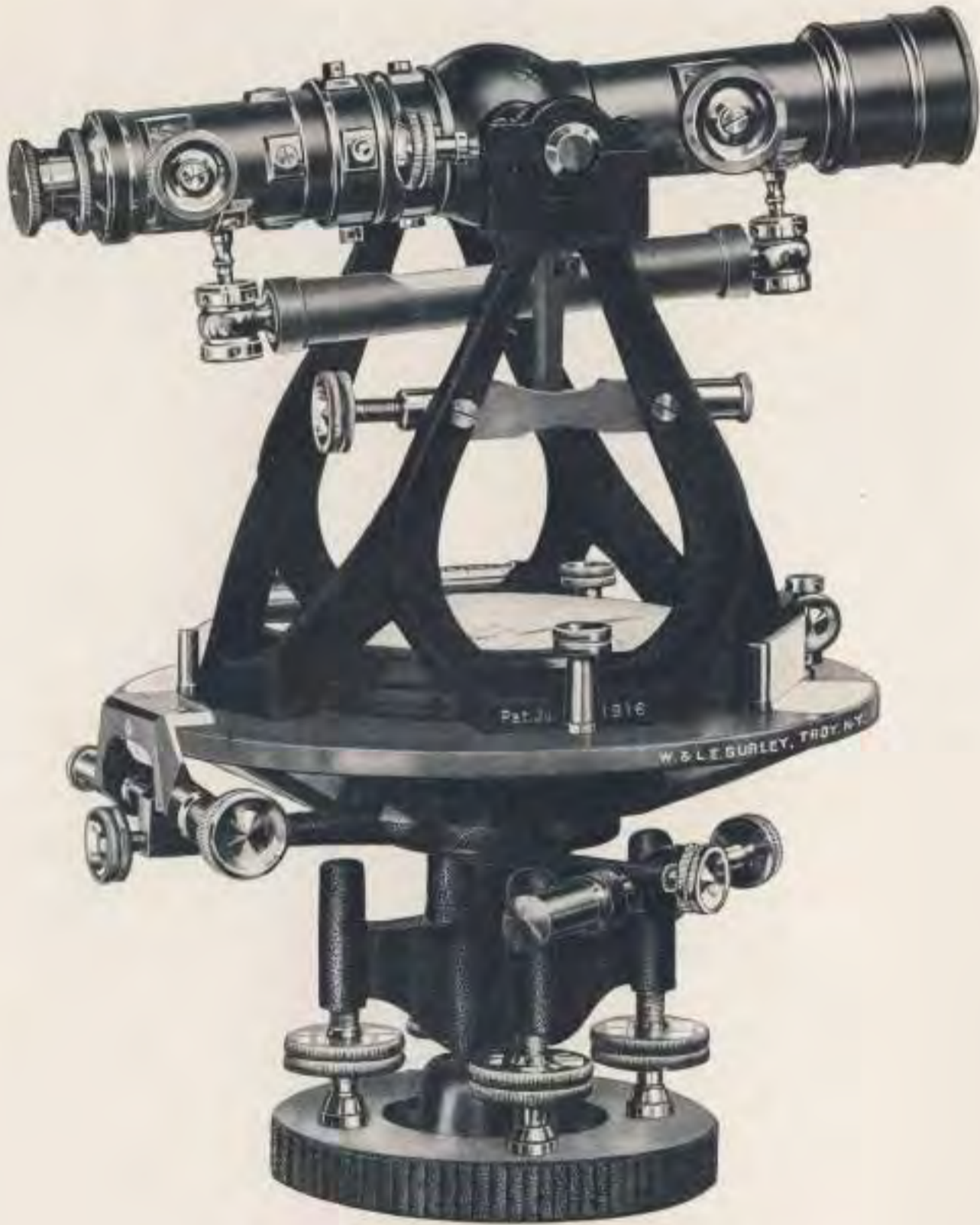
Extension Leg Tripod No. 410 costs \$3.00 extra if substituted on Transits Nos. 6-A to 18-A, instead of the split leg pattern. *If Solid Round Leg Tripod No. 400* is substituted, deduct \$5.00.

If Split Leg Tripod No. 405 is substituted on Transits Nos. 25-A to 32-A, instead of the extension leg pattern, deduct \$3.00. *If Solid Round Leg Tripod No. 400* is substituted, deduct \$8.00.

See pages 43 to 46 for information about *Explorers Precise Transits*, Nos. 20-A to 24-A, with limb 4 inches in diameter.



Gutley Precise Transit No. 18-A, mounted on concrete pier, as used at Hell Gate Bridge
See pages 28 and 29.



Gurley Precise Transits

No. 7-A Engineers Size—No. 26-A Light Mountain Size

No. 7-A 6.25 in. limb, 3.5 in. needle, 11 in. telescope, weight 16 lbs. . . . \$318.00
 No. 26-A 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 11.5 lbs. . . . 312.00

Attachments: Level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see pages 22 and 23.

These Transits will be furnished without the level on telescope but with clamp and tangent to telescope axis, as follows:

No. 6-A 6.25 in. limb, 3.5 in. needle, 11 in. telescope, weight 15.5 lbs. . . . \$299.00
 No. 25-A 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 11 lbs. . . . 293.00



Gurley Precise Transits

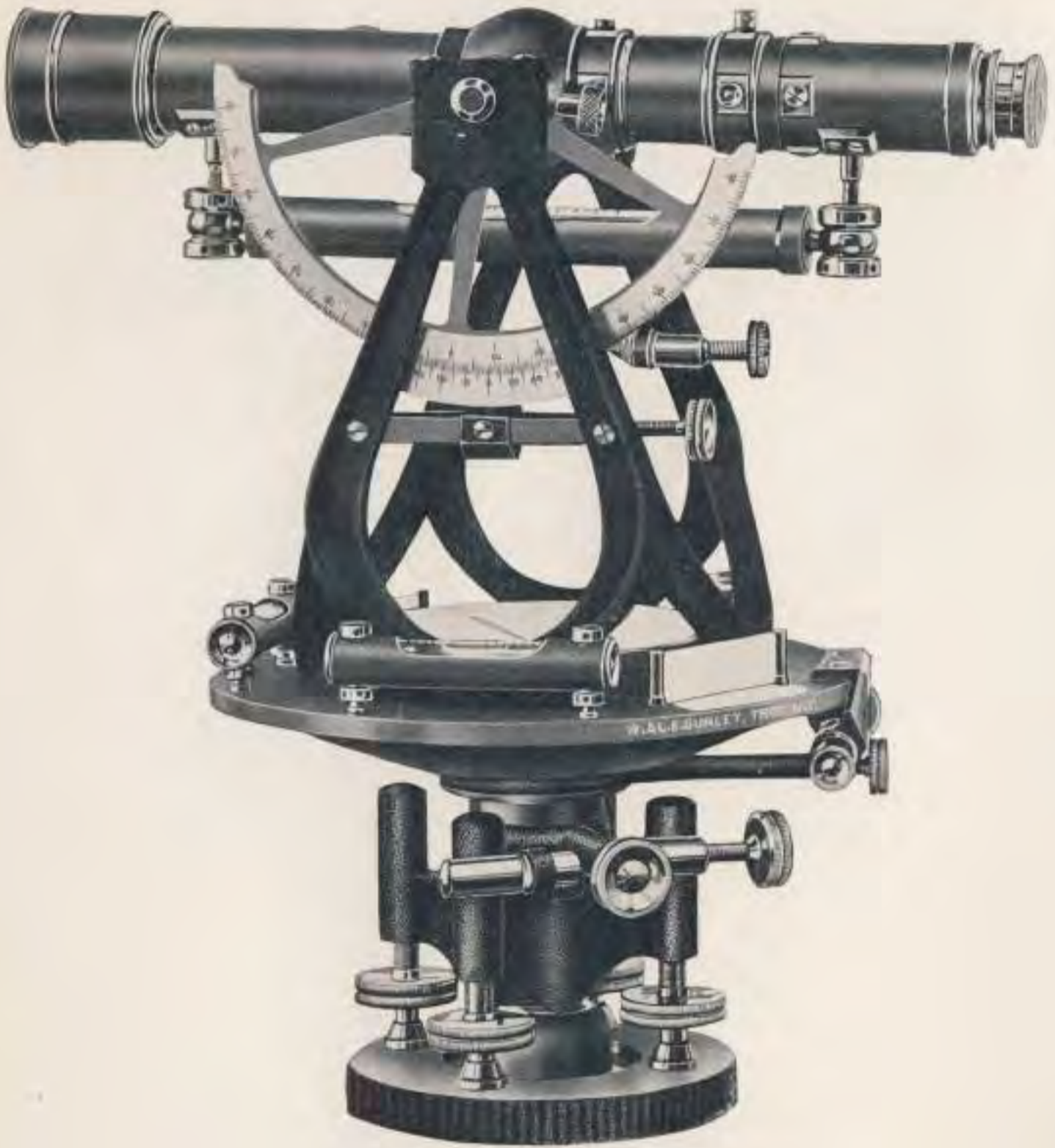
No. 8-A Engineers Size—No. 27-A Light Mountain Size

No. 8-A 6.25 in. limb, 3.5 in. needle, 11 in. telescope, weight 16.5 lbs..... \$346.00
 No. 27-A 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 12 lbs..... 340.00

For actual illustration of the No. 27-A Precise Light Mountain Transit, see colored frontispiece.

Attachments: Vertical limb, full circle, 5 inches diameter, (4.5 inches diameter on No. 27-A,) reading by vernier to 1 minute; with detachable guard; level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see pages 22 and 23.



Gurley Precise Transits

No. 9-A Engineers Size — No. 28-A Light Mountain Size

No. 9-A 6.25 in. limb, 3.5 in. needle, 11 in. telescope, weight 16.5 lbs. . . . \$346.00
No. 28-A 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 12 lbs. . . . 340.00

Attachments: Vertical limb, arc of 3 inches radius (2.5 inches radius on No. 28-A), reading by vernier to 1 minute; level on telescope; clamp and tangent to telescope axis.

For detailed specifications see pages 22 and 23.



Gurley Precise Transits

No. 10-A Engineers Size — No. 29-A Light Mountain Size

No. 10-A 6.25 in. limb, 3.5 in. needle, 11 in. telescope, weight 16.5 lbs. \$364.00
 No. 29-A 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 12 lbs. 358.00

Attachments: Vertical limb, arc of 3 inches radius (2.5 inches radius on No. 29-A), reading by vernier to 1 minute; level on telescope; gradienter, combined with clamp and tangent to telescope axis.

For detailed specifications see pages 22 and 23.



Hell Gate Bridge Erection Controlled by a Gurley Precise Transit

The bridge of the New York Connecting Railroad, over the East River at Hell Gate, stands as one of the most notable achievements in bridge engineering in recent years. It is a steel arch of 970 feet span and carries four tracks.

The rapid tidal currents of the river and the necessity of maintaining a free passage for navigation, during the construction, made the use of false work impossible. The arch was built from the two abutments simultaneously and its successful completion demanded that the ends of the two halves should meet in mid-stream with extreme exactness. This called for instrument control of the very highest precision.

The engineers who had this work in charge selected a Gurley Precise Transit and staked their engineering reputation on its choice. That confidence in the instrument was justified is indicated by the fact, that the cantilever members met within one-quarter of an inch of their predetermined position.

Long base lines, lateral to the structure, were laid out on both shores. Concrete piers were built at the triangulation points, each pier having a permanent base for the Gurley Precise Transit which governed the work.

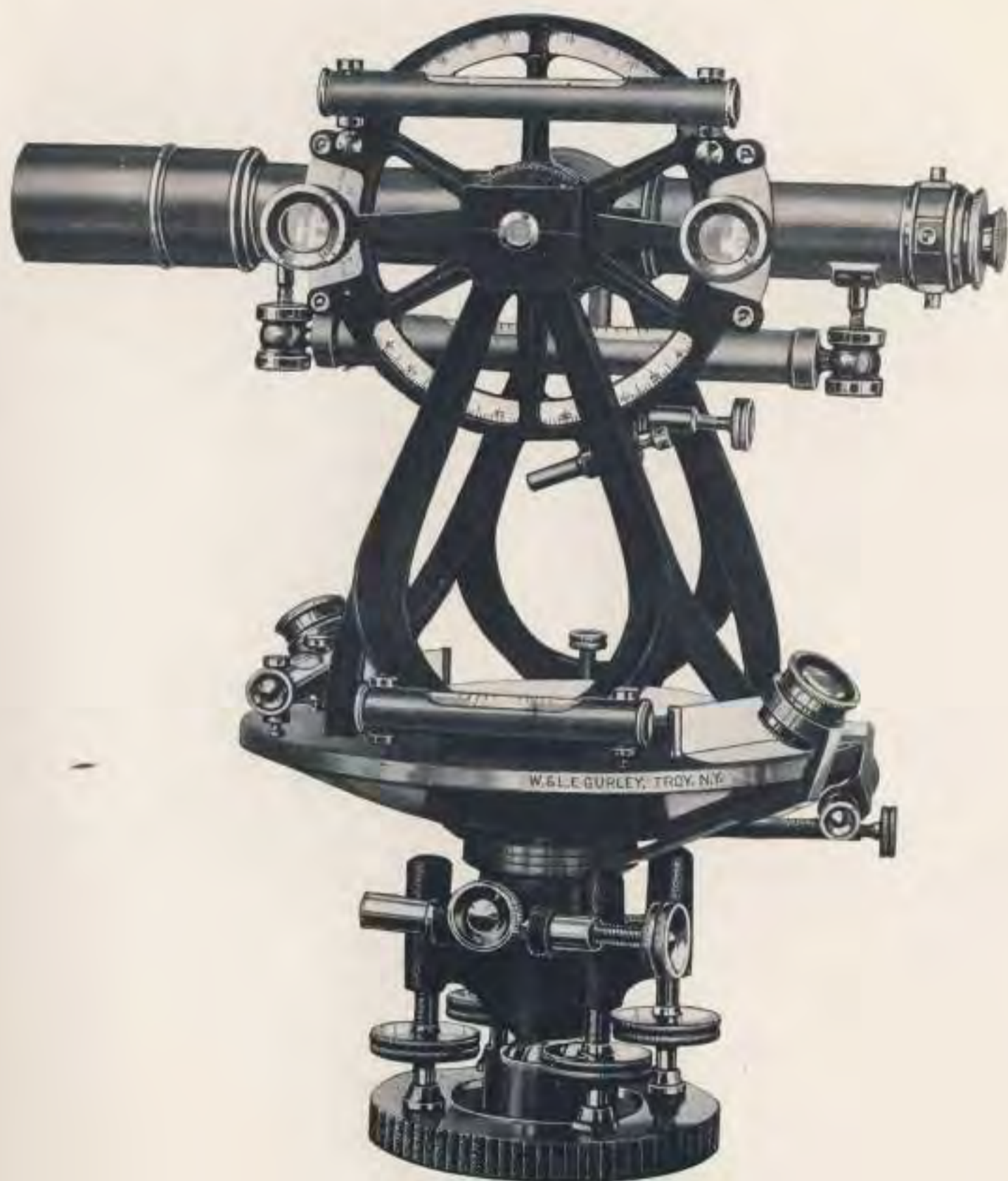
Vertical and horizontal angles to 10 seconds were taken to panel points as erection proceeded, the exact position of each point being accurately determined and checked by observations from several stations.

This Transit represents our supreme effort and is the result of more than seventy-five years experience in designing and building engineering instruments. It embodies all of the desirable qualities of our regular model Precise Transits and has the added advantages of the special features shown and described on the opposite page.

It is adapted for triangulation, bridge building, municipal engineering, etc., and for all classes of work demanding the highest degree of accuracy and refinement.



View of Hell Gate Bridge during construction



Gurley Precise Transit

Hell Gate Model

No. 18-A 6.7 in. limb, 3.5 in. needle, 11 in. telescope, weight 19 lbs..... \$575.00

Excepting the diameter of the horizontal limb, which is 6.7 in. instead of 6.25 in., this Transit is constructed according to the detailed specifications given on pages 22 and 23, with the following special features:

Attachments: Horizontal and vertical limbs graduated to 10 minutes, *each reading by two opposite double verniers to 10 seconds*; attached microscopes to all verniers; guard to vertical limb, with attached level; inverting eyepiece.

This transit can be supplied with horizontal and vertical limbs graduated to read by verniers to 20 seconds, or 30 seconds, instead of 10 seconds. The price of the instrument so modified is \$535.00.



Gurley Precise Transit
Engineers Size
With Three-Screw Leveling Head

No. 10-A-3 6.25 in. limb, 3.5 in. needle, 11 in. telescope, weight 19 lbs. . . . \$392.00

For detailed specifications, see Transit No. 10-A, as listed on pages 22 and 23.

A Three-Screw Leveling Head, as shown, can be furnished with any new Gurley Transit, if desired, for \$28.00 extra. *This leveling head is made to order only.*



Gurley Precise Transits

With Burt Solar Attachment

Light Mountain Size—Engineers Size

No. 30-A Light Mountain Size, 5.65 in. limb, 3 in. needle, 8 in. telescope,
weight 12.5 lbs. \$436.00

Attachments: Burt Solar with latitude level; vertical limb, arc of 2.5 inches radius,
reading by vernier to 1 minute; level on telescope; clamp and tangent to
telescope axis.

Engineers Size

The Burt Solar Attachment, as shown in this illustration, can also be furnished
with Precise Transits Nos. 9-A, and 10-A, and increases the price of those instruments
\$96.00.

For detailed specifications see pages 22 and 23.

For description of Burt Solar Attachment, see page 62.

This illustration also shows the Beaman Stadia Arc, the cost of which is not
included in the above price. This attachment will be supplied for \$22.00 extra.



Gurley Precise Transit

With Telescopic Solar Attachment

U. S. General Land Office and U. S. Forest Service Model

When a continued series of solar observations are to be made, it is often desirable that the main telescope of the transit be used without disturbing the solar apparatus.

The new Gurley Telescope Solar Attachment meets such requirements, as the main telescope of the transit may be used independently and solar observations taken with no other settings than the hourly change in declination. The instrument is so designed that its adjustments can be accomplished with ease and precision in the field.

As shown in the illustration on the opposite page, the sun is viewed through an auxiliary telescope, a reflector being placed in front of the objective that brings the sun's reflected image to the cross wires.

The solar telescope is mounted on a horizontal axis which is supported by a vertical triangular base fastened to the right hand side of the standard. The solar telescope can be moved about its horizontal axis until it coincides with the polar axis, this position being indicated by the latitude arc attached to it.

The declination arm tilts the mirror at the objective end of the solar telescope, the angle being read on the declination arc attached to its side. Both the latitude arc and the declination arm have clamp and tangent movements for convenience in setting.

Having set the main telescope in the meridian and adjusted the mirror to the proper declination, the course of the sun is followed by rotating the solar telescope in collar bearings about its own axis; an hour circle surrounding the solar telescope indicates the apparent time.

The Gurley Telescopic Solar adds but little weight and when furnished in connection with a Gurley Precise Mountain Transit, with One Piece Truss Standard, is the standard instrument for public land surveys and similar work requiring exceptionally accurate results.



Gurley Precise Transit

With Telescopic Solar Attachment

U. S. General Land Office and U. S. Forest Service Model

Mountain Size

No. 32-A 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 13 lbs..... \$515.00

Attachments: Telescopic Solar; vertical limb, full circle, 4.5 inches diameter; reading by vernier to 1 minute, with detachable guard; level on telescope; clamp and tangent to telescope axis.

For detailed specifications see pages 22 and 23.



Gurley Precise Mining Transit

No. 35-A—Light Mountain Size

Interchangeable Auxiliary Telescope in Side Position

The extreme favor which Gurley Light Mountain Transits enjoy with the Mining Engineer caused us to develop the improved attachment, especially adaptable to the No. 27-A pattern. Engineers will find it exceedingly useful for vertical sighting in mine surveying. The construction of the auxiliary telescope is similar to that of the main instrument. As the auxiliary telescope is detachable, the transit may be used with or without the attachment, as the engineer prefers.

Provision has been made to protect the verniers and compass box against moisture, by setting the glasses flush and beveling the compass cover glass.



Gurley Precise Mining Transit

No. 35-A—Light Mountain Size

Interchangeable Auxiliary Telescope in Top Position

No. 35-A Comprises No. 27-A Light Mountain Transit, 5.65 in. limb, 3 in. needle, 8 in. telescope, weight 14.75 lbs. \$400.00

Attachments: Vertical limb, full circle, 4.5 in. diameter, reading by vernier to 1 minute; with detachable guard; level on telescope; clamp and tangent to telescope axis; 6.5 in. auxiliary telescope arranged to mount on top of main telescope, or to one side, as indicated in illustration on opposite page, the instrument being provided with a counterweight attached below the main telescope, or at opposite end of telescope axis, depending upon the position of the auxiliary telescope. For detailed specifications of transit, see pages 22 and 23.



Gurley Light Mountain or Mine Transits

The Best Known Transits in America

The first Light Mountain Transit used in this country was designed and made by W. & L. E. Gurley, in 1876. It was quickly adopted by mining engineers who had been obliged to use larger and heavier instruments. Since the introduction of the original model many improvements and modifications have been added and now because of their combined accuracy and portability, they are the most popular transits in use.

Although especially adapted for mine and mountain surveys, they are used extensively for other work, as follows:

- Municipal Engineering
- Highway Engineering
- Railroad Engineering
- Bridge Construction
- Solar Observations
- Forest Surveys

Built with long, compound centers, angle-section standards, and with leveling head, limb and main plate of ribbed construction, we have combined in one instrument accuracy, stability and portability.

Special attention is called to the telescope which, having a power of twenty diameters, brilliant illumination and flat field, is admirably adapted for taking stadia shots.

These Transits are regularly equipped with our improved extension tripod, the legs of which can be lengthened or shortened at will. It is thus adapted for use in mountain surveys, where one or more legs must be shortened, or for use in mines, where a short tripod is often indispensable. The sliding pieces can be turned end for end, the points being thus out of the way and the tripod more easily transported. The tripod when closed is only three feet long and is carried by a leather strap with a handle, which is furnished with it.

Gurley Light Mountain Transits may also be had in the Precise type, with One Piece Truss Standard. See Precise Transits Nos. 26-A to 32-A, as illustrated and described on pages 13 to 33.

Specifications of Light Mountain Transits Nos. 25 to 30

Centers: Compound.

Leveling Head: Of one-piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.

Horizontal Limb: 5.65 in. diameter. Strongly ribbed, depth increasing towards center. Graduated on *sterling silver* to 30 min., reading by two opposite double verniers to 1 min. Figured like Limb I, see page 16: 0 to 90 each way, inner row, and 0 to 360, outer row. (If specified in the order, will be figured like Limb IV: two rows 0 to 360 reading in opposite directions and inclined in direction of increase.) Verniers at 30 deg. to line of sight with reflectors.

Plate: Strongly ribbed, depth increasing towards center. 4 in. bar needle, with circle graduated on upper face to 30 min. and figured 0 to 90 each way; graduated on inner edge to degrees, with beveled plate glass cover, water-proof. Variation arc graduated to 30 min. and reading by vernier to 1 min., with pinion movement, and clamp. Flush vernier covers, water-proof. Two graduated plate levels. Clamp and tangent.

Standards: Angle-section, with ample bases. Multi-grooved axis bearings.

Telescope: 8 in. long, power 20 diameters, aperture of objective 1 in. Erecting eyepiece. Balanced; transits either end; center point on top. Pinion movement to eyepiece and objective slides. *Platinum* cross, and stadia wires, ratio 1:100. (Disappearing stadia furnished, if specified in the order.) Dust guard to objective slide, detachable sunshade and cap. Clamp and tangent to telescope axis.

Transits Nos. 25 and 26 are regularly furnished with plain cross wires, unless stadia is specified in the order.

Telescope Level: 5 in. long, with graduations on vial. Middle part of vial is under telescope axis. (Not furnished with No. 25.)

Finish: Bronze; screws and small parts bright. Morocco finish on standards and leveling head.

Equipment: Mahogany box, with reading glass, 10 oz. adjustable plummet, etc.

Tripod: No. 410, with extension legs, cap, and carrying strap; weighs 10 lbs.

Weight: Transit only, about 11.5 lbs.; transit, including box and accessories, about 20 lbs.

Shipping Weight: Transit and tripod, in two boxes, for domestic shipment, about 65 lbs.; for export, about 90 lbs.

Vertical Limb on Transit No. 27 is a full circle 4.5 in. in diameter, graduated on *sterling silver* to 30 min. and reads by one double vernier to 1 min.

Vertical Limb on Transits Nos. 28, 29 and 30 is an arc of 2.5 in. radius, graduated on *sterling silver* to 30 min. and reads by one double vernier to 1 min.

A *Detachable Aluminum Guard*, morocco finished, is furnished for the vertical limb of Transit No. 27.

A *Beaman Stadia Arc* attached to Transits Nos. 27 to 30 costs \$22.00 extra.

Sole Leather Carrying Case (outside dimensions 10 x 9.5 x 14.5 in.) with handle and shoulder straps, to enclose the mahogany box, costs \$22.00 extra.

If *Split Leg Tripod No. 405* is substituted instead of extension leg pattern, deduct \$3.00. If *Solid Round Leg Tripod No. 400* is substituted, deduct \$8.00.



Gurley Light Mountain Transit

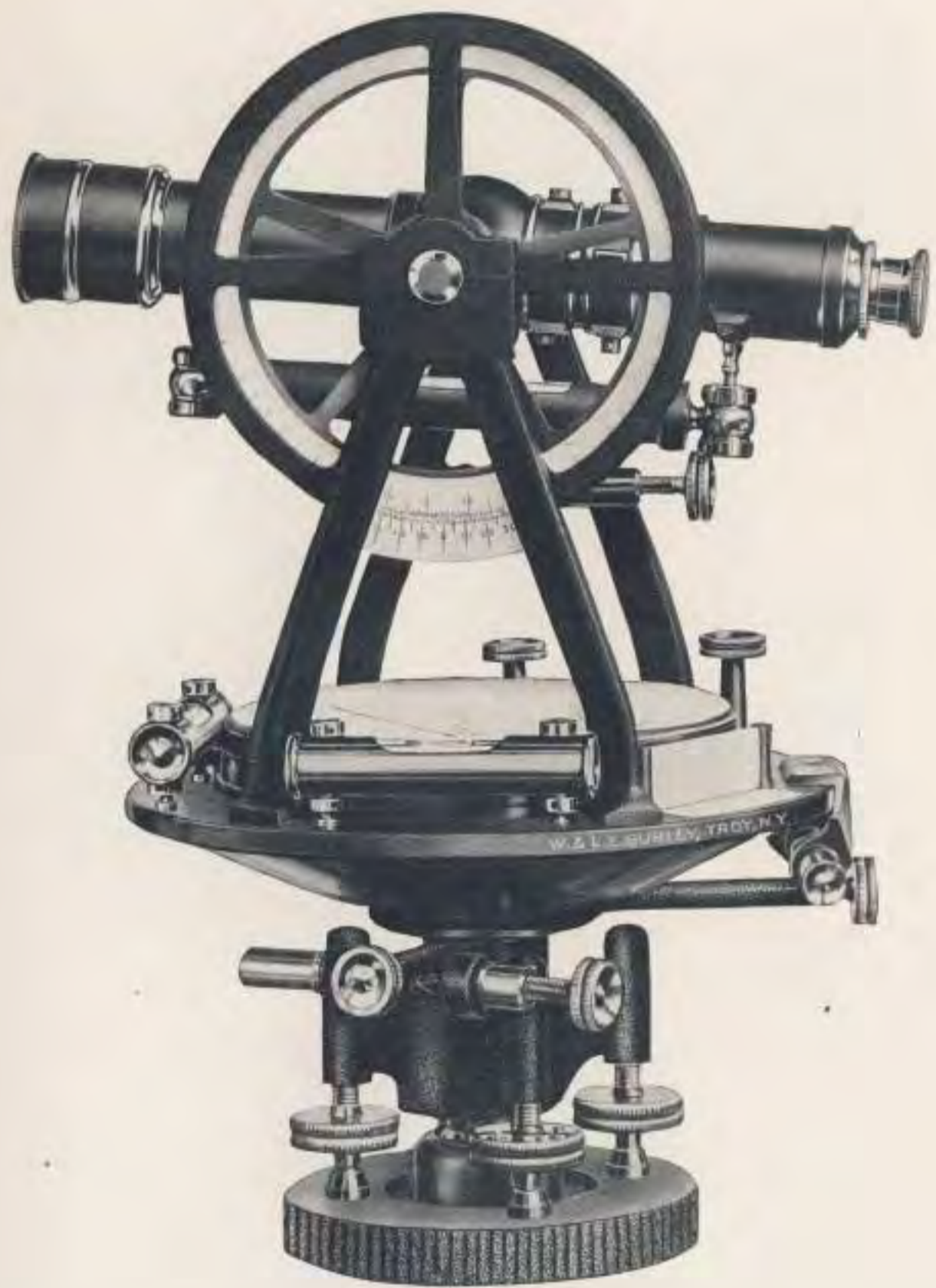
No. 26 5.65 in. limb, 4 in. needle, 8 in. telescope, weight 11 lbs..... \$287.00

Attachments: Level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see page 37.

This Transit will be furnished without the level on telescope, but with clamp and tangent to the telescope axis, as follows:

No. 25 5.65 in. limb, 4 in. needle, 8 in. telescope, weight 10.5 lbs..... \$268.00



Gurley Light Mountain Transit

No. 27 5.65 in. limb, 4 in. needle, 8 in. telescope, weight 11.5 lbs..... \$315.00

Attachments: Vertical limb, full circle, 4.5 inches diameter, reading by vernier to 1 minute, with detachable guard; level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see page 37.



Gurley Light Mountain Transit

No. 28 5.65 in. limb, 4 in. needle, 8 in. telescope, weight 11.5 lbs.....\$315.00

Attachments: Vertical limb, arc of 2.5 inches radius, reading by vernier to 1 minute, level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see page 37.



Gurley Light Mountain Transit

No. 29 5.65 in. limb, 4 in. needle, 8 in. telescope, weight 11.5 lbs..... \$333.00

Attachments: Vertical limb, arc of 2.5 inches radius, reading by vernier to 1 minute, level on telescope; gradienter, combined with clamp and tangent to telescope axis.

For detailed specifications, see page 37.



Gurley Light Mountain Transit

With Burt Solar Attachment

No. 30 5.65 in. limb, 4 in. needle, 8 in. telescope, weight 12 lbs..... \$411.00

Attachments: Burt Solar with latitude level; vertical limb, arc of 2.5 inches radius, reading by vernier to 1 minute; level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see page 37.

For description of Burt Solar Attachment, see page 62.

Gurley Explorers Precise Transits

For detailed description, see pages 44 to 46

This smallest and lightest Gurley Transit is preferred by those working in new or undeveloped country, where the utmost convenience in carrying and handling is wanted. It is equal in quality to the larger Gurley Transits, in every respect, and can be depended upon for accurate and reliable day-in and day-out service.

An idea of the compactness of this outfit may be gained from an examination of the illustration showing the several parts, and the fact that the entire equipment can be packed into a 24 in. dress suit case.



A Gurley Explorers Transit with its special Jointed Extension Tripod, Canvas Carrying Case, and Leather Covered Wooden Box.



A Gurley Explorers Transit, with its special Tripod, packed in a dress suit case 24 inches long

The Gurley Explorers Transit Suit Case is well put together, and designed to carry and hold the equipment in a manner which protects it from harm and makes it convenient to handle and carry.

For the man who is moving about the country on consulting engineering work, it is the ideal outfit — light, compact, easy to carry. A compartment in the suit case may be used for traveling accessories.

Leather Dress Suit Case, 24 in. long. \$16.00



Gurley Explorers Precise Transits

The smallest and lightest Gurley Transits

Specifications of Explorers Precise Transits Nos. 20-A to 24-A

- Centers:** Compound.
- Leveling Head:** Of one piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.
- Horizontal Limb:** 4 in. diameter. Strongly ribbed. Graduations on *sterling silver* to 30 min., reading by two opposite double verniers to 1 min. Figured like Limb I, see page 16; 0 to 90 each way, inner row, and 0 to 360, outer row. (If specified in the order, will be graduated like Limb IV; two rows 0 to 360, reading in opposite directions and inclined in direction of increase.) Verniers at 30 deg. to line of sight; with reflectors.
- Plate:** Strongly ribbed. 2.13 in. bar needle, with circle graduated on upper face to degrees and figured 0 to 90 each way, with beveled plate glass cover, waterproof. Variation arc graduated to degrees and reading by vernier to 5 min., with pinion movement and clamp. Flush vernier covers, waterproof. Two graduated plate levels. Clamp and tangent.
- Standard:** One Piece Truss pattern (patented), with extra wide base. Multi-grooved axis bearings.
- Telescope:** 6.5 in. long, power 16 diameters, aperture of objective 0.7 in. Erecting eyepiece. Balanced; transits either end; center point on top. Pinion movement to objective slide, spiral movement to eyepiece slide. *Platinum* cross, and stadia wires, ratio 1:100. (Disappearing stadia furnished if specified in order.) Dust guard to objective slide, detachable sunshade and cap. Clamp and tangent to telescope axis.
- Telescope Level:** 3 in. long, graduated on the vial.
- Vertical Limb:** Full circle, 4 in. diameter, graduated on *sterling silver* to 30 min. and reading by one double vernier to 1 min., with detachable aluminum guard.
- Finish:** Bronze; screws and small parts bright. Morocco finish on standard and leveling head.
- Equipment:** Leather-covered, light mahogany box (outside dimensions 5.5 x 7 x 10.25 in.) with shoulder strap, reading glass, 6 oz. plain plummet, etc.
- Tripod:** No. 412, with jointed extension legs, cap and canvas carrying case; weighs about 5 lbs.

Transit and tripod can be packed together in an ordinary 24 in. suit case, as shown on page 43.

Weight: Transit only, about 5 lbs.; transit, including box and accessories, about 9 lbs.

Shipping Weight: Transit and tripod, in two boxes, for domestic shipment, about 50 lbs.; for export, about 75 lbs.

No. 20-A	Explorers Precise Transit, complete as specified.....	\$315.00
No. 21-A	Explorers Precise Transit, same as No. 20-A, except the vertical limb is an arc of 2 in. radius, graduated on <i>sterling silver</i> to 30 min. and reads by one double vernier to 1 min.....	315.00
No. 22-A	Explorers Precise Transit, same as No. 21-A, but with addition of gradienter, combined with clamp and tangent to telescope axis	333.00
No. 23-A	Explorers Precise Transit, same as No. 21-A, but with addition of Burt Solar Attachment.....	411.00
No. 24-A	Explorers Precise Transit, with a two-vernier vertical circle having a level attached to the guard, as illustrated and described on page 46.....	363.00

A Beaman Stadia Arc attached to Transits Nos. 20-A, 21-A, 22-A, or 23-A costs \$22.00 extra.

Leather Suit Case, 24 in. long, to contain Explorers Transit and jointed extension tripod in canvas case (see page 43), costs \$16.00.

If *Extension Tripod No. 411*, without joints or canvas case, is substituted with the above Explorers Transits instead of the regular Jointed Extension Tripod No. 412, deduct \$5.00. However, owing to its length of 38 in. when closed, this tripod cannot be packed in a suit case.



Gurley Explorers Precise Transits

The smallest and lightest Gurley Transits

No. 20-A 4 in. limb, 2.13 in. needle, 6.5 in. telescope, weight 5 lbs..... \$315.00

Attachments: Vertical limb, full circle, 4 inches diameter, reading by vernier to 1 minute; level on telescope; clamp and tangent to telescope axis.

The Gurley Explorers Precise Transit is designed to meet the demand for a transit of greatest accuracy with the least possible weight. Similar to our Precise Light Mountain Transit in construction, the instrument itself weighs only about 5 lbs., and when placed in its leather-covered case can be readily packed and carried in a 24 in. dress suit case, together with its special tripod, as shown on page 43. See also Explorers Level, on page 70, and Explorers Alidade, on pages 80 and 81.



Gurley Explorers Precise Transits

No. 24-A 4 in. limb, 2.13 in. needle, 6.5 in. telescope, weight 6 lbs. \$363.00

Attachments: Vertical limb, full circle, 4 inches diameter, reading by two opposite double verniers to 1 minute, and with a level attached to the guard; level on telescope; clamp and tangent to telescope axis.

For detailed specifications, see page 44.

This specially equipped transit has been used with great success by engineers on exploring expeditions, particularly for solar work. Its extreme lightness, accuracy and convenience particularly fit it for this class of work.

The desirable attachments of diagonal prism, elbow eyepiece, and reflectors for the cross-wires will be found on page 50.



Gurley Reconnoissance Transits

The Gurley Reconnoissance Transit meets the demand for a very light instrument for rapid work. It is the transit for the rough and ready, knock-about service, which usually falls to the lot of an instrument used in making hurried surveys.

While light in weight, it is nevertheless an unusually rugged transit which combines the elements of accuracy and handiness to a degree which make it a highly desirable instrument for the particular work for which it is recommended. Constructed like our Mountain Transits, with long centers and with ribbed leveling head, limb and main plate, and made with the same care as our larger and more expensive patterns, it is recommended as reliable for a great variety of work.

Its accuracy, its convenience in carrying, and its proved ability to stand up satisfactorily under severe use, have made this transit especially popular with Surveyors, Contractors, Road Engineers, Architects and Builders.



Specifications of Reconnaissance Transit No. 102

One Vernier to Limb

Centers: Compound.

Leveling Head: Of one piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.

Horizontal Limb: 5 in. diameter. Strongly ribbed, depth increasing towards center. Graduated on *sterling silver* to 30 min., reading by one double vernier to 1 min. Figured like Limb I, see page 16: 0 to 90 each way, inner row, and 0 to 360, outer row. (If specified in the order, will be figured like Limb IV: two rows 0 to 360, reading in opposite directions and inclined in direction of increase.) Vernier at 30 deg. to line of sight.

Plate: Strongly ribbed, depth increasing towards center. 3.5 in. bar needle, with circle graduated on upper face to 30 min. and figured 0 to 90 each way, with beveled plate glass cover, waterproof. Variation arc graduated to 30 min., reading by vernier to 1 min., with pinion movement and clamp. Flush vernier cover, waterproof. Two graduated plate levels. Clamp and tangent.

Standards: Angle-section, with ample bases. Multi-grooved axis bearings.

Telescope: 9 in. long, power 18 diameters, aperture of objective 0.69 in. Erecting eyepiece. Balanced; transits either end; center point on top. Pinion movement to objective slide; spiral movement to eyepiece slide. *Platinum* cross, and stadia wires, ratio 1:100. (Disappearing stadia furnished, if specified in the order.) Dust guard to objective slide, detachable sunshade, and cap. Clamp and tangent to telescope axis.

Telescope Level: 4.3 in. long, graduated on the vial.

Vertical Limb: Full circle, 4.5 in. diameter, graduated on *sterling silver* to 30 min. and reading by one double vernier to 1 min.

Finish: Bronze; screws and small parts bright. Morocco finish on standards and leveling head.

Equipment: Mahogany box, with reading glass, 6 oz. plain plummet, etc.

Tripod: No. 411, with extension legs, cap, and carrying straps; weighs about 8 lbs.

Weight: Transit only, about 8 lbs.; transit, including box and accessories, about 12.5 lbs.

Shipping Weight: Transit and tripod, in two boxes, for domestic shipment, about 50 lbs.; for export, about 75 lbs.

No. 102 *Reconnaissance Transit*, complete as specified..... \$235.00

No. 103 *Reconnaissance Transit*, same as No. 102, except the vertical limb is an arc of 2.5 in. radius, graduated on *sterling silver*, to 30 min. and reads by one double vernier to 1 min..... 244.00

Detachable Aluminum Guard to protect the vertical circle on Transit No. 102 costs \$9.00 extra.

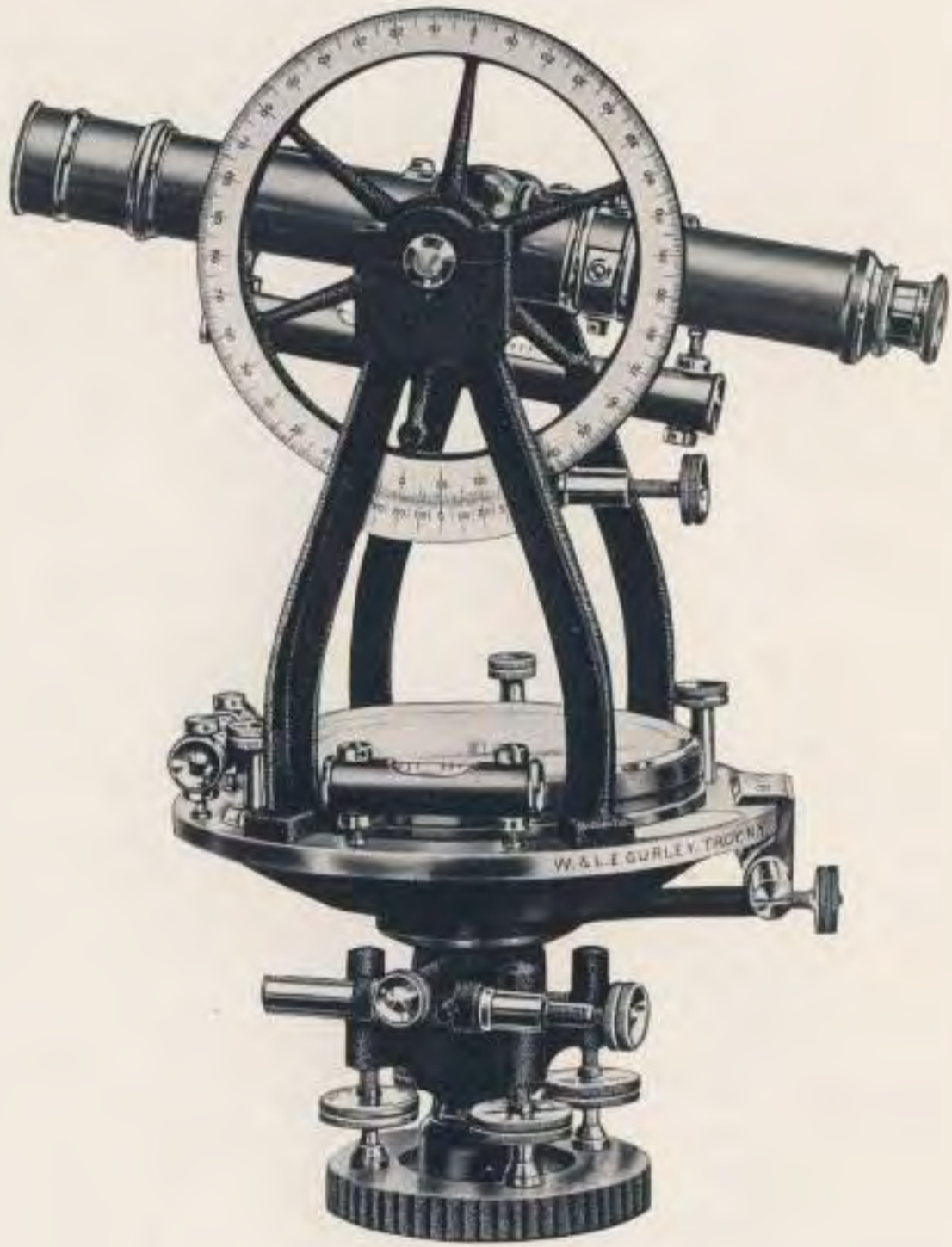
A Beaman Stadia Arc attached to Transits Nos. 102 or 103 costs \$22.00 extra.

A Gradiometer, combined with the clamp and tangent to the telescope axis on Nos. 102 or 103, costs \$18.00 extra.

Sole Leather Carrying Case with handle and shoulder straps, to enclose the mahogany box, costs \$20.00 extra.

If *Split Leg Tripod No. 406* is substituted for the extension leg pattern, deduct \$5.00.

A Trivet Plate, to enable setting the instrument upon the walls or girders of a building where it is impossible to use a tripod, costs \$2.25 extra.



Gurley Reconnaissance Transit
 One Vernier to Limb

No. 102 5 in. limb, 3.5 in. needle, 9 in. telescope, weight 8 lbs..... \$235.00



Attachments and Extras for Gurley Transits

The following prices are for attachments only when furnished with a new instrument.

When fitted to a complete instrument, the cost of alterations must be added to the price of the new parts.

No. 131	Variation Arc added to Transits when sent for repairs.....	\$25.00
No. 135-B	Vertical Circle, 4 in. diameter, with vernier reading to 1 min....	18.00
No. 136	Vertical Circle, 4.5 in. diameter, with vernier reading to 1 minute	18.00
No. 137	Vertical Circle, 5 in. diameter, with vernier reading to 1 min.	22.00
No. 138	Vertical Circle, 5 in. diameter, two opposite double verniers reading to 1 minute, and with guard. (See page 52.).....	50.00
No. 139	Vertical Circle, 4.5 in. diameter, with graduations on edge or rim, protected by a metal guard. Circle graduated to 30 minutes, with vernier reading to 1 minute. (See page 54.)..	45.00
No. 139-A	Vertical Arc, 2 in. radius, with vernier reading to 1 minute....	28.00
No. 139-B	Vertical Arc, 2.5 in. radius, with vernier reading to 1 minute...	28.00
No. 140	Vertical Arc, 3 in. radius, with vernier reading to 1 minute. (See page 53.)	28.00
No. 141	Detachable Aluminum Guard for Vertical Circle. (See page 53.)	9.00
No. 145	Level on Telescope, with ground and graduated vial. (See page 52.)	19.00
No. 146	Level on Telescope, with Reversion Vial. (See page 54.).....	27.00
No. 148	Clamp and Tangent to Telescope Axis. (See page 52.).....	9.00
No. 149	Beaman Stadia Arc, for Transit having a one-vernier vertical circle or vertical arc. (See pages 56 to 58.).....	22.00
No. 149-A	Beaman Stadia Arc, for Transit having a two-vernier vertical circle No. 138.....	50.00
No. 149-B	Beaman Stadia Arc, for Telescopic Alidades Nos. 592 and 592-A	20.00
No. 149-C	Beaman Stadia Arc with edge graduations, for Telescopic Alidade No. 584-B.....	45.00
No. 150	Gradiometer, combined with Clamp and Tangent. (See pages 53 and 59.).....	27.00
No. 151	Platinum Stadia Wires, adjustable, and diaphragm.....	8.00
No. 152	Platinum Stadia Wires, fixed, and diaphragm.....	10.00
No. 155	Pinion movement to eyepiece slide.....	8.00
No. 157	Sights on Telescope, with folding joints.....	12.00
No. 158	Sights on Standards, at right angles with telescope.....	12.00
No. 162	Interchangeable Side and Top Telescope with Counterpoise, for vertical sighting. (See pages 34 and 35.).....	60.00
No. 165	Reflector for illuminating cross wires. (See page 60.).....	12.00
No. 166	Reflector for illuminating cross wires of large Wye Level. (See page 60.).....	15.00
	The elliptical reflecting pieces on Reflectors Nos. 165 and 166 are of <i>sterling silver</i> .	
No. 167	Elbow Eyepiece, in addition to regular eyepiece, and interchangeable	50.00
No. 168	Diagonal Prism for eyepiece of telescope. (See page 60.).....	12.00
No. 169	Eyepiece Cap with darkener glass in shutter, for direct solar observations	3.00
No. 170	Plummet Lamp for mine surveying. (See page 61.).....	15.00
No. 180	Attached Magnifier, with three universal joints, to read verniers. (See page 60.) Each.....	8.00
No. 181	Attached Microscopes to read verniers of horizontal limb, as shown with No. 18-A Transit. (See page 29.) Per pair....	30.00
No. 182	Attached Microscopes to read verniers of No. 138 vertical limb, as shown with No. 18-A Transit. (See page 29.) Per pair....	30.00



Attachments and Extras for Gurley Transits

No. 185	Graduation of horizontal limb to read to 20 or 30 seconds, extra	15.00
No. 186	Graduation of horizontal limb to read to 10 seconds, extra.....	35.00
No. 187	Graduation of 4.5 or 5 in. Vertical Circle to read to 20 or 30 seconds, extra.....	10.00
No. 188	Graduation of No. 138 Vertical Circle to read to 20 or 30 seconds, extra	15.00
No. 189	Graduation of No. 138 Vertical Circle to read to 10 seconds.....	35.00
No. 190	Burt Solar Attachment, with declination arc, hour circle, polar axis, patent latitude level, adjusting level and adjusting bar. (See page 62.)	96.00
No. 192	Solar Screen, to fit eyepiece of telescope. (See page 61.).....	12.00
No. 193	Patent Latitude Level, for use with Burt Solar Transit.....	9.00
No. 196	Striding or Adjusting Level.....	8.00
No. 197	Adjusting Bar for Solar Attachment of Transit.....	2.25

Parts for Gurley Transits Liable to Loss or Injury

Needle with jeweled center and center pin.....	\$5.00
Center Pin only.....	.75
Ground Glass Level Vials, for plate, each.....	1.25
Ground Glass Level Vials, brass mounted complete, for plate, each.....	3.00
Ground Glass Level Vial, for telescope, unmounted.....	\$2.75 to 3.50
Cap for eyepiece or object glass, each.....	1.00
Shade for object glass.....	1.00
Clamp Screws for horizontal limb, each.....	1.00
Tangent Screw for leveling head.....	\$1.00 to 2.00
Clamp Screw for leveling head.....	1.00
Leveling Screw for leveling head, each.....	\$1.25 to 2.00
Eyepiece complete, including lenses and settings, and omitting cap.....	8.00
Object Glass complete.....	8.00
Platinum Cross Wires and Diaphragm.....	4.50
Platinum Stadia Wires, adjustable, and diaphragm.....	8.00
Platinum Stadia Wires, fixed, and diaphragm.....	10.00
Platinum Cross Wires only fitted to old diaphragm.....	3.50
Platinum Cross Wires and adjustable Stadia Wires fitted to old diaphragm.....	6.00
Platinum Cross Wires and fixed Stadia Wires fitted to old diaphragm.....	8.00
Brass packing box for mailing any of the above diaphragms.....	.50
*Mahogany Box with lock and strap, and fitted inside, according to size, \$12.00 to \$15.00	
*When ordering, specify length of telescope, length of compass needle, height of the instrument from bottom plate of the leveling head to the tops of the standards, and also state whether it has a vertical arc or a full vertical circle. Unless the Transit is sent to us, the new box will be furnished with the packing pieces or blocks not fitted in position.	
Plummet Screw and chain for bottom of leveling head.....	.45
Adjusting Pins, each .....	.05
Adjusting Pins, with eye for attaching to key ring, each.....	.20
Screwdriver, small size .....	.35
Screwdriver, large size .....	.65
Waterproof Hood	1.25
Instrument Oil, finest grade, small bottle.....	.45
Camel Hair Brush.....	1.25
Rubber Tips, for bottom of instrument box, per set.....	.80
Leather Strap and Buckle for transit box	1.00
Leather Strap and Buckle for level box	1.25
Lock and Key for instrument box.....	1.00
Reading Glass for transit, each.....	1.25
Brass Plummet with screw cap, for transit or level, each.....	2.00

For Parts of Gurley Tripods, see page 89.



Attachments and Extras for Gurley Transits

For Prices, See Pages 50 and 51



Nos. 145 and 148

Level on Telescope, and Clamp and Tangent to Telescope Axis



No. 138

Vertical Circle, with two opposite double verniers, and with Guard

Attachments and Extras for Gurley Transits

For Prices, See Pages 50 and 51



No. 141

The illustration shows No. 141 Detachable Aluminum Guard attached to the vertical limb to protect the graduations from injury. It can be removed readily and is regularly supplied with Transits Nos. 8-A, 20-A, 27, 27-A and 32-A. It will be furnished with No. 102 Reconnaissance Transit, see page 49, for \$9.00 extra.



Nos. 140, 145 and 150

The illustration shows No. 140 Vertical Arc, No. 145 Level on Telescope with ground glass vial, and No. 150 Gradienter combined with Clamp and Tangent to telescope axis. An enlarged view of the Gradienter, with description, will be found on page 59.



Attachments and Extras for Gurley Transits

For Prices, See Pages 50 and 51



No. 146

Level on Telescope, with Reversion vial.



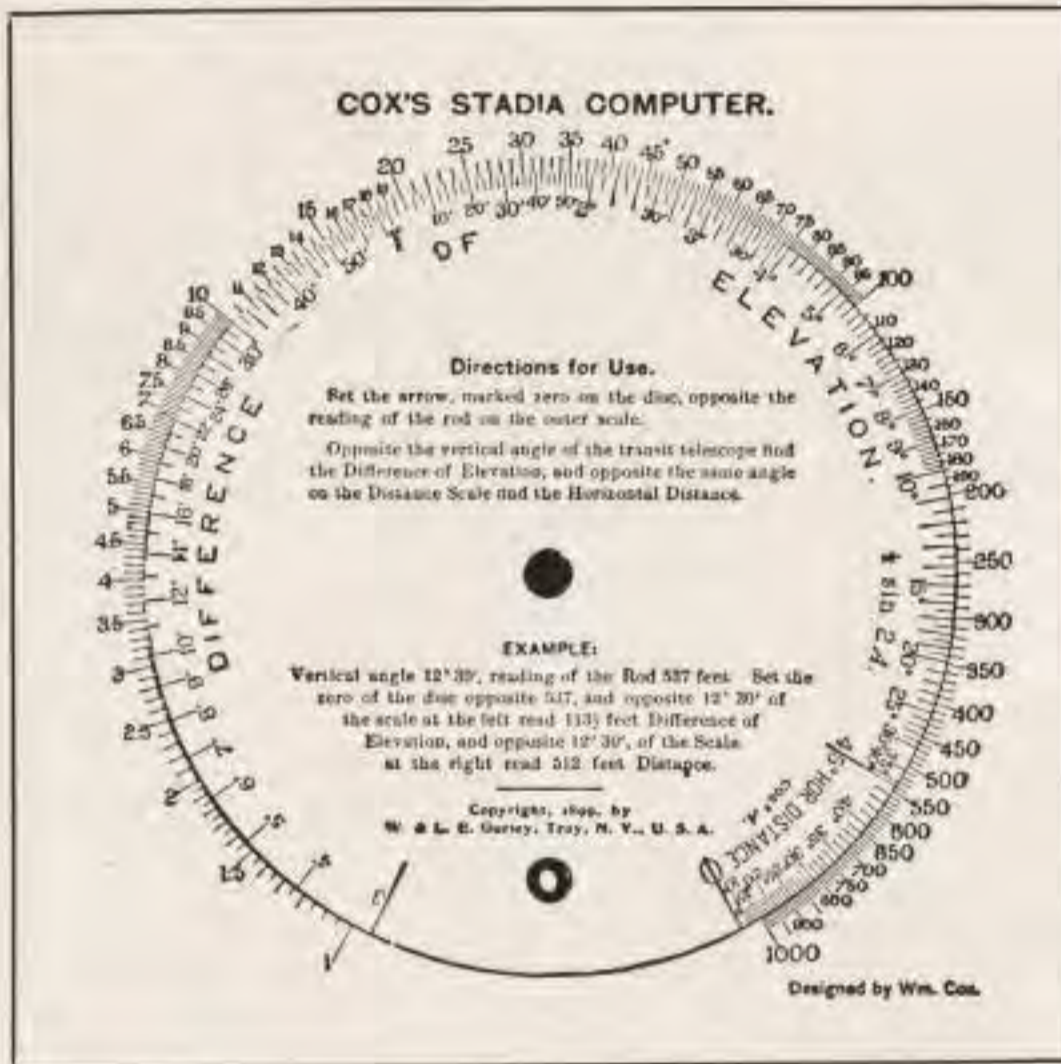
No. 139

Vertical Circle, 4.5 inches diameter, with graduations on edge or rim, protected by a metal guard. Circle graduated to 30 minutes, with vernier reading to one minute.



Cox Stadia Computer

A circular slide rule for the reduction of stadia readings,
in convenient form for field use



The Cox Stadia Computer is a circular slide rule of about fifteen inches effective length. The fixed outer scale, or base, is graduated to the logarithms of numbers from 1 to 1000. The movable inner disc, concentric with it, is graduated on a portion of its circumference to the logarithms of one half the sine of twice the angles from 3 min. to 45 deg., and inscribed "Difference of Elevation." Another portion of its circumference is graduated to the logarithms of the cosine squared of the angles from 0 to 45 deg., and inscribed "Hor. Distance."

Printed on heavy celluloid, size $5\frac{7}{8} \times 5\frac{7}{8}$ inches, suitable for carrying in coat pocket.

Complete explanation sent on request.

Price, postage paid, \$1.00.



Attachments and Extras for Gurley Transits Beaman Stadia Arc

A practical attachment for Transits and Telescopic Alidades, simplifying Stadia Surveying and eliminating the use of stadia tables, slide rules or diagrams

Patented March 27, 1906

Manufactured only by W. & L. E. Gurley, Troy, N. Y.



No. 149

Beaman Stadia Arc, attached to the vertical circle of a transit

This attachment does not interfere with the addition of Detachable Guard No. 141

This specially graduated vertical arc was devised and patented by W. M. Beaman, a topographer in the United States Geological Survey, and is now extensively used by that bureau in its topographical surveys. In 1906 we introduced it on our transits and alidades, and because this arc furnishes engineers with a rapid mechanical solution of the stadia problem, the use of the stadia in surveying has been popularized to an appreciable extent.

By the use of this arc differences in elevation, and reduced horizontal distances can be determined with great rapidity, and without the intricate calculation heretofore necessary.

The arc is attached to the vertical limb of the transit or alidade, and carries two scales having coincident zero points, marked 0 and 50 respectively, either scale being read by an index common to both. The scale graduations are so spaced and figured as to give simple multiples, of the rod interval.

The Beaman Stadia Arc can be used also for metric measurements, as the graduations are based on a ratio of 1 to 100, which is 1 foot to 100 feet, or 1 meter to 100 meters.

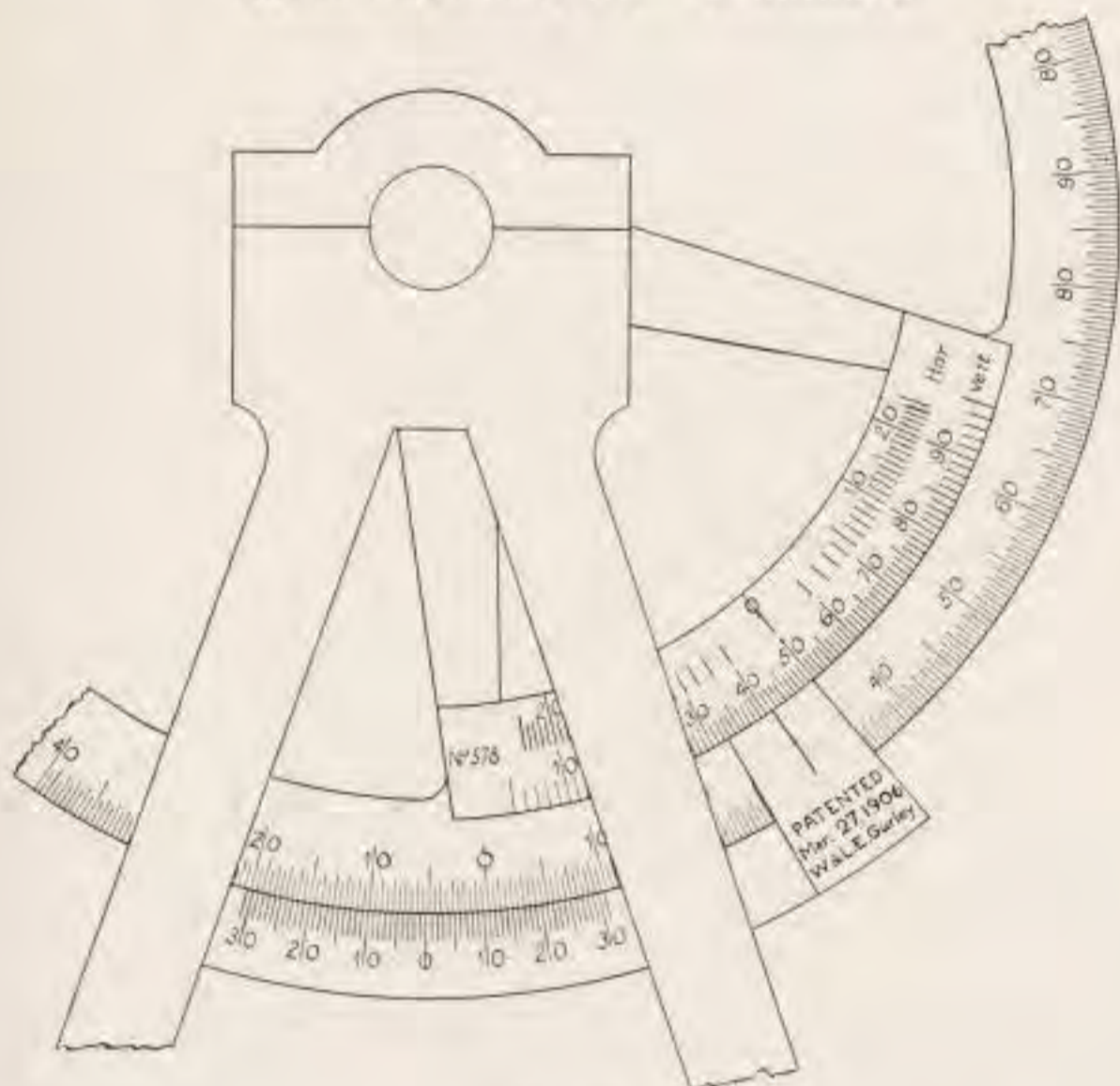
Advantages of the Beaman Stadia Arc

1. The use of stadia tables, slide rules, or diagrams is entirely obviated.
2. There is no vernier or similar contrivance to be read.
3. Final results are obtained in less than one-third the time required by ordinary methods.
4. The accuracy of results is identical with formulæ or table computations, regardless of the angle or distance.
5. The simplicity of the process practically eliminates the chances of error incidental to the use of other methods.

To Obtain Difference in Elevation between Instrument and Rod

The outer scale, marked "Vert.," indicates multiples of the rod interval, for determining differences in elevation between instrument and rod. The zero point of this scale is marked 50, so that a direct scale reading will indicate whether the telescope is elevated or depressed.

Attachments and Extras for Gurley Transits Beaman Stadia Arc — Continued



No. 149

Enlarged view of graduations of Beaman Stadia Arc, attached to vertical limb of a transit

A unique feature of the use of the multiple scale is that only such inclinations of the telescope are used as will give a whole number scale reading, while the fractional part of the elevation is quickly and accurately determined by the reading of the middle wire on the rod.

To obtain the desired multiple, therefore, sight anywhere on the rod, it does not matter where, so that a whole number reading is obtained on the multiple scale.

Subtract 50 from this scale reading and use the algebraic remainder; e. g., if the Vert. scale reads 56, the multiple is $56 - 50 = 6$. If this scale reads 47, the multiple is $47 - 50 = -3$.

Example: Suppose the observed stadia interval to be 6.40 (640 ft.), and to obtain a whole number for the scale reading, the telescope is inclined so that the multiple scale reads 33, at which setting the middle wire reads 7.30 on the rod.

$$\begin{aligned} \text{Then the interval equals} \quad & 33 - 50 = -17 \\ & -17 \times 6.40 = -108.8 \end{aligned}$$

Difference in elevation between instrument and base of rod,

$$-7.30 - 108.8 = -116.1 \text{ ft.}$$

The negative sign indicates that the point where the rod was held is lower than the instrument.



Attachments and Extras for Gurley Transits Beaman Stadia Arc — Continued

To Reduce Observed Distance to True Horizontal Distance

The inner scale, marked "Hor.," gives at the same pointing a direct reading of the percentage of correction (always subtractive) necessary to reduce the observed stadia reading (in feet subtended) to the true horizontal distance.

Example: At the above setting the reduction scale would read 3, or 3%.
3% of 640 ft. = 19.2 ft.
640—19.2=620.8 ft., the true horizontal distance.

For illustrations of the Beaman Stadia Arc attached to complete instruments, see the following:

Precise Transit No. 30-A, page 31.
Telescopic Alidade No. 548-C, page 78.
Explorers Alidade No. 592-C, page 80.

Prices of the Beaman Stadia Arc

The Beaman Stadia Arc can be supplied with any new transit of our manufacture having a one vernier vertical circle or vertical arc, 4 inches diameter or larger, for \$22.00 extra, if ordered with the instrument. When applied to No. 138 two vernier vertical circle, the extra cost is \$50.00.

This attachment can also be fitted to an old Transit (or old Alidades Nos. 582, 583, 592, 592-A, 584-A, or 584-B), but the additional cost of alterations and readjusting can only be determined upon examination of the instrument which must be in our hands for this purpose.

Leather Carrying Cases

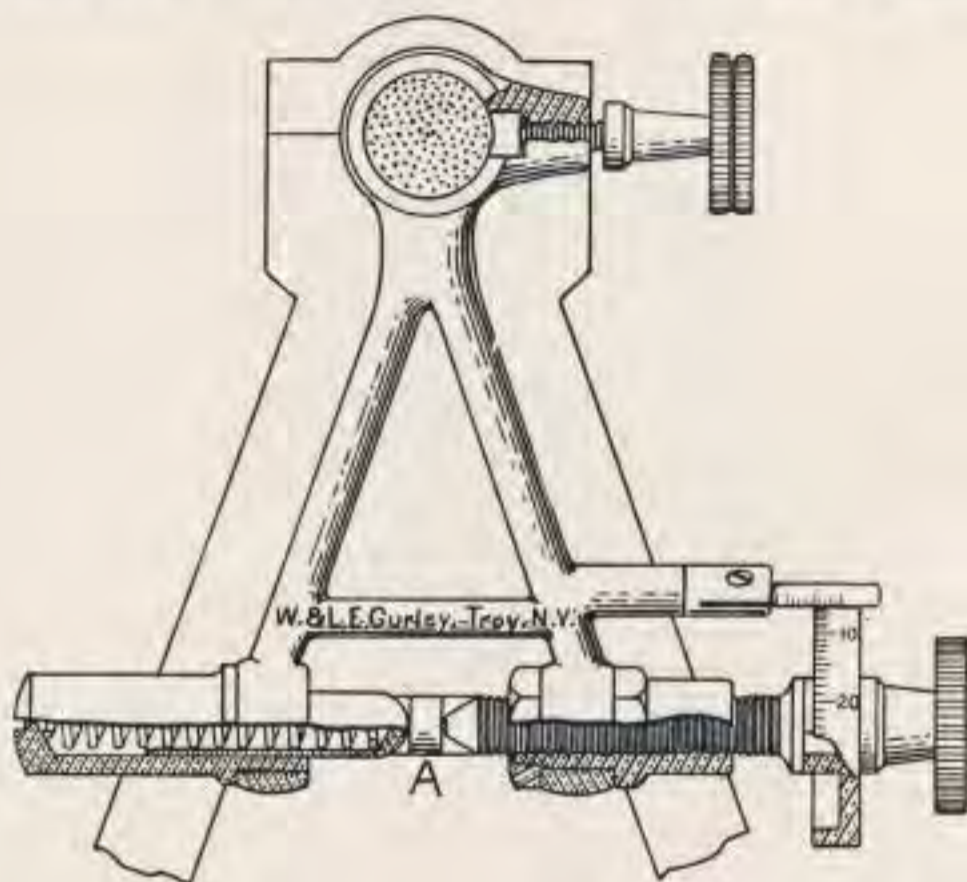
We are prepared to supply Leather Carrying Cases for our Transits. These Cases are of high-grade sole leather, carefully put together and reinforced at all joints by double rows of stitching. Lined inside to protect the surface of the transit box and provided with strong carrying handle and shoulder straps.



Sole Leather Carrying Case with shoulder straps, to enclose the mahogany transit box.
This case costs \$22.00 extra when furnished with Light Mountain
Transits Nos. 25-A to 32-A, or Nos. 25 to 30.



Attachments and Extras for Gurley Transits



No. 150 Gradiometer

This attachment is a modification of the tangent screw attached to the horizontal axis of the telescope, and is used in measuring small vertical angles in terms of their tangents.

It consists of a screw accurately cut to a determined number of threads which, passing through a sleeve nut on one side of the arm, presses against the small stud, A, fixed to the inside surface of the right-hand standard. A drum having a rim of *sterling silver* centered on the micrometer screw, is graduated into 100 equal parts and a short arm carries a small silver scale, graduated to read complete turns of the micrometer screw, which serves as an index to the micrometer drum. Pressing against the opposite side of the stud is an enclosed spiral spring which maintains a positive movement of the Gradiometer screw.

In the Gurley Gradiometer attachment the value of the screw thread is such that a complete revolution of the screw will move the horizontal cross wire of the telescope over a space of one foot on a rod held at a distance of 100 feet. If the screw is turned through fifty spaces on its graduated head, the wire will pass over fifty one-hundredths, or one-half foot on the rod, and so on in the same proportion. The same ratio applies to metric measurements, 1 meter to 100 meters. Thus the Gradiometer can be used in the measurement of distances.

The most important use of the Gradiometer is in establishing grades in surveying connected with railroads, streets, highways, sewers, canals, irrigation ditches, etc. The procedure is as follows: First, level the instrument; bring the telescope level to its center by the clamp of the gradiometer screw; move the graduated head until its zero is brought to the edge of the scale; and then turn off as many spaces on the head as there are hundredths of feet to the hundred in the grade to be established.

The Gradiometer drum and the index are graduated on *sterling silver*; thus the graduations are even, distinct and permanent. The entire attachment is of such construction and workmanship that it can be depended upon for accurate work.

See illustrations of Transits Nos. 10-A, 29-A and 29.

No. 150 Gradiometer, combined with clamp and tangent to telescope axis... \$27.00
 When supplied with any new Transit, which is listed with clamp and tangent movement to telescope axis, the extra cost is \$18.00



Attachments and Extras for Gurley Transits

Reflector for Cross Wires



No. 165
Reflector, \$12.00

The Reflector for Cross Wires, No. 165, consists of an elliptical piece of silver inclined at an angle of 45 deg. with the ring, which is fitted to the objective end of the telescope. The opening in the reflector allows the use of the telescope, while a light held near the inner surface illuminates the cross wires.

No. 165 Reflector for Cross Wires... \$12.00

Diagonal Prism

The Diagonal Prism, No. 168, is used when it is necessary to observe greater vertical angles than can be taken with the ordinary telescope. It consists of a prism attached to the cap of the eye-piece, by which the object is presented to the eye when placed at right angles with the telescope. When the telescope is directed to the sun the slide or darkener containing colored glass is moved over the opening.

No. 168 Diagonal Prism... \$12.00



No. 168
Diagonal Prism, \$12.00

Attached Magnifiers

Attached Magnifiers are frequently used over the verniers of the horizontal or vertical limb, and are held by a universal three-jointed arm, which allows the lens to be placed over any point of the vernier. The magnifier for the "A" vernier can also be used for reading the vernier of the vertical limb (any style having one vernier.)

No. 180 Attached Magnifier, each... \$8.00



No. 180
Attached Magnifier, \$8.00



Attachments and Extras for Gurley Transits

Plummet Lamp



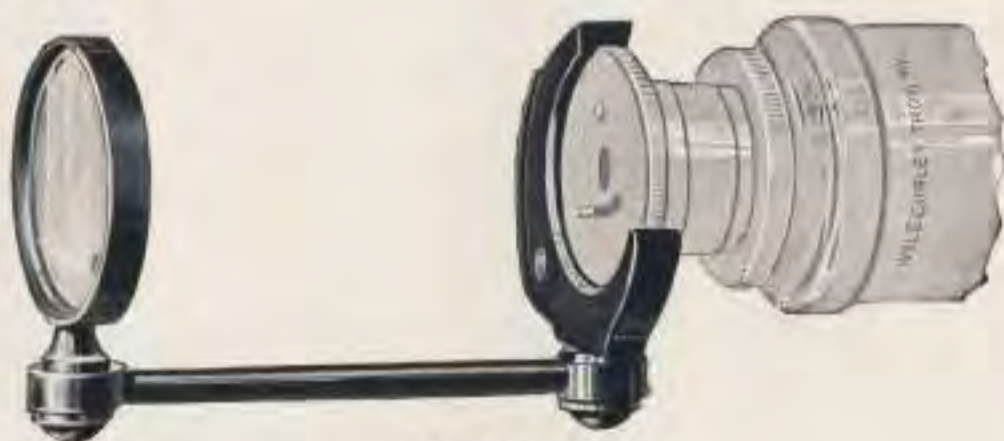
No. 170
Plummet Lamp, \$15.00

The Plummet Lamp, No. 170, is a large plummet, of which the upper part is hollow to contain oil. It has a tube for a wick, and an extinguisher.

It is hung in gimbals by chains with a hook, and so always assumes a vertical position, and when suspended from the shifting center of a leveling head it can be easily adjusted over a given point.

These lamps are packed in a wooden case, furnished with a strap to sling over the shoulders. The weight of each lamp is about 1¼ lbs., and either one, two or three may be packed in a single box.

No. 170 Plummet Lamp \$15.00



No. 192
Solar Screen, \$12.00

Solar Screen

If desired, we furnish a Solar Screen arranged to clamp to the eyepiece end of the telescope, and detachable at will. On this screen the image of the sun and cross wires can be readily observed, a greater movement of the eyepiece, however being required.

No. 192 Solar Screen \$12.00



Attachments and Extras for Gurley Transits



No. 190 Burt Solar Attachment as applied to transits \$96.00

The Solar Attachment is essentially the solar apparatus of Burt placed upon the cross bar of the ordinary transit. A little disc one and one-half inches in diameter, having a short round pivot projecting above its upper surface, is first securely screwed to the telescope axis. Upon this pivot rests the enlarged base of the polar axis, which is also firmly connected with the disc by four capstan head screws.

The Hour Circle surrounding the base of the polar axis is easily movable about it, and can be fastened at any point desired by two flat head screws above. It is graduated to 5 minutes of time, is figured from I to XII, and is read by an index fixed to the declination arc and moving with it. The Declination Arc is graduated to quarter degrees, and reads by vernier to minutes.

The latitude is set off by means of a large vertical limb figured from the center each way in two rows, from 0 to 80 degrees, and from 90 to 10 degrees, the first series being intended for reading vertical angles and the latter series for setting off the latitude.

No. 193 Patent Latitude Level is used for recovering the latitude on a solar transit without referring to the vertical arc, and also for setting the telescope at any desired angle in running grades and similar work.

It consists of a level connected by a short conical socket with the end of the telescope axis, to which it is clamped by a milled head screw, and made adjustable by a tangent screw and spring on the enlarged end of the tube. When the clamp screw is released the level turns vertically upon the axis, and can thus be set at any angle with the telescope, the final adjustment being made by the tangent screw.

The latitude being set off upon the vertical arc as usual, the level is clamped and brought into the middle, as above described.

The telescope may then be released and used in running lines, until it is desired to recover the latitude again. This is easily and accurately done without referring to the vertical arc. The use of the attachment in running any desired grade is readily understood.

This attachment is furnished without extra charge with a new Burt Solar Transit, together with Adjusting Level No. 196 and Adjusting Bar No. 197.



"The New Gurley"

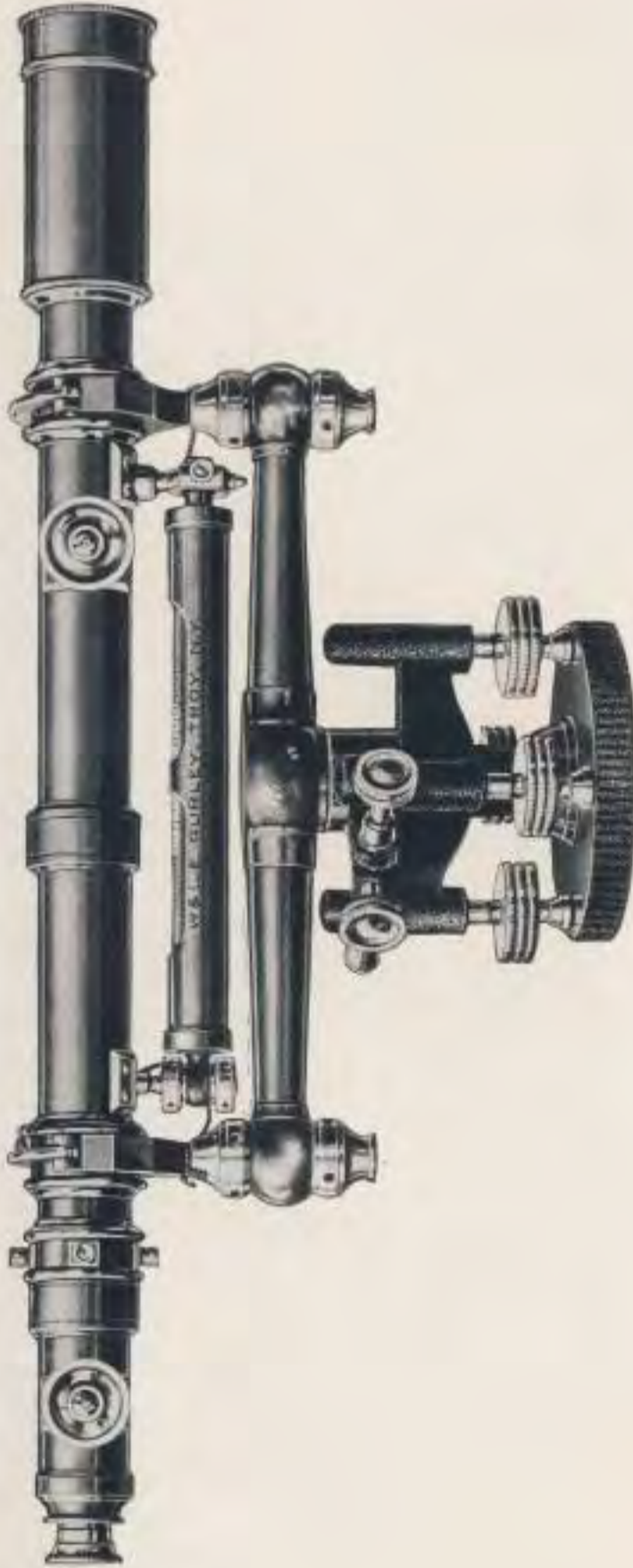
A Worthy
Descendant of
the Veteran
Gurley

"His Father's Son"

The bright little chap behind the Gurley was busy calculating a deflection angle—just as he watched daddy do many a time.

And this is more than a fanciful photograph. It's a leaf from life—for that Gurley Transit has been forty years on the job, and it's still in use by the County Surveyor stationed at Grand Canyon, Arizona. He sent us the picture of his little "surveyor," and we're glad to show it to you, together with the two generations of Gurley Transits—the grizzled veteran below and the New Gurley which marks the latest advance in instrument construction.





Gurley Engineers Wye Levels

Three Sizes

No. 375	Engineers Wye Level, 22 in. telescope.....	\$225.00
No. 377	Engineers Wye Level, 18 in. telescope.....	215.00

(See page 66 for illustration of Level No. 378)

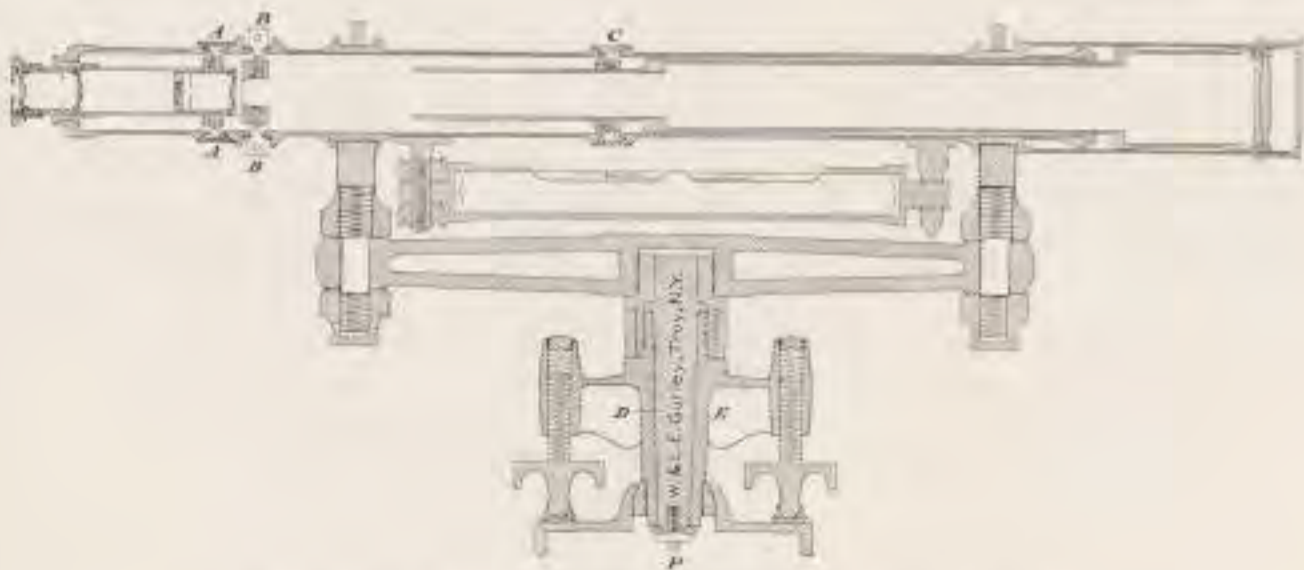
Gurley Engineers Wye Levels

Tried and Proven by Four Generations of Engineers

Scarcely a highway or railroad on which they have not been used, because of their great reliability, accuracy, ease of manipulation and general ruggedness.

We are schooled to think of precision and accuracy in instruments of this sort, but rarely, if ever, do we concern ourselves with the question of ruggedness, and yet it is possible to provide this quality. Those concerned with the manufacture of Gurley Levels, can tell you that ruggedness has been built into them to an extent which insures a long life of usefulness.

The quality of the metals used in its construction, and the proportion of weight to size, produce an instrument which is not excelled for long wearing qualities. We have actual knowledge of Gurley Levels made more than twenty years ago which have not required repairs, although subjected to continuous field service during all that time.



Sectional View of Gurley Engineers Wye Level



Gurley Engineers Wye Levels

Three Sizes (Also see Pages 64 and 65)

No. 378 Engineers Wye Level, 15 in. telescope..... \$205.00

Specifications of Engineers Wye Levels Nos. 375, 377 and 378

	No. 375	No. 377	No. 378
Length of Telescope	22 in.	18 in.	15 in.
Power of Telescope.....	42 diam.	32 diam.	26 diam.
Length of Telescope Level...	10.25 in.	8.38 in.	8.38 in.
Least Focussing Distance of Telescope, from center of instrument	12 ft.	8.75 ft.	8.5 ft.
Weight of Instrument.....	14.5 lbs.	13.25 lbs.	11.5 lbs.
Weight of Instrument, including box and accessories	26 lbs.	22 lbs.	19 lbs.
Shipping Weight, instrument and tripod, in two boxes, for domestic shipment, about..	75 lbs.	65 lbs.	60 lbs.
For export, about.....	110 lbs.	100 lbs.	90 lbs.
Price	\$225.00	\$215.00	\$205.00

Centers: Steel spindle with bronze socket.

Leveling Head: Of one piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.

Bar and Wyes: Bar of bell metal, shaped for greatest strength in the parts most subject to strain. Large, strong wyes with adjustable nuts. One wye clip fitted with stop which maintains cross wires in true horizontal and vertical position.

Telescope: Aperture of objective, 1.38 in. Erecting eyepiece. *Platinum* cross wires. Pinion movement to eyepiece and objective slides. Dust guard to objective slide, detachable sunshade, and cap.

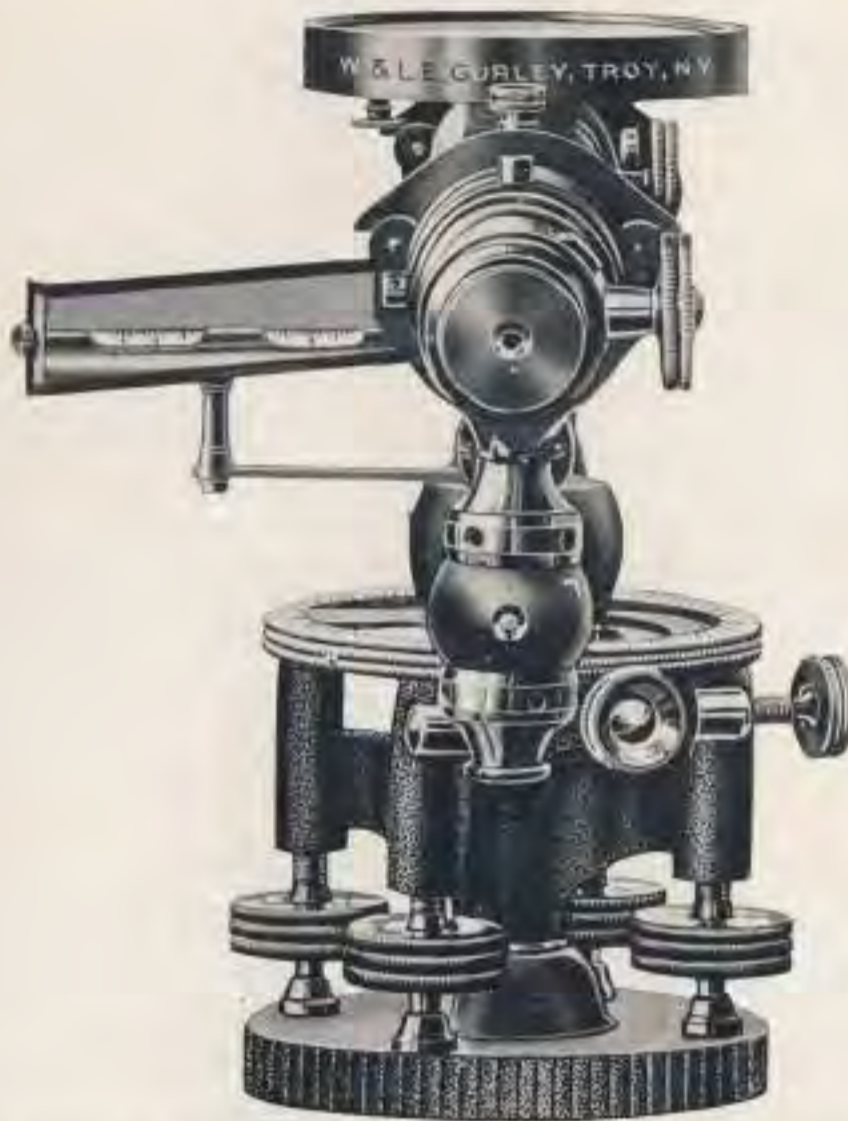
On Level No. 378 the eyepiece slide is focussed by spiral movement, and the objective slide has no dust guard.

Level: Adjustable horizontally and vertically, with graduations on the vial.

Finish: Bronze; screws and small parts bright. Morocco finish on leveling head.

Equipment: Mahogany box with usual accessories.

Tripod: No. 435, with split legs, and cap; weighs about 10 lbs.



Engineers Wye Levels can be equipped as shown above with a horizontal Circle of 3.5 inches diameter, a Compass having a 3-inch needle and a Mirror for observing the level bubble. The prices of these extra attachments are given below.

**Attachments and Modifications for Engineers Wye Levels
Nos. 375, 377 and 378, when ordered with the
instruments, can be supplied as follows:**

<i>Stadia Wires of platinum, adjustable, disappearing or fixed.....</i>	No extra charge
<i>Morocco Finish, on telescope and level tube.....</i>	No extra charge
<i>Level Vial, extra sensitive, value ten seconds to two millimeters (instead of regular vial), extra.....</i>	\$10.00
<i>Pinion Movement to eyepiece slide, for Level No. 378, extra.....</i>	8.00
<i>Dust Guard to objective slide, for Level No. 378, extra.....</i>	8.00
<i>Horizontal Limb, full circle, 3.5 in. diameter, graduated to degrees, reading by vernier to 5 minutes, as shown above, extra.....</i>	25.00
<i>Compass, with needle circle graduated to degrees, needle 3 in. long with stop. Attached on top of telescope and secured with two clamp screws, as shown above, extra.....</i>	25.00
<i>Mirror, for observing level bubble from eyepiece end of instrument, as shown above, extra.....</i>	15.00
<i>Reflector No. 166, for illuminating cross wires. Similar to No. 165, see page 60.....</i>	15.00
<i>Waterproof Hood, extra.....</i>	1.25
<i>Extension Leg Tripod No. 440, instead of split leg tripod, extra.....</i>	3.00
<i>Sole Leather Carrying Case, to enclose mahogany box.....</i>	\$22.00 to 26.00
<i>Sole Leather Case, for extension tripod, extra.....</i>	25.00
<i>Canvas Case with leather mountings, for extension tripod, extra.....</i>	15.00
<i>Special Outside Packing Box with hinged cover and lock, lined inside with rubber cushions, for convenience in reshipping, extra.....</i>	8.00

For Prices of Parts Liable to Loss or Injury, see page 72.



Gurley Architects Level

One Size

Specifications of No. 381

Centers: Long bronze spindle and socket.

Leveling Head: Of one piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.

Bar and Wyes: Bar of bell metal, shaped for greatest strength in the parts most subject to strain. Wyes with adjustable nuts. One wye clip fitted with stop which maintains cross wires in true horizontal vertical position.

Telescope: 12 inches long, power about 19 diameters, aperture of objective 1.19 in. Erecting eyepiece. *Platinum* cross wires. Pinion movement to objective slide. Spiral movement to eyepiece slide. Detachable sunshade and objective cap. Objects clearly visible 6.5 feet from center of instrument.

Level: With sensitive ground and graduated vial. Adjustable horizontally and vertically.

Circle: 3 in. diameter, graduated to degrees, figured 0 to 90 each way and reading by vernier to 5 min. Vernier attached to spindle. Circle can be revolved independently on friction plate.

Finish: Bronze; screws and small parts bright. Morocco finish on leveling head.

Equipment: Mahogany box, with hinged cover, lock and strap. Accessories of trivet plate, to enable setting the instrument upon the walls or girders of a building, where it is impossible to use a tripod; 6 oz. plain plummet; screw driver and adjusting pins.

Tripod: No. 431, with solid round legs, and protecting cap, weighs about 7.5 lbs.

Weight: Instrument only, about 7 lbs.; with box and accessories, about 12 lbs.

Shipping Weight: Level and tripod, in two boxes, for domestic shipment, about 45 lbs.; for export, about 65 lbs.

No. 381 Architects Level, complete as specified..... \$125.00

Prices of Attachments and Extras When Ordered with the Instrument

Stadia wires of <i>Platinum</i> , adjustable, disappearing or fixed.....	No extra charge
Pinion Movement to eyepiece.....	\$8.00
Dust Guard to objective slide.....	8.00
Compass, with full needle circle graduated to whole degrees, figured 0 to 90 each way, needle 3 in. long, with stop. Attached on top of telescope and secured with two clamp screws.....	25.00
Waterproof Hood.....	1.25
Split Leg Tripod No. 436, instead of solid round leg tripod.....	3.00
Extension Leg Tripod No. 441, instead of solid round leg tripod.....	8.00

For Prices of Parts Liable to Loss or Injury, see page 72.



Gurley Architects Level

No. 381 Architects Level, 12 in. telescope..... \$125.00

The Gurley Architects Level is extensively used by intelligent and enterprising architects, builders and millrights on construction and building work, as well as by engineers and surveyors in the grading of streets, sewers, irrigation ditches and drains. A constantly growing demand for this instrument has been created by its moderate price, simplicity and excellence.



Up-to-date Building Contractors always have a little Gurley "on the job."



Gurley Explorers Level

The smallest and lightest Gurley Level

One Size

A small, compact and light weight model designed to meet the requirements of engineers for a serviceable and an accurate instrument for running preliminary levels, in exploration work where it is impossible, inconvenient or unnecessary to operate a large one. It is particularly adapted for hydraulic engineers in exploring streams to determine the possibilities of water supply and in the investigation of irrigation and drainage projects.

This instrument is designed and constructed with great care; it may be depended upon to do accurate leveling. The centers are composed of a long bronze spindle and socket of different degrees of hardness. The arms of the leveling head are ribbed and the tops of the leveling screws are protected from dust.

No. 384 Explorers Level, 6.5 in. telescope..... \$120.00

Specifications of Explorers Level No. 384

Centers: Long bronze spindle and socket, of different degrees of hardness.

Leveling Head: Of one piece, strongly ribbed, with four dust protected leveling screws. Clamp and tangent. Shifting center.

Telescope: Rigidly and permanently attached to spindle (Dumpy design.) 6.5 in. long, power 16 diameters, aperture of objective 0.7 in. Erecting eyepiece. Pinion movement to objective slide, spiral movement to eyepiece slide. *Platinum*, cross and stadia wires, ratio 1:100. (Disappearing stadia furnished, if specified in the order.) Dust guard to objective slide, detachable sunshade, and cap.



Level: 3 in. long, graduated on the vial. Adjustable vertically.

Finish: Bronze; screws and small parts bright. Morocco finish on leveling head.

Equipment: Leather-covered, light mahogany box (outside dimensions 7.75 x 6 x 4 in.) with shoulder strap, and usual accessories.

Tripod: No. 443, with jointed extension legs, cap, and canvas carrying case. Weighs about 6.5 lbs.

Level and Tripod can be packed together in an ordinary 24 in. suit case. See illustration below.

Weight: Level only, about 2.75 lbs.; level including box and accessories, about 5 lbs.

Shipping Weight: Level and tripod, in two boxes, for domestic shipment, about 40 lbs.; for export, about 65 lbs.

No. 384 Explorers Level, complete as specified..... \$120.00

A Special *Aluminum Compass*, with needle 2.5 in. long and circle graduated to degrees will be attached to No. 384 Explorers Level for \$35.00 extra, if specified in the order.

A Gurley Explorers Outfit

Complete—Accurate—Easy to carry



A No. 20-A Explorers Transit, a No. 384 Explorers Level, and a No. 592-C Explorers Alidade, all packed in a 24-inch suit case, together with one Jointed Extension Tripod (with canvas carrying case), suitable for use with both the Transit and the Level.

NOTE: For suitable Plane Table Movement, with Tripod and Drawing Board, to use with the No. 592-C Alidade, we recommend No. 571 and No. 573-A with Canvas Case. See page 75.

The Explorers Level is a companion instrument to our Explorers Transit and Explorers Alidade, and can be packed with them in an ordinary 24 in. suit case, including one jointed extension tripod, as shown above. Also see pages 43 to 46, and pages 80 and 81.



Parts for Gurley Wye Levels Liable to Loss or Injury

Ground Glass Level Vial, unmounted, graduated and figured, for 22-inch Wye Level	\$5.00
Ground Glass Level Vial, unmounted, not graduated or figured, for 22-inch Wye Level	4.50
Ground Glass Level Vial, unmounted, graduated and figured, for 15-inch, 18-inch or 20-inch Wye Level.....	4.50
Ground Glass Level Vial, unmounted, not graduated or figured, for 15-inch, 18-inch or 20-inch Wye Level.....	4.00
Ground Glass Level Vial, unmounted, extra sensitive (value of each graduation 10 seconds), graduated and figured, for 18-inch, 20-inch or 22-inch Wye Level	10.00
Ground Glass Level Vial, unmounted, extra sensitive (value of each graduation 10 seconds), not graduated or figured, for 18-inch, 20-inch or 22-inch Wye Level	9.50
Ground Glass Level Vial, unmounted, for Architects Level.....	2.25

NOTE: Whenever possible the metal case or tube should be sent us so that the vial can be properly set. The extra cost is 75 cents.

Cap for eyepiece or object glass, each.....	1.00
Clamp Screw for leveling head.....	1.00
Tangent Screw for leveling head.....	\$1.50 to 2.00
Leveling Screw for leveling head, each.....	1.50 to 2.75
Eyepiece complete, including lenses and settings, and omitting cap.....	8.00
Object Glass, complete.....	10.00
Platinum Cross Wires and Diaphragm.....	4.50
Platinum Adjustable Stadia Wires, Cross Wires, and Diaphragm.....	8.00
Platinum Fixed Stadia Wires, Cross Wires, and Diaphragm.....	10.00
*Mahogany Box with lock and strap, and fitted inside, according to size, \$7.50 to \$15.00.	

*NOTE: When ordering specify the exact length of the telescope when both the eyepiece and the objective slides are not extended; also state the height of the instrument from the bottom plate of the leveling head to the top of the wyes and mention the diameter of the bottom plate of the leveling head. Unless the Level is sent to us, the new box will be furnished with the packing pieces or blocks not fitted in position.

Adjusting Pins, each .....	.05
Adjusting Pins, with eye for attaching to key ring, each.....	.20

For parts of Gurley Tripods, see pages 87 to 89.



Gurley Plane Tables

The plane table method of topographic map making is rapidly increasing in popularity among topographers, geographers, landscape engineers, geologists and others who require accurate maps that can be made easier and quicker than by the usual method of transit survey.

On account of their combined efficiency and portability, the several Gurley instruments designed especially for this class of work have become standard equipment with the principal users.

The Plane Table is an instrument by means of which points are located in the field by graphic methods on a map, which is fastened to a drawing board supported on a tripod. The most important advantages of the plane table method over other topographic methods, is that all sketching is done in the field, where the topographer can see the form of the ground that he is mapping. He can sketch details at once in their proper position without burdening his memory and without making elaborate notes.

For landscape work, points on a designed map can be transferred to the field. For contour or topographic surveying, the direction of sights can be marked, while the distances, both vertical and horizontal, can be taken by the stadia, and plotted without further notes. For traverse work a smaller board is used with an alidade having slotted sight vanes instead of a telescope.

Johnson Movement: The drawing board is mounted on the tripod by the improved Johnson Movement with ball-and-socket head. Loosening the upper wing nut allows the board to be leveled in any direction by the pressure of the hand and clamped firmly. By loosening the lower wing nut, the board can be oriented about its vertical axis and clamped.

Alidade: The alidade consists of a flat blade on which is supported a telescope with a vertical motion only, and a vertical arc to measure this motion. It can be moved about on the surface of the board as desired. The alidade blade may be beveled on the edge and graduated for a scale. A pencil drawn along the fiducial edge of the blade registers the line. If the points sought are thus lined off and the table set up in another position and oriented parallel to its first position, similar lines drawn in the new position will give intersections that define the location and relation of the points.

Drawing Board: The wooden table is built up to prevent warping. For use in some localities, as the Philippine Islands, cleats are screwed to the underside. The screws pass through the cleats in oblong slots with metal bushings which fit closely under the heads but allow the screws to move freely when drawn by the contraction or expansion of the board, caused by climatic conditions. The paper is held firmly by brass screws passing through the edges of the paper into brass sockets let into and slightly below the surface of the board. This method offers no obstruction to the movement of the alidade about the surface of the board.

Compass: A square brass plate with a compass and spirit levels serve to level the board and if placed against the edge of the alidade blade, will give magnetic bearing. Another form has a trough compass either inserted in the edge of the board or mounted on the alidade blade, and a circular level on the blade.

Plumbing Arm: The plumbing arm, as shown in the figure, has an index at its end that may be brought to a given place on the paper, the plummet hanging below indicating the corresponding point on the ground.



No. 570

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

Gurley Plane Tables

The improved form of Johnson Plane Table Movement, as shown above, combines in a most satisfactory manner stability, light weight, and ease of operation. This extremely efficient and portable plane table has been adopted as standard equipment by the U. S. Geological Survey and many of the State Geological departments.

The construction of the Johnson Movement is shown in the insert above. This movement supplies an arrangement whereby the table can be easily made horizontal and then secured by the large upper wing nut, A. To orient the board, the lower wing nut, B, is loosened, leaving the hemispherical surface bearing the board secured to the flange, free to turn, and it can be clamped by screwing up the same nut.

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 accuracy, and it is capable of standing rough usage without getting out of order.

Alidades Nos. 584-B, 584-C or 592-C are suitable for use with the Johnson Plane Table.

TOPOGRAPHIC INSTRUMENTS



Johnson Plane Table Movements and Extras

Prices for Separate Parts

No. 570	Johnson Plane Table Movement and split leg tripod.....	\$45.00
No. 570-A	Johnson Plane Table Movement and extension leg tripod.....	57.00
No. 571	Johnson Plane Table Movement, special light weight model, with special light weight extension leg tripod.....	50.00
	Canvas Case, leather trimmed, for No. 571.....	9.00
No. 573	Drawing Board, 31 x 24 in., with brass screw plate fitted, and with eight clamp screws and sockets for paper.....	9.00
	Canvas-covered Wooden Case for No. 573.....	8.00
	Flexible Canvas Case with shoulder strap, for No. 573.....	4.75
	Eggshell Drawing Paper, single mounted, 31 x 24 in., per sheet..	1.25
	Eggshell Drawing Paper, double mounted (muslin between), so that drawings can be made on both sides, 31 x 24 in., per sheet	2.50
No. 573-A	Drawing Board, 18 x 24 in., with brass screw plate fitted, and eight clamp screws and sockets for paper.....	8.00
	Canvas-covered Wooden Case for No. 573-A.....	6.25
	Flexible Canvas Case with shoulder strap, for No. 573-A.....	3.00
	Eggshell Drawing Paper, single mounted, 18 x 24 in., per sheet ..	.85
	Eggshell Drawing Paper, double mounted (muslin between), so that drawings can be made on both sides, 18 x 24 in., per sheet	1.50
	Note: If desired, we can supply a Drawing Board, 20 x 20 in., together with Cases and Paper, for the same prices as listed under No. 573-A.	
No. 573-B	Drawing Board, 15 x 15 in., with brass screw plate fitted, and four clamp screws and sockets for paper.....	6.00
	Flexible Canvas Case with shoulder strap, for No. 573-B.....	2.50
	Eggshell Drawing Paper, single mounted, 15 x 15 in., per sheet..	.50
	Eggshell Drawing Paper, double mounted (muslin between), so that drawing can be made on both sides, 15 x 15 in., per sheet	1.10
No. 573-X	Drawing Board, 31 x 24 in., with brass screw plate fitted, and with eight clamp screws and sockets for paper. Especially constructed for use in tropical climates, of heavy stock and with expansion cleats	11.00
	Flexible Canvas Case with shoulder strap, for No. 573-X.....	8.25
No. 574	Plumbing Arm and 10 oz. plummet.....	6.25
No. 575	Combined Compass with levels and square base.....	25.00

For Nos. 570, 570-A or 571

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



No. 576-C

Plane Table Outfit, with Johnson Movement, and No. 584-C Alidade, with Beaman Stadia Arc, \$265.00

Gurley Plane Table Outfits

U. S. Geological Survey Standard

- No. 576-C Plane Table Outfit, consisting of Johnson Movement No. 570, with split leg tripod; Drawing Board No. 573, 31 x 24 in. with brass screw plate fitted, and with eight clamp screws and sockets for paper..... \$54.00
- Flexible Canvas Case with shoulder strap, for No. 573 Drawing Board 4.75
- Plumbing Arm and Plummet, No. 574..... 6.25
- Alidade No. 584-C, with 11 in. telescope, inverting eyepiece with diagonal prism, power about 22 diameters, enlarged objective, 1.38 in. aperture, *platinum* cross wires and stadia wires; detachable striding level with revolving shield; edge graduated vertical arc reading to 1 min., combined with Beaman Stadia Arc; clamp and tangent to telescope axis; blade 18 x 3 in., with left hand edge beveled; circular level, and box compass with 4 in. needle, mounted on blade. In Mahogany carrying case. See illustration on page 78..... 200.00
- Complete, as shown above..... 265.00
- No. 576-B Plane Table Outfit, similar to Outfit No. 576-C, but with Alidade No. 584-B substituted for Alidade No. 584-C..... 265.00
- Either of the above Outfits can be equipped with No. 573-A, 18 x 24 in. Drawing Board, instead of the 31 x 24 in. Drawing Board. With this modification, the price of either outfit is.... 262.25

For Eggshell Drawing Paper, see page 75.

TOPOGRAPHIC INSTRUMENTS



Topographers at Work

United States Government Topographers of the International Boundary Commission, at work with Gurley Plane Table Outfits. The upper view shows a station along the 141st Meridian, on the Alaskan Boundary Survey; the second view is along the 49th Parallel, at the Summit of the Rocky Mountains, on the United States and Canada Boundary Survey.



Enlarged
view of
Graduations



No. 584-C
Telescope Alidade, with detachable Striding Level, edge graduated Vertical Arc combined with Beaman Stadia Arc, Circular Level, and Box Compass, \$200.00

Gurley Telescopic Alidades

U. S. Geological Survey Standard

Alidade No. 584-C has a brass ruler 18 inches long and 3 inches wide, with the left hand edge beveled. On this blade is mounted a circular spirit level, the glass body of which is hermetically sealed, and which is sensitive enough to permit the plane table to be leveled with sufficient accuracy. Attached also to the ruler is a rectangular box compass having a 4 inch needle, and whose meridian line is parallel to the fiducial edge. If desired, the box compass can be omitted from the blade and be furnished separately for insertion along one edge of the drawing board.

The telescope, which is mounted on a column attached to the ruler, is 11 inches long, and is equipped with an enlarged objective, *platinum* cross wires and stadia wires, and a detachable striding level with revolving shield. The telescope is regularly furnished with an inverting eyepiece, and is fitted with a diagonal prism. (If an erecting eyepiece is desired, it can be had with Alidade No. 584-B, which is otherwise similar to Alidade No. 584-C, except that the telescope does not have an enlarged objective.) For easy adjustment of the line of collimation, the telescope can be revolved on its vertical axis through 180 degrees. The telescope axis is equipped with clamp and tangent movement.

The vertical arc is graduated on *sterling silver* and reads by vernier to 1 minute. As the zero is at one end, all the angles read are positive. The reading of vertical angles is made easier by the arc and vernier being graduated on their edges.

TOPOGRAPHIC INSTRUMENTS



Gurley Telescopic Alidades (continued)

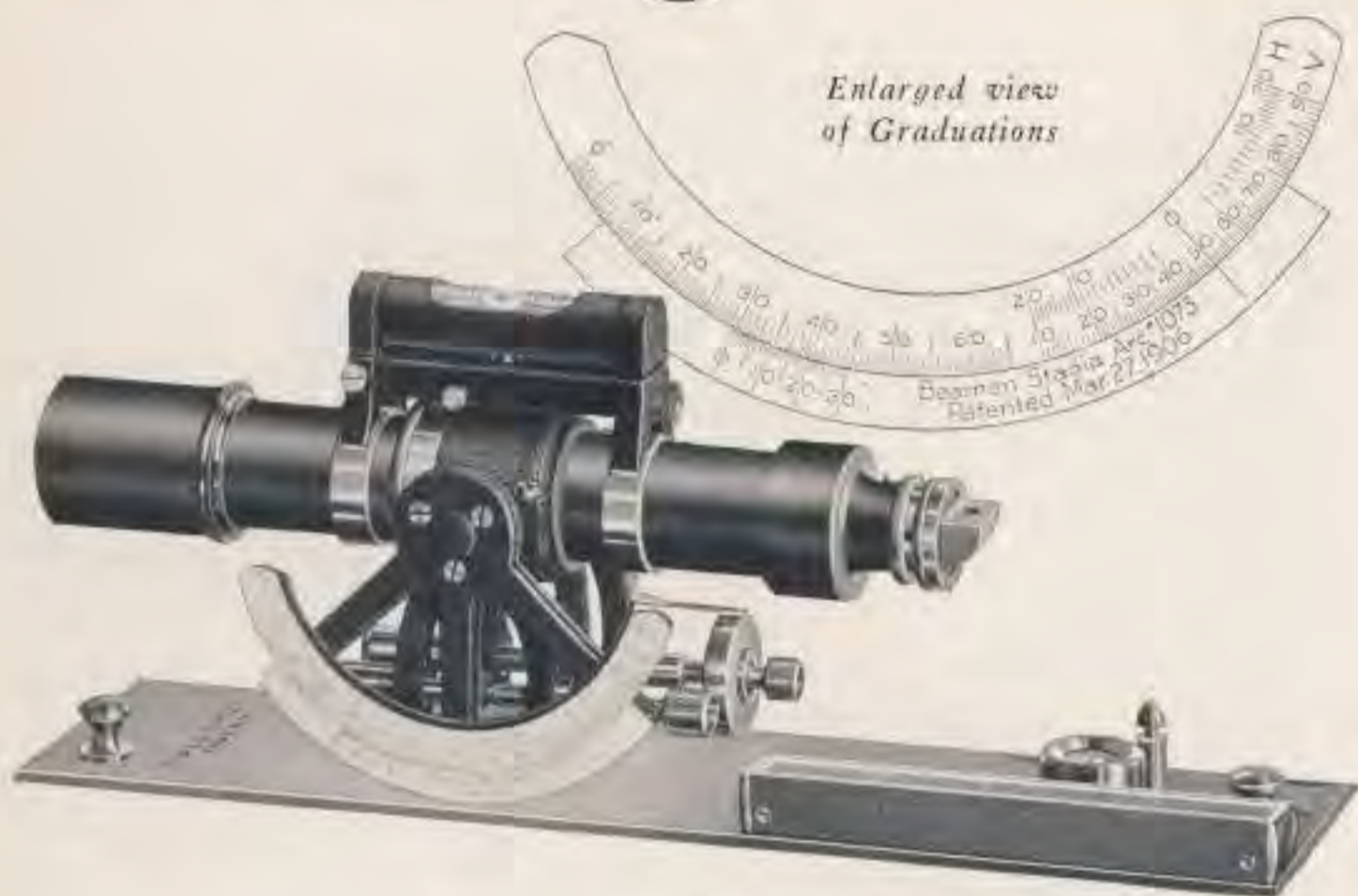
The Beaman Stadia Arc is combined with the edge graduated vertical arc and vernier, thus greatly increasing the usefulness and efficiency of the instrument. This patented attachment, as described on pages 56 to 58, mechanically reduces stadia readings and eliminates the necessity of using stadia tables, slide rules or diagrams. The value of the Beaman Stadia Arc is evidenced by the fact that this attachment is regular equipment on all Alidades used by the U. S. Geological Survey, whose engineers are the largest users of topographic instruments in this country. Many hundreds of these attachments are in use on transits and telescopic alidades and are giving universal satisfaction.

Alidade No. 584-C is standard with the U. S. Geological Survey, which is using large numbers of Gurley Instruments of this pattern. Johnson Plane Table Outfit No. 576-C, as illustrated and described on page 74, is part of its regular equipment and has been developed and improved by co-operation with its engineers.

No. 584-C	Telescopic Alidade, with 11 in. telescope, inverting eyepiece with diagonal prism, power about 22 diameters, enlarged objective, 1.38 in. aperture; <i>platinum</i> cross wires and stadia wires; detachable striding level with revolving shield; edge graduated vertical arc reading to 1 minute, combined with Beaman Stadia Arc; clamp and tangent to telescope axis; blade 18 x 3 inches, with left hand edge beveled, circular level, and box compass with 4 in. needle, mounted on blade. In mahogany carrying case with leather handles	\$200.00
No. 584-B	Telescopic Alidade, similar to Alidade No. 584-C, but equipped with an erecting eyepiece, power about 26 diameters, objective 1.19 inches aperture.....	200.00
A <i>Gradienter</i> can be combined with the clamp and tangent movement on Alidades Nos. 584-C or 584-B, at an extra cost of \$18.00.		
If Alidade No. 584-C or No. 584-B is desired without the Beaman Stadia Arc attachment, deduct \$45.00.		
No. 585	Box Compass, rectangular metal case, 4 in. needle, for Alidades Nos. 584-B or 584-C.....	12.50

Parts for Alidades Nos. 584-C and 584-B

Striding Level, complete.....	20.00
Control Level mounted on vertical arc vernier of No. 584-B or No. 584-C Alidade	25.00
Extra Glass Vial only, for Striding Level.....	2.25
Circular Level, complete.....	6.50
Extra Glass Vial only, for Circular Level.....	4.50
Quarter interval wire, midway between upper stadia wire and horizontal cross wire	2.75



No. 592-C
Explorers Alidade, with Gradiometer and Beaman Stadia Arc, \$154.00

Gurley Explorers Alidade

The smallest and lightest Gurley Telescopic Alidade

Topographers, geographers, geologists and landscape engineers needing a serviceable, dependable, *light weight* alidade will be interested in this new Gurley pattern.

The Explorers Alidade is a modification of the well known No. 584-C Gurley Alidade, U. S. Geological Survey standard. It is smaller and lighter, yet built with precisely the same care and accuracy.

The majority of these alidades are ordered with the Beaman Stadia Arc, a patented device controlled by us which gives accuracy and speed to stadia surveying that can be obtained by no other method. See pages 56 to 58.

The Gradiometer attachment will prove useful in the measurement of distances and the establishment of grades. The Gradiometer head and index are graduated on *sterling silver*, thus, the graduations are clear, distinct and permanent. The entire attachment is of such construction and workmanship that it can be depended upon for accurate work.

The Explorers Alidade constitutes an appropriate companion to our well known Explorers Transit and Explorers Level, and the three instruments can be packed conveniently in a 24 inch dress suit case, as shown on page 71. Also see pages 43 to 46 and page 70.

In connection with our special light weight Johnson Plane Table Movement No. 571, and either the 15 x 15 inch or the 18 x 24 inch Drawing Board, it provides an outfit for topographical surveying which cannot be excelled for combined accuracy and extreme portability. The Explorers Alidade can also be used successfully with the Traverse Plane Table.

Specifications of Explorers Alidade No. 592-C

Blade: 11 in. long by 2.75 in. wide; right edge beveled and graduated to $\frac{1}{10}$ inch.

Box Compass: 4 in. needle, mounted on blade.

Circular Level: With hermetically sealed vial, mounted on blade.

Telescope: 8 in. long; prismatic eyepiece; power about 13 diameters; aperture of objective 1 in. *Platinum* cross wires, focussed by spiral movement and adjusted by revolution of telescope in axis. *Platinum* stadia wires. Combined dust guard and sun shade, permanently attached to telescope. Pinion movement to objective slide.

TOPOGRAPHIC INSTRUMENTS



- Gradienter:* Combined with clamp and tangent movement to telescope axis.
- Striding Level:* With ground and graduated vial, sensitiveness 90". Can be detached from telescope and parked on blade.
- Vertical Arc:* 2 in. radius, graduated on *sterling silver* and reading by vernier to 1 min., vernier movable by tangent screw.
- Beaman Stadia Arc:* Combined with the vertical arc.
- Carrying Case:* Leather covered wooden box, velvet lined, size 3.5 x 3.75 x 10.5 in., with shoulder sling.
- Height:* 3.4 in. over all.
- Weight:* 3.25 lbs.; including case, 5 lbs.
- No. 592-C Explorers Alidade, as specified, with Gradienter and Beaman Stadia Arc \$154.00

For Explorers Alidades

Striding Level Vial, sensitiveness 60" or 40".....	No extra charge
If the Beaman Stadia Arc is omitted, deduct,.....	\$22.00
If the Gradienter is omitted, deduct,.....	9.00
Special Graduations on Blade, extra.....	6.50
Striding Level, complete.....	16.50
Extra Glass Vial only, for Striding Level.....	1.65
Circular Level, complete.....	5.50
Extra Glass Vial only, for Circular Level.....	3.85
Quarter interval wire, midway between the upper stadia wire and horizontal cross wire	2.75

Gurley Explorers Plane Table Outfits

With Johnson Movement

- No. 592-D Explorers Plane Table Outfit, consisting of Johnson Movement No. 570, with split leg tripod; Drawing Board No. 573-A, 18 x 24 in., with brass screw plate fitted, and eight clamp screws and sockets for paper.
- Flexible Canvas Case with shoulder strap, for No. 573-A Drawing Board.
- Explorers Alidade No. 595-C, with Gradienter and Beaman Stadia Arc.
- Complete \$210.00
- No. 592-F Explorers Plane Table Outfit, consisting of Johnson Movement No. 571, special light weight model, with special light weight extension leg tripod; Drawing Board No. 537-A 18 x 24 in., with brass screw plate fitted, and eight clamp screws and sockets for paper.
- Flexible Canvas Case with shoulder strap, for No. 573-A Drawing Board.
- Explorers Alidade No. 592-C, with Gradienter and Beaman Stadia Arc.
- Complete, as shown on page 82..... 215.00



No. 592-F
Explorers Plane Table Outfit, \$215.00
(See page 81)

Gurley Explorers Plane Table Outfits

No. 592-H Explorers Plane Table Outfit, consisting of Johnson Movement No. 571, special light weight model, with special light weight extension leg tripod; Drawing Board No. 573-B, 15 x 15 in., with brass screw plate fitted, and four clamp screws and sockets for paper.

Flexible Canvas Case with shoulder strap, for No. 573-B Drawing Board.

Explorers Alidade No. 592-C, with Gradiometer and Beaman Stadia Arc, complete as specified on pages 80 and 81..... \$212.50

Paper for Drawing Boards Nos. 573-A and 573-B

	For No. 573-A 18 x 24 in.	For No. 573-B 15 x 15 in.
Eggshell Drawing Paper, single mounted, per sheet.....	\$0.85	\$0.50
Eggshell Drawing Paper, double mounted (muslin between), so that drawings can be made on both sides, per sheet.....	1.50	1.10

TOPOGRAPHIC INSTRUMENTS



Gurley on the Job in Alaska

Traverseman of the International Boundary Commission using a Gurley Traverse Plane Table on Alaskan Boundary Maps.



Mapping the Mexican Boundary

United States Government Topographers working with Gurley Plane Table Outfits on The Mexican Boundary Survey.



No. 586

Traverse Plane Table Outfit, \$38.50

Gurley Traverse Plane Table

U. S. Geological Survey Pattern

See "Gurley on the Job in Alaska," on page 83.

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.

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.

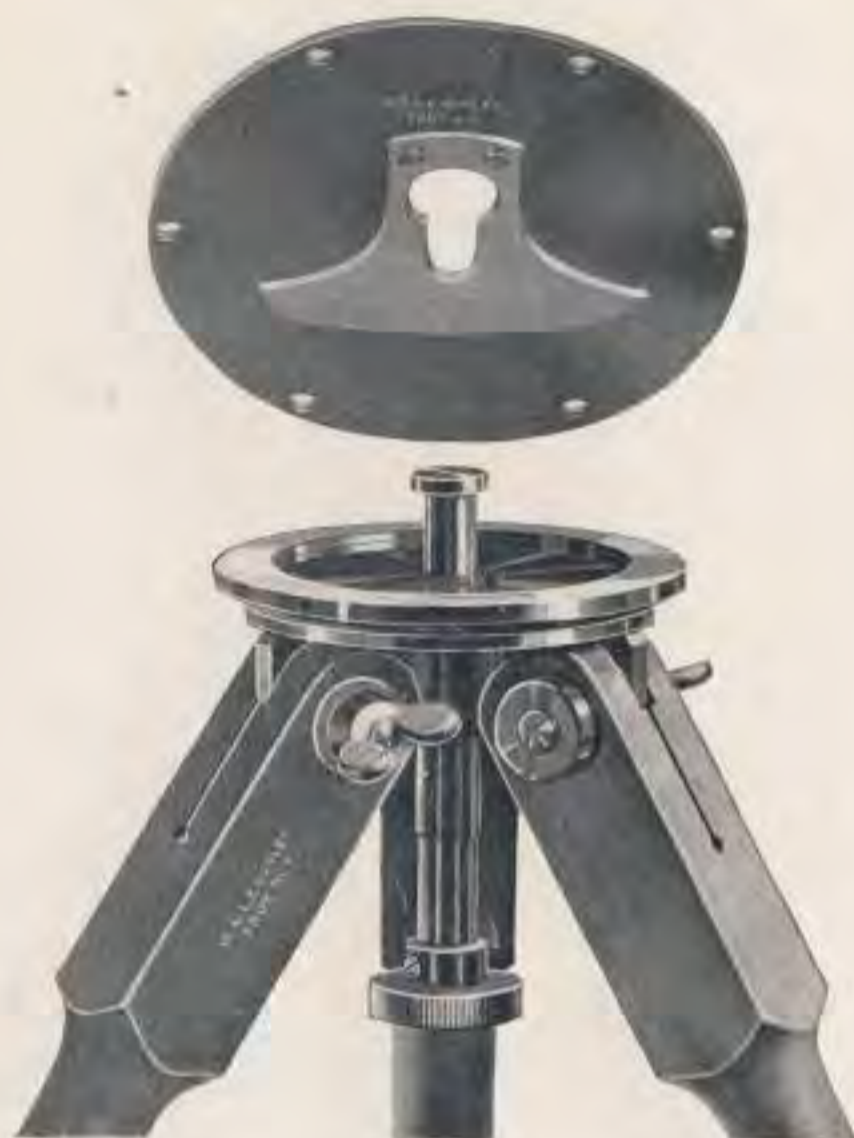
The board is 15 inches square, and has on its under side a strong brass flange with spring, in which the plunger clamp of the tripod head engages, allowing the board to be clamped or oriented as desired. Small clamp screws with sockets for holding the paper are placed at the corners of the board. Inserted in one edge of the board is a small box compass with needle about 4 inches long.

The alidade consists of a brass ruler 10 inches long, graduated on the beveled edge to a scale of 40 parts to the inch, and having at each end hinged sights which fold close to the surface of the ruler. The alidade is furnished with a leather pouch.

Traverse Plane Table Outfit

No. 586 Traverse Plane Table Outfit, consisting of Traverse Movement No. 587, 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; Ruler Sight Alidade No. 589, with graduated edge, folding sights and leather pouch; complete as shown.. \$38.50

TOPOGRAPHIC INSTRUMENTS



Traverse Plane Table Movement, showing the tripod head and legs, the plunger clamp screw, and the improved spring board plate

Extras for Traverse Plane Table

Extension Leg Tripod, instead of Solid Round Leg Tripod, extra.....	\$6.50
Jointed Extension Leg Tripod, closing to 23 in., with canvas case instead of Solid Round Leg Tripod, extra.....	16.00
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.....	.50
Eggshell Drawing Paper, double mounted (muslin between), so that drawings can be made on both sides, 15 x 15 in., per sheet.....	1.10

Prices for Separate Parts for Traverse Plane Table

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.....	\$16.50
No. 573-T	Drawing Board, 15 x 15 in., with spring plate fitted, and with four clamp screws and sockets for paper.....	6.00
No. 588	Box Compass, rectangular metal case, 4 in. needle.....	10.00
No. 589	Ruler Sight Alidade, 10 in. long, with graduated edge, folding sights and leather pouch.....	15.00



Prices of Separate Parts for Traverse Plane Table

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
Solid Round Tripod Legs, each.....	1.75
Extension Tripod Legs, each.....	4.00
Bolt, with wing nut and washer, for tripod head, each.....	1.00
Wing Nut for tripod bolt, each.....	.45

Gurley Pocket Sight Alidade



No. 590-A

Pocket Sight Alidade, with folding sights, \$9.50

Pocket Sight Alidade No. 590-A is 6 inches long and has hinged sights which fold close to the ruler. The beveled edge is graduated the entire length to read $1/10$ and $1/20$ of a mile for ratios of $1/90,000$ and $1/45,000$, respectively. The middle part of the edge is further divided to read $1/50$ and $1/100$ of a mile, respectively, for the same two ratios. A leather case with pencil pockets is furnished.

No. 590-A Pocket Alidade, 6 in. long, with graduated edge and folding sights, and with leather case having pencil pockets.....	\$9.50
No. 590-B Extra Folding Sights, for Alidade No. 590-A, per pair.....	4.00

Beaman Stadia Arc

This efficient attachment for Transits and Telescopic Alidades is fully illustrated and described on pages 56 to 58.

Cox Stadia Computer

For a description of this useful device, see page 55.



Nos. 415 and 416
Solid Round Leg Tripods
For Compasses



Nos. 400 and 430
Solid Round Leg Tripods
For Transits and Levels



Nos. 405 and 435
Split Leg Tripods
For Transits and Levels



Nos. 410 and 440
Extension Leg Tripod
For Transits and Levels

Gurley Tripods

The legs of all Gurley Tripods are made of straight grained hardwood, and are about 4 feet 8 inches long from head to point. The upper part of the leg is flattened and slotted to fit closely on each side of a tenon projecting from the underside of the tripod head, to which it is firmly held by a brass bolt, with large head and thumb nut on opposite sides of the leg. The tripod head is of the best bell metal, the tenons and upper part being cast in one piece and firmly braced together. The legs are round, and taper in each direction toward the head and point. The shoe is a steel pointed, tapering brass ferrule, firmly attached to the wood.

Solid Round Leg Tripods

These are made in three sizes, as follows:

Tripod No. 400, the heavy size, has a metal head $4\frac{1}{4}$ inches in diameter, with legs $1\frac{3}{8}$ inches in diameter at the top, $1\frac{3}{4}$ inches at the swell and $1\frac{1}{8}$ inches near the point. This pattern is suitable for use with the Precise, the Engineers and the Surveyors Transits, and with the Engineers Wye Levels.

Tripod No. 415, the medium size, has a head about 3 inches in diameter, and legs which are about 1 inch in diameter at the top, $1\frac{3}{8}$ inches at the swell and $\frac{7}{8}$ inch near the point. This tripod is designed for use with Vernier Compass No. 226.

Tripod No. 416, the small size, is for use with Pocket Compasses. It is of the same pattern as No. 415, but has a smaller head and legs. The legs are nearly $\frac{3}{4}$ inch in diameter at the top and bottom, and $1\frac{1}{8}$ inches at the swell.



Split Leg Tripods

The form of the improved Split Leg Tripods, Nos. 405 and 435, is shown in section at A-B in the illustration.

The legs are of straight grained hardwood, combining stiffness and strength with reduced weight, and allowing greater ease in carrying. Several sizes of this tripod are made for use with transits, levels and compasses.

Extension Leg Tripods

Extension Leg Tripods, Nos. 410 and 440, shown in section at A-B, are very popular, as they combine strength and rigidity with light weight and are especially easy and convenient to carry. The shape of the side pieces allows the middle piece to be clamped firmly with the bands and screws, while slight changes in length can be made by twisting the middle piece up or down. In carrying, the points are usually reversed in position, and the total length is reduced to 38 ins.

These tripods are made in several sizes. The large size is used with the large transits and levels, and the medium size with the Light Mountain Transits. A smaller size is used with the smaller transits, Architects Level and large compasses. The smallest size is used with the Pocket Compasses.

For use in mines, which have shallow veins or seams, we are prepared to furnish special extension tripods which have a minimum height of about 22 inches and a maximum height of about 36 inches. The price is the same as for tripods of full size.

Jointed Extension Leg Tripods



Nos. 412 and 443 Jointed Extension Leg Tripod
For Explorers Transits and Levels

For use with Explorers Precise Transits Nos. 20-A to 24-A and Explorers Level No. 384 we furnish a special light weight tripod, each leg of which has a protected metal screw joint. The minimum length when assembled for carrying is only 24 inches, so that it can be packed in an ordinary size suitcase. A leather trimmed canvas carrying case, with handle, is furnished.

Instructions for Ordering Tripods

The majority of the Nos. 400 to 443 include more than one size tripod. For instance, No. 400 covers two sizes; one size for Transits Nos. 6-A to 18-A, and another size for Transits Nos. 25-A to 32-A and Nos. 25 to 30. The price, \$12.00, is correct for any size when equipped with solid round legs.

Therefore, when ordering a separate tripod, the customer should always specify the catalogue number of the instrument for which it is intended; also give the inside diameter of the bottom plate of the leveling head. If the instrument is very old, it will be necessary to send us the bottom plate of the leveling head.

R O D S A N D T R I P O D S



If specified in the order, metal spurs will be attached to the legs of any Gurley Tripod without additional charge.

Transit Tripods

No. 400	Solid Round Leg Tripod, for Transits Nos. 6-A to 32-A (except Nos. 20-A to 24-A).....	\$15.00
No. 401	Solid Round Leg Tripod, for Transits Nos. 20-A to 24-A and Nos. 102 and 103.....	12.00
No. 405	Split Leg Tripod, for Transits Nos. 6-A to 32-A (except Nos. 20-A to 24-A).....	20.00
No. 406	Split Leg Tripod, for Transits Nos. 20-A to 24-A and Nos. 102 and 103.....	15.00
No. 410	Extension Leg Tripod, for Transits Nos. 6-A to 32-A (except Nos. 20-A to 24-A).....	23.00
No. 411	Extension Leg Tripod, for Transits Nos. 20-A to 24-A and Nos. 102 and 103.....	20.00
No. 412	Jointed Extension Leg Tripod, with canvas case, for Transits Nos. 20-A to 24-A.....	25.00

Compass Tripods

No. 415	Solid Round Leg Tripod, for Compass No. 226.....	10.00
No. 416	Solid Round Leg Tripod, for Compasses Nos. 285, 294, 300, 305, 335 and 350.....	9.00
No. 420	Split Leg Tripod, for Compass No. 226.....	15.00
No. 421	Split Leg Tripod, for Compasses Nos. 285, 294, 300, 305, 335 and 350.....	12.00
No. 425	Extension Leg Tripod, for Compass No. 226.....	20.00
No. 426	Extension Leg Tripod, for Compasses Nos. 285, 294, 300, 305, 335 and 350.....	15.00

Level Tripods

No. 430	Solid Round Leg Tripod, for Levels Nos. 375 to 378.....	15.00
No. 431	Solid Round Leg Tripod, for Level No. 381.....	12.00
No. 435	Split Leg Tripod, for Levels Nos. 375 to 378.....	20.00
No. 436	Split Leg Tripod, for Level No. 381.....	15.00
No. 440	Extension Leg Tripod, for Levels Nos. 375 to 378.....	23.00
No. 441	Extension Leg Tripod, for Level No. 381.....	20.00
No. 443	Jointed Extension Leg Tripod, with canvas case, for Level No. 384.....	25.00

Carrying Cases for Tripods

To protect the tripod in transportation, a carrying case can be furnished. One style of case is substantially made of heavy canvas, with leather trimmings. Another form is made of sole leather, with cap and carrying handle.

No. 494	Leather Case, with cap and carrying handle, for extension tripod.....	\$25.00
No. 496	Canvas Case, with leather trimmings, for solid round leg, or split leg tripod.....	18.00
No. 497	Canvas Case, with leather trimmings, for extension tripod.....	15.00

Tripod Parts Liable to Loss or Injury

Solid Round Tripod Legs only, for Engineers Transit or Level, per set....	7.50
Split Tripod Legs only, for Engineers Transit or Level, per set.....	12.50
Extension Tripod Legs only, for Engineers Transit or Level, per set.....	16.00
Clamp Screw and Band for extension tripod leg, each.....	1.25
Tripod Head only, with bolts and nuts, for Engineers Transit or Level.....	7.50
Cap for tripod head, each.....	1.25
Brass Bolt and Nut to fit tripod head, each.....	1.00
Metal Point or Shoe for tripod leg, each.....	.65
Shawl Strap (superior), for extension tripod.....	1.25



Gurley Compass with Limb and Telescope

This instrument is a highly developed form of a Telescope Compass and has the added characteristics of a light weight Transit; thus it can be successfully used for ordinary land surveying, preliminary or reconnoissance surveys, mine surveys, etc., in fact for a variety of work in which rapidity, ease of operation and portability, rather than extreme accuracy, are the essential factors. Engineers and Surveyors, as well as Explorers, will find this instrument a desirable addition to their equipment, enabling them to reserve their valuable Transits for precise work. The needle is of unusual length for such a compact instrument, making it ideal for accurate compass surveys.

Specifications of No. 294

Centers: Long, compound and tapered.

Leveling Head: Arms strongly ribbed, with four dust protected leveling screws. Clamp and tangent.

Horizontal Limb and Plate: Limb 4 in. diameter, built inside the needle circle, graduated on *sterling silver* to 30 minutes, reading by one double vernier to one minute; the limb opening and its vernier are under the eyepiece end of telescope. Limb figured like Limb I, see page 16: 0 to 90 each way inner row, and 0 to 360 outer row. Clamp and tangent movement to limb.

Compass needle 4.5 in. long, of horizontal shape; needle circle graduated on a silvered surface to 30 minutes, figured 0 to 90 each way; variation is read on the compass circle by means of an index, located within the compass box and locked by a clamp underneath the body. Two right angle levels inside the circle. Selected plate glass over compass face, waterproof.

Telescope: 6.5 in. long, power 16 diameters, aperture of objective 0.7 in., erecting eyepiece. Balanced, transits either end. Pinion movement to objective slide, spiral movement to eyepiece, *platinum* cross, and stadia wires, ratio 1:100. Dust guard to objective slide, detachable sunshade and cap. Clamp and tangent to telescope axis. Telescope is firmly supported by standards which are rigidly attached to main plate, a great improvement over original method of mounting by saddle on folding sights.

Telescope Level: 3 in. long, graduated on the vial.

Vertical Limb: Full circle, 4 in. diameter, figured 0 to 90 each way, graduated on *sterling silver* to 30 minutes, and reading by one double vernier to 1 min.

Finish: Bronze; screws and small parts bright. Morocco finish on standards and leveling heads.

Equipment: Mahogany box, outside dimensions about 8 x 6 x 11 ins., with reading glass, 6 oz. plain plummet, adjusting pins, screw driver, etc.

Tripod: No. 416, with solid round legs; weighs about 4.5 lbs.

Weight: Instrument only, about 7.25 lbs.; including box and accessories, about 11 lbs.

Shipping Weight: Instrument and tripod, in two boxes, for domestic shipment, about 50 lbs.; for export, about 75 lbs.

No. 294 Compass with Limb and Telescope, complete as specified..... \$150.00
 If *Extension Leg Tripod No. 426* is substituted for the solid
 round leg pattern, the extra cost is..... 5.00

Note: The extension leg tripod is highly recommended, as it allows the instrument to be used conveniently on uneven ground and provides a more portable outfit.



Gurley Compass with Limb and Telescope

No. 294 4 in. limb, 4.5 in. needle, 6.5 in. telescope, weight 7.25 lbs.....\$150.00

A moderate priced instrument suitable for ordinary land surveying, preliminary or reconnoissance surveys. Superseding Instruments previously listed as No. 293 and 293-A.

We make a complete line of Compasses which, like all Gurley instruments, are noted for their high grade construction and long wearing qualities. They possess the features which insure accuracy and ease of operation, and are described in Bulletin C-55 which we will be glad to send upon request.



Gurley Geologists Compass

For Geologists and Foresters

U. S. Forest Service Standard

This instrument has proved admirably adapted for topographical work, and has been adopted by the U. S. Forest Service for the use of field men in making forest surveys and maps.

It is made of aluminum to secure lightness in weight and has a needle $2\frac{5}{8}$ inches long enclosed with its compass circle in a circular box set on a plate 4 inches square. With the improved needle lifter as shown, a water and dust-proof needle box is assured.

The edges of this base are beveled and graduated, two for a tangent scale and two to inch scales. One of these latter is graduated to eighths, each of which represents ten chains, and the other is decimal. The compass circle is made movable, and by a vernier attached to it on the inside the magnetic declination may be set off to 5 minutes.

On the other side of the plate is a township plat.

On the east side of the compass is an arc of 180 degrees figured on each side of the 0 line from 0 to 90. A weighted pendulum hung from the center pin indicates, by its pointer on this arc, the angle of slope, when the compass is placed so that it rests on its east edge. On the outside of the box containing the compass circle is a movable circle, beveled and graduated on its upper edge and figured from 0 to 90, and having at each quadrant a slit for sighting.

Two tall folding sights are attached to the edge of the circular box, and two levels are placed at right angles with each other upon the base.

The compass is supported on a simple ball spindle and socket, with staff mountings, and is usually carried in a leather pouch with shoulder and belt straps. Such a pouch can be supplied for \$5.00 extra.

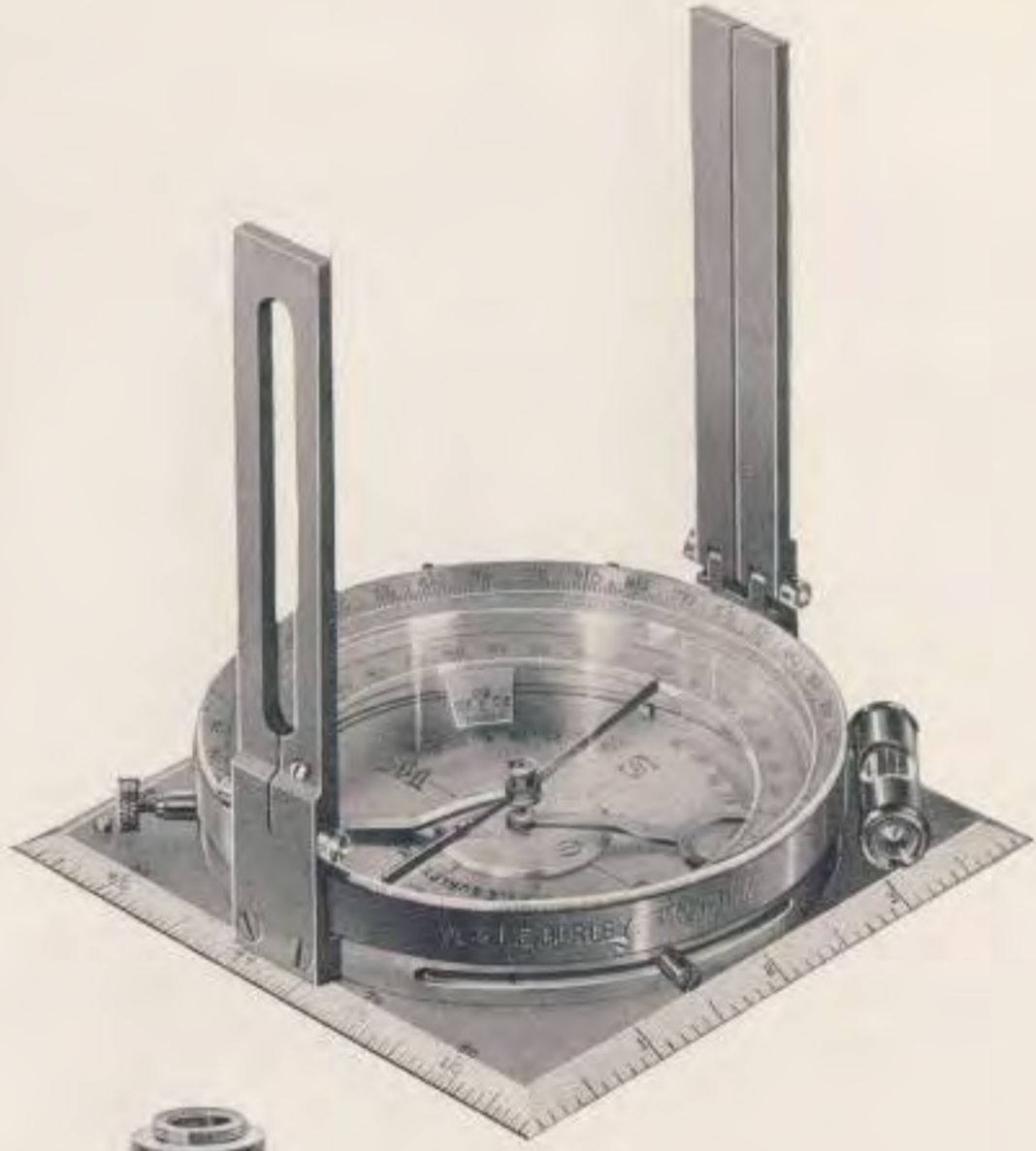
The staff cap is slotted to allow vertical angles to be read by means of the pendulum while the compass is on the staff or tripod.

Tripods Nos. 416, 421 and 426 are suitable for use with this compass.

No. 335 Geologists Compass (of aluminum), U. S. Forest Service pattern, $2\frac{5}{8}$ in. needle, graduated movable sighting circle, graduated base, variation arc, folding sights, two levels, clinometer and staff mountings.....	\$35.00
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Extras for No. 335 Geologists Compass

No. 416 Solid Round Leg Tripod.....	\$9.00
No. 421 Split Leg Tripod.....	12.00
No. 426 Extension Leg Tripod.....	15.00
No. 490 Leather Pouch.....	5.00
"Treatise on Practical Field Geology," by J. H. Farrell, E. M., and A. J. Moses, E. M.	3.00



Gurley Geologists Compass

No. 335 Geologists Compass, 2⁵/₈ in. needle..... \$35.00



Gurley Dip Compasses

No. 341-A Dip Compass, 3 inch needle, and attached level..... \$23.00

The Dip Compass consists essentially of a magnetic needle so suspended as to move readily in a vertical direction, the angle of inclination, or "dip", being measured upon the graduated rim of the compass circle.

When in use, the ball is held by the hand, and the compass box by its own weight assumes a vertical position. *It must be held in the plane of the magnetic meridian.*

In this position the needle when unaffected by the attraction of iron, assumes a horizontal line, as shown by the zeros of the circle. When brought over any mass of magnetic iron ore it dips, and thus detects the presence of such ore with certainty.

If Dip Compass No. 341 or No. 341-A is held horizontal, it serves as an ordinary pocket compass, and indicates the magnetic meridian, in the plane of which it should be held when used to ascertain the dip.

Dip Compasses Nos. 341 and 341-A have a 3 inch needle, provided with a stop which is released by screwing down the clamp in the ball. The new style needle clamp enables the instrument to be held and controlled to the best advantage. The improved form of needle release is positive in action, durable in construction and not liable to injury. The Compasses have the two sides of glass and are furnished with removable brass covers.



Gurley Dip Compasses

In use carefully note the following:

The needle of our Dip Compass is adjusted to read 0 at Troy, N. Y., when held in the plane of the magnetic meridian, but it may read differently in another place.

The readings of these compass needles are always relative and not absolute; therefore, if a needle is held in the plane of the meridian, in a place where it is known that there is no magnetic attraction, and the reading is carefully noted; and the needle is then held in the plane of the meridian where magnetic attraction is suspected, a different reading will show the presence of some magnetic body, where the needle is, in the first case, perfectly horizontal (reads to zero) or not.

When in use the needle should always be held so that it will swing freely in the plane of the meridian, the stops being drawn entirely out of the way.

When not in use the clamp should be unscrewed so that the needle is securely held.

There is no instrument made which will indicate the presence of gold or silver.

No. 341	Dip Compass, 3 in. needle with stop, glass on both sides, and brass covers.....	\$20.00
No. 341-A	Dip Compass, 3 in. needle with stop, glass on both sides, brass covers, and attached level.....	23.00
No. 490	Sole Leather Pouch, with belt loop, for Nos. 341 and 341-A..	5.00
	"Location and Examination of Magnetic Ore Deposits by Magnometric Measurements," by Eugene Haanel, Ph. D., Superintendent of Mines, Canada.....	1.00
	"Treatise on Mine Surveying," by B. H. Brough.....	2.50
	"Practical Geology," by J. H. Farrell, E. M., and A. J. Moses, E. M....	3.00



Gurley Wood Box Pocket Compasses

U. S. Government Pattern

For Military Topographers, Foresters, and Timber Cruisers

No. 3154 Wood Box Pocket Compass, 2 in. needle..... \$4.00

These Compasses, made by W. & L. E. Gurley, are the best instruments of their kind. The dial and needle circle are of white celluloid, on which the graduations appear clear and distinct. A line on the inside of the cover is convenient for sighting.

When the cover is closed the needle is lifted automatically from its center pin and thus the delicate bearings are protected from injury when the instrument is not in use.

Originally designed for military topographers, foresters and timber cruisers, these Compasses are also very popular with tourists and sportsmen who desire a magnetic needle that can be depended upon and one which is mounted in a neat and substantial case.

No. 3153	Pocket Compass, mahogany case, $3\frac{1}{8}$ in. square by $1\frac{1}{8}$ in. deep, needle circle graduated on raised ring to whole degrees and figured 0 to 90 each way. Needle 2 in. long, with jeweled center and automatic stop; hinged cover with clasp. Weight 4 oz.	\$4.00
No. 3154	Pocket Compass, like No. 3153 but with needle circle figured 0 to 360	4.00
No. 3155	Pocket Compass, like No. 3153 but with mahogany case $3\frac{3}{4}$ in. square by $1\frac{1}{8}$ in. deep, and needle $2\frac{1}{2}$ in. long, needle circle figured 0 to 90 each way. Weight 5 oz.	5.00
	Clinometer Attachment, for Nos. 3153, 3154 or 3155, extra	2.00
	Piano Hinge, full width of cover, instead of the two small hinges, on Nos. 3153, 3154 or 3155, extra	1.00
	Township Diagram on inside of cover of Nos. 3153, 3154 or 3155, 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. Postpaid.....	2.10



No. 3215
Brunton Pocket Transit, as used for
taking courses or horizontal angles.
Price \$30.00



No. 3215
Brunton Pocket Transit, as used on a
Tripod for taking vertical angles.
Price complete, \$44.00

Brunton Pocket Transit

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. Aluminum case. Size $2\frac{3}{4}$ x $2\frac{3}{4}$ x 1 in. Weight 8 oz.	\$30.00
Ball and Socket Tripod Head	6.00
Tubular Extension Tripod	8.00
Plain Leather Case for instrument only	2.25
Leather Case with belt loop for instrument only	2.50
Leather Case with sling strap for instrument only	3.00
Leather Case for instrument, tripod head, and tripod with sling strap	6.00



Gurley Leather Cases and Pouches

We have in our establishment the best facilities for making all kinds of leather work to order, and can promptly furnish anything in the line of cases or pouches for surveying instruments.

The small pouch as shown in the illustration furnishes a very convenient method for carrying small Pocket Compasses without telescopes, as Nos. 300-350.

These pouches are strongly made of the best sole leather, furnished with adjustable sling strap, and are so arranged as to hold the Compass and its mountings firmly and protect them from any injury in transportation.

The wooden box in which the small Compasses are packed is omitted when the leather *pouch* is used.

The leather *cases*, however, are fitted to hold the wooden box containing the instrument, and are used with any transit, level or compass.

Sole Leather Cases, with Shoulder Straps

To fit outside the wooden box



No. 476

Sole Leather Carrying Case, with shoulder straps,
enclosing the mahogany transit box

No. 475	Case for Engineers or Surveyors Transits.....	\$25.00
No. 476	Case for Light Mountain or Reconnaissance Transits.....	22.00
No. 478	Case for Compasses Nos. 226 and 227.....	17.50
No. 479	Case for Engineers Wye Levels.....	\$20.00 to 26.00
	Price according to size.	
No. 480	Case for Architects Levels.....	14.50
No. 485	Case for Compasses Nos. 335, 341, 341-A and 350.....	6.00
No. 486	Case for Compasses Nos. 300 and 319.....	6.50
No. 487	Case for Compasses Nos. 285 and 305.....	7.50

SMALL FIELD INSTRUMENTS & ACCESSORIES



Sole Leather Pouches, with Shoulder Straps Fitted to receive Pocket Compasses without the wooden box



Nos. 490 to 492

No. 490	Pouch for Compasses Nos. 335, 341, 341-A and 350.....	\$5.00
No. 491	Pouch for Compasses Nos. 300 and 319.....	5.75
No. 492	Pouch for Compass No. 305.....	7.00

Tripod Cases

No. 494	Leather Case, with cap and carrying handle, for Extension Leg Tripod	25.00
No. 496	Canvas Case, with leather trimmings, for Solid Round Leg, or Split Leg Tripod	18.00
No. 497	Canvas Case, with leather trimmings, for Extension Leg Tripod..	15.00

Engineers Leather Field Bag



No. 498

No. 498	Engineers Field Bag, made of heavy sole leather, with two extra pockets and with shoulder strap. Inside measure 9 in. long, 7 in. high, 2½ in. wide.....	8.00
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We make to order Leather Cases and Pouches of any style and size that may be desired, and will quote prices upon receipt of detailed specifications.



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



No. 643
Locke Hand Level, \$9.25

This especially well made instrument consists of a nickel-plated brass tube about 6 inches long, having a draw to the eyepiece and a level vial on top near the objective end, as shown. There is an opening in the tube beneath, through

SMALL FIELD INSTRUMENTS & ACCESSORIES



which the bubble can be seen, as reflected by a prism immediately under the level vial. Both ends of the tube are closed by discs of plain glass to exclude dust, and there is at the inner end of the sliding or eye tube a semi-circular convex lens, which serves to magnify the level bubble and the cross wire beneath, while it allows the object to be clearly seen through the open half of the tube.

The cross wire is fastened to a frame moving under the level tube, and adjusted to its place by the small screw shown on the end of the level case. The level of any object in line with the eye of the observer is determined by sighting upon it through the tube, and bringing the bubble of the level into a position where it is bisected by the cross wire.

- No. 643 Locke Hand Level, nickel-plated, with draw to eyepiece, in leather pouch with belt loop..... \$9.25
- No. 643-T Locke Hand Level, bronze finish, Taylor Make, similar to Gurley No. 643, in leather pouch..... 7.50

Abney Level and Clinometer



No. 646-T
Abney Level and Clinometer \$17.00

The Abney Level is a modification of the Locke Hand Level, combining with it an excellent clinometer.

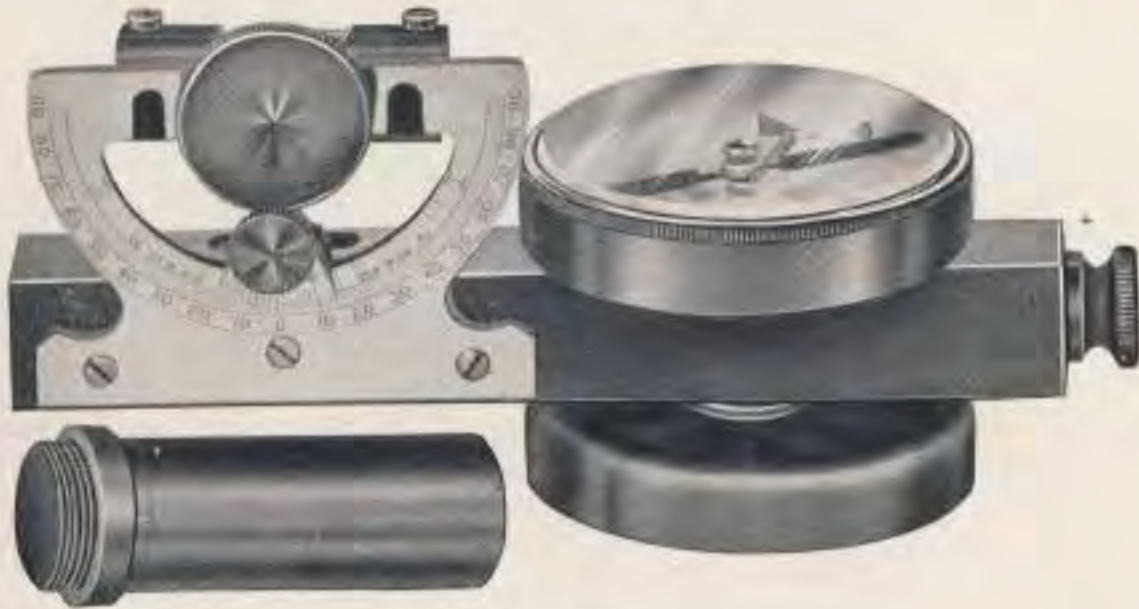
The main tube being square, it can be applied to any surface, the inclination of which is ascertained by bringing the level bubble into the middle, and reading off the angle to five minutes by the arc and vernier. When sighted at an object and the bubble brought into the middle, the vertical angle from 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 5 min., also to read slopes, as 1 to 1, 2 to 1, etc. With sole-leather pouch having shoulder strap \$17.00
- No. 647-T Abney Level, graduated to read per cent. of grade. With sole leather pouch having shoulder strap..... 17.00



Abney Level with Compass



No. 648
Abney Level with Compass. \$25.00

- 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. \$25.00

Stadia Hand Level (Telescopic)



No. 649
Stadia Hand Level. \$32.00

- 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. \$32.00

SMALL FIELD INSTRUMENTS & ACCESSORIES



Gurley Plummets



Nos. 450 to 458
Plain Plummets



No. 460
Plain Plummet



No. 465 Adjustable Plummet
showing details of
Concealed Reel

Brass Plummets

Plain

No. 450	Plummet, screw head, steel point, 6 oz.	\$1.50
No. 452	Plummet, screw head, steel point, 10 oz.	2.00
No. 454	Plummet, screw head, steel point, 16 oz.	2.50
No. 456	Plummet, screw head, steel point, 24 oz.	3.50
No. 458	Plummet, screw head, steel point, 32 oz.	4.00
No. 460	Plummet, screw head, steel point, long neck, 12 oz.	2.50

Brass Plummet

Adjustable

This Plummet has a concealed reel, R, around which the string is wound by turning the milled head, K, on top. The friction upon the reel will hold the Plummet at any desired point of the line.

No. 465	Adjustable Plummet, 10 oz.	3.25
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Spads, Stake Tacks, Plummet Cord

No. 471	Iron Spads, for suspending plummets in mines, per 100	2.00
No. 472	Stake Tacks, galvanized, 2 oz. box ....	.10
No. 473	Stake Tacks, galvanized, 1 lb. box ....	.55
No. 474	Plummet Cord, braided linen, per 25 yards ....	.38



Gurley Rods

"A Good Rod Speeds the Job"

A good Leveling Rod is as important a part of the essential equipment of every engineer or surveyor as a good Transit or Level. It should, therefore, be selected with equal care, always bearing in mind that a permanently accurate and durable rod cannot be obtained at a low price.

Gurley Rods have steadily grown in favor with discriminating users, whose experience has convinced them that the greatest satisfaction under varying service conditions can be obtained with these rods.

With the intention of having Gurley Rods absolutely the best that can be made, constant study and experiments are carried on and no expense is spared.

What is a Good Rod ?

A good rod has accurate graduations, retains its straightness, never binds, stands the hard knocks of field use, is easy to read and *stays that way for years*

Accuracy

As official evidence of the accuracy of Gurley Rods, we are prepared to submit copies of reports made from tests by the United States Bureau of Standards. The rods tested were furnished from our regular stock to the people who secured the certificates; they were not selected for the purpose.

Gurley Rods are used extensively by many departments of the U. S. Government and the most critical work, necessitating the utmost precision, has been performed with rods of our manufacture.

Special Rods

Many engineers need rods of special pattern, graduation or shape adapted to the particular requirements of their practice. We make to order rods of any design and will submit estimates of cost to those who desire them and who furnish us with data showing the details required.

Preparing the Blanks

The first essential in the manufacture of rods is the material, and experience has shown that certain localities produce wood better suited for this purpose than others. Our expert personally examines a large quantity of the lumber and selects only that which straightness of grain and freedom from flaws make fit for our use. The peculiarities of grain and texture that develop in the different woods due to the varying climatic conditions under which they have grown must be kept in mind when making this selection.

The blanks, after having been cut to the desired sizes, are stored and carefully air dried until they are thoroughly seasoned. Any blank that warps in drying is immediately rejected.



The blanks are especially treated to enable the rods to withstand the varying climatic conditions to which they will be subjected. In this process the greatest care and attention are required.

This method of careful preparation and inspection is very expensive, but is justified by the excellence of the finished product.

Graduating

The engine which graduates the rods was invented and made in the Gurley factory, and is the result of years of experience in this special line of work. It is adapted to receive and graduate all kinds of rods accurately in the decimal, fractional or metric system, and in any other system which may be desired for special use.

On Gurley Rods the graduations are not merely painted on the surface, but are impressed into the rod, thus increasing their durability.

Every detail is carefully observed in the graduation of the rod; the engine and the room in which it is used are so arranged that they are kept at a uniform temperature, both winter and summer. The bases from which the graduations are made are linear standards, every division of which has been verified and certified by the highest authority in the world on all matters pertaining to Weights and Measures, the International Bureau of Weights and Measures, Sevres, France.

Finishing

An unusual amount of attention is paid to the finishing of the rods, and materials are used which are made especially for us. A number of coats of preservative varnish are applied and rubbed down thoroughly. Besides being noted for their beautiful finish, Gurley Rods possess unequalled wearing qualities.

Wherever possible, the exterior corners are rounded, making the handling or carrying of the rod more agreeable. With the improved form of clamp, the slide is effectually clamped with but a slight pressure of the screw.

Targets

The targets are stamped from one piece of metal and have a raised perimeter, or rounded rim, which increases the strength and protects the face. The targets are so reinforced that the screws are not liable to bend, and wherever possible the use of nipples is avoided, as they often work loose.

Carrying Cases

To prevent the defacing of the graduations in transportation, a canvas case to hold the rod can be supplied. This case is substantially made of heavy material and is recommended for all rods used in precise leveling.

Repairs and Regrading

Owing to their durable construction, Gurley Rods can be restored at moderate cost to first class condition for further service, after they have become worn or damaged by excessive use or accident. As this cannot be done with a rod cheaply made, this advantage of a Gurley Rod should be considered when purchasing.



Gurley Service Rods

Service Rod, 2 Ply, with Oval Target, No. 500-R

Many engineers do not require all the refinements of our No. 500 Philadelphia Rod, described on pages 108 and 109. In order to meet the demand for a smooth working, substantially made and accurately graduated Philadelphia Rod at a popular price, the No. 500-R Service Rod is furnished.

This rod is made of the same material, and is of the same weight and dimensions as the higher priced rod. The target, on which the micrometer device is omitted, is oval in form, thus providing a longer line upon which to direct the horizontal cross-wire of the telescope.

The Service Rod is not so highly finished as the higher priced rods, but it is graduated on the same machine and is, therefore, just as accurate. Its construction is rugged and substantial, thus providing a rod that, as the name implies, is made for "service".

No. 500-R	Service Rod, 2 ply, 7.3 ft. closed, sliding to 13 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths, and with oval target.....	\$15.00
No. 500-S	Service Rod, 2 ply, 5 ft. closed, sliding to 9 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths, and with oval target.....	14.00
No. 500-T	Service Rod, 2 ply, 3.3 ft. closed, sliding to 5 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths, and with oval target	12.00
No. 500-R	Service Rod without target	12.00
No. 500-S	Service Rod without target	11.00
No. 500-T	Service Rod without target	9.00

Service Rod, 3 Ply, without Target, No. 500-R-3

Many engineers require a rod which combines the strength and accuracy of the two-ply Philadelphia model and with an available reading of 12 feet, but which is more portable than the standard rod.

To fulfill such requirements we offer the new Gurley three-ply Service Rod, No. 500-R-3, without target. It is 4 feet long, over all, when closed, and is 12 feet long when extended. The graduations are feet, 10ths and 100ths.

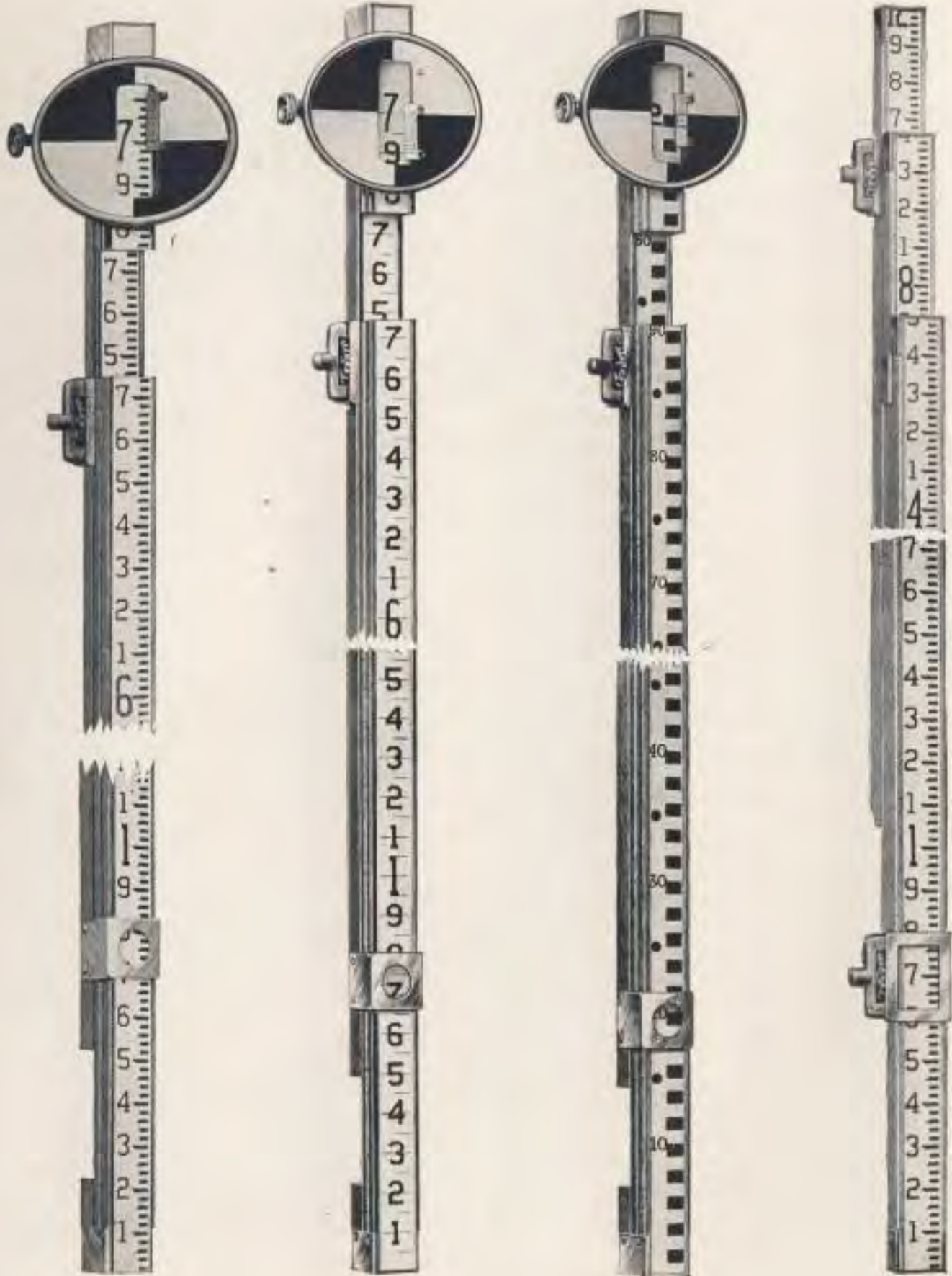
Because of its short length when closed, it is convenient to transport by automobile, train or other conveyance. This advantage will be especially appreciated by those engineers who are not allowed, in some cities, to carry on trolley cars articles which are over six feet long.

No. 500-R-3	Service Rod, 3 ply, 4 ft. closed, extending to 12 ft., graduated in feet, 10ths and 100ths, without target.....	\$17.00
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If specified when ordering, any of the above rods will be furnished at the above prices, graduated as follows:—

(a) in feet, tenths and half tenths, with target and rod reading by natural scales to half hundredths — the tenths figures being 0.06 ft. high; (b) in meters and centimeters, reading by vernier to millimeters.

R O D S A N D T R I P O D S



No. 500-R
Service Rod
2 Ply, \$15.00
100ths graduations

No. 500-R
Service Rod
2 Ply, \$15.00
Half 10ths graduations

No. 500-R
Service Rod
2 Ply, \$15.00
Metric Graduations

No. 500-R-3
Service Rod
3 Ply, \$17.00
100ths graduations



Philadelphia Rods

Philadelphia Rods, with Micrometer Target, Nos. 500 and 500-A

This Rod is made in two parts, each about $\frac{3}{4}$ inch thick by $1\frac{1}{2}$ inch wide and $7\frac{5}{16}$ feet long, the parts connected by two metal sleeves, the upper one of which has a clamp screw for fastening the two parts together when the rod is extended for higher reading than 7 feet.

Both sides of the back strip and one side of the front are recessed $\frac{1}{8}$ inch below the edges. These surfaces are painted white, graduated into feet, tenths and hundredths of a foot, and the feet and tenths figured. The graduations and figures are slightly impressed on the recessed surfaces, thus increasing their durability.

The front piece reads from the bottom upward to 7 feet, the foot figures being red and the tenths figures black. When the rod is extended to full length the front surface of the rear half reads from 7 to 13 feet, and the whole front of the rod is figured continuously and becomes a self-reading rod, 13 feet long, reading to hundredths of a foot.

The back surface of the rear half is figured from 7 to 13 feet, reading from the top down. It has a vernier scale by which the rod is read to thousandths of a foot as it is extended. The round brass target has a raised perimeter and is printed in white and red quadrants. It has also a vernier scale on its chamfered edge, reading to thousandths of a foot. The target has a micrometer attachment which permits of rapid and accurate setting.

When a level of less than 7 feet is desired, the target is moved up or down the front surface, the rod being closed and clamped; but when a greater height is required the target is fixed at 7 feet and the rear half extended, the vernier scale on the back giving the readings like those of the target to thousandths of a foot.

No. 500	Philadelphia Rod, 2 ply, $7\frac{5}{16}$ ft. closed, sliding to 13 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths, and with Micrometer target.....	\$22.50
No. 500-A	Philadelphia Rod, 2 ply, $6\frac{5}{16}$ ft. closed, sliding to 12 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths, and with Micrometer target.....	22.50

Philadelphia Rod, with Plain Target, No. 500-B

No. 500-B	Philadelphia Rod, 2 ply, $7\frac{5}{16}$ ft. closed, sliding to 13 ft., graduated to feet, 10ths and half 10ths, with both target and rod reading by natural scales to half 100ths; the 10th figures are 0.06 ft. high	\$20.00
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In the illustration on page 109, the half-tenths graduations are not shown.

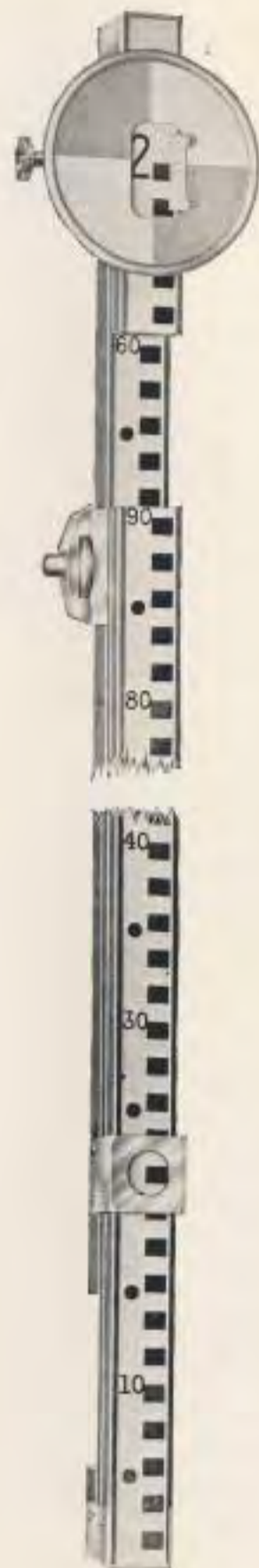
R O D S A N D T R I P O D S



No. 500
Philadelphia Rod
Micrometer Target
2 Ply, \$22.50



No. 500-B
Philadelphia Rod
Plain Target
2 Ply, \$20.00



No. 500-M
Philadelphia Rod
Plain Target
Metric Graduations
2 Ply, \$20.00



Philadelphia Rods (Continued)

Philadelphia Rods Nos. 501 and 501-B

No. 501	Philadelphia Rod, 3 ply, 5 $\frac{3}{16}$ ft. closed, sliding to 13 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths.....	\$27.50
No. 501-B	Special Self-reading Rod, 3 ply, 7 $\frac{5}{16}$ ft. closed, sliding to 20 ft., graduated on four faces to feet and 10ths, and on back of the front section to feet, 10ths and 100ths; also reading by two scales to half-hundredths. With aluminum target and canvas case...	31.25

Philadelphia Mining Rod, No. 502-A

No. 502-A	Philadelphia Mining Rod, 2 ply, 3 $\frac{3}{16}$ ft. closed, sliding to 5 ft., graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	18.00
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Note: We are prepared to furnish 2 ply standard Philadelphia Rods like No. 500, in special lengths, as follows:

- 4.3 ft. closed, sliding to 7 ft.
- 5.3 ft. closed, sliding to 9 ft.

Prices on application. Also see Service Rods Nos. 500-S and T, page 106.
 Canvas Cases for Rods Nos. 500, 500-A, 500-R, 500-B and 501.. 4.50

See page 127 for special Targets.

Any of our Leveling Rods made with metric graduations without extra charge.

RODS AND TRIPODS



No. 501
Philadelphia Rod
3 Ply, \$27.50



No. 501-B
Self-reading Rod
Light 3 Ply, \$31.25



Rear View of
Self-reading Rod
No. 501-B



Architects Rods, Nos. 510 and 511

Architects Rod No. 510 is a very light and simple sliding rod made in two equal parts, each $\frac{7}{8}$ inch square, and when closed the rod is about 5 feet 6 inches long.

As shown, the face of the front part and the side of the rear part are graduated to feet, inches and sixteenths, and read by an index on the target and on the side of the rod.

The target is similar to those of the rods already described, and moves on the closed rod when levels of less than 5 feet 5 inches are to be taken.

When a greater height is needed, the target is fixed at the highest graduation, the rear part carried above the front part and clamped by the clamp screw at any point desired, and the height up to 10 feet read off by the index on the side of the lower part.

This rod is especially adapted for use with Architects Level No. 381.

Architects Rod No. 511 is similar to No. 510 except that the face of the front part and the side of the rear part are graduated to feet, tenths, and hundredths, and read by verniers on the target and side to thousandths of a foot.

No. 510	Architects Rod, 2 ply, 5½ ft. closed, sliding to 10 ft., graduated to feet, inches and 16ths.....	\$10.00
No. 511	Architects Rod, 2 ply, 5½ ft. closed, sliding to 10 ft., graduated to feet, 10ths and 100ths, with verniers reading to 1000ths.....	10.00

Telemeter or Stadia Rods, Nos. 513 and 514

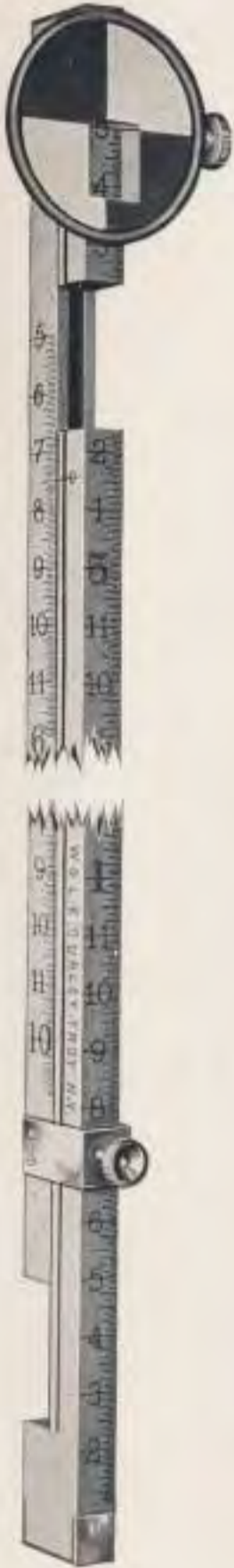
This Rod is formed of two pieces of pine, each 2½ inches in width and 6 feet long. The inner surfaces of the rod are recessed and painted white, with graduations in black to feet, tenths and hundredths, the feet figured in red and the tenths in black. The two pieces are connected by strong brass hinges and are folded in transportation. When in use they are opened and are held firmly in line by a sturdy ribbed metal brace and clamp on the back of the rod.

This is a self-reading rod, and is often used in connection with the stadia to ascertain distances by simple observation, in the same manner as the Philadelphia Rod.

No. 513	Telemeter or Stadia Rod, without target, hinge joint, 6 ft. folded, unfolding to 12 ft., graduated to feet, 10ths and 100ths.....	\$15.00
No. 514	Telemeter or Stadia Rod, without target, hinge joint, 7 ft. folded, unfolding to 14 ft., graduated to feet, 10ths and 100ths.....	16.00

Any of our Leveling Rods made with metric graduations without extra charge.

R O D S A N D T R I P O D S



No. 510
Architects Rod
\$10.00



No. 513
Telemeter or Stadia
Rod—\$15.00



No. 513-M
Telemeter or Stadia Rod
Metric Graduations
\$15.00



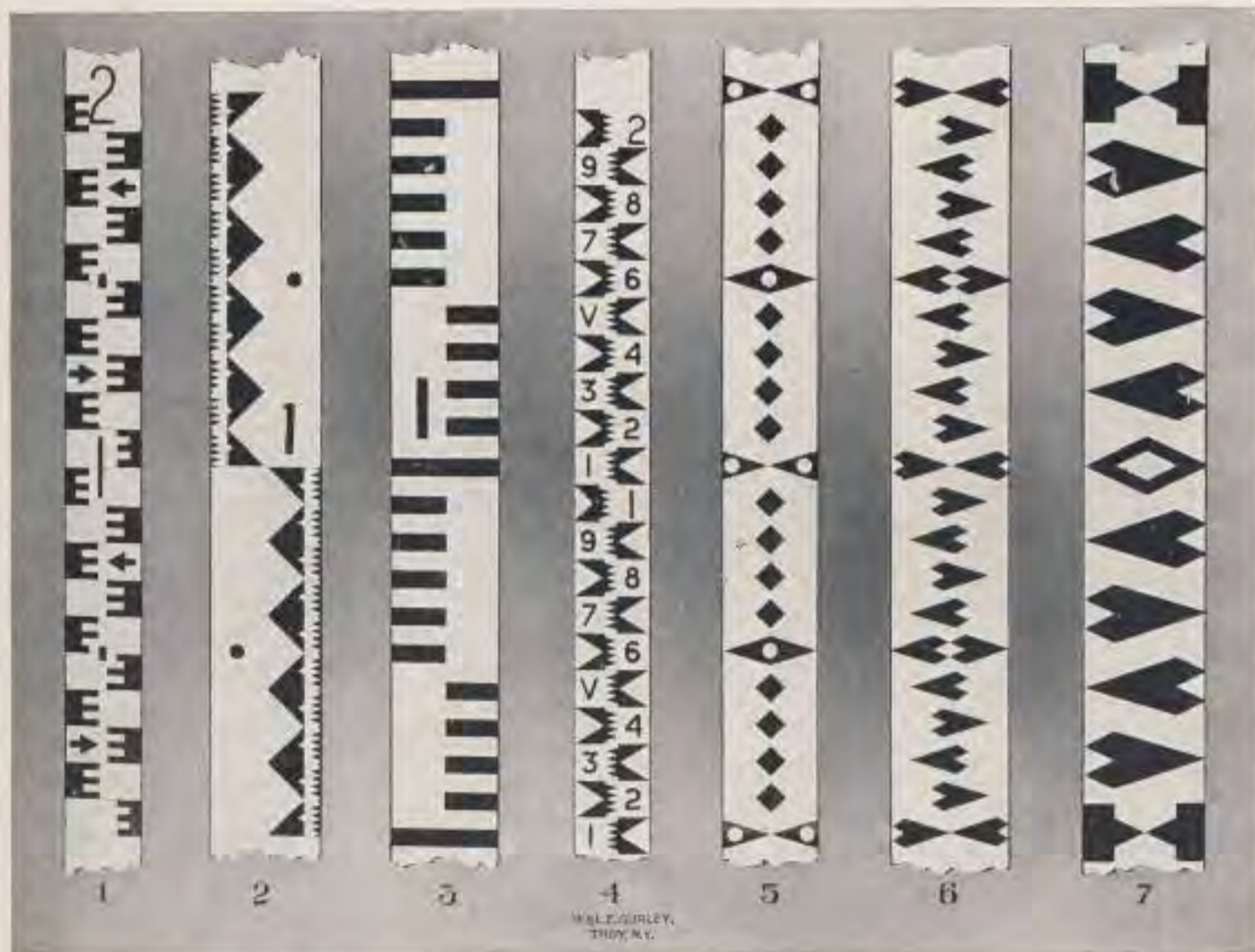
Enlarged View of
Hinges, Ribbed Brace
and Clamp of Telemeter
Rods, Nos. 513 and 514



Telemeter or Stadia Rods, Nos. 514-B to 514-E

No. 514-B	Stadia Rod, one piece, without target, 10 ft. long, 4 in. wide, with brass ends, graduated on recessed face of 3½ in. width to feet, 10ths and 2/100ths.....	\$12.50
No. 514-C	Stadia Rod, similar to No. 514-B, but 12 ft. long.....	15.00
The graduations of Nos. 514-B and 514-C begin at the base and end at the top of the rods. The illustration does not show completed graduations.		
No. 514-D	Stadia Rod, one piece, without target, 10 ft. long, 3⅛ in. wide, with brass ends, graduated on flat face to feet, 10ths and 2/100ths....	9.50
No. 514-E	Stadia Rod, similar to No. 514-D, but 12 feet long.....	10.50
Hinge Joint for Stadia Rods Nos. 514-B, 514-C, 514-D or 514-E, to permit folding, extra.....		5.00
Rods Nos. 513 to 514-E can be furnished in any length up to 16 ft. Prices on application.		

Specimens of Graduations for Stadia Rods (Two Foot Sections)



Graduations Nos. 1, 4 and 5 can be furnished on Rods similar to Nos. 514-D and 514-E, having a flat face 3⅛ in. wide. Graduations Nos. 2, 3, 6 and 7 can be furnished on Rods similar to Nos. 514-B and 514-C, having a recessed face 3½ in. wide. Either style can be supplied in any length up to 16 ft. Prices on application.

Value of Specimen Graduations

No. 1 Feet, 10ths and 2/100ths.	No. 5 Feet and 10ths.
No. 2 Feet, 10ths and 100ths.	No. 6 Feet, 10ths and 2/100ths.
No. 3 Feet and 10ths.	No. 7 Feet, 2/10ths and 4/100ths.
No. 4 Feet, 10ths and 100ths.	

Any of our Leveling Rods made with metric graduations without extra charge.

Page one hundred fourteen

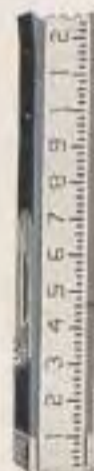
R O D S A N D T R I P O D S



Stadia Rod
 No. 514-B—10 feet, \$12.50
 No. 514-C—12 feet, 15.00



Stadia Rod
 No. 514-D—10 feet, \$9.50
 No. 514-E—12 feet, 10.50



No. 516
 Cross-Section Rod
 \$17.50
 See page 116



Cross Section Rod, No. 516

This Rod is made of well seasoned pine, and is 10 feet long, with ends $1\frac{3}{8}$ inches thick and 2 inches wide. It is about 4 inches thick at the middle, where there is an opening for the hand, as shown. Both sides are graduated on a recessed white surface, the graduations being painted black like those of a leveling rod, and figured from the end of the rod. There is also an adjustable spirit level at each end, as shown in the illustration on page 115.

No. 516 Cross Section Rod, one piece, without target, 10 ft. long, with level at each end, graduated to feet, 10ths and 100ths..... \$17.50

Gurley Slip-Jointed Leveling Rod, No. 517

New Model

No. 517 Slip-Jointed Leveling or Stadia Rod, 12 ft. long two inch graduated, recessed face, three sections (two slip joints,) graduated in feet, 10ths and 100ths. The joints are secured and released by spring catches. With canvas carrying case..... \$17.00

Plain Leveling Rods, Nos. 518-A to 521-B

One Piece, or with Hinge Joint

A very good self-reading Rod is made of seasoned white pine, recessed and graduated on one face like the Philadelphia Rod. A rib at the back, extending through the length of the rod, gives great rigidity, while it does not materially increase the weight.

This rod is also made with a hinge joint at the middle, as shown on page 118.

No. 518-A Plain Rod, one piece, without target, 10 ft. long, graduated to feet, 10ths and 100ths.....	\$7.50
No. 518-B Plain Rod, without target, hinge joint, 5 ft. folded, unfolding to 10 ft., graduated to feet, 10ths and 100ths.....	11.25
No. 519-A Plain Rod, one piece, without target, 12 ft. long, graduated to feet, 10ths and 100ths.....	8.75
No. 519-B Plain Rod, without target, with hinge joint, 6 ft. folded, unfolding to 12 ft., graduated to feet, 10ths and 100ths.....	13.75
No. 520-A Plain Rod, one piece, without target, 14 ft. long, graduated to feet, 10ths and 100ths.....	10.00
No. 520-B Plain Rod, without target, with hinge joint, 7 ft. folded, unfolding to 14 ft., graduated to feet, 10ths and 100ths.....	15.00
No. 521-B Plain Rod, without target, with hinge joint, 8 ft. folded, unfolding to 16 ft., graduated to feet, 10ths and 100ths.....	16.25

Any of our Leveling Rods made with metric graduations without extra charge.

RODS AND TRIPODS



No. 517
Slip-Jointed Rod
12 ft.—\$17.00

Front and Rear
Views of No. 517
Slip-Jointed Rod

No. 518-B
Plain Rod with
Hinge Joint
\$11.25

No. 518-B
Plain Rod, Rear
View, showing
Wooden Rib,
Hinge Joint,
Brace and
Clamp Screw



Plain Leveling Rods, Nos. 522-A to 522-C

Sliding Pattern—2 ply

Especially designed for convenience in use and for ease in carrying when traveling.

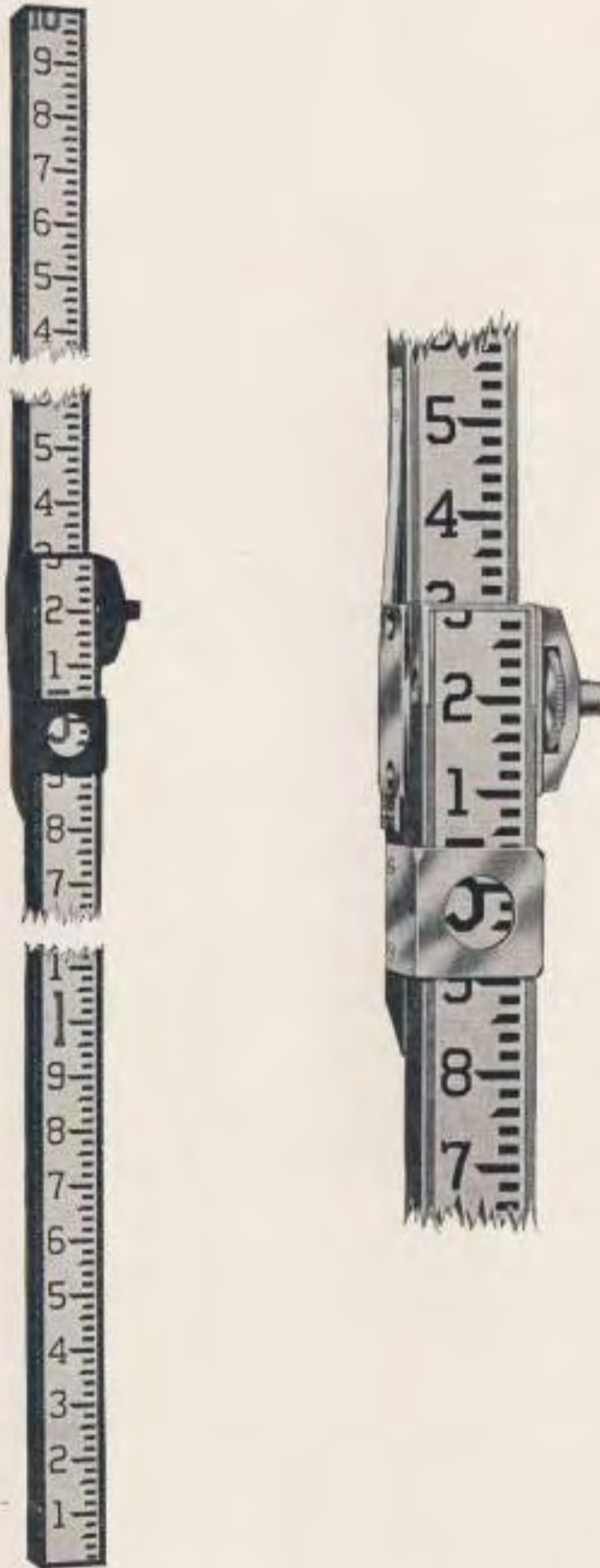
This light, compact, self-reading rod, without target, is made in two parts, extending to 10, 12 or 14 feet. See Rods Nos. 522-A, B and C. No. 522-A is shown on page 119.

No. 522-A	Plain Rod, 2 ply, without target, $5\frac{3}{10}$ ft. long, sliding to 10 ft., graduated to feet, 10ths and 100ths.....	\$11.25
No. 522-B	Plain Rod, 2 ply, without target, $6\frac{3}{10}$ ft. long, sliding to 12 ft., graduated to feet, 10ths and 100ths.....	12.50
No. 522-C	Plain Rod, 2 ply, without target, $7\frac{3}{10}$ ft. long, sliding to 14 ft., graduated to feet, 10ths and 100ths.....	13.75



Enlarged View of Hinged Joint used on Rods Nos. 518-B, 519-B, 520-B and 521-B. Note the sturdy construction of the hinges and the manner in which the strong metal brace is anchored into the wooden rib; also the wing nut clamp screw.

RODS AND TRIPODS



No. 522-A
Plain Rod, 2 Ply
\$11.25
See page 118

Enlarged View
of Clamp of
Plain Rods
Nos. 522-A to 522-C



Plain Leveling Rod, No. 524-A

Sliding Pattern—4 Ply

The No. 524-A furnishes the engineer with a rod, which is the usual length of leveling rods and which is, at the same time, light and portable.

This rod is especially popular with engineers who travel by trolley, train, automobile or other conveyance. It is usually ordered with a flexible canvas case.

A particularly compact and convenient outfit consists of one of these No. 524-A Four Ply Rods, several Jointed Wooden Flagstaffs similar to Nos. 537-A to 538-B, and an Extension Tripod with head adapted for use with the Transit or Level.

No. 524-A Plain Rod, 4 ply, without target, $3\frac{3}{8}$ ft. long, sliding to $11\frac{2}{3}$ ft., graduated to feet, 10ths and 100ths..... \$17.50

Canvas Case for No. 524-A..... 3.00

[The No. 524-A Rod, with metric graduations, when extended reads to 3.3 meters and when closed reads to 1 meter. See illustration on page 121.]

Flexible or Pocket Leveling Rods, Nos. 525-B to 528

The flexible self-reading rod shown on the opposite page is a convenient form where extreme accuracy is not essential and where ease in carrying is desirable. It is made of especially prepared canvas, so treated as to insure permanence in length within reasonable limits, and is graduated on its painted surface to feet, tenths, and hundredths, or to special design. In use it is fastened to a board with thumb tacks, and can be rolled up easily and carried in the pocket in the tin case.

No. 525-B Pocket Rod, 10 ft. long, graduated to feet, 10ths and 100ths..... \$4.50

No. 526-A Pocket Rod, 12 ft. long, graduated to feet, 10ths and 100ths..... 5.50

No. 526-B Pocket Rod, 12 ft. long, graduated to feet, inches and 8ths..... 5.50

No. 527 Pocket Rod, 14 ft. long, graduated to feet, 10ths and 100ths..... 7.00

No. 528 Pocket Rod, $3\frac{1}{2}$ meters long, graduated to centimeters..... 5.50

NOTE—Flexible or Pocket Leveling Rods Nos. 525-B to 527 can also be supplied with any of the special stadia rod graduations as shown on page 114. The width of these special graduations varies from 3" to 4". Prices on application.

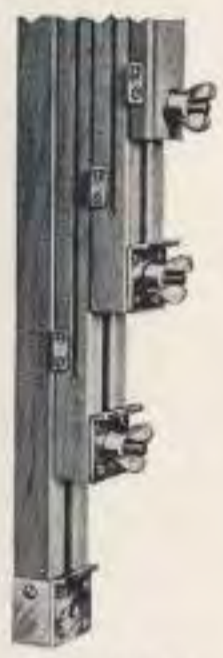
Any of our Leveling Rods made with metric graduations without extra charge.

R O D S A N D T R I P O D S



No. 524-A
Plain Leveling
Rod, without
Target. 4 Ply
\$17.50

No. 524-A
Plain Leveling
Rod
Metric Graduations
4 Ply, \$17.50



Rear View of 4 Ply
Leveling Rod No. 524-A,
showing details of
construction



Nos. 525-B—527
Flexible or Pocket
Leveling Rods
\$4.50 to \$7.00



No. 528
Flexible Rod
Metric Graduations
\$5.50



Combined Leveling Pole and Flagstaff, Nos. 530 and 531

The Leveling Pole, No. 530, is a combination of a plain self-reading rod and a flag pole. It is made with flat face, front and rear, and rounded sides. One face is graduated to feet and hundredths of a foot, while the other face and sides are graduated to feet only and are painted red and white alternately.

The pole is made 7 and 9 feet long, the graduated faces reading to 6 and 8 feet, respectively, and when used as a rod is read as shown in the illustration.

No. 530 Wooden Leveling Pole and Flagstaff, 7 ft. long.....	\$6.25
No. 531 Wooden Leveling Pole and Flagstaff, 9 ft. long.....	7.50

Wooden Flagstaffs or Ranging Poles, Nos. 534 to 536

Wooden Flagstaffs, or Ranging Poles, Nos. 534 to 536 are made in three sizes and are octagonal in form, tapering from the bottom to the top, and have metal shoes. They are graduated to feet, and painted alternately red and white. When desired they are graduated metrically, five spaces to each meter.

No. 534 Wooden Flagstaff, octagonal, 6 ft. long.....	\$3.50
No. 535 Wooden Flagstaff, octagonal, 8 ft. long.....	4.25
No. 536 Wooden Flagstaff, octagonal, 10 ft. long.....	5.25

Screw-Jointed Wooden Flagstaffs, Nos. 537-A to 538-B

Jointed Wooden Flagstaffs Nos. 537-A to 538-B are especially designed for convenience in use and for ease in carrying when traveling. They are about 1 inch in diameter, and are made in equal sections, which are firmly joined together by protected metal screw joints. If desired, a heavy canvas case is furnished to contain the several parts, and to protect them from injury in transportation. See illustration on page 124.

No. 537-A Jointed Wooden Flagstaff, round, 6 ft. long, in 2 sections	\$5.50
No. 537-B Jointed Wooden Flagstaff, round, 6 ft. long, in 2 sections and with canvas case.....	8.75
No. 537-C Jointed Wooden Flagstaff, round, 6 ft. long, in 3 sections	8.75
No. 537-D Jointed Wooden Flagstaff, round, 6 ft. long, in 3 sections and with canvas case.....	12.00
No. 538-A Jointed Wooden Flagstaff, round, 9 ft. long, in 3 sections	9.50
No. 538-B Jointed Wooden Flagstaff, round, 9 ft. long, in 3 sections and with canvas case.....	13.00

Iron and Steel Ranging Poles, Nos. 540-A to 544

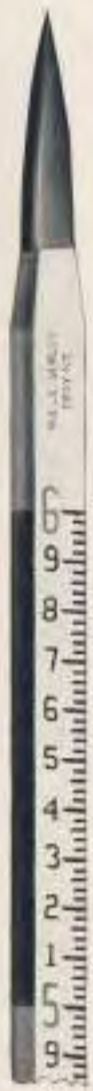
Ranging Poles Nos. 540-A and 540-B are made in two lengths, of a solid hexagonal steel rod, $\frac{1}{2}$ inch in diameter, are graduated to feet and are painted alternately red and white.

Ranging Poles Nos. 541 to 544 are made of an iron tube $\frac{1 1}{8}$ inch in diameter, in three lengths, are graduated to feet and are painted alternately red and white.

No. 540-A Steel Ranging Pole, solid, hexagonal, 6 ft. long, $\frac{1}{2}$ in. diameter..	\$4.50
No. 540-B Steel Ranging Pole, solid, hexagonal, 8 ft. long, $\frac{1}{2}$ in. diameter..	4.75
No. 541 Iron Tubular Ranging Pole, 6 ft. long, $\frac{1 1}{8}$ in. diameter.....	3.50
No. 543 Iron Tubular Ranging Pole, 8 ft. long, $\frac{1 1}{8}$ in. diameter.....	4.25
No. 544 Iron Tubular Ranging Pole, 10 ft. long, $\frac{1 1}{8}$ in. diameter.....	5.25

Any of the above Staffs and Poles with metric graduations (five to a meter) at same price.

R O D S A N D T R I P O D S



Combined Wooden
Leveling Pole and
Flagstaff, Front View
No. 530 7 feet, \$6.25
No. 531 9 feet, 7.50

Nos. 530 and 531
Combined Wooden
Leveling Pole and
Flagstaff, Rear View

Wooden Flagstaff
No. 534 6 feet, \$3.50
No. 535 8 feet, 4.25
No. 536 10 feet, 5.25

Iron Tubular
Ranging Pole
No. 541 6 feet, \$3.50
No. 543 8 feet, 4.25
No. 544 10 feet, 5.25



Screw-Jointed Wooden Flagstaffs, Nos. 537-A to 538-B



The above illustration shows Flagstaff No. 537-D, 6 feet in length, in 3 sections of 2 feet each, having protected metal screw joints. The heavy canvas case, for protecting the rod from injury in transportation, also is shown. For description and prices, see page 122.

Gurley Rods with Metric Graduations

Besides the usual graduation of leveling rods into feet and parts of a foot, we graduate them, when desired, into meters, decimeters and centimeters, without extra charge.

The scales on the targets and sides of the rods read the centimeters to millimeters on all except the Telemeter, Telescopic and Plain Rods, which have no targets and are read only to centimeters. The Architects metric rods are graduated, when desired, to read by vernier to one-tenth of a millimeter.

R O D S A N D T R I P O D S



Gurley Precise Leveling Rod, No. 550-R



No. 550-R Gurley Precise Leveling Rod, cross-shape section, graduated on three faces to yards, 10ths and 100ths, reading to $3\frac{1}{2}$ yds., with silver-faced plugs at each half yard. Fitted with wooden handle, thermometer, fixed circular rod level, canvas case, turning point and plate. Packed in a special pine box with hinged cover, handles and lock..... \$110.00

Any of our Leveling Rods made with metric graduations without extra charge.



Gurley Rod Levels

For the Accurate Plumbing of Leveling and Stadia Rods



No. 545 Rod Level—Folded
For Any Rod
\$5.00



No. 545 Rod Level
As applied to a Rod
\$5.00

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.

No. 545 Rod Level, for plumbing any rod..... \$5.00



No. 546 Rod Level
For One Piece, or Folding, Rods
\$6.00

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.



Special Targets for Leveling Rods

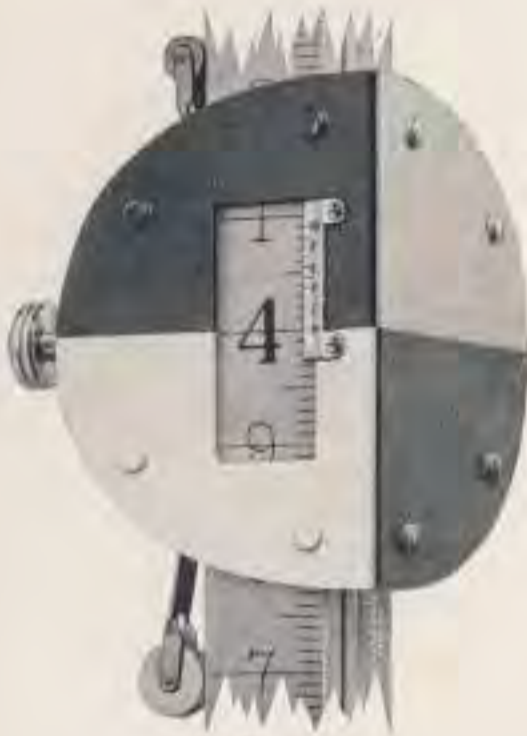


Figure 1
Angle Target



Figure 2
Angle Micrometer Target

Prices of Targets when Sold Separately

Plain round target, as supplied with rods Nos. 500-B, 500-M, 501, 501-B and 505; also New York Rod, Geological Survey pattern.....	\$5.50
Plain oval target, as supplied with Rod No. 500-R.....	4.00
Micrometer target, as supplied with Rod No. 500.....	8.00
Angle target, as shown above, figure 1.....	8.00
Angle Micrometer target, as shown above, figure 2.....	9.00

Note: When ordering rods with different targets than regularly supplied, *add* the price of the target desired to the price of the rod as listed and *deduct* the price of the target which is to be omitted.

Leather-trimmed Canvas Cases for Leveling Rods

Canvas Case for Rods Nos. 500, 500-A, 500-R, 500-B, 501, 502-A, 504, or 505...	\$4.00
Canvas Case for Rod No. 524-A.....	3.00

Prices will be quoted upon request for Cases for other Rods.

Repairing and Regrading Rods

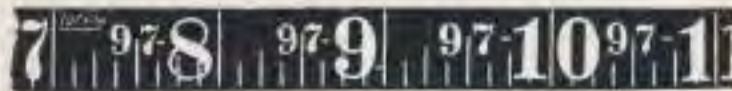
Old and worn Gurley rods need not be discarded, as they can be repaired and regraded. We have unequalled facilities and our method is such that when the work is done, the rods are as good for service as they were when new.

The average cost of repainting and regrading two-ply rods, such as No. 500 and No. 505, is \$10.00. Estimates for repairing other patterns will be submitted upon request.

Rods of special design made to order. Prices will be quoted on receipt of full specifications.



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

No.	Length	Markings	Each
No. 795	33 ft.	marked 10ths or 12ths with links on back.	\$5.00
No. 796	50 ft.	marked 10ths or 12ths with links on back.	7.00
No. 797	66 ft.	marked 10ths or 12ths with links on back.	9.00
No. 798	100 ft.	marked 10ths or 12ths with links on back.	12.00
No. 799	200 ft.	marked 10ths or 12ths with links on back.	23.00

"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

No.	Length	Markings	Each
No. 800	25 ft.	marked 10ths or 12ths.	\$4.00
No. 801	50 ft.	marked 10ths or 12ths.	6.00

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

No.	Length	Markings	Each
No. 820	33 ft.	marked 10ths or 12ths.	\$5.75
No. 821	50 ft.	marked 10ths or 12ths.	6.75
No. 822	66 ft.	marked 10ths or 12ths.	8.50
No. 823	75 ft.	marked 10ths or 12ths.	9.50
No. 824	100 ft.	marked 10ths or 12ths.	12.00

Tapes listed above can also be furnished in metric or vara measurements, at an additional cost of two cents per foot added to list price.

SMALL FIELD INSTRUMENTS & ACCESSORIES



"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.....	\$3.75
No. 810	50 ft. marked 10ths or 12ths.....	4.50
No. 811	66 ft. marked 10ths or 12ths.....	5.50
No. 813	100 ft. marked 10ths or 12ths.....	7.00



"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.....	\$9.00
No. 815	66 ft. marked 10ths or 12ths.....	11.00
No. 816	75 ft. marked 10ths or 12ths.....	12.00
No. 817	100 ft. marked 10ths or 12ths.....	15.00



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	\$6.75
No. 891	75 ft. marked 10ths or 12ths	9.50
No. 892	100 ft. marked 10ths or 12ths	11.50
No. 893	200 ft. marked 10ths or 12ths	23.00



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	\$6.00
No. 895	100 ft. marked 10ths or 12ths	10.00

One-Half Inch Steel Tapes

No. 851	50 ft. marked 10ths or 12ths	\$7.00
No. 853	100 ft. marked 10ths or 12ths	12.00



Tapes listed above can also be furnished in metric or vara measurements, at an additional cost of two cents per foot added to list price.



Surveyors Chain Tapes

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.



One-Quarter Inch Heavy Steel Tapes

Marked in feet. End feet in 10ths and 100ths.

With Reel			Without Reel		
No.	Length	Each	No.	Length	Each
No. 776	100 ft.	\$8.50	No. 0776	100 ft.	\$6.00
No. 777	200 ft.	12.50	No. 0777	200 ft.	10.00
No. 778	300 ft.	20.50	No. 0778	300 ft.	15.50

Marked in links and poles. End links graduated 10ths of links.

No. 774	100 links	\$7.00	No. 0774	100 links	\$4.50
No. 775	200 links	10.00	No. 0775	200 links	7.50

Marked first decimeter in millimeters, first meter in centimeters, balance of tape in decimeters.

No. 25M	25 meters	\$8.00	No. 025M	25 Meters	\$5.50
No. 30M	30 meters	9.00	No. 030M	30 meters	6.50
No. 50M	50 meters	13.50	No. 050M	50 meters	11.00
No. 100M	100 meters	24.00	No. 0100M	100 meters	19.00

The above tapes can also be furnished with vara measurements, at an additional cost of two cents per foot added to list price.



We recommend these tapes for use in highway and railroad construction as they are tapes that 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.

Five-Sixteenths Inch Steel Tapes

Marked feet. End feet in 10ths

With Reel			Without Reel		
No.	Length	Each	No.	Length	Each
No. 976	100 ft.	\$8.50	No. 0970	100 ft.	\$6.00
No. 977	150 ft.	12.50	No. 0977	150 ft.	8.00
No. 978	200 ft.	15.50	No. 0978	200 ft.	10.50

Marked links. End links in 10ths

No. 974	100 links	\$7.50	No. 0974	100 links	\$5.00
No. 975	200 links	12.50	No. 0975	200 links	8.00



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	\$2.75
No. 782	50 ft.	marked 10ths or 12ths	3.25
No. 784	75 ft.	marked 10ths or 12ths	4.00
No. 786	100 ft.	marked 10ths or 12ths	5.00

Metallic Tapes Only—Without Cases

No. 790	33 ft.	marked 10ths or 12ths	\$1.25
No. 791	50 ft.	marked 10ths or 12ths	1.75
No. 793	75 ft.	marked 10ths or 12ths	2.50
No. 794	100 ft.	marked 10ths or 12ths	3.25



Pocket Steel Tapes

In nickel silver cases, spring wind center stop

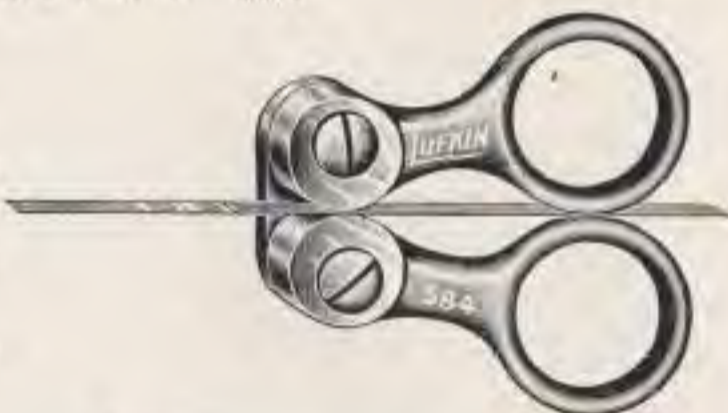
No.	Length	Markings	Each
No. 860	3 ft.	in 10ths or 12ths	\$0.80
No. 863	6 ft.	in 10ths or 12ths	1.00
No. 866	12 ft.	in 10ths or 12ths	2.25
No. 870	6 ft.	in 10ths one side and 12ths reverse side	1.25
No. 873	12 ft.	in 10ths one side and 12ths reverse side	2.75
No. 875	3 ft.	in 10ths or 12ths and meters	.85
No. 877	6 ft.	in 10ths or 12ths and meters	1.25
No. 879	12 ft.	in 10ths or 12ths and meters	2.75



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 each \$2.00



Tape Hooks

For attaching to steel tapes. Measures from inside of hook.

No. 847 for 1/4 inch tape, each... \$0.50
 No. 848 for 3/8 inch tape, each... .50



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 \$4.00



Gurley Aluminum String Level

No. 849 \$1.25





Flexible Spring Joint 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

Punch and Riveter for Repairing Tape Lines



No. 885

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	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 and Accessories

No. 670	33 ft., 50 links, No. 12 tempered steel wire, brazed links and rings..	\$8.00
No. 671	50 ft., 50 links, No. 12 tempered steel wire, brazed links and rings..	10.00
No. 672	66 ft., 100 links, No. 12 tempered steel wire, brazed links and rings..	18.00
No. 673	100 ft., 100 links, No. 12 tempered steel wire, brazed links and rings..	20.00

Steel Snaps to make full chains into half chains, without extra charge, if ordered with the chain.

No. 740	Set of 11 Pins, No. 4 iron wire, nickel-plated, 14 in. long.....	\$1.45
No. 743	Set of 11 Pins, $\frac{1}{8}$ 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.....	.25

DRAWING INSTRUMENTS & OFFICE SUPPLIES



Alteneders Patent Joint Drawing Instruments



No. 1085

- No. 1085 Folding Pocket Case, with flexible flaps and containing Hair-spring Dividers, No. 1068; Compasses, No. 1026; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of leads..... \$40.00

Kerns Extra Fine Swiss Drawing Instruments



- No. 1150 Set of instruments containing two pens, spring bow divider, spring bow pencil, spring bow pen, hair spring divider, compasses and box of leads, all in morocco case..... \$25.00
 No. 1152 Same as above but contained in pocket folding case..... 27.00

The above sets are some of the most popular ones used by Engineers and Draftsmen. For a complete list of Drawing Instruments in sets and also separate pieces, write for our Bulletin S-400.



Polar Planimeters



No. 1095

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..... \$65.00

Drawing Boards and Trestles

Made by W. & L. E. Gurley



No. 1978

- 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..... \$20.00
- No. 1979 Folding Trestle and Drawing Board, same as No. 1978, but with the Drawing Board 55 x 33 in..... 25.00
- No. 1962 Drawing Board, pinewood, 21 x 16 in., tongue and groove ends. 1.25
- No. 1964 Drawing Board, pinewood, 28 x 20 in., tongue and groove ends. 2.00
- No. 1966 Drawing Board, pinewood, 40 x 28 in., tongue and groove ends, the "Bridge" Board..... 6.00
- No. 1967 Drawing Board, best white pine, 55 x 33 in., expansion cleats.... 14.00

Drawing Boards and Trestles of any size made to order.

Send for our Bulletin S-400 listing Boxwood Scales, Slide Rules, Flexible Pocket Rules, Drawing Paper, Tracing Cloth, and all the materials necessary for a drafting office.



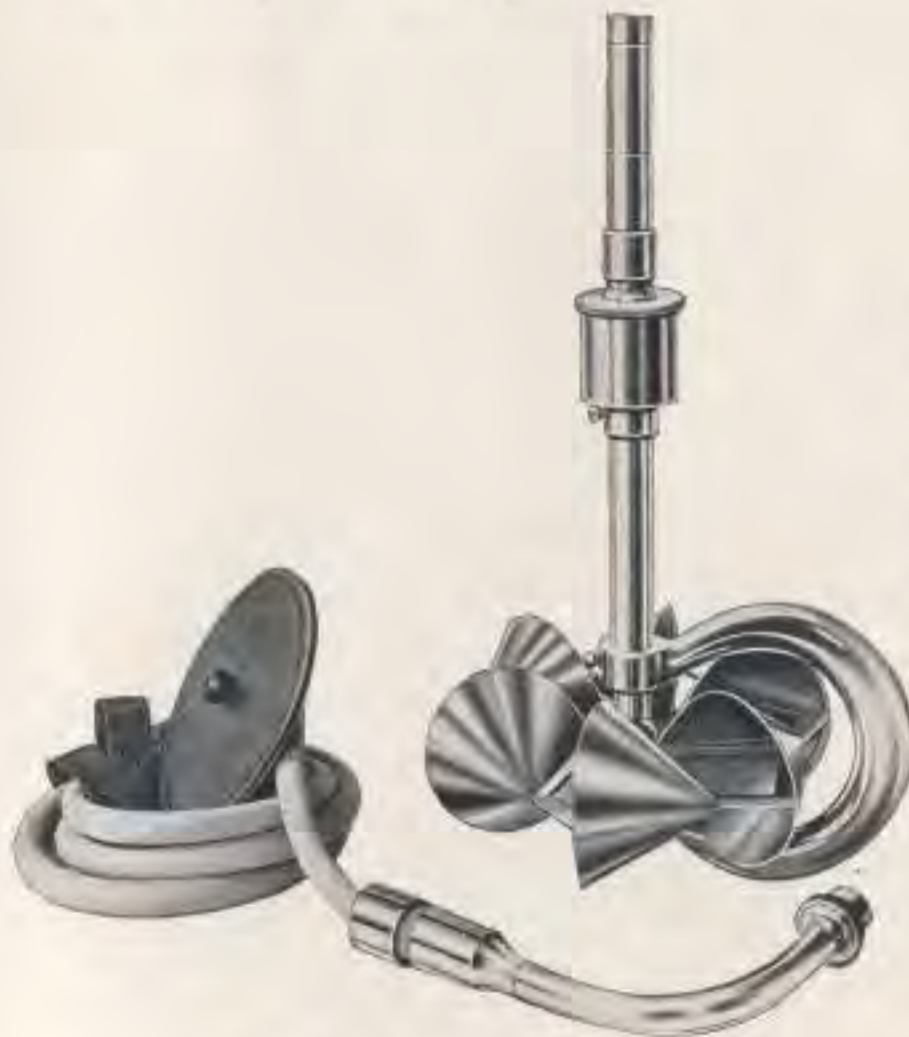
Gurley Current Meters

U. S. Geological Survey Standard

For determining the Velocity of the Flow of Water in Harbors,
Rivers, Streams, Sewers and Irrigation Ditches

For more than thirty years W. & L. E. Gurley have made Current Meters under the patents of W. G. Price, the Assistant Engineer of the Corps of Engineers, United States Army, who in 1885 devised the initial pattern. The general features are retained in the latest models, although somewhat modified as the result of suggestions from many hydraulic engineers who have had large experience in current meter observation, under all conditions of service.

Gurley Current Meters are made in two patterns, Acoustic and Electric, as briefly described herein. They have been brought to such a high degree of efficiency that they are recognized by hydraulic engineers as the standard instruments for the exact measurement of water in connection with the study of natural resources, the conservation and control of water supply, and water power development.



Indicating each tenth revolution

Gurley Acoustic Current Meter, No. 616

For use in shallow streams. At each tenth revolution of the bucket wheel, a hammer automatically strikes one blow against a diaphragm, the sound of which is transmitted through the hollow wading rod and rubber tube to the ear of the observer. Thus the number of revolutions of the bucket wheel in any given space of time are easily counted and, by means of the rating table, the velocity of flow is determined.

No. 616 Acoustic Current Meter Outfit. Meter indicates each 10th revolution. Equipped with rubber tube, ear piece and connection, two lengths of wading rod measuring four feet from plane of bucket wheel; in wooden carrying case, with all accessories..... \$66.00

Send for bulletin No. H-301 describing, in detail, Gurley Current Meters.



Gurley Electric Current Meter, No. 623

While of universal adaptation, because of the many features of convenience which it possesses, the No. 623 Electric Current Meter is especially applicable to harbors, rivers, sewers, irrigation and drainage systems, which are not as readily accessible to the observer.

Its outstanding distinctive feature consists of two interchangeable commutator boxes, one indicating each revolution and the other indicating each fifth revolution of the bucket wheel; thus the meter can be used with equal facility for determining both low and high velocities of flow.

By means of wire connections, a dry cell battery and a telephone receiver, the revolutions of the bucket wheel for any period of time are transmitted to the hearing of the observer so distinctly that they may be noted or confirmed by a witness or co-operator. This is important where litigation is involved.

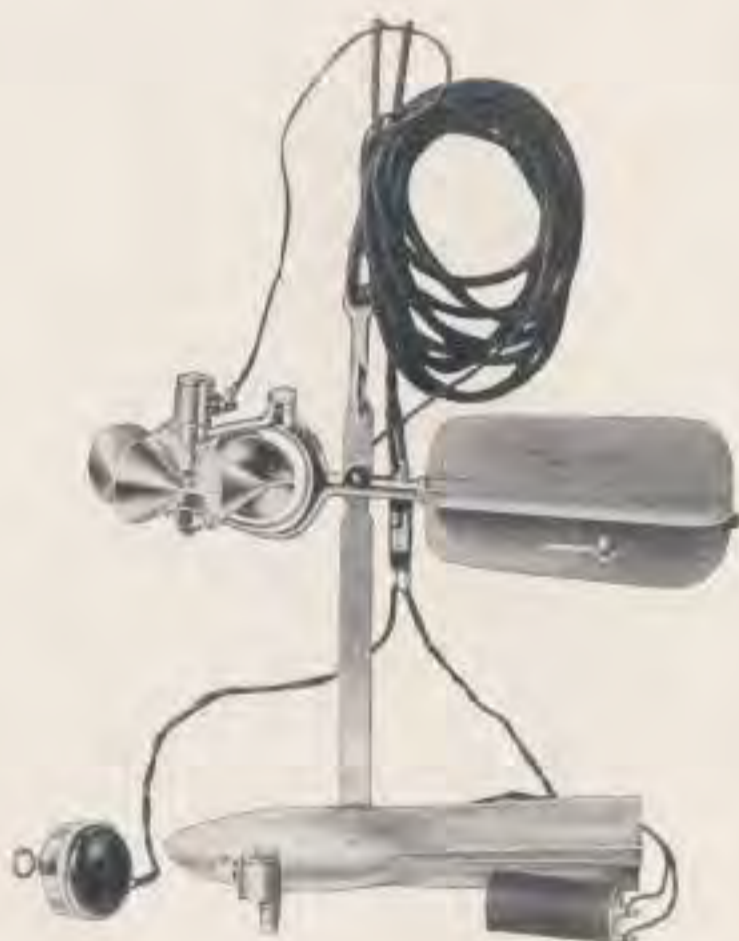
In deep water the meter is submerged by a torpedo-shaped weight to which it is connected by a hanger and suspended by a cable. In shallow streams, the weight and hanger are detached and the meter is held by one or a series of jointed wading rods, screwed into a coupling on its yoke. This device is known as the Covert Yoke.



No. 623

Electric Current Meter Outfit, with meter suspended by jointed wading rods, and with telephone sounder, cable, dry cell battery, and extra commutator box, \$110.00. Jointed wading rods cost \$3.25 per 2 foot length, additional.

Indicating each, or each fifth, revolution



No. 623

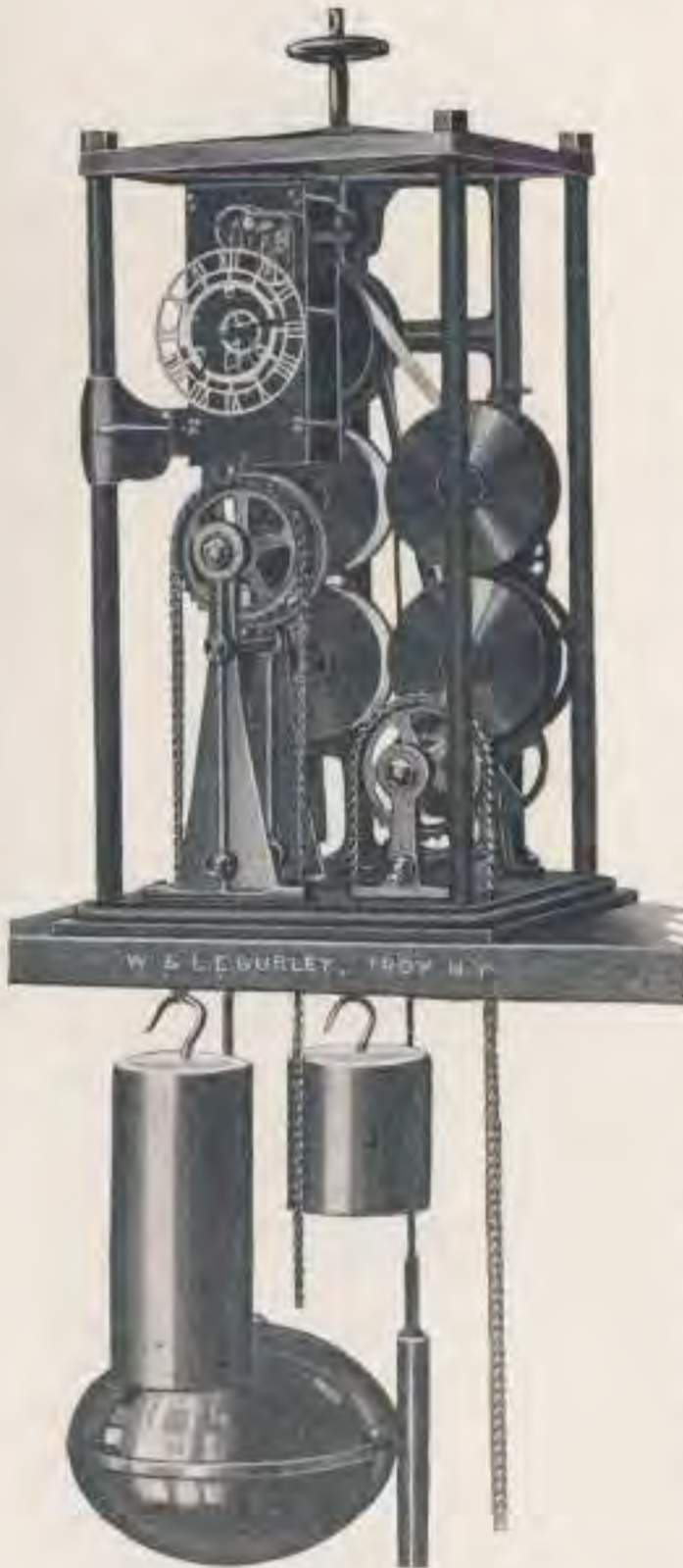
Electric Current Meter Outfit, with meter suspended by cable, and with telephone sounder, cable, dry cell battery, and extra commutator box, \$110.00.

Indicating each, or each fifth, revolution

For other interesting information regarding our Current Meters and accessories, ask for bulletin H-301.



Gurley Printing Water Stage Register



The Gurley No. 630 Printing Water Stage Register is the most efficient instrument yet devised for producing an accurate record of the rise and fall of water in places which are inaccessible or where, for any reason, records are required for long periods of time and therefore must be continuous. It is the only register making a printed record of both the water stage and the time on a paper ribbon and which can be read without computation.

Many of these Printing Registers are producing accurate records of water level in out-of-the-way places where inspection can not be made more frequently than once in several months.

The range is 0 to 36.99 feet without repeating, the instrument may be equipped to print at intervals of 15, 30 or 60 minutes, and the time that the clock will run depends upon the depth of the well, the clock weight falling at the rate of $1\frac{1}{2}$ inches per day. The diameter of the float is about $10\frac{1}{2}$ inches.

No. 630 Printing Water Stage Register\$385.00

Complete detailed specifications of this Register and equipment are given in our bulletin H-300 which we will gladly supply upon request.



Gurley Graphic Water Stage Registers

For recording the water stage in places which are convenient to visit at regular intervals, we supply a Register as shown. It may be had with either a spring or weight driven clock, as listed.

It produces a graphic record on a ruled paper chart, the normal vertical range is 0 to 10 feet, and the time scale, regularly supplied, is seven days. However, the time scale can be modified to provide a one day, four day, fourteen day, or twenty-eight day record. Also, by a change of gears, a variety of vertical scales can be furnished, ranging from 0 to 1 foot, to 0 to 20 feet; also 0 to 1½ meters and 0 to 3 meters.

The Gurley distinctive features of accuracy, durability, and simplicity of construction are combined in this efficient instrument, which can be depended upon for reliable and clean cut records.

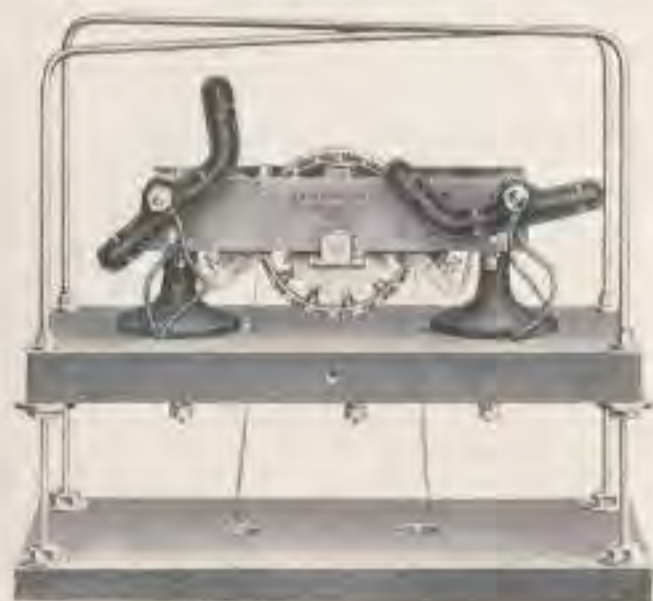


- | | | |
|---------|---|----------|
| No. 633 | Graphic Water Stage Register, spring driven clock, normal range
0 to 10 feet, time scale seven days..... | \$145.00 |
| No. 636 | Graphic Water Stage Register, like the above but with weight
driven clock | 145.00 |

Send for bulletin H-300 containing other information of interest.



Gurley Long Distance Water Stage Recorder



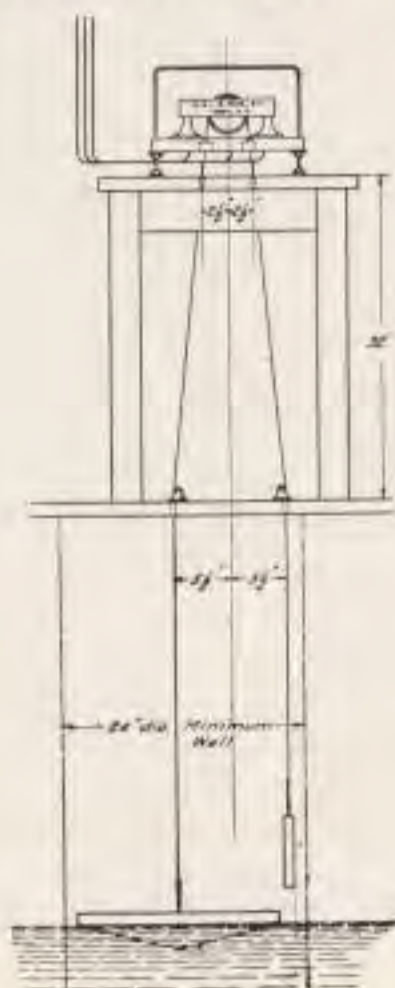
No. 638
Long Distance Sender, \$110.00



No. 637
Long Distance Recorder, \$275.00

To provide a quick, comparatively inexpensive, and convenient means for continuously registering or indicating in the central office of hydro-electric power and water supply companies, the fluctuations of the level of a distant body of water, we supply the Gurley Long Distance Water Stage Recorder.

The equipment consists of a float operated Sender, No. 638, located where the water level is to be measured, and which telegraphs variations of $1/20$ of a foot to the Recorder, No. 637, located in the office or power house, and there makes a graphic record on a ruled chart like that of Registers No. 633 and No. 636.



An Indicator, No. 639, costing \$155.00, can be substituted for the Recorder, if desired, or one or more Indicators can be used in connection with a Sender and a Recorder. The Indicator consists of a Recorder attachment, as supplied with No. 637, which operates a pointer on a 12 inch dial, indicating each $1/20$ of a foot variation. This Indicator will inform the operator at the power house, while the Recorder may be placed in the chief engineer's office where the records may be kept and studied.

Full information regarding this Register and equipment is given in Gurley Bulletin No. H-305.

View of Sender installed on Table over Stilling Well, showing relationship between Sender, Float, and Counterweight; also minimum diameter of well.



Gurley Standard Weights and Measures for Industrial Corporations, Railroads and Public Officials

Manufacturing plants appreciate, more and more, the desirability of establishing a department, or assigning an individual, upon whom to rest the responsibility for the maintenance, in accurate working condition, of scales and other weighing apparatus, playing an important part in the manufacture of the plant's product.

They have found that it prevents loss and inspires confidence, by building reputation for fair dealing.

In order to facilitate inspection and testing of the apparatus, it is essential to provide suitable testing equipment.

Gurley Weights and Measures Equipment has been adopted by practically all of the States, Counties, Cities and Towns engaged in Weights and Measures work; it is also being used by the National Bureau of Standards, Washington, D. C., and by many railroads and industrial concerns. Gurley Standards of Weight and Measure are guaranteed to be made in accordance with the regulations of the Bureau of Standards and are furnished with the certificate of that Bureau, if so ordered.

The line of Standard Weights and Measures includes Office and Field Testing Balances; Avoirdupois, Metric, Troy and Apothecary Test Weights, — in the One Piece Gold Plated, Pinned and Sealed Screw Knob, Grip Handle, and Flat types; also Liquid and Dry Measures, Meter and Yard Standards, Inspection Outfits, etc.

They are suitable for testing scales, weights, and automatic weighing and measuring machines; determining sizes of metal and glass containers, etc., etc.

The Gurley Line of Weights and Measures Testing Equipment is complete. Write us regarding your needs. We will be glad to supply literature and full information.





The Gurley Manual 48th Edition

For years the Gurley Manual has been looked upon, by Engineers and Technical Schools, as an authoritative treatise on the subject of engineering and surveying instruments, their construction, use, care and adjustment.

In fact, the Manual is used by many schools as a text book.

This latest edition, the 48th, has been thoroughly rewritten and revised. It contains 333 profusely illustrated pages of highly valuable information, in convenient size and shape - $6\frac{5}{8}$ " x $4\frac{3}{4}$ ". It fits the pocket and is neatly and durably cloth bound.



Table of Contents

Transits: Construction; Selection; Application; Care; Adjustment.

Astronomical Terms: Definitions.

Solar Attachments: Adjustment; Care; Use; Table of Mean Refractions in Declination of the Sun; Computations of Declination of the Sun; Direct Observations on the Sun.

Compasses: Types; Construction; Use; Care; Adjustments.

Levels: Construction; Application; Care; Adjustments.

Hand Levels: Description; Use.

Leveling Rods: Construction; Types; Use; Care.

Tripods: Construction; Use.

Plane Table Outfits: Description; Use; Adjustment.

Sketching Cases: Construction and Use.

Chains, Tapes and Accessories.

Hydraulic Engineering Instruments: Current Meters, their construction and use; Hook Gages, description and use; Water Stage Registers, types, construction, installation, use, and care.

Miscellany.

Price \$1.00, Postage paid



Gurley Literature

We issue various bulletins, etc., illustrating and fully describing our field instruments, equipment and supplies. Copies of any of this literature will be furnished upon request, free of charge. Order by number.

<i>No.</i>	<i>Title</i>
T-1.....	Solar Ephemeris
T-3.....	Explorers Precise Transits
T-4.....	Reconnaissance Transits
T-6.....	Light Mountain Transits
T-8.....	Beaman Stadia Arc
T-11.....	Precise Transits
C-50.....	Wood Box Pocket Compasses
C-55.....	{ Surveyors Compasses Geologists Compasses Dip Needle Compasses Pocket Compasses
C-56.....	Compass with Limb and Telescope
L-102.....	Engineers Wye Levels
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PT-151.....	Plane Table Outfits
PT-155.....	"The Plane Table"
SC-200.....	Army Sketching Case
SC-202.....	Scout Sketching Case
R-250.....	"A Reading on the Rod" (explaining construction of Gurley Leveling Rods, Stadia Rods, etc.).
R-253.....	Popular Leveling Rods, Stadia Rods and Sight Rods
R-255.....	The Service Rod
H-300.....	Water Stage Registers
H-301.....	Current Meters
H-302.....	Hook Gage
H-305.....	Long Distance Water Stage Recorders
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S-351.....	Tripods and Plummets
S-354.....	Chains and Tapes
S-400.....	Drawing Instruments and Materials and Office Supplies
M-480.....	"Gurley Engineering Instruments"
6012.....	Standard Weights and Measures and Precision Balances, for Weights and Measures Officials, Railroad Track Scale Inspectors and Industrial Corporations.

GENERAL INFORMATION



Gurley Private Cable Code

Cable Address: "Gurley, Troy, N. Y."

Use Western Union, Five-Letter Edition; Bentley's; Lieber's; or A. B. C.,
5th Edition, Codes. All Numbers are taken from the Gurley
Catalogue, Thirty-second Edition.

Cat. No.	Description	Code Word	Cat. No.	Description	Code Word
6-A	Precise Transit, Engineers size..	Abaab	169	Eye-piece Cap.....	Abalu
7-A	Precise Transit, Engineers size..	Ababa	170	Plummet Lamp.....	Arrub
8-A	Precise Transit, Engineers size..	Ababs	180	Attached Magnifier.....	Asbid
9-A	Precise Transit, Engineers size..	Abaca	181	Attached Microscopes.....	Abamo
10-A	Precise Transit, Engineers size..	Abacy	182	Attached Microscopes.....	Abams
10-A-3	Precise Transit, with Three-Screw Leveling Head.....	Abagn	185	Limb Graduation.....	Ascog
18-A	Precise Transit, Hell Gate Model	Abago	186	Limb Graduation.....	Asdig
25-A	Precise Transit, Mountain size..	Abaha	187	Vertical Circle Graduation.....	Asels
26-A	Precise Transit, Mountain size..	Abahi	188	Vertical Circle Graduation.....	Asgle
27-A	Precise Transit, Mountain size..	Abahl	189	Vertical Circle Graduation.....	Abamu
28-A	Precise Transit, Mountain size..	Abahs	190	Burt Solar Attachment.....	Ashik
29-A	Precise Transit, Mountain size..	Abaih	192	Solar Screen.....	Abasa
30-A	Precise Transit, Mountain size..	Abaid	193	Patent Latitude Level.....	Asilt
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21-A	Explorers Precise Transit.....	Abaic	241	Leveling Adopter.....	Afbir
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24-A	Explorers Precise Transit.....	Abac	265	Vertical Circle for No. 262 Telescopic Sight.....	Apfob
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27	Light Mountain or Mine Transit	Atjip	268	Offset Standard and Counterpoise for No. 262 Telescopic Sight.....	Apost
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155	Pinion Movement.....	Abait	425	Compass Tripod.....	Aworl
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158	Sights on Standards.....	Arrot	430	Level Tripod.....	Axbar
160	Detachable Side Telescope and Counterpoise.....	Arsan	431	Level Tripod.....	Axcet
161	Detachable Riding Telescope.....	Artap	435	Level Tripod.....	Axdox
165	Reflector for Transit Cross Wires	Artot	436	Level Tripod.....	Axfoy
166	Reflector for Level Cross Wires	Arvit	440	Level Tripod.....	Axgub
167	Elbow Eyepiece.....	Abaly			
168	Diagonal Prism.....	Arwet			



Gurley Private Cable Code—(Continued)

Cat. No.	Description	Code Word	Cat. No.	Description	Code Word
441	Level Tripod.....	Axhob	526-B	Flexible or Pocket Leveling Rod	Amsed
443	Level Tripod.....	Abapa	527	Flexible or Pocket Leveling Rod	Amtad
450	Plain Plummet.....	Abaph	528	Flexible or Pocket Leveling Rod	Amudy
452	Plain Plummet.....	Abapt	530	Combined Leveling Pole and Flagstaff.....	Akhon
454	Plain Plummet.....	Abapy	531	Combined Leveling Pole and Flagstaff.....	Akkip
456	Plain Plummet.....	Abarb	534	Wood Flagstaff.....	Abazi
458	Plain Plummet.....	Abarc	535	Wood Flagstaff.....	Abazy
460	Plain Plummet.....	Abarf	536	Wood Flagstaff.....	Abbac
465	Adjustable Plummet.....	Abari	537-A	Screw-Jointed Wood Flagstaff...	Abbaf
471	Iron Spads.....	Abarm	537-B	Screw-Jointed Wood Flagstaff...	Abbal
472	Stake Tacks.....	Abarp	537-C	Screw-Jointed Wood Flagstaff...	Abbam
473	Stake Tacks.....	Abars	537-D	Screw-Jointed Wood Flagstaff...	Abbap
474	Plummet Cord.....	Abaso	538-A	Screw-Jointed Wood Flagstaff...	Abbas
475	Leather Case.....	Abasp	538-B	Screw-Jointed Wood Flagstaff...	Abbaw
476	Leather Case.....	Abast	540-A	Steel Ranging Pole.....	Abbed
478	Leather Case.....	Abasy	540-B	Steel Ranging Pole.....	Abbeh
479	Leather Case.....	Abata	541	Iron Tubular Ranging Pole.....	Abbek
480	Leather Case.....	Abath	543	Iron Tubular Ranging Pole.....	Abben
485	Leather Case.....	Abaty	544	Iron Tubular Ranging Pole.....	Abbet
486	Leather Case.....	Abaud	550-R	Gurley Precise Rod.....	Abbig
487	Leather Case.....	Abaur	551-R	Moliter Precise Rod.....	Abbig
490	Leather Pouch.....	Abaux	552-R	Tape Leveling Rod.....	Abbig
491	Leather Pouch.....	Abauz	545	Rod Level.....	Amnez
492	Leather Pouch.....	Abauj	546	Rod Level.....	Amnit
494	Tripod Case.....	Abava	547	Rod Level.....	Annor
496	Tripod Case.....	Abavi	548	Rod Level.....	Abbev
497	Tripod Case.....	Abavy	570	Johnson Plane Table Movement	Abbig
498	Leather Field Bag.....	Abawi	570-A	Johnson Plane Table Movement	Abbig
	<i>If metric graduations are wanted, specify "METRIC" after the code word for the Rod.</i>		571	Johnson Plane Table Movement	Abbig
500	Philadelphia Rod.....	Albol	573	Drawing Board.....	Abbig
500-A	Philadelphia Rod.....	Abaxo	573-A	Drawing Board.....	Abbig
500-B	Philadelphia Rod.....	Alcan	573-B	Drawing Board.....	Abbig
500-R	Service Rod.....	Abayu	573-T	Drawing Board.....	Abbig
501	Philadelphia Rod.....	Alden	573-X	Drawing Board.....	Abbig
501-B	Special Self-Reading Rod.....	Alfop	574	Plumbing Arm and Plummet...	Abbon
502-A	Philadelphia Mining Rod.....	Algor	575	Combined Compass and Levels..	Abbor
504	Troy Rod.....	Alimb	576-B	Plane Table Outfit.....	Abboz
505	New York Rod.....	Aljeb	576-C	Plane Table Outfit.....	Abbud
510	Architects Rod.....	Aljer	584-B	Telescopic Alidade.....	Abnot
511	Architects Rod.....	Alnew	584-C	Telescopic Alidade.....	Abbuk
513	Telemeter Rod.....	Alond	585	Box Compass.....	Abome
514	Telemeter Rod.....	Alrob	586	Traverse Plane Table Outfit...	Ankud
514-B	Stadia Rod.....	Alsay	587	Traverse Plane Table Movement and Drawing Board.....	Anlic
514-C	Stadia Rod.....	Abaye	588	Box Compass.....	Anmid
514-D	Stadia Rod.....	Abayr	589	Ruler Sight Alidade.....	Anoby
514-E	Stadia Rod.....	Abayt	590-A	Pocket Sight Alidade.....	Anpad
515	Telescopic Rod.....	Abaza	590-B	Pocket Sight Alidade.....	Anruk
516	Cross Section Rod.....	Altic	592-C	Explorers Alidade.....	Abcag
517	Slip-Jointed Rod.....	Alubs	592-D	Explorers Plane Table Outfit...	Abcal
518-A	Plain Rod.....	Abbej	592-F	Explorers Plane Table Outfit...	Abcam
518-B	Plain Rod.....	Alvof	592-H	Explorers Plane Table Outfit...	Abcap
519-A	Plain Rod.....	Alwed	594	Army Sketching Case.....	Abcas
519-B	Plain Rod.....	Amand	596	Fiala Scout Sketching Case.....	Abced
520-A	Plain Rod.....	Ambin	609	Electric Register for Cur. Meters	Acrub
520-B	Plain Rod.....	Amcus	616	Current Meter.....	Acvod
521-B	Plain Rod.....	Amdut	617	Current Meter.....	Acwid
522-A	Plain Rod.....	Amfs	619	Time Recorder or Stop Watch..	Adaft
522-B	Plain Rod.....	Amgit	621	Current Meter.....	Adbel
522-C	Plain Rod.....	Amhow	623	Current Meter.....	Adbat
524-A	Plain Rod, 4 ply.....	Amild	628	Hook Gage.....	Abcek
525-B	Flexible or Pocket Leveling Rod	Amkoy	630	Printing Water Stage Register..	Anvel
526-A	Flexible or Pocket Leveling Rod	Ampod	632	Tape Reel.....	Anwat
		Amrid			

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Cat. No.	Description	Code Word	Cat. No.	Description	Code Word
633	Graphic Water Stage Register..	Abceet	V-50	Vara Steel Ribbon Chain Tape..	Abdik
634	Graphic Water Stage Register..	Abceev	V-100	Vara Steel Ribbon Chain Tape..	Abdin
634-A	Graphic Water Stage Register..	Abceic	780	Metallic Tape.....	Abdir
636	Graphic Water Stage Register..	Abceif	782	Metallic Tape.....	Abdit
637	Long Distance Register.....	Abceik	783	Metallic Tape.....	Abdir
638	Long Distance Sender.....	Abceit	786	Metallic Tape.....	Abdob
638-A	Long Distance Recording Outfit	Abceiv	790	Metallic Tape without Case....	Abdoo
638-B	Long Distance Indicating Outfit	Abceix	791	Metallic Tape without Case....	Abdof
638-C	Long Distance Recording and Indicating Outfit.....	Abceji	792	Metallic Tape without Case....	Abdog
639	Long Distance Indicator.....	Abcein	794	Metallic Tape without Case....	Abdol
639-A	Indicating Gage.....	Abceir	795	Reliable Steel Tape.....	Abdom
640	Monocular Hand Level.....	Aklut	796	Reliable Steel Tape.....	Abdop
643	Locke Hand Level.....	Akpow	797	Reliable Steel Tape.....	Abdos
646	Abney Hand Level.....	Aksoy	798	Reliable Steel Tape.....	Abduc
646-A	Abney Hand Level.....	Abceil	799	Reliable Steel Tape.....	Abdud
647	Abney Hand Level.....	Abcim	800	Reliable Junior Steel Tape....	Abdug
647-A	Abney Hand Level.....	Abcip	801	Reliable Junior Steel Tape....	Abdul
648	Abney Level with Compass....	Abcuv	808	Rival Steel Tape.....	Abdum
649	Stadia Hand Level.....	Aktye	809	Rival Steel Tape.....	Abdup
650	Iron Chain.....	Abcis	810	Rival Steel Tape.....	Abdus
651	Iron Chain.....	Abciy	811	Rival Steel Tape.....	Abduy
652	Iron Chain.....	Abcod	812	Rival Steel Tape.....	Abdye
653	Iron Chain.....	Abcoh	813	Rival Steel Tape.....	Abdyk
656	Steel Chain.....	Abcek	814	Wolverine Steel Tape.....	Abdyr
658	Steel Chain.....	Abcon	815	Wolverine Steel Tape.....	Abdyt
662	Steel Chain.....	Abcox	816	Wolverine Steel Tape.....	Abdyn
670	Brazed Steel Chain.....	Abpiti	817	Wolverine Steel Tape.....	Abdad
671	Brazed Steel Chain.....	Abret	820	Engineers Steel Tape.....	Abdsh
672	Brazed Steel Chain.....	Abstat	821	Engineers Steel Tape.....	Abdsh
673	Brazed Steel Chain.....	Abtoy	822	Engineers Steel Tape.....	Abdsh
690	Vara Chain.....	Abcur	823	Engineers Steel Tape.....	Abdsh
691	Vara Chain.....	Abcut	824	Engineers Steel Tape.....	Abdsh
694	Vara Chain.....	Abceux	831	Engineers Steel Tape.....	Abdsh
695	Vara Chain.....	Abcyb	832	Engineers Steel Tape.....	Abdsh
700	Vara Chain.....	Abcyo	833	Engineers Steel Tape.....	Abdsh
704	Vara Chain.....	Abcyf	834	Engineers Steel Tape.....	Abdsh
708	Vara Chain.....	Abcyg	835	Engineers Steel Tape.....	Abdsh
710	Vara Chain.....	Abcyl	841	Steel Tape Handles.....	Abesh
715	Meter Chain.....	Abcul	842	Steel Tape Handles.....	Abeco
719	Meter Chain.....	Acfon	844	Spring Balance for Tapes.....	Abect
723	Meter Chain.....	Acily	846	Steel Tape Clamp Handles....	Aboda
730	Meter Chain.....	Acker	849	String Level.....	Abeds
732	Meter Chain.....	Aclar	850	Extra Wide Steel Tape.....	Abedy
740	Marking Pins.....	Abcym	851	Extra Wide Steel Tape.....	Abeeb
742	Marking Pins.....	Abcys	852	Extra Wide Steel Tape.....	Abeec
743	Marking Pins.....	Abdah	853	Extra Wide Steel Tape.....	Abdia
744	Marking Pins.....	Abdan	854-A	Extra Wide Steel Tape.....	Abcef
748	Marking Pins.....	Abdat	854-B	Extra Wide Steel Tape.....	Abceg
749	Marking Pin Carrying Ring....	Abdav	860	Pocket Steel Tape.....	Abeel
750	Timber Scribe.....	Abdax	863	Pocket Steel Tape.....	Abecn
774	Steel Ribbon Chain Tape.....	Abdaz	866	Pocket Steel Tape.....	Abcep
775	Steel Ribbon Chain Tape.....	Abdeb	870	Pocket Steel Tape.....	Abces
776	Steel Ribbon Chain Tape.....	Abdeo	873	Pocket Steel Tape.....	Abefa
777	Steel Ribbon Chain Tape.....	Abdef	875	Pocket Steel Tape.....	Abefi
778	Steel Ribbon Chain Tape.....	Abdeg	877	Pocket Steel Tape.....	Abefs
779	Steel Ribbon Chain Tape.....	Abdep	879	Pocket Steel Tape.....	Abefy
M-20	Metric Steel Ribbon Chain Tape	Abdes	885	Punch and Riveter.....	Abega
M-25	Metric Steel Ribbon Chain Tape	Anper	886	Extra Eyelets.....	Abegi
M-30	Metric Steel Ribbon Chain Tape	Anrot	887	Eureka Tape Outfit.....	Abegs
M-50	Metric Steel Ribbon Chain Tape	Ansub	3153	Wood Box Pocket Compass....	Abegy
M-100	Metric Steel Ribbon Chain Tape	Antic	3154	Wood Box Pocket Compass....	Abeho
V-20	Vara Steel Ribbon Chain Tape..	Abdew	3155	Wood Box Pocket Compass....	Abeho
V-30	Vara Steel Ribbon Chain Tape..	Abdid	3215	Brunton Pocket Transit.....	Abeht



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