



TINSLEY LABORATORIES

Supplies for the Amateur

3017 WHEELER STREET

BERKELEY : CALIFORNIA



Operating under and co-operating with the Code of the Scientific Apparatus Industry.

Dedicated to

THE AMATEUR TELESCOPE MAKER

TINSLEY LABORATORIES



CLAYTON R. TINSLEY

This order, this unbroken chain of law,
Whence but from some divine transcendent Power.
Not less, but infinitely more than these.
Because it is their Fountain and their Guide."

—Alfred Noyes.

TELESCOPES

For School and Home



MARS, Drawing by Hamilton.

TINSLEY LABORATORIES
3017 WHEELER STREET
BERKELEY, CALIFORNIA, U. S. A.

Reflecting Telescopes.

EARLY in the Seventeenth Century Galileo placed a simple convex lens at one end of a tube and a concave lens at the other, thus producing a telescope of three diameters magnification. Although Galileo himself is not credited with the actual invention of the telescope, he eventually developed an instrument of thirty-three diameters magnification, a very considerable advance over previous efforts. Here, however, he could go no further, as special glass for this purpose had not yet been invented.

Even with the advent of better glass, Newton perceived as early as 1666 that the minimization of chromatic aberration and confusing color effects necessitated an entirely new type of telescope. He therefore reversed the refractor principal and reflected the light rays from the surface of a spherically concave mirror.

With the refinement of the spherical mirror to its present parabolic form, astronomical knowledge increased by leaps and bounds. Today, all of the larger telescopes of the world's observatories are reflectors. The reflector, in fact, is rapidly becoming universal for telescopes both large and small.

Until recently, however, many possessed of normal intelligent curiosity concerning our celestial neighbors have been obliged to content themselves with inadequate hand scopes of low power, or with occasional visits to distant observatories. for good equipment has been unnecessarily expensive. Today. Tinsley Laboratories offer astronomical instruments of highest standards at unprecedented prices. Efficient telescopes of wide variety and type are available for schools, institutions and for individual astronomy enthusiasts.

The following pages illustrate and describe reflecting telescopes both large and small, as well as auxiliary optical instruments, and it is suggested that you read each page carefully. Whether you plan the purchase of a high powered instrument, or require merely an additional ocular, you are assured of the highest standards of telescope manufacture— the fruits of fifteen years of research and experience.

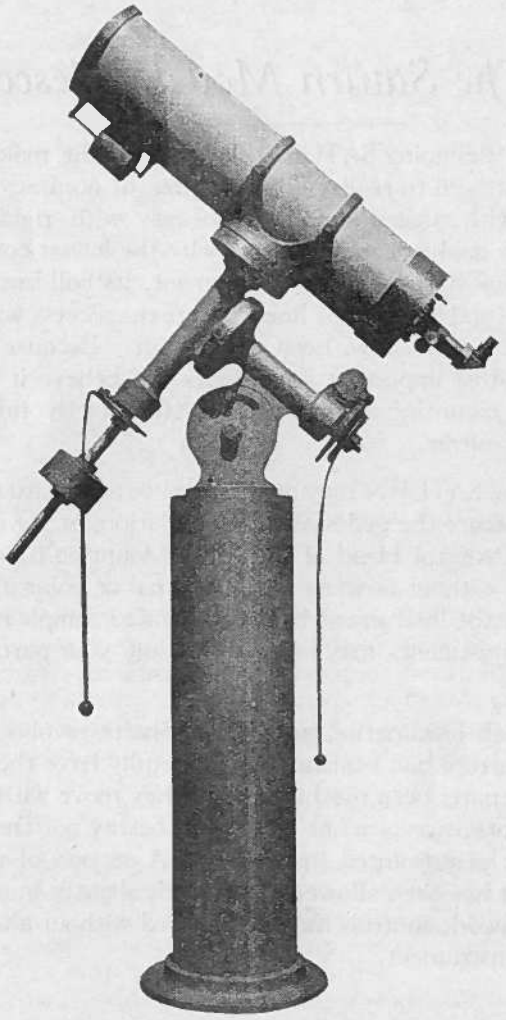
Special Note:—It is recommended that all those interested in any phase of astronomy obtain and read the book, "1001 CELESTIAL WONDERS," by C. E. Barns. This work takes the reader on a tour of the heavens in delightful manner. The book is listed elsewhere in this catalogue.

The Saturn Model Telescope.

IN designing SATURN Telescopes, the makers have striven to realize a high degree of accuracy coupled with rugged simplicity, beauty with rigidity, and finest quality commensurate with the lowest cost. · The unusual strength of the instrument, its ball bearing precision and its grace of line indicate the success with which these factors have been carried out. Because of these and other important advantages, we believe it to be an ideal mounting and a worthy setting for the finest parabolic mirror.

The SATURN may be adjusted to any latitude. Simply secure the pedestal to a foundation, or, if you prefer, the Pedestal Head of the Main Mounting to a concrete post, without concern for latitudinal or polar alignment. After the instrument has been secured, simple mechanical adjustments may be made to suit your particular locality.

Both Declination and Polar Shafts revolve on New Departure ball bearings. So carefully have these important parts been machined that they move with the ease and precision of a fine watch, yet betray not the slightest trace of unwanted instability. A section of the Polar Shaft has been allowed to protrude slightly in order that clockwork controls may be adapted without alteration to the instrument.



TWELVE-INCH CASSEGRAINIAN.

Tinsley

Ten, Twelve, Fourteen, Sixteen and Twenty Inch

Cassegrainians.

WHERE the highest powers and greatest light-gathering capacities are required, Tinsley Cassegrainian Telescopes are unsurpassed. Their beauty, precision of movement and efficiency of design make them ideal for universities, country estates and all other surroundings where the most efficient and convenient astronomical observation is desired, and where adequate facilities for housing may be had. The photoplate at the left shows the convenient location of the eyepiece, and the ease with which the instrument may be controlled.

Installation of this instrument is simplicity itself. After the pedestal has been secured, simple mechanical adjustments may be made for latitude and for polar alignment. Construction is such that adjustments may be made for equatorial use at any spot on earth.

Prices below are F. O. B., Berkeley, Calif., and do not include automatic clock controls which are separately priced herewith.

Reflector: Aluminized parabolic, standard focal length, *f* 4. E. F. L. of instrument, *f* 16.

Cassegrain Mirror: Conventional aluminized convex.

Mounting: Ball bearing equatorial.

Trim: Chromium plate or polished brass.

Finder: Achromatic low power telescope.

Controls: Local slow motion.

Setting circles.

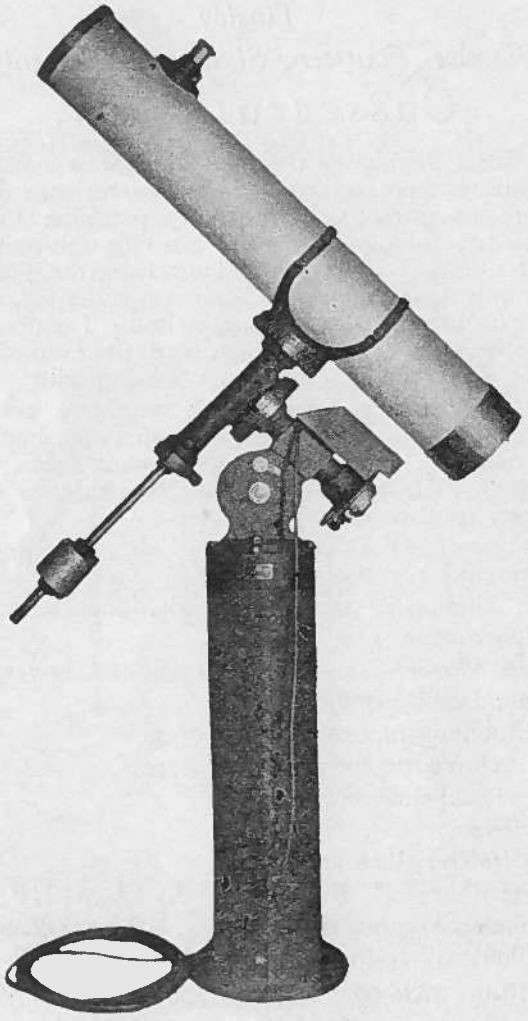
Eyepiece Holder: Rack and pinion.

Eyepieces: Four — 2″, 1″, ½″, ¼″, *f. l.* Diam., 1¼″.

Approximate Shipping Wts.: 10-in., 400 lbs. 12-in., 900 lbs. 14-in., 1000 lbs. 16-in., 1200 lbs. 20-in., 1500 lbs.

Prices: 10-in., ***$636.00.*** 12-in., ***$1150.00.*** 14-in., ***$1666.00.*** 16-in., ***$2063.00.*** 20-in., ***$2655.00.***

Electric Drive Clockwork, ***$75.00.***



SIX-INCH NEWTONIAN.

Tinsley

Six to Twelve Inch Newtonians.

SIMILAR to the larger instruments in design, yet of the Newtonian type, these instruments will be found ideal for many purposes. Of convenient size, yet of high power, their housing is a comparatively simple matter. Though formal observatory structure is preferable, their covering may consist of nothing more than a waterproof cloth. The same type of fine cell structure and equatorial mounting seen in the larger Cassegrainians is duplicated in the six and eight inch Newtonians.

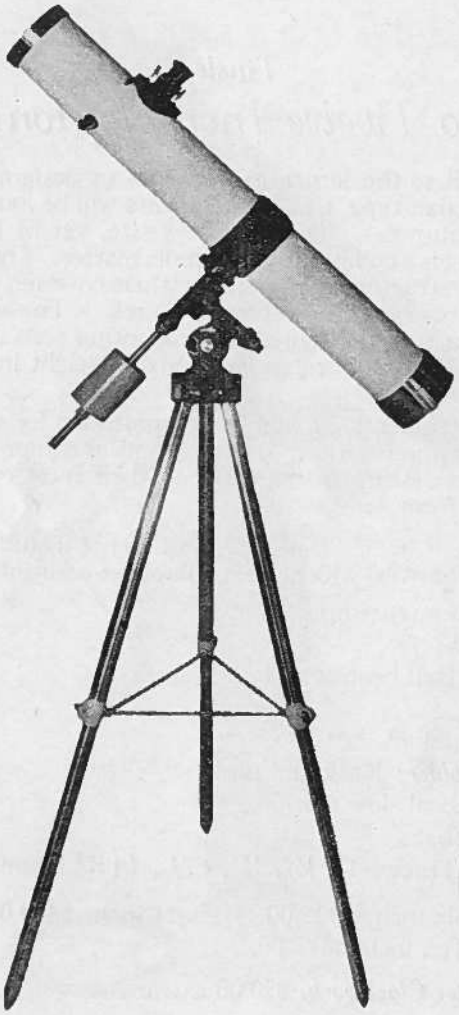
These instruments are highly recommended for schools having limited appropriations for astronomical equipment, and to all observers desiring instruments in their most compact and economical form.

Prices are F. O. B., Berkeley, and do not include automatic clockwork controls, which are available at additional cost.

Reflector; Aluminized parabolic.
Focal Length; *f*8.
Mounting: Ball bearing equatorial.
Finder: 8x.
Trim; Chromium.
Eyepiece Holder; Rack and pinion.
Controls; Local slow motion.
Setting Circles.
Eyepieces; Three—1″, ½″, ¼″, F. L. (1¼″ Diam.)

Six inch, $325.00. Eight inch, $400.00.
Ten inch, $475.00.

Electric Drive Clockwork, $50.00 extra.



FOUR-IN. EQUATORIAL REFLECTOR

Tinsley

Four-inch Equatorial Reflector.

THE Four–Inch Portable Equatorial may now be obtained combined with the famous "SATURN" Mounting. The Mounting is of bronze throughout, and the bearings run the entire length of the housing, giving a delightful smoothness combined with lateral rigidity.

The Tube rotates in its cradle, thus permitting the eyepiece to be used in the most convenient position.

The Setting Circles are are of blackened brass with lines and numbers in white, giving extreme visibility in dim light.

Circles read to 5° in declination and to 10 minutes of time.

The Tube is of aluminum finished in cream colored crystalized lacquer with end trim of polished aluminum.

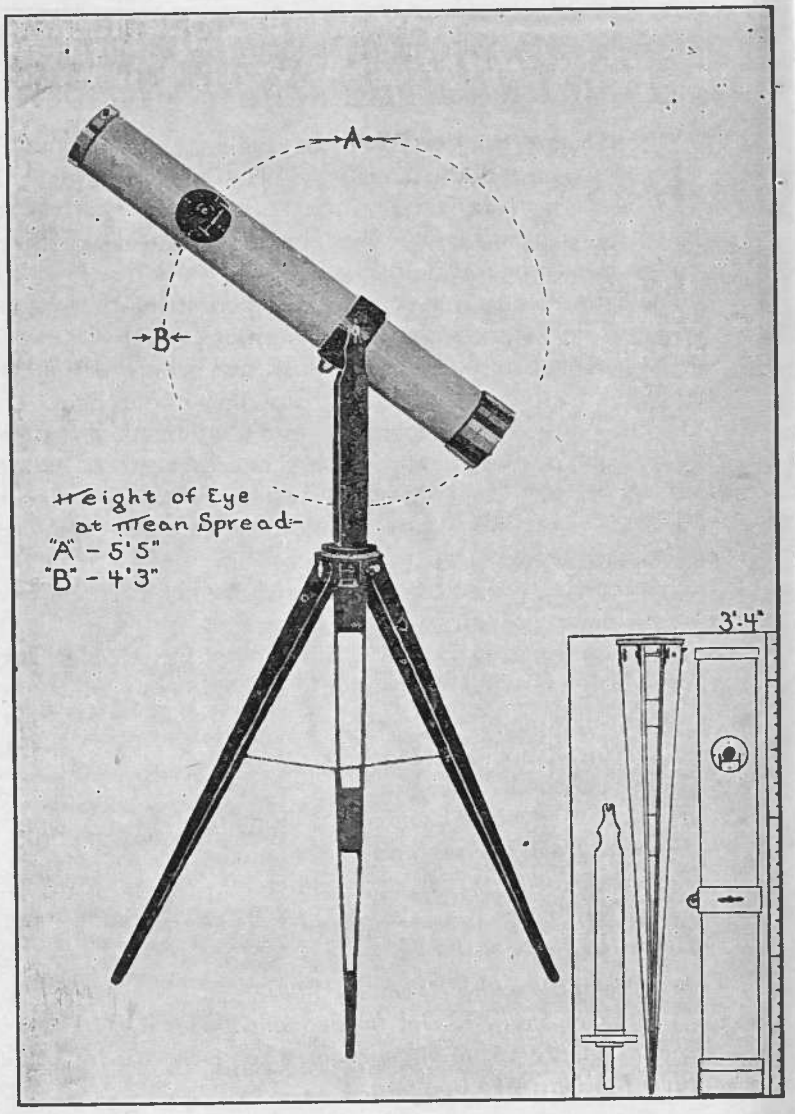
Tripod is of heavy duralumin tubing with telescoping legs tipped with brass points.

By removing two screws only, the Mount may be transferred to a permanent pedestal.

Prices are F. O. B. Berkeley, and do not include Slow Motions which are available at additional cost.

Reflector: Aluminized Parabolic.
Mounting: Equatorial portable.
Trim: Polished Aluminum.
Tripod: Telescoping Legs of Duralumin.
Eyepiece Holder: Rack and pinion.
Focal Length: 32 inches, approximately.
Eyepieces: Three Ramsden—1", ½", ¼",—1¼" diam.
Respective Powers: 32, 64, 128.

Price complete with Tripod, $175.00.
With Steel Pedestal for permanent Mount, $165,00.
Mount and Tripod to fit your tube, sizes, 2-in. to 5-in, $75.00.
Slow Motions, $25.00 extra.



FOUR-INCH NEWTONIAN. (Inset: Portability of Mount).

Tinsley
Four-Inch Portable

Newtonian Reflector.

THE four inch tripod mounted portable Newtonian telescope is designed to meet a combination of demands. It is, first, an instrument for high grade astronomical use; second, being equipped with erecting system, it is also a terrestrial telescope (optional); third, it can be put together and taken apart again in a matter of seconds; fourth, it is compact and convenient for moving from place to place; fifth, it is inexpensive.

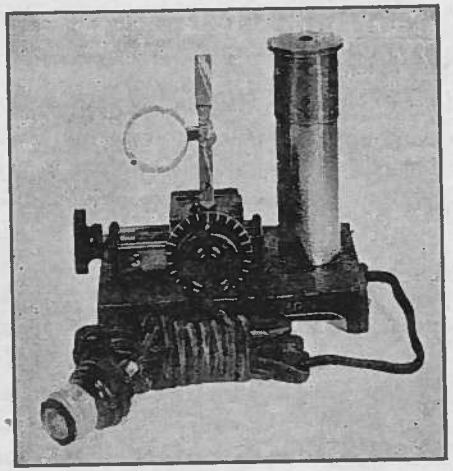
This all-purpose altazimuth instrument is constructed almost entirely of cast brass, and its moving parts are very accurately machined. There is none of the instability associated with tripod mounts, and both tube and mounting move with delightful smoothness and precision. Moreover, the instrument remains as set, and cannot be moved by even a strong breeze. Not only is this four inch instrument an invaluable aid to the astronomy student, but, thanks to its erecting system, it serves as a highly efficient and entertaining land scope.

Furnished complete with carrying case, F. O. B., Berkeley. Net weight, 30 lbs.

Reflector: Aluminized parabolic.
Mounting: Altazimuth portable.
Trim: Chromium.
Tripod: Duralumin throughout.
Eyepiece Holder: Rack and pinion.
Focal Length: 32 inches, approximately.
Eyepieces: Astronomical only; three — 1", ½", ¼" 1¼" diam. Respective powers, 32, 64, 128.

Prices:	With Case	Without Case
Astronomical only,	$165.00	$134.00

Terrestrial Eyepiece, $12.00 extra.

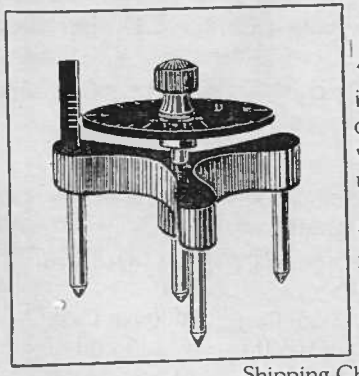


THE TINSLEY FOUCAULT KNIFE EDGE AND EYEPIECE TESTER eliminates improvised and inefficient methods of figuring the parabolic mirror.

Equipped with both knife edge and holder for 1¼" eyepiece, either test may be made with the greatest facility, as the eyepiece holder slips out of the way when the knife-edge is in use, and vice versa.

Adjustments may be made to secure any of three sizes of pinholes. In addition to the lateral adjustment for cutting in and out, provision has been made for the lowering or raising of the eyepoint. Micrometer readings are in thousandths.

The Tinsley Foucault Knife Edge and Eyepiece Tester operates on 110 V., and is furnished complete with 5 watt lamp and nine feet of cord. $12.50



ANOTHER great aid to the Instrument maker is the SPHEROMETER, in that it does away with the necessity of sun tests for focal length, as well as inefficient forms for measuring curvature.

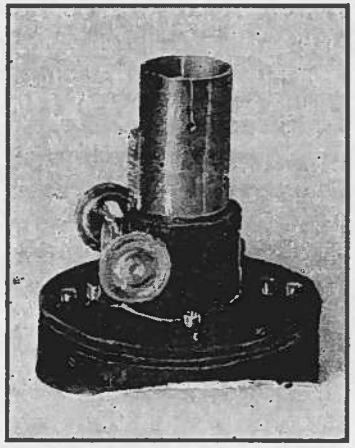
With the Tinsley Spherometer it is a simple matter to read the focal length at any time, under any conditions. Micrometer readings are in thousandths.

$4.50

Shipping Charges Prepaid

Tinsley

Eyepiece Holders.



Tinsley Eyepiece Holders are of the rack and pinion type and controled by a knurled knob which stands well clear, and is easily found and operated in the dark. The rack gives a full two and one-half inches of travel which is sufficient to accommodate both positive and negative eyepieces.

The base of the Eyepiece Holder is flat, and there is furnished in addition a saddle to fit the curvature of any tube specified. The alignment is controled by the push-pull screws shown. The saddle is is to be secured firmly to the telescope tube. The parts that show bright in the picture are chromium plate.

Price, complete with saddle to fit your tube, ***$9.50***.

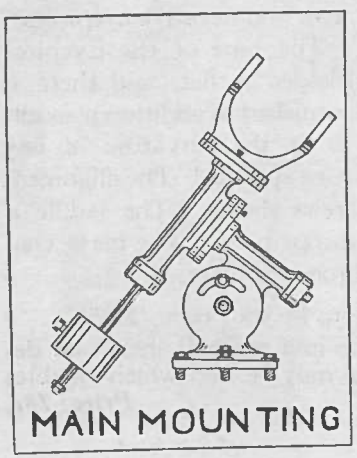
Should a longer travel than two and one-half inches be desired for any reason, an adapter may be had which doubles the available length of the tube. . . ***Price: 75c.***

Tinsley

Telescope Mountings and Parts.

THE Main Mounting, as indicated below, is that portion of the instrument extending from the pedestal to the tube. The saddle and saddle hoops, being cast, hold the tube snugly, thus eliminating the instability usually found where pliable straps are employed. All mountings, except the four-inch altazimuth, are of the equatorial type, and readily adaptable for clockwork control. The equatorial mountings are equipped with ball bearings throughout.

Any of the aforementioned mountings, except the four inch, may be equipped with local slow motion controls at an additional cost of $50.00, (not including special sizes above twelve inches).



MAIN MOUNTING

MAIN MOUNTING ONLY

6″ (for 7″ tube), $100 00
8″ (for 9″ tube), 105.00
10″ (for 11″ tube), 115 00
4″ (for 5″ tube), with complete Tripod, . . $75.00
Without Tripod, 50.00

F. O. B. Berkeley.

Tinsley

Rough Cast Mountings and Parts.

ALL of the major parts of the instruments described in this booklet are available in rough cast form. This will appeal to the machinist having the advantage of machine lathe and drill press facilities. Comprehensive blueprints for accurate machining are furnished with all rough castings. Certain parts, such as bearings and bolts, are included with castings, as these could not be satisfactorily home-manufactured.

MAIN MOUNTINGS

6″ (for 7″ tube), $37.00
8″ (for 9″ tube), 39.00
10″ (for 11″ tube), 42.00
12″ (for 13″ tube), 75.00

(Raw lead for counterbalance not included unless specified).

MAIN MOUNTING for 4″ equatorial (for 5″ tube).

Complete with Dural for Tripod, $30.00
Without " 15.00

CELL, CELL CAPS, and END PIECES:

	Order corresponding casting by this No.				
C4	RC4	$2.00	CC8	RCC8	$8 00
C6	RC6	2.50	CC10	RCC10	18.00
C8	RC8	5.50	CC12	RCC12	30.00
C10	RC10	10 00	U4	RU4	85
C12	RC12	16.00	U6	RU6	1.25
CC4	RCC4	3.00	U8	RU8	2.50
CC6	RCC6	4.50	U10	RU10	4.00
			U12	RU12	6.00

F. O. B. BERKELEY.

DIAGONAL or PRISM HOLDER.—Designing a holder for the Diagonal or Prism is always a difficult job. Tinsley Laboratories have developed an article, adjustable in any plane and easily attached to any tube.

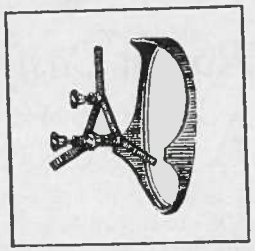
There are four radial legs, very slender, while the holder proper has four adjustable screws, and may be moved longitudinally in the tube.

For any size tube.

Prices: *5″, $2.00. 7″, 2.50. 9″, 3.00. 11″, 3.50. 13″ 4.00.*

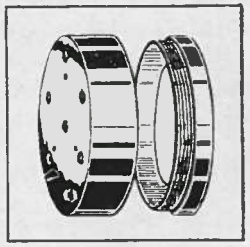
Odd sizes to order.

The CELL STRUCTURE for holding the parabolic mirror is very important in that it can "choke" the reflector or otherwise produce inefficiencies unless properly designed. The cell herewith pictured is employed in all Tinsley telescopes, and is fitted with three spring tension adjustment points, permitting proper alignment of the mirror with the greatest ease. Adaptable to any type of cell cap. Blackened brass.



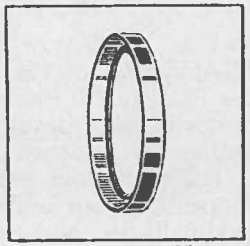
Reflector sizes:	4″	6″	8″	10″	12″
Number:	C4	C6	C8	C10	C12
Price:	$5.00	$8.00	$12.00	$20.00	$30.00

THE CELL CAP is that part which covers the cell structure and lower end of tube When used in conjunction with the cell described above, the adjustment points protrude through for easy manipulation, When the cap is unscrewed, both cell and mirror are removed with it. The entire assembly is very simply secured to any tube of proper dimensions, and will add beauty and efficiency to your instrument. Made of brass, with brass or chromium finish, as ordered. Six inch cell fits seven inch cell cap, and so on.



Tube sizes:	5″	7″	9″	11″	13″
Number:	CC4	CC6	CC8	CC10	CC12
Price:	$10.00	$15.00	$25.00	$40.00	$60.00

THE UPPER END PIECE is trim for the upper end of the tube, and gives that finished appearance so desired by the in strument owner whose observatory is his pride. Easily secured to any tube of proper dimensions. Made of brass, with either brass or chromium finish, as ordered.



Tube sizes:	5″	7″	9″	11″	13″
Number;	U4	U6	U8	U10	U13
Price;	$3.50	$4.00	$7.00	$10.00	$14.00

Telescoping Brass Tubing.

For Eyepieces and Finders.

1 5-16in. or 1 1-4in., inside diam., per inch. *5cts.*

Larger sizes of Brass Tubing; Brass and Steel Rod; Nuts, Bolts and Bearings. Write for Prices.

110v. Miniature Lamp for Knife-edge Tester, *30c*. Socket, *45c*

STAR DIAGONALS consist of an elongated eyepiece holder bent at right angles, a prism being inserted at the angle. These are extremely convenient for observing stars at high altitudes with refractors and Cassegrains as one may look into the instrument horizontally. Their use requires that the focal plane of the mirror or objective lens be brought out through the eyepiece holder approximately two inches beyond the usual point. Their purchase is only recommended where the user may change the location of the eyepiece holder or otherwise make the necessary adjustment.

Price; $16.00, postpaid.

SOLAR DIAGONALS are similar to star diagonals save that the prism is replaced with a wedge of glass which permits most of the light of the Sun to escape, only a small fraction reaching the eyepiece proper. A dark glass cover is provided in addition.

Price: $12.00, postpaid.

SETTING CIRCLES, any type, made to order.

Write for prices.

Silvering.

Tinsley Silvering is by the Brashear process; and when requested, is protected by a thin coating of transparent lacquer. A lacquered surface will endure indefinitely; but where the highest efficiency is desired, lacquering is not recommended.

If you wish your speculum tested before silvering, we shall be glad to consult you before proceeding. There is no charge for this test. Specula are returned by express, in specially constructed boxes, charges collect.

4"—$2.00 6"—$3.00 8"—$4.00 10"—$5.00 12"—$6.00

Materials for Silvering.

C. P. Silver Nitrate, . Per Oz., *.85*. Per ¼ lb , *$2.25*

Other chemicals not admitted to the mails

SILVER PROTECTING CLOTH.—Something new and unsurpassed for the purpose. This cloth of soft Canton Flannel, heavily impregnated with Silver Salts, takes up and absorbs gases and other elements in the air which tarnish your mirror. Positively eliminates lacquering and protects the mirror surface when mirror is not in use as though it were in vacuum. The cost is very reasonable. We urge you to try it.

4" to *6"*, *25*cts *8"* to *12"*, *50*cts.

1 5-16, or 1 1-4, inside diam., per inch, *5cts*.

110 v. Miniature Lamp for knife-edge tester, *30c*. Socket. *45c*.

Mirrors Aluminized.

THE new PANCRO process, an alloy of Magnesium and Aluminum, gives all the benefits of pure Aluminum coupled with more equal selection of ALL the colors of the spectrum, This coating is, as the name implies, panchromatic, giving beautiful star and planet images in true colors. The deposit is made in an extremely high vacuum, and the surface is protected by a very hard, transparent film of Aluminum Oxide. (*See The Physical Review, Feb. 1, 1933.*)

Price:—$1.25 per diam: inch: i. e. 4", $5.00; 6". $7.50, etc.

Tinsley

Parabolic Telescope Reflectors.

BY far the most important part of a reflecting telescope is the parabolic mirror. For the most effective performance, it must be the product of practiced hands and delicate instruments. Even after hours of polishing by almost human machinery, the finishing parabolization touches must be made by hand.

In the introduction to this booklet, the principle of the parabolic mirror is explained. The parabolization of the otherwise spherically polished surface consists of a correction for spherical aberration. It is also important that the mirror be "under parabolized" or "over parabolized" to allow for falling evening temperatures or rising morning temperatures, respectively.

Very high grade glass is required for the parabolic mirror to insure against internal stress and strain. A reflector of inferior glass will appear as a choppy sea under critical instrumental observation. Tinsley Reflectors are made of Pyrex of correct thickness.

Mirrors are shaped to *f*8, or as specified. Prices include aluminizing.

Prices: 4", $40. 6", $60. 8", $80. 10", $130. 12", $180.

Larger sizes manufactured to order.

CORRECTION OF TELESCOPE MIRRORS.

Imperfect mirrors corrected and parabolized. Send your glass to us for free criticism and estimate.

(Mirrors under eight inches, minimum charge, $20.00.)

CASSEGRAINIAN SECONDARY MIRRORS

Manufactured to Order.



Achromatic Telescopes.

Rhodium plated draw tubes and attractive ribbed vulcanized fiber body assure permanence and durability. The smooth acting, true fitting tubes permit quick focusing and perfect alignment at all times. Packed in a sturdy waterproof case.

Power	Diameter of Objective	Length Extended	Length Closed	Draw Tubes	Field at 100 yds.	Weight	PRICE:
10X	⅞"	14¾"	5⅜"	3	33 yds.	6 oz.	$7.50
15X	1¼"	18⅝"	6½"	3	25 yds.	12 oz.	10.00
20X	1 7-16"	24⅞"	8"	3	21 yds.	15 oz.	12.50
25X	1 11-16"	30½"	9"	4	17 yds.	26 oz.	17.50
35X	2"	38"	10⅞"	4	15 yds.	40 oz.	32.50
*45X	2¼"	48"	12½"	4	13 yds.	60 oz.	47.50

*When used with celestial eyepiece, magnification is 68X.

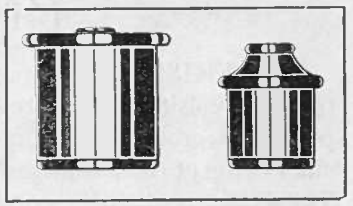
DARK GLASS FILTER: for Solar observation Supplied in mount to fit any of the above Telescopes, *$2.50.*

Three point adjustable brackets may be had for attaching the Finder to the telescope tube. . *Price: $1 00* per pair.

INVERTING EYEPIECES: Many times it is desirable to use the astronomical telescope for viewing the landscape. Ordinarily the view will appear upside down. This is obviated by the use of an Inverting Eyepiece which brings the picture right side up. Our inverting eyepieces can be slipped into the eyepiece holder in place of the regular eyepiece. Your standard eyepieces may then be used to obtain any power desired.

Price: $12.00, postpaid.

Eyepieces.



EYEPIECES, or oculars, are manufactured in a variety of sizes and focal lengths for a variety of purposes. American standard telescope oculars are 1¼" in diameter. The ⅞" type, entirely suitable for telescopic use, is also listed below, as it is very convenient for certain types of instruments. Focal lengths of both the ⅞" and 1¼" eyepieces are given below in inches and millimeters. The shorter the focal length the higher the power, the 1" having twice the magnifying power of the 2", and the ½" twice that of the 1"; the ¼", in turn, will produce an image twice that of the ½", and so on.

⅞" HUYGHENIAN NEGATIVE

mm.	inches	Price
50.	2	$4.00
25.	1	4.00
20.5	4-5ths.	4.00
15.6	3-5ths.	5.00

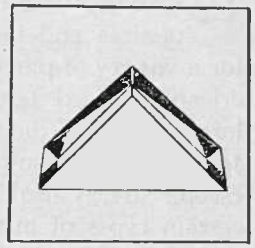
TOLLES

Inch	Price
½	$6.00
2-5	6.00
⅓	6.00
¼	6.00
1-5	6.00

1¼" RAMSDEN POSITIVE

mm.	inches	Price
50.	2	$6.50
37.5	1½	6.50
30.25	1¼	6.50
25.	1	6.50
18.75	¾	6.50
12.5	½	6.50
6.25	¼	6.50

Prisms.



THE PRISM is the true marvel of optical precision. The three sides of the prism are ground to perfect flats, two sides being at right angles to each other. These right angle prisms are accurate to one wave-length of light.

For Newtonian telescopes approximating *f*8 focal lengths, the following size prisms are used:—

Four-inch	Parabolic Mirror,	1″ Prism.
Six ″	ditto,	1¼″ ″
Eight ″	ditto,	1½″ ″
Ten ″	ditto,	1¾″ ″
Twelve ″	ditto,	2″ ″

Prices: — ½″, $3.50. ¾″, $4.50. 1″, $5.00. 1¼″, $6.50. 1½″, $8.00. 1¾″, $11.00. 2″, $15.00

Larger sizes up to 4″. Shipping Charges prepaid.

Prism Blanks.

For those who wish to make their own right angle Prisms.

1″ — $1.80. 1¼″ — $2.70. 1½″ — $4.10.

Silvered Diagonals.

For use in the Newtonian telescope in place of the prism.

For a 4″, or 6″ Mirror, 50c. 8″, 75c. 10″, $1.00. 12″, 1.50.

Prepaid.

Amateur Telescope Making.

What it is all about.

THE Amateur Telescope Maker has played an important part in the advancement of astronomy. Not only has the amateur served this science by his very enthusiasm, but he has been the discoverer of many hitherto unknown facts of greatest significance.

During the last ten years the amateur telescope maker has persevered in spite of seemingly insurmountable obstacles. Impure polishing materials and bulging glass could not hold him down. He organized and traded information until today he numbers his fellows in thousands, and his cooperative societies are networked over the entire country.

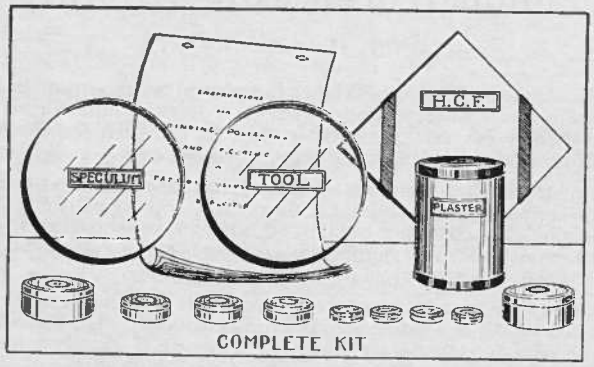
Thanks to the pioneering amateurs, materials of highest quality are now at the disposal of the industrious instrument-maker. The pages herewith not only offer castings for the home manufacture of excellent mountings, but items such as properly annealed glass discs, pure abrasives and rouge, tempered pitch and honeycomb wax are listed singly and in a variety of combinations. Complete Reflector Making Kits, containing all necessary materials for grinding and polishing the parabolic reflector, as well as simple non-technical instructions, have been prepared in sizes from 4″ to 12″.

The question is often asked, "If I make my own reflector with a Tinsley kit, what else will I need before I can do actual observing?" The question is a fair one, but difficult, as the requirements of the individual instrument maker are premised upon his own ingenuity and desires. Basicly, the three optical parts of the ordinary Newtonian telescope are the reflector, the prism and the eyepiece. The mounting may consist only of a few pieces of wood for retaining these cardinal parts in their proper respective positions. Inventive amateurs have made excellent mountings of pipe joints and old automobile parts. Of course where instruments of high efficiency are desired, there are the Tinsley equatorial mountings, available either ready for use or in rough cast form.

The choice of reflector making kit is an important one, and it is well to begin with the size desired ultimately. It is about as easy to grind and polish a ten-inch mirror, for example, as a four-inch; and the glass itself can not be spoiled, unless actually broken. No matter how inaccurate your first attempt may be, the same glass can be re-shaped and re-polished an inestimable number of times. Most amateurs, however, achieve gratifying results from the start.

The spots of light which are the planets will turn into fascinating worlds when viewed with your own telescope made with your own hands. Why not allow TINSLEY LABORATORIES to help you make such an instrument at minimum cost?

"A" Type Kits.



COMPLETE KIT

Complete Reflector-making Kits include the two glass discs for Speculum and Tool of suitable thickness, eight grades of abrasive, rouge, Beginners' Instructions, and materials for either the honeycomb or pitch polishing laps. Honeycomb is recommended and will be supplied unless otherwise directed by the purchaser.

4″,–$4.00. 6″,–$5.00. 8″,–$10.00. 10″,–$15.00.

"B" TYPE KIT

Our "B" Type Kits are the same as the "A" Kits, but in addition contain a $4.00 Huyghenian Eyepiece and a Diagonal Mirror, unsilvered.

Note: Should you send your finished Mirror to us for silvering, no extra charge will be made for silvering this Diagonal.

4″,–$8.00 6″,–$9.00 8″,–$14.00. 10″,–$19.00

"C" TYPE KITS

Our "C" Type Kits are the same as the "A" Kits, and in addition contain a $6.50 Ramsden Eyepiece and a fine right angle Prism of suitable size.

4″,–$15.00 6″,–$18.00 8″,–$24.00 10″,–$32.00

Shipping weights: 5, 9, 15, and 22 lb., respectively.

Glass.

GLASS DISCS for making Telescope specula (mirrors) should have very definite qualifications if success is to be looked for: —

(*a*) The glass disc should be at least one-eighth of its diameter in thickness. TINSLEY discs all conform to this standard.

(*b*) The glass should be of uniform consistency and well annealed.

(*c*) It should be free from edge chips, with edges ground, and of smooth, circular contour. Do not accept anything less.

BLANK DISCS.

For Reflector:			For Tool:		
Size	Thickness		Size	Thickness	
4″	⅝″	$1.50	4″	½″	$1.25
6″	1″	3.00	6″	½″	1.50
8″	1″	4.50	8″	¾″	3.00
10″	1¼″	7.00	10″	¾″	5.00

Weights: 1, 3, 7, and 13 lb., each, respectively.

EYEPIECE LENS BLANKS

Of Good Quality Crown Glass

⅝″ Diam., . . 15c
¾″ " . . 20c
1″ " . . 30c

SCHOTT-JENA CROWN AND FLINT TELESCOPE OBJECTIVE DISCS

Clear Aperture	Per Pair
2″ .	$4.00
3″ .	10.00
4″ .	18.00
5″ .	35.00
6″ .	45.00
8″ .	140.00

Pyrex Kits.

PYREX Glass for Speculum and Plate glass for Tool, with eight grades of abrasive, rouge and pitch.

6" – $6.00. 8" – $11. 10" – $16.00. 12½" – $26.00

Shipping Weights: 9, 15, 22 and 32lb.

Diam.	Thickness	Mold Finished	Edges Ground Perpendicular, Both Surfaces Plane	
		TYPE A	TYPE B	
4¼"	¾"	$1.75	$3.75	Wt., 1lb.
6"	1"	3.25	4.75	3
8"	1⅜"	4.75	6.65	7
10"	1¾"	7.00	9.75	13
12½"	2⅛"	13.00	18.25	25

The Type A blank is rough molded exactly is it comes from the manufacturer. The Type B blank has been ground accurately round, with edges at right angles to the faces. The faces themselves have been ground flat and parallel, but not polished.

For prices on glass for tools, look on page 27.

Not prepaid.

Abrasives.

The unguided amateur can find plenty of trouble when it comes to a choice of abrasives. Emery was formerly used for our purpose but required enormous energy from the workman. Modern abrasives made for working glass have entirely superceded this inefficient grit.

TINSLEY LABORATORIES continues to try out everything that comes on the market; and after years of experience has chosen the best for the purpose — quick-cutting from the start, soft as velvet and scratchless, in the finest grades. Fine grinding need no longer be dreaded.

ABRASIVES AND ROUGE.

(Sealed in Metal Containers)

No. 80 Coarse Grinding Abrasive, .	½lb. tin, 25c	Lb. 50c.
Nos. 100, 150, 220, 320, 400, 500, . each,	2oz. tin, 30c.	Lb. 1.00
No. 600, Finest Grinding Abrasive, .	2oz. tin, 50c.	Lb. 1.50
Optician's Rouge, . .	2oz. tin, 30c.	Lb. 1.00

POLISHING LAPS.

There are many forms of polishing laps, two of which stand out pre-eminently over all others. First, there is the old tried-and-true pitch lap, surfaced with beeswax; second, the Honeycomb Foundation lap, set on a base of plaster.

The pitch lap is messy to make and should be carefully tempered, as is the pitch furnished by TINSLEY LABORATORIES. The Honeycomb Foundation lap on plaster is easy to make and best for the beginner.

Prices are as follows:—

Plaster—per 12oz. container. .	$ .20
Tempered Pitch—per lb., . .	.80
Honeycomb Foundation—8x12 sheet,	.30
NOTE: On glasses larger than 8-in., join two sheets.	
Beeswax, in cakes, per ¼lb. cakes, -	.30

Add 10c packing charge on each sheet of Honeycomb.

Finders.

THE following addition to our line marks a step in advance in the supply of accessories for amateur-built instruments. We offer three Finders that are without doubt the very best obtainable.

These Finders all give images as sharp and clear as the best astronomical telescopes. They are finished in polished and lacquered brass, with dew-cap. The 15x and 10x may be be had with electrically lighted cross-hairs at a slight increase in cost. The observer locates the object in the field, then by pressing the lever, views the cross-hairs ruled sharply against the sky, and centering the object is instantaneous and easy—a grateful saving of time and patience during a long evening's observations. The source of the current may be either a flashlight battery or A. C. current delivered through a small step down transformer.

15x:—1½" Objective gives a field 2° 45′ wide. Overall length, 17-in. PRICE, plain, $18.00. Electrically lighted, $21.00.

10x:—1¼" Objective gives a field 4° wide. Overall length, 12-in. PRICE, plain, $15.00. Electrically lighted. $18.00.

8x:—1" Objective gives a field 5° wide. Overall length, 10-in. PRICE, (plain only), $12.00.

Not prepaid,

Publications Available.

"1001 Celestial Wonders as Observed with Home Built Instruments," by C. E. Barns, 3rd. Ed. (Pacific Science Press). Undoubtedly the best guide obtainable for the amateur astronomer in locating and studying the stars. Recommended by leading authorities. Contains 72 Star Charts in color and over 100 illustrations. Several chapters are also devoted to amateur instrument-building The first book the owner of a telescope should obtain. *Price: $2.50, postpaid. Canada and For., $3.00.*

"Amateur Telescope Making," edited by AlbertG. Ingalls. New edition. (Scientific American Pub. Co) Practically everything of value known to the amateur instrument-maker. From the elemental fundamentals to the most intricate formulae the reader may find how to construct and test any and all parts of telescopes and accessories. An inexhaustible fund of information. *Price: 3.00, postpaid* Canada and For., *3.25.*

"Instructions for Grinding and Polishing a Parabolic Reflector Telescope." An eight-page illustrated non-technical pamphlet, included free of charge with complete reflector-making kits listed in another Price List. *50cts.*

"The Barritt-Serviss Star and Planet Finder."



This map has received the highest endorsement of professional and amateur astronomers the world over as the most simple and practical device for locating the heavenly bodies ever designed. Thousands in use everywhere. Good for any latitude and time of day or night in the calendar year. Invaluable to the amateur.

Price: 5.00.

Not Prepaid.

OTHER TINSLEY PRODUCTS

Astronomical and Terrestrial Telescopes

Sizes up to Thirty Inches

Special Optical Equipment

Manufactured to Order

Electric Clock Drives and Slow Motions

NOTICE TO CUSTOMERS.

ARTICLES marked "Prepaid" will be sent by Parcel Post. Orders for other apparatus not accompanied by proper postage will be shipped postage collect.

Foreign shipments entailing extra transportation cost, consular fees, etc., will also be sent subject to collection for the extra amount.

There is a postal charge on all "C. O. D." collections, and it is therefore advisable to ascertain shipping charges from your local Post Office, or compute same from Zone Rates below. Surplus postage refunded.

PARCEL POST RATES.

Parcels weighing up to 8oz. may be mailed any distance for 1½c. for each 2oz. Parcels weighing more than 8oz. take pound rates shown in the table below, a fraction of a pound being considered a full pound.

ZONES	1st & 2nd Up to 150 Miles	3rd 150 to 300 Miles	4th 300 to 600 Miles	5th 600 to 1000 Miles	6th 1000 to 1400 Mi.	7th 1400 to 1800 Mi.	8th Over 1800 Miles
For weights from 8 ounces to 1 pound the postage is	8c	9c	10c	11c	12c	14c	15c
For each additional pound or fraction, add	1.1c	2c	3.5c	5.3c	7c	9c	11c

Ex: If your P. O. is in the 2nd Zone, over 50 but not over 150 miles from us, parcel wt., 10lb, the charge is 8c for the 1st pound, plus 1.1c per pound for each of the additional 9 pounds, a total of 18c.



NEWTON'S FIRST REFLECTOR
Preserved in the Archives of the
Royal Society of England.