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BAUSCH & LOMB

Life Long

BINOCULARS

PRICES AND SPECIFICATIONS

for Catalog G-19



Bausch & Lomb Life Long Binoculars

Code Word	Catalog No.	Description	Power	Objective Diam. in mm	Prices Effective March 1, 1935
<i>Jaicy</i>	61-26-01-01	Sport Glass.....	2	27.4	\$16.00
<i>Jepox</i>	61-26-40-20	Companion Field Glass.....	4	38.1	17.50
<i>Jesub</i>	61-21-60-01	Binocular C.F.....	6	30	72.00
<i>Jetax</i>	61-21-61-01	Binocular I.F.....	6	30	66.00
<i>Jaixt</i>	61-21-70-01	Binocular C.F.....	7	35	86.00
<i>Jaizw</i>	61-21-71-01	Binocular I.F.....	7	35	81.00
<i>Jadex</i>	61-21-75-01	Binocular I.F.....	7	50	118.00
<i>Jesex</i>	61-21-80-01	Binocular C.F.....	8	30	82.00
<i>Jesoz</i>	61-21-81-01	Binocular I.F.....	8	30	76.00
<i>Jajav</i>	61-21-90-01	Binocular C.F.....	9	35	93.50
<i>Jajec</i>	61-21-91-01	Binocular I.F.....	9	35	88.50
<i>Jacew</i>	61-21-04	Binocular I.F.....	10	45	105.00
<i>Jadoz</i>	61-21-05-01	Binocular I.F.....	10	50	132.00
<i>Jaesm</i>	61-41-25-19	NRA Spotting Scope with 19.5X Eyepiece	19.5	50	55.00
<i>Jaetn</i>	61-44-67	19.5X Eyepiece.....	19.5		7.50
<i>Jaeop</i>	61-44-70	12.8X Eyepiece.....	12.8		6.00
<i>Jaexs</i>	61-44-65	26.0X Eyepiece.....	26.0		6.00
<i>Jaexv</i>	61-44-63	36.5X Eyepiece.....	36.5		7.50
<i>Jatax</i>	61-48-05	Leather case and strap.....			7.00
<i>Jafey</i>	61-47-29-25	Metal Tripod.....			10.50
<i>Jafiz</i>	61-47-31	Wooden Tripod.....			35.00
<i>Jafob</i>	61-48-08	Metal Container for one Eyepiece.....			1.50
<i>Jerix</i>	61-41-20	Draw Tube Spotting Scope.....	20	45	30.00
<i>Jetey</i>	61-47-27-26	Table Tripod with Binocular Support.....			14.75
<i>Jetiz</i>	61-48-26	Binocular Support only (without tripod).....			9.85
<i>Jetob</i>	61-47-24	Adjustable Metal Floor Stand on base.....			35.00
<i>Jetay</i>	61-48-29	Tripod Adapter for Large Wooden Tripod.....			2.75

C.F.—Central Focusing Eyepieces I.F.—Independently Focusing Eyepieces

The prices herein are subject to change without notice and to increase for taxes, excises or other charges imposed by governmental authorities with respect to articles listed herein or to the sale thereof.

Bausch & Lomb Optical Company
Rochester, N. Y., U. S. A.





BAUSCH & LOMB

Life Long

BINOCULARS



Bausch & Lomb Optical Co.
Rochester, N. Y., U. S. A.

New York
Los Angeles

Chicago
London

San Francisco
Frankfurt a/M.



In 1609 Galileo was acclaimed by distinguished citizens of Venice when he demonstrated his first telescope from the tower of St. Marks.

This illustration was painted for Bausch & Lomb by W. F. Soare. Copyright, Bausch & Lomb Optical Co.

ALL AMERICAN



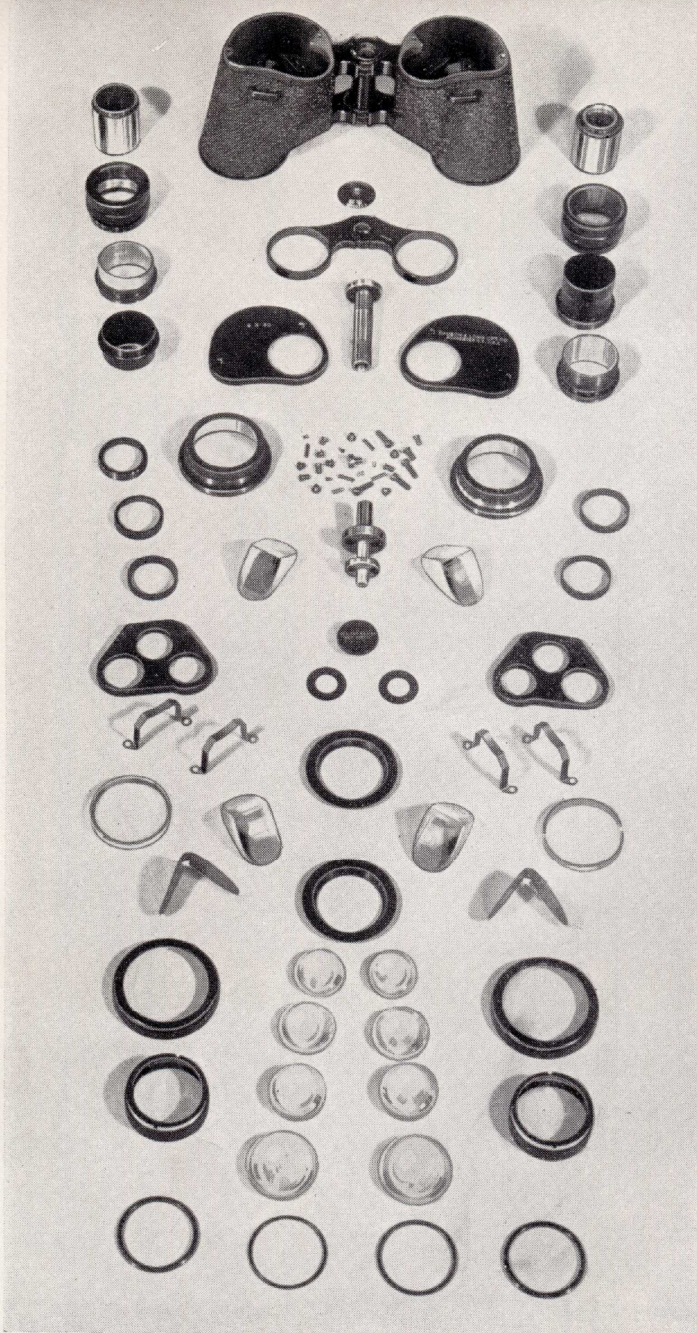
Bausch & Lomb Binoculars are made in America. They are designed in our Scientific Bureau, castings are made in our foundry, machining is done in our own shops and the glass is made in our glass plant, the only glass works in America maintained by an optical manufacturer. Every part and process is the result of American thought and ingenuity.

We acknowledge our heritage from the optical science of the past, but particularly we wish to point to the

achievements of the modern American optical scientist, the metallurgist and the mechanical engineer who have placed the new Bausch & Lomb Binoculars in the forefront in value and quality of world products.

A Guarantee Certificate accompanies every Bausch & Lomb Binocular that leaves the factory. It guarantees to you the finest of materials and workmanship and the satisfaction from a purchase of lasting value.





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As many as 118 parts are needed to make up a Bausch & Lomb Life Long Binocular, and each part must conform to the most rigid standards of quality and accuracy. Each side of the Binocular must have its complete optical system, consisting of prisms and lenses, and a mechanical system permitting adjustment while maintaining perfect alignment of the optical system.

FOREWORD

Binoculars represent a phase in the efforts of man to push back the boundaries of distance—to increase and vary human experience—by scientific means—through extending the range of his vision.

Binoculars, like other products of modern science, are manufactured in various styles and types. Some glasses that look quite similar are in reality very different. A brief study, and perhaps a test, should greatly aid you in choosing a glass that will fit your individual requirements, and will assure a quality that will afford lasting pride.

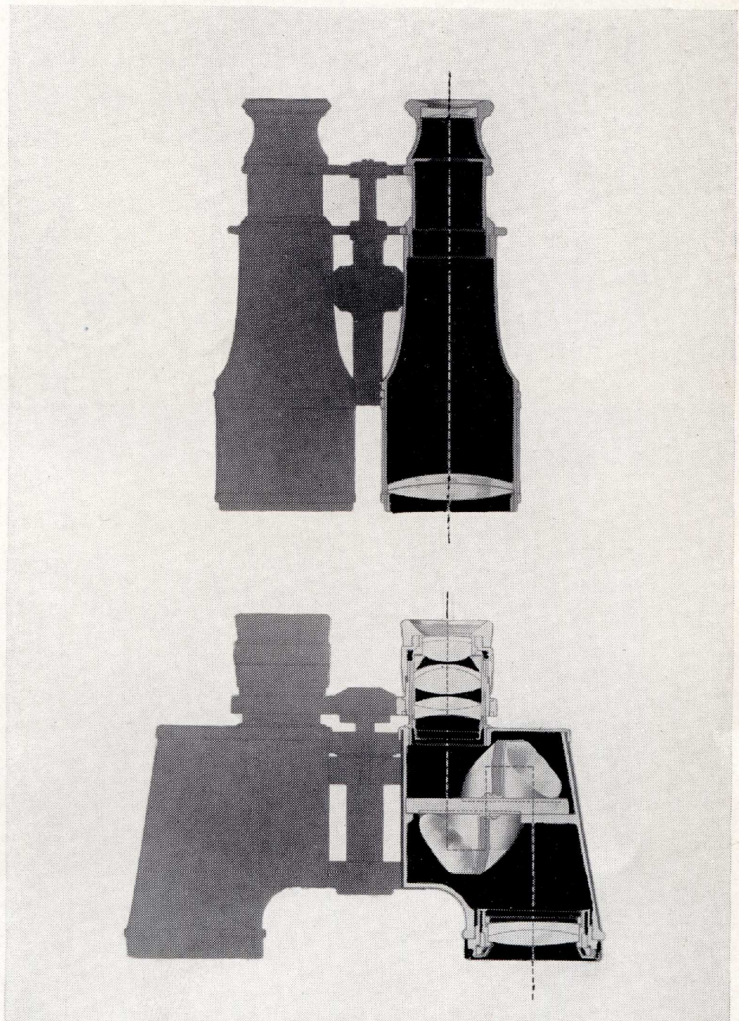
Efforts to extend vision date back to 1608 when the first telescope was produced. Galileo devised a telescope to use for his astronomical work in 1609 and the simple type of instrument still bears his name. By 1823 binocular field glasses were in use; they were patterned after the early telescopes and are known today as Galilean field glasses. About 1900 the prism type—a powerful, compact, lightweight, and efficient glass was developed. This type has become most popular.

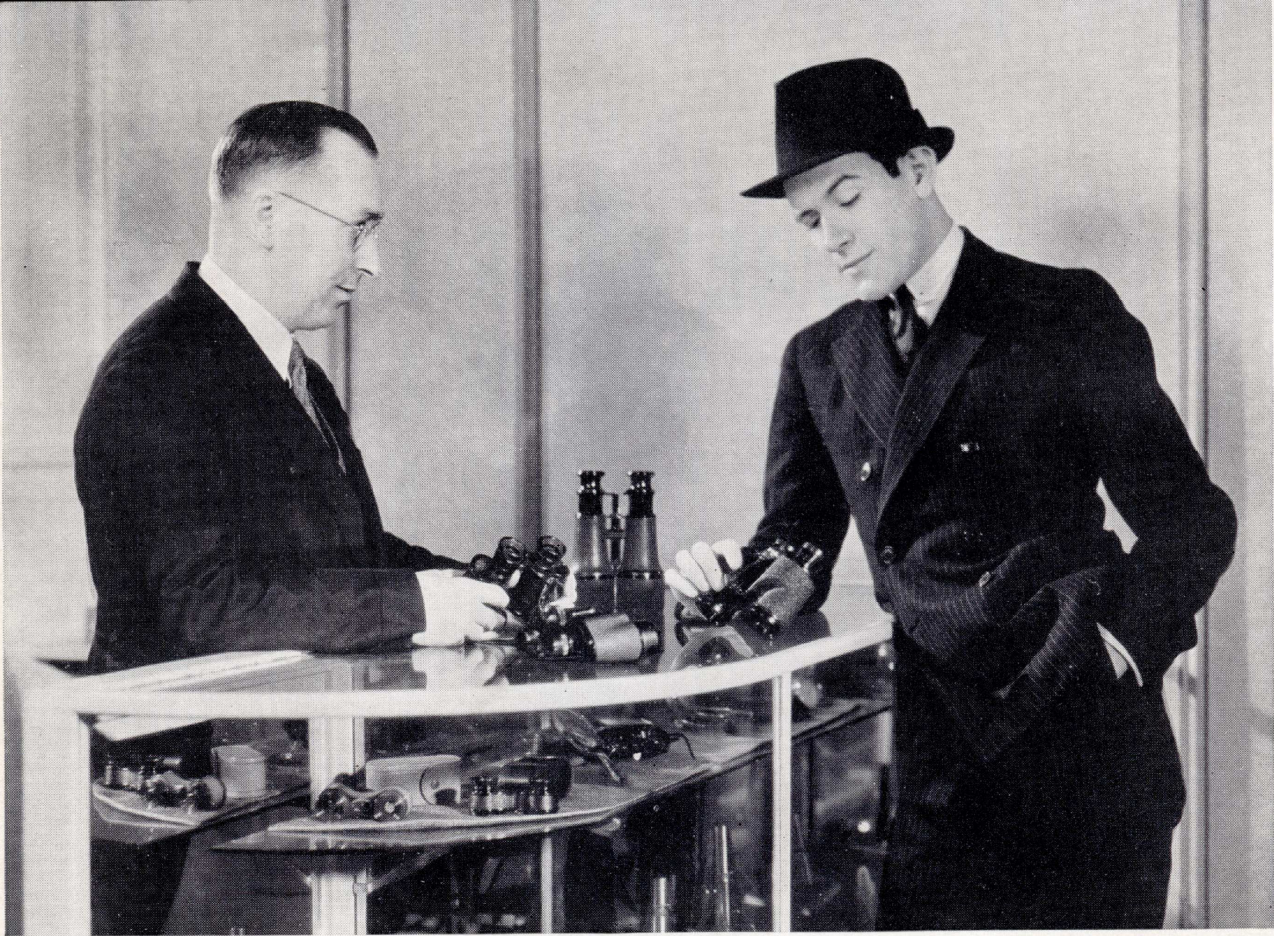
The prism binocular has been developed to meet various uses: high power glasses for observation at great distances; medium power glasses for studying moderately distant objects, and lower power for following moving objects.

It is quite natural for one to demand the highest possible magnification when purchasing binoculars. Yet the characteristics of the medium power glasses render them far superior for the usual work. Before you make your selection, consider each of the important characteristics. Make the tests suggested in the section entitled “Checking-up on Binocular Quality,” and you will be rewarded with lasting satisfaction.



Top: Galilean Field Glass.
Bottom: Bausch & Lomb Prism Binocular.





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Selecting a Binocular presents its problems—many glasses look similar, yet are sold for widely varying prices. They come from many makers in many different countries. They have different optical and mechanical qualities. How shall we judge value?

INSIDE INFORMATION ON BINOCULARS

Little understood facts on the optical characteristics that distinguish different glasses

Would you like to check up on Binocular value? Know why prices vary? Why Uncle Sam buys the finest glasses obtainable?

Binoculars are scientific instruments and the best facilities and highest order of skill are required in their manufacture, yet the tests by which you can measure the quality of a glass are simple and can easily be performed.

The following tests will enable you to go into a store and intelligently examine and compare different glasses.

Focusing

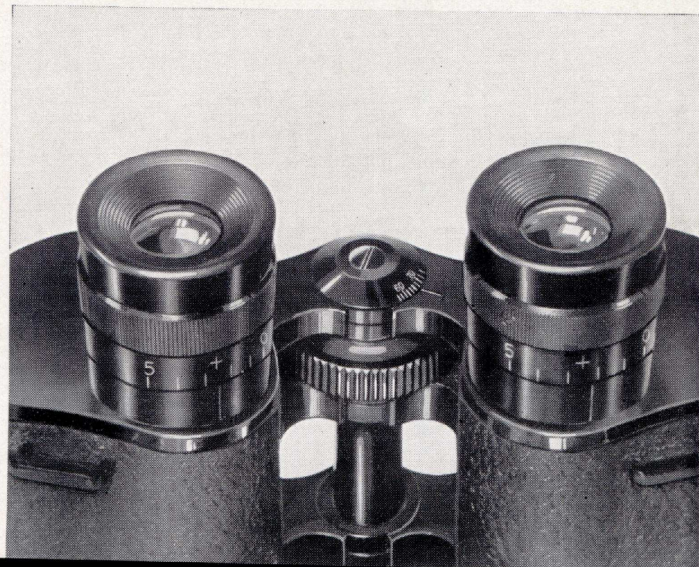
Two adjustments are necessary to render a pair of binoculars adaptable to any pair of eyes having normal or abnormal vision. The barrels must swing on a hinge to provide for adjusting to the distance between the eyes. Secondly, to accommodate those having eyes of unequal vision, one eyepiece must be individually adjustable. Both of these adjustments should be graduated for convenient resetting.

Then, because binoculars are used for varying distances, it is necessary

to focus the eyepieces. To adjust a glass, place it before your eyes and move the barrels together or apart until it comfortably fits the eyes. Next, if the glass has a central focusing device, cover, with the hand, the objective which is on the same side as the adjustable eyepiece and rotate the central focusing adjustment until the object is as clear and distinct as possible. Then cover the other objective and turn the individual eyepiece adjustment until the object can be seen clearly, and the glass will be set. By taking the readings which are on the adjustment scales, you can, at any future time, readily reset the glass to fit your eyes.

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Below: a central
focusing mode
7X, 35.



Magnification

By magnification (or power, as it is sometimes designated) we mean the number of times the image seen through the glass is larger than the object appears to the naked eye. Magnification is a comparatively easy characteristic to obtain in a binocular. By placing lenses of the proper curvature the proper distance apart, any desired magnification within reason can be had.

It is obtaining the numerous other desirable qualities necessary to a good binocular, that requires workmanship and skill of the highest degree. Do not, however, take for granted the power which is stamped on a glass. Glasses of obscure make are sometimes much lower in power than they are claimed to be. The following experiments will enable you to check up on the power of binoculars.

Select an object about one hundred feet away, place the glass upon a rest, adjust it to your eyes and focus it on the object. Any object which does not occupy the entire field will do. Now, instead of looking through both barrels, look at the object through one barrel, having the other eye exposed so that it is peering down the outside of the glass at the object. Then with both eyes looking at the object you will see two images, a large one seen through the glass and a small one seen with the naked eye. Then move the glass

The square illustration shows a view of New York City as it would look to you from above. Others show the magnifications obtained by 4, 6, 8, 10 and 20 power glasses.



4 POWER



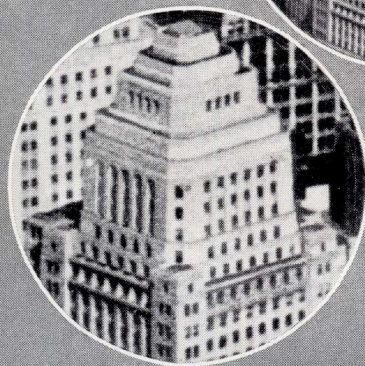
6 POWER



8 POWER

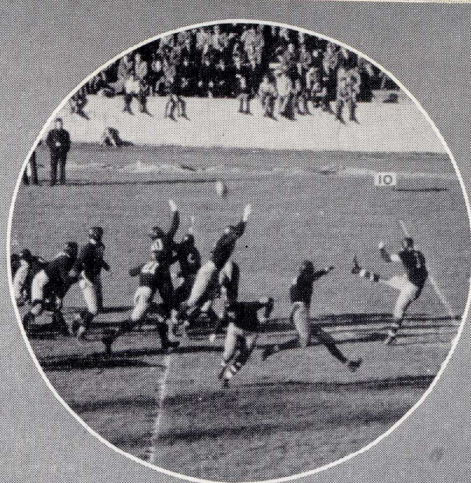
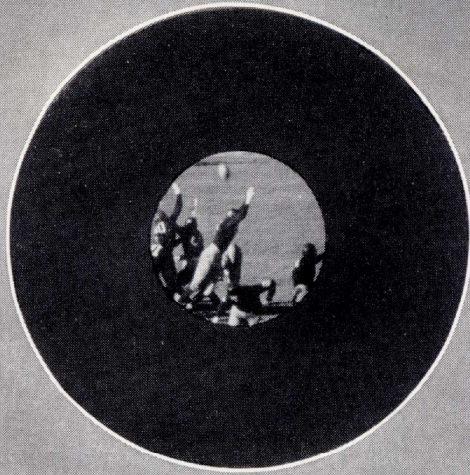


10 POWER



20 POWER
TELESCOPE

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Left: The field of view of a Galilean Glass.

Right: The field of view of a Bausch & Lomb Binocular.

about until the large image overlaps the smaller. Now compare the sizes of the images. The number of times the large image exceeds the small image in size is the actual power of the glass. In other words, if the glass is 8 power, the large image should be eight times as large as the small image.

Field of View

“Field of view” is the term used to designate the width of the view which can be seen through a binocular at a given distance. A wide field of view is highly desirable, both in making it easy to locate any particular object that you wish to observe and in being able to see more of a view without moving the glass.

Even at the expense of imperfect marginal definition, the large field of view is desirable because of the time it saves in locating an object.

Comparing two glasses for field of view is a simple matter. First be sure that the two glasses are of the same rated power, because a low power glass will generally allow a greater field to be seen than a high power glass. Focus each binocular on the same object at a moderate distance. A brick building can be used for

this purpose. Place one binocular to your eyes and count the number of bricks which you can see across the widest part of the field without moving the glass. Repeat this performance with the other glass. Of course, the glass showing the larger number of bricks has the greater field. If a brick building is not available, this test can be performed by focusing both binoculars on any object or landscape which is larger than the area covered by the glass, and observing the most widely separated points which can be seen through each glass. The glass which has the more widely separated objects in its field is the glass which has the larger field.

Clearness of Field

In testing to determine if a large field of view is clearly defined to the edge, hold the head still and swing the binocular so that the object appears to move to the edge of the field. In comparing two glasses for clearness of field we must first be certain that the magnification and field of view are the same. Glasses are not made that show definition in the margin of the field, equal in every respect to that in the center.



Size and Construction

Binoculars are divided into two distinct classes, the old fashioned Galilean type and the modern prismatic type. The former is nothing more or less than a double telescope with direct vision through the lenses. The prismatic type reflects the image through a series of prisms set at opposing angles. The Galilean glass is seldom constructed to magnify more than $3\frac{1}{2}$ or 4 times, because the length overall would make it ponderous and an impractical glass to carry. Then, too, the field of view is necessarily very small. In the prismatic type the light passes through the objective lens and is reflected by the first prism into the second prism, and then is reflected through the eyepiece lens system, as shown on page 13. Directing the path of light back and forth permits a light weight, more compact binocular and, more important, permits achievement of relatively large fields combined with high power, excellent illumination, clear definition and enhanced stereoscopic effect.

The Bausch & Lomb Scientific Bureau established new values in construction and performance when they designed the binoculars listed for the first time in this catalog.

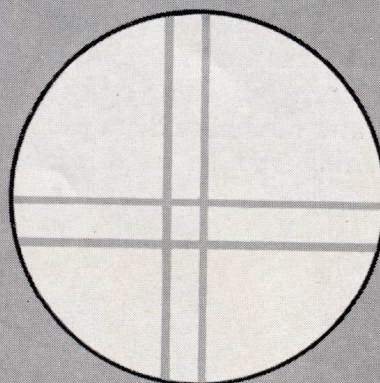
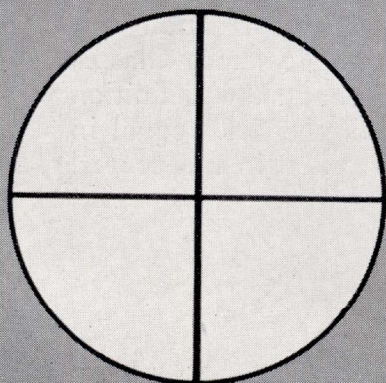
Alignment

In order that a glass may function properly, both optical and mechanical axes must be aligned. This calls for extreme precision and rigid inspection, especially in a glass which has an interpupillary adjustment, because the alignment must be correct at every possible interpupillary distance. To test a binocular for alignment, a rest upon which to place the glass is necessary. First draw upon a piece of paper two lines about two or three feet long, crossing each other at right angles. Place this cross line diagram about one hundred feet away and focus the glass on it. If the glass is correctly aligned, you will see a single sharp image of the cross line. If not, you will see two images of one or both of the lines or the lines will be thick and fuzzy. The alignment of a binocular may be correct when the glass is new, but very little wear or the slightest impact may throw it out of adjustment unless it is rigidly constructed to give life-long service. The prisms in ordinary glasses are not securely mounted, and they are easily shaken out of position. Bausch & Lomb Binoculars have prisms securely mounted by mechanical means, insuring life-long performance.

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Left: Shows perfect alignment

Right: Out of alignment



The greater the visual angle the greater the stereoscopic effect.

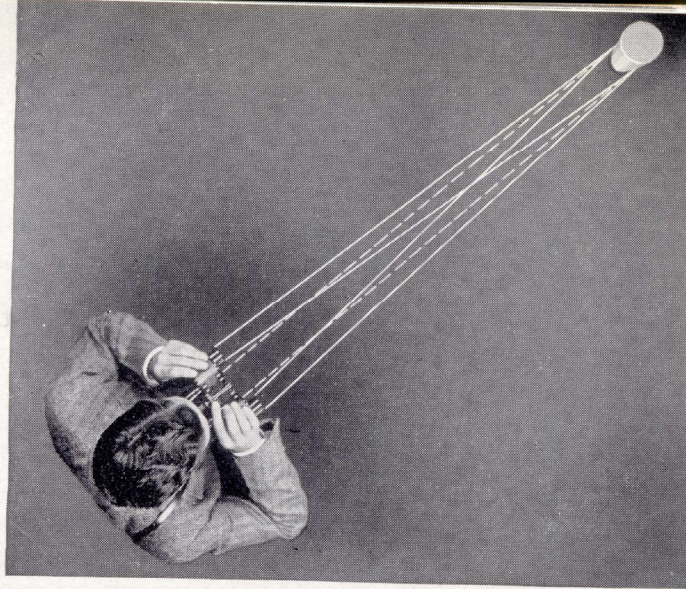
Stereoscopic Effect

The stereoscopic effect of a binocular is its quality of giving the view depth, as well as breadth and height. If you will close one eye and observe several objects within your view, you will find that it is quite difficult to determine their respective distances from you, and from each other. Yet when you look with two eyes, the relative positions become apparent. The reason for this is that when you look with two eyes you are looking at the objects from two slightly different angles. The greater the angles, the greater the stereoscopic effect will be.

A quality binocular, therefore, will have the objective lenses much further apart than the eyepiece lenses. (See illustration). This feature should be considered when you are purchasing a prism binocular. Particularly in hunting, you will find that stereoscopic effect will aid you in determining the relative distance of game and its surrounding objects. Stereoscopic effect is of great importance if correct observations are to be made.

Brightness

Brightness is a factor that must always be considered, but especially



when using binoculars under conditions of low visibility, as in wooded country, in the early morning, in fog, rain, or at night. In any glass, if we neglect the possibility of light losses in passing through the optical system, illumination is proportional to the square of the quotient of the full aperture of the objective divided by the magnification; for a given magnification the larger the objective the more light. Light losses can be caused by improper design such as leads, for example, to a reduction of the effective aperture to a value lower than the apparent free aperture of the objective.* A certain loss of light is inevitable, due to reflection at the glass surfaces and to absorption within the glass.

*This defect is easily overlooked in the examination of a prism binocular.

Left: Bright image from optical system of B & L glass.
Right: Dark image.

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BAUSCH & LOMB BINOCULARS



Designed for lifetime service

In telling you how to "check up" on Binocular quality, we have furnished you with a club to hold over our heads. If there are any defects in our glasses, you will be able to detect them. However, we have no fear as to what your choice will be, if all of the above tests are made.

The superiority of B & L glasses is made evident by the fact that they are used by the U. S. Army and Navy and are the ultimate choice of those who must have the best.

Bausch & Lomb glasses are as light and compact as it is practical to make them. Weight has been decreased to the minimum possible without sacrifice of the sturdiness requisite to permit rough usage and to furnish proper protection for the optical parts.

Bausch & Lomb glasses remain in alignment and adjustment even after they have been subjected to severe abuse. This is entirely due to their sturdy construction. The bodies are made of strong aluminum alloy. The prisms, instead of being cemented in as they are in many cheaper glasses, are recessed into the prism support and are so snugly fitted into this recess that lateral shift is impossible. The prism is held down into this depression by a sturdy bridge-shaped strap, held by screws.

Because the alignment adjustments in B & L Binoculars is made with the objective lenses, the prisms

can be permanently anchored in this manner. In cheaper or old style glasses collimating is often accomplished by shifting the prisms. It is obvious that when provision is made for shifting these prisms they cannot be firmly locked in place.

If the prisms were merely cemented in, a slight impact would cause them to loosen and get out of place. Glasses of this construction are frequently in need of repairs and are a source of dissatisfaction to the owner. Some of the better types of glasses have prisms held in the body by means of three screws which are used to adjust the prism for collimating. Although this method of mounting is superior to cementing, the prisms are likely to get out of adjustment and ruin the alignment or collimation of the glass.

The field of view is as large as possible without sacrifice of other desirable qualities. Any B & L Glass has a field of view about three times larger in diameter and nine times larger in area than that of the Galilean type. The eye cups on a B & L glass are formed to fit comfortably against the brow; they do not exert pressure against the eye itself, and thereby irritate it—a valuable and comfortable characteristic in prolonged observation. For those who wear spectacles, exceptionally flat eyepiece caps may be had as optional equipment on the 6, 7, 8 and 9 power glasses. An adjustment of one eye-

piece enables the user to adjust the B & L center focusing glass to his own eyes and a scale enables him to reset them in a fraction of a minute. The independently focusing eyepieces (preferred by U. S. Navy and Army) are available in all models.

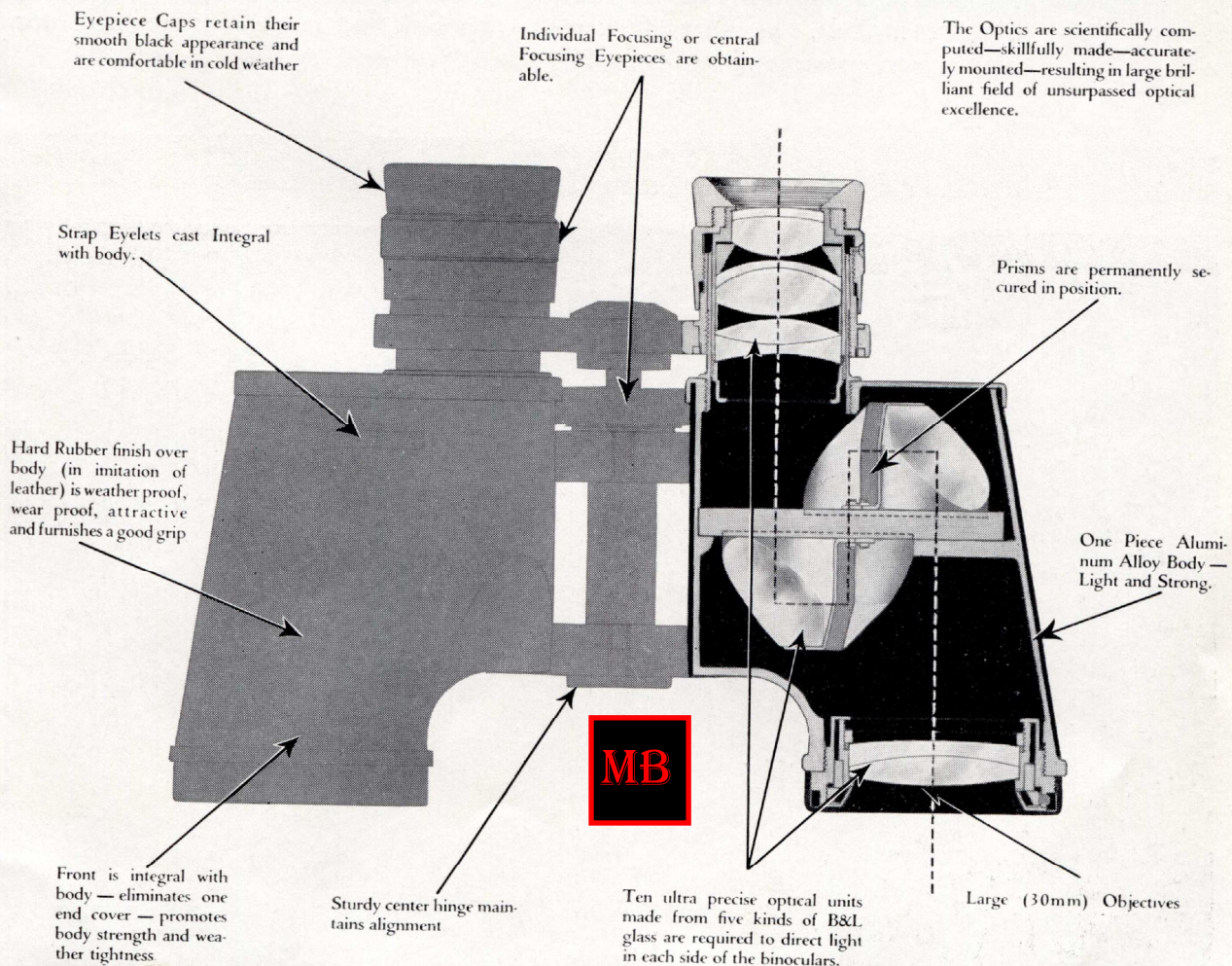
B & L glasses are adjusted and tested until the alignment of the barrels is correct to 1% from one extreme of the adjustment to the other.

The Bausch & Lomb Optical Company is the only American manufacturer who manufactures glass for use in precision instruments. The same quality of glass is used in B & L Binoculars as is used in high grade scientific instruments. This assures a binocular which will show clear bright images.

In making a binocular, the lenses and prisms must be accurate to within a wavelength of light of the specifications. That means that the measurements must be made in millionths of an inch. Such fine measurements cannot be obtained by any mechanical device. They can only be made by actually using light waves as units of measurement.

Decide what power of glass will suit your needs, compare the B & L glass with others on the market, by means of the tests which we have suggested or any other test you might conceive. Then make your decision. Optical excellence, mechanical dependability and handiness are combined in B & L Binoculars. If you desire any further information about binoculars, write us.

Below: Cross Section of 8X 30 glass.



WHAT MODEL TO CHOOSE

The experts make recommendations

There is a binocular which is best suited for every individual use. We cannot, however, say that one type of glass (and that type only) can be used for a particular purpose. Many, in spite of adverse opinions, have successfully used some "pet" glass for numerous purposes.

In choosing a binocular, first of all, one must decide the chief purpose or purposes for which this glass will be used.

Some Prefer Independently Focusing Eyepieces

B & L Glasses are made in central focusing and independently focusing eyepiece models. The central focusing device is very convenient, especially

where several people will use the same binocular. The independent eyepiece construction is preferred by the Army and Navy because of its moisture tight construction, simplicity and sturdiness. It is preferred by the hunter because he can set his glass for distinct focus at 300 yards and all objects beyond 300 yards will be in sharp focus. Some hunters strap the eyepiece tightly with adhesive tape in this position to be ready for instant use. A hunter seldom needs to use a glass under 300 yards.

Do you wear glasses?

For those who wear eyeglasses, special flat cups are available for 6, 7, 8 and 9 power glasses.

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Binoculars and the Sportsman

Ozark Ripley, the well known guide, author and sportsman, uses Bausch & Lomb Binoculars. He recently said:

"Binoculars are positively an essential part of a modern sportsman's equipment. For hunting big and small game, fishing, exploring, mountain climbing, yachting, motoring, field trials, canoe cruising, they add to your enjoyment—a boon to duck hunters!

"When you buy a binocular, buy a quality product. Don't let advertised low prices of cheap inferior glasses mislead you. You pay more for a good glass but you get more. The myth of European optical superiority was exploded long ago. You can buy a quality U. S. A. made binocular at relatively lower cost, considering quality. Select the glass best suited for your purpose. As a sportsman's allround glass, I carry a B & L 6×30".



Ozark Ripley

Hunting

If the sportsman expects to spend the greater part of his time hunting in wooded country, illumination is an exceedingly important factor. In the dim borders of the woodland the light is often poor and the atmosphere is seldom as clear as it is in the higher altitudes of mountain country. Also at dawn and dusk visibility is invariably poor.

In all forms of hunting, of course, weight and size enter into consideration. As long as the glass has sufficient magnification and illumination, the smaller and more compact it is, the less the sportsman has to carry around.

In timbered country it is seldom

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Field Trials

Ozark Ripley uses a Bausch & Lomb Binocular in judging field trials. It enables the judges and the gallery to follow the widest and fastest of dogs as though they were by their side every moment of the heat. The wider ranging the champion, the harder he is to follow with the naked eye. A glass of medium power and large field is required.



The 6X, 30 BINOCULAR

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Action in the outdoor world—fast moving sporting events—football—racetrack—hunting deer, moose, ducks, etc.—study of birds and animals—wherever a glass of brilliant illumination and moderate, easily controlled power is required, the 6× 30 is ideal. Available in central or

individual focusing models.

The angular field is $8^{\circ} 29'$, or the linear field 445 ft. at a distance of 1,000 yards, length $4\frac{11}{16}$ inches closed, or $4\frac{15}{16}$ inches open. Weighs $19\frac{1}{2}$ ounces. Exit pupil 5 mm, relative brightness 25.

- | | |
|-------------|------------------------------------------------------------------------------------------|
| 61-21-60-01 | Bausch & Lomb Life Long Binocular 6×, 30 mm diam. central focusing, in case with straps. |
| 61-21-61-01 | Same but with independently focusing eyepieces. |



The 6X, 30 BINOCULAR

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Action in the outdoor world—fast moving sporting events—football—racetrack—hunting deer, moose, ducks, etc.—study of birds and animals—wherever a glass of brilliant illumination and moderate, easily controlled power is required, the 6X 30 is ideal. Available in central or

individual focusing models.

The angular field is $8^{\circ} 29'$, or the linear field 445 ft. at a distance of 1,000 yards, length $4\frac{1}{16}$ inches closed, or $4\frac{5}{16}$ inches open. Weighs $19\frac{1}{2}$ ounces. Exit pupil 5 mm, relative brightness 25.

61-21-60-01 Bausch & Lomb Life Long Binocular 6X, 30 mm diam. central focusing, in case with straps.

61-21-61-01 Same but with independently focusing eyepieces.

Outdoor Sports

For use in observing track racing, boat racing and numerous other outdoor sports, wide field of view is perhaps the most important feature of a glass. A wide field of view will enable the observer to see a larger number of the entrants than will a small field. High power is not important, as the objects are seldom far enough away to make real high magnification necessary. A wide field will enable the observer to follow the scene with considerable ease. We, therefore, recommend the following glasses for this purpose: 6X, 30; 7X, 35, the B & L Sport Glass and the Companion Glass.

Camping Trips By Water

The canoeist or fisherman on a trip through strange waterways will find

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a binocular to be a handy piece of equipment. With it he can locate camping sites along a wooded shore or he can save time by investigating the safety of the wind swept water beyond a protecting point. Since weight is an all important factor at the portage, a good glass of small size is required.

Woodchuck Hunting

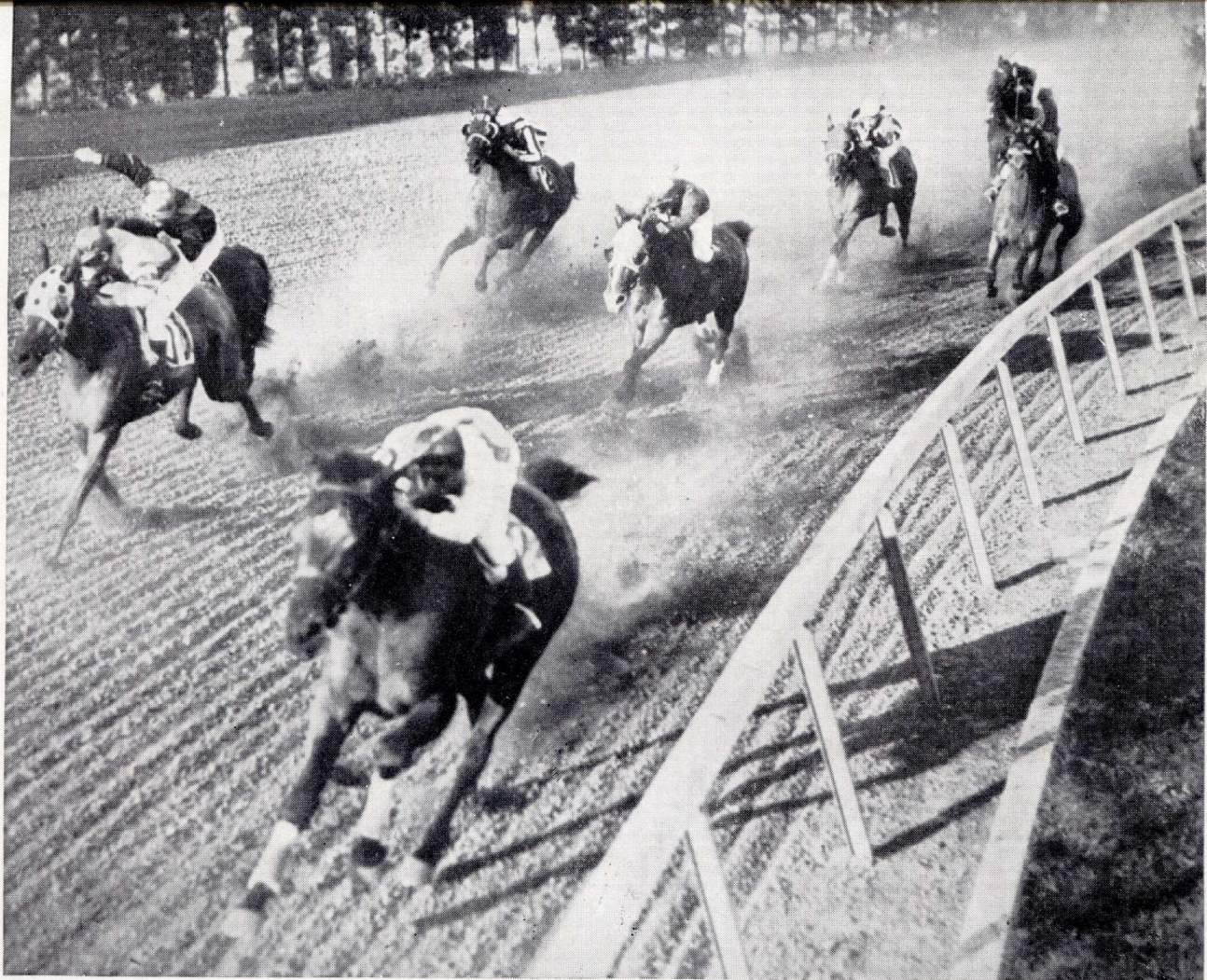
Woodchuck and prairie dog hunters will find a light-weight Binocular a handy part of his outfit. The glass can be slung from a shoulder strap. Only one hand is necessary to manipulate it when he scans the distant side hill to locate a 'chuck which may be out for food.

The Carrying Case and Straps

Sturdy carrying cases of pingrain cowhide are supplied with Bausch & Lomb Prism Binoculars. They are designed to protect the Binocular, yet are neat and attractive in appearance. An adjustable shoulder strap for the case and a neck strap for the Binocular are also standard equipment included in the purchase price.

When the Binocular is in almost constant use as in coast guard, army and navy work, the officer making observations keeps his glass suspended from his neck when not in use. This frees his hands for other work, yet the glass is ready for instant use.





Target Shooting

Captain Paul A. Curtis, noted arms and ammunition authority and Editor of the Arms and Ammunition Department of *Field & Stream*, in commenting on the use of binoculars for target shooting said:

“To the modern rifle or pistol shot, binoculars and a spotting scope are indispensable, but unless they are of the best quality, one is better off without them. We have been the victims of an avalanche of cheap optical junk from Europe, some of which is so bad that it imposes a severe strain upon the eyes.”

The Race Track

Rare is the picture of a race track which does not include binoculars. There is a reason for it. When the horses round the far turn and start down the other side of the field, one needs a binocular to see the position of his choice. Horse race enthusiasts have long appreciated and used B & L Binoculars.

Wide field of vision is a prime requisite of a binocular for this pastime.

The 6×, 30 mm Binocular is recommended. The Companion Glass and Sport Glass are also used.

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The 7X, 35 BINOCULAR

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Yachtsmen have long preferred a 7X glass, and many will select this glass because of its convenient small size and light weight. Yet, this glass has all of the qualifications of the six thirty binoculars for gen-

eral all around use.

The angular field is $7^{\circ} 17'$, or the linear field 381 feet at a distance of 1,000 yards, length $5\frac{7}{16}$ " closed, or $5\frac{3}{4}$ " open, weight 26 ounces. Exit pupil 5 mm, relative brightness 25.

61-21-70-01 Bausch & Lomb Life Long Binocular 7X, 35 mm diam., central focusing, in case with straps.

61-21-71-01 Same but with independently focusing eyepieces.



MB

Admiral Richard Byrd

Exploration

When preparing for his 1934-1935 Antarctic exploration, Admiral Richard Byrd tested a wide variety of glasses and selected Bausch & Lomb Binoculars as the official glasses of the expedition. He is equipped with six 7 \times , 50 Bausch & Lomb Binoculars and one 10 \times , 50.

Only the best equipment should be used when human life is exposed to hazards of exploration in new lands.

Navigation

Perhaps the most important feature of a glass which is to be used for navigation is the ease with which it can be held steady. The action of the water and the throb of the engine make it necessary for the navigator to have a glass which he can hold steady. Then, too, the chief use which a navigator has for a binocu-

lar is to sweep the horizon to locate other boats and to locate and identify navigation lights and buoys. Where distances are great a high power glass brings the objects closer.

Therefore, we recommend the following glasses for navigation in the order in which they are given: 10 \times , 50; 7 \times , 50, and 7 \times , 35.

Night Glass

Image brightness is the most important feature, of course, to be looked for in a glass which is to be used for work under poor light conditions.

You will find that in all of the Bausch & Lomb Binoculars light losses due to absorption are reduced to a minimum. A glass of the largest possible exit pupil size is called for. We suggest the 7 \times , 50, 10 \times , 50, and 7 \times , 35. High power is desirable for night work if the glass can be held steady.

The 7X, 50 BINOCULAR

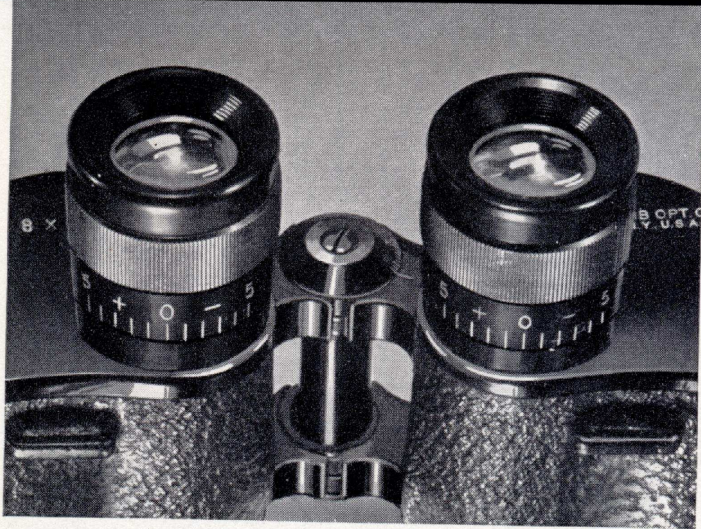
The professional navigator is interested in brilliant illumination for use in foggy weather—a glass with such excellent light gathering ability that it can be used in the evening or even at night. The larger size and greater weight necessary in a 50 mm glass are not serious considerations

on board ship. This glass is dust and water tight.

The angular field is 7.3° , the linear field 381 feet at a distance of 1,000 yards. Its length is $7\frac{1}{16}$ inches closed or $7\frac{7}{16}$ inches open. It weighs 42 ounces. Exit pupil 7.1 mm, relative brightness 50.4.

61-21-75-01 Bausch & Lomb Life Long Binocular, 7X, 50 mm diam., in case with straps. Independent focusing only.





For General All-round Use

For the person who can afford but one good binocular, we suggest either the 6 \times , 30 or the 8 \times , 30 mm glass. Their wide field of view, bright illumination, small size, light weight and large exit pupil, together with the fact that their magnification is suited to all-round use, make these glasses the ideal for general purposes.

MB

Bird Study

Mr. Ernest G. Holt, Director of Sanctuaries, National Association of Audubon Societies, wrote us in regard to his Bausch & Lomb Binoculars as follows:

"As I am rather suspicious of the motive of those who write testimonials, I have heretofore scrupulously avoided lending my own name to any commercial purpose. I am making an exception in this case solely for three reasons: (1) I honestly believe that you manufacture a superior product; (2) the few contacts I have had with your firm lead me to believe that you maintain an exceptionally high standard of courtesy in your dealings with the public; and (3) the little advertising matter of yours that has come to my attention has not been an insult to my intelligence."

Mr. Holt recommends the 8 \times 30 as the best all-around bird glass.



**MB**

8X, 30 BINOCULAR

This is the general purpose glass selected by travellers, mountain climbers, hunters and nature students. Ideal in mountain country, for long distance, and clear atmosphere, because of its light weight and high power (few demand higher power). It is highly corrected op-

tically. Available in central and independent focusing models.

The angular field is $8^{\circ} 29'$; its linear field 445 feet at a distance of 1,000 yards. The length closed is $4\frac{1}{2}$ " ; open $4\frac{1}{16}$ inches; weight 22 ounces. Exit pupil 3.8 mm, relative brightness 14.3.

- | | |
|-------------|-----------------------------------------------------------------------------------------|
| 61-21-80-01 | Bausch & Lomb Life Long Binocular 8X, 30 mm diam. central focusing, in case with strap. |
| 61-21-81-01 | Same but with independently focusing eyepieces. |



MB

Hunting in Mountains

In hunting mountain sheep or goats, or any animal where long range stalking is necessary, a light glass of fairly high power is by far the best. A glass of too high a power is difficult to hold steady, and in this type of hunting one is generally climbing or travelling over long distances. After one has made a long climb to an advantageous point of observation, he is usually breathing heavily and will find a glass of high power difficult to hold steady.

In all kinds of hunting a wide field of view is extremely important—the widest possible field permitting clear definition.

Hunting Ducks

The duck hunter who has never used a binocular to watch rafts of floating ducks, or ducks in flight, has missed one of the enjoyable parts of the sport. With a binocular, much can be learned of the habits and characteristics of various species that will be of future value to the hunter. Spring hunting with binoculars when the ducks are going north to the breeding grounds is a new sport enjoyed by all members of the family. Watch for those spring duck hunters the next time you are near the water and join them with your Bausch & Lomb Binocular. High power and good illumination are desirable for this work.

The 9X, 35 BINOCULAR

Light weight and high power are combined in this instrument. It is the Binocular to use for hunting in mountain countries where great distances demand its power and where the clear atmosphere permits the use

of a smaller glass, one easy to carry.

The angular field is $7^{\circ} 17'$. The linear field is 381 feet at 1,000 yards. The weight is 26 ounces and the length open is $5\frac{11}{16}$ inches. Exit pupil 3.8 mm, relative brightness 14.4.

61-21-90-01 Bausch & Lomb Life Long Binocular, 9X, 35 mm diam., central focusing eyepieces, in case with straps.
61-21-91-01 Same but with independently focusing eyepieces.



Coast Guard

"What is it? Quick! Give me the binoculars." This is the constant story of the Coast Guard, in its heroic effort to save life and protect the best interests of our Government. Perhaps it is a smuggler seeking to evade the law, or a boat in distress on the horizon. Perhaps human beings are struggling in the water. What are the details that the human eye cannot see—that high power binoculars will resolve?

The Coast Guardsman needs a reliable glass—one with excellent illumination for dark weather—for piercing fog, sleet and snow, for use at night or at dusk, for hazards on the water are doubly tragic at night. The 10X, 50mm is a favorite glass among Coast Guardsmen and the United States Government has purchased many of these during the past few years.

Target Work

For target work a binocular is usually placed on a rest and the target is stationary. The purpose is to obtain as much detail as possible, still having the entire target in the field of view. Hence, magnification is the chief consideration. Due to the fact that the binocular is used on a rest, high magnification is not objectionable. Binocular Tripods are described on page 30 and shown in use with the Spotting Scope on page 33. Spotting Scopes were especially designed for target work and are preferred by many. We recommend the 10X, 45; 10X, 50, and 9X, 35 glasses, also the Draw Tube and Prism Spotting Scope.

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Left: Phillips Lord, radio entertainer uses a Bausch & Lomb Binocular on the "Seth Parker" Cruise.



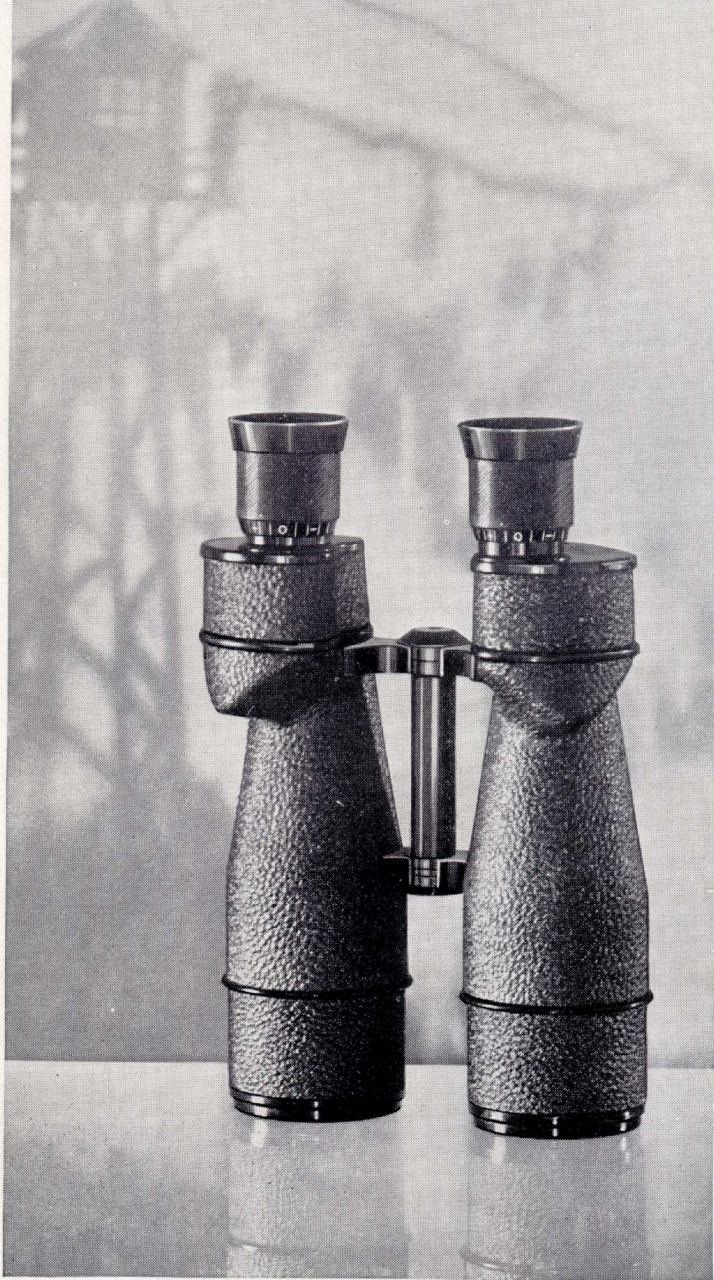


The 10X, 50 BINOCULAR

Like the seven fifty Binocular, this model is designed for marine use, excellent in illumination and high in power. It is recommended wherever a high power glass which is dust and moisture tight is desirable.

The angular field is $5^{\circ}12'$; its linear field is 272 feet at 1,000 yards. The length closed is $6\frac{1}{8}$ inches; open 7 inches; weight 41 ounces. Exit pupil 5 mm, relative brightness 25.

61-21-05-01 Bausch & Lomb Life Long Binocular 10X, 50 mm diam., in case with straps. Independently focusing eyepieces only.



Forest Rangers

Ask the alert forest ranger to let you look through his binoculars the next time you climb to a mountain observation tower. Binoculars are an essential part of the equipment of every fire warden. They increase the area over which his vigilance can be effective. They assist in definitely establishing the position of an incipient forest conflagration. High power is most useful in such work and we recommend the 10 \times , 45, the 10 \times , 50 and the 9 \times 35.

Tripods for Binoculars

A support is available to hold binoculars on any one of three sturdy stands—the Spotting Scope tripod, the metal Telescope stand or the adjustable wooden Telescope Tripod. A support of some kind is almost essential for prolonged observations with high power binoculars, such as the 10 \times glasses.

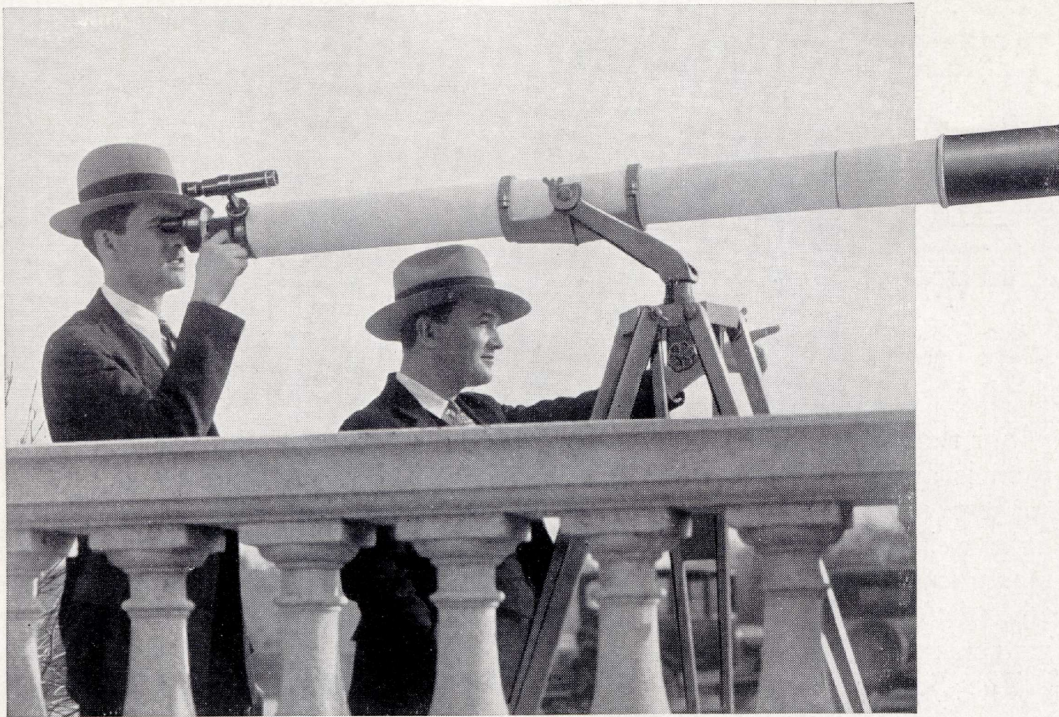
MB

The 10 \times , 45 BINOCULAR

A high power glass designed to meet the requirements of army and navy officers. The 10 \times , 45 mm is recommended also for mountain observation work.

Angular field 4° 23'; linear field 231 feet wide at a distance of 1,000 yards. Length closed 7 $\frac{7}{8}$ "; open 8 $\frac{1}{8}$ ". weight 36 ounces. Exit pupil 4.4 mm, relative brightness.

61-21-04 Bausch & Lomb Life Long Binocular, 10 \times , 45 mm. diam., in case with straps. Independently focusing eyepieces only.



B & L TELESCOPES

Bausch & Lomb telescopes range in power from $12.8\times$ to $120\times$. These instruments are adapted to country estates, country clubs, mountain and seashore resorts, and observation towers of tall buildings. Some of the low power models have been especially designed for rifle range work. An equatorial telescope, for use of the amateur or student astronomer, supplies all conveniences necessary in this type of work. A coin operated

telescope, such as you have probably seen on the Empire State Tower and the Century of Progress buildings, is the instrument for capitalizing on a suitable point of vantage. Two models of B & L Spotting Scopes are described on the following pages. Write us, giving full details of the work you wish to accomplish with an instrument or ask us for literature on the instrument that interests you most.

MB

THE DRAW TUBE AND PRISM SPOTTING SCOPES



For those who want higher power than is advisable in binoculars

For those who want higher power than is available in Binoculars, we suggest the Spotting Scopes, the light weight instruments that give magnifications of 12.8, 19.5, 20.0, 26 and 36.5 times, depending on the instrument and eyepiece used.

The Scopes are available with metal floor stands adjustable for height. They are convenient for use on the porches of hotels and homes, observation balconies, summer houses, etc. The illustration shows the permanent standard for those who wish to use their scope in about the same place. A collapsible wooden tripod is available for those who prefer a portable outfit.

N. R. A.* Model Prism Spotting Scope

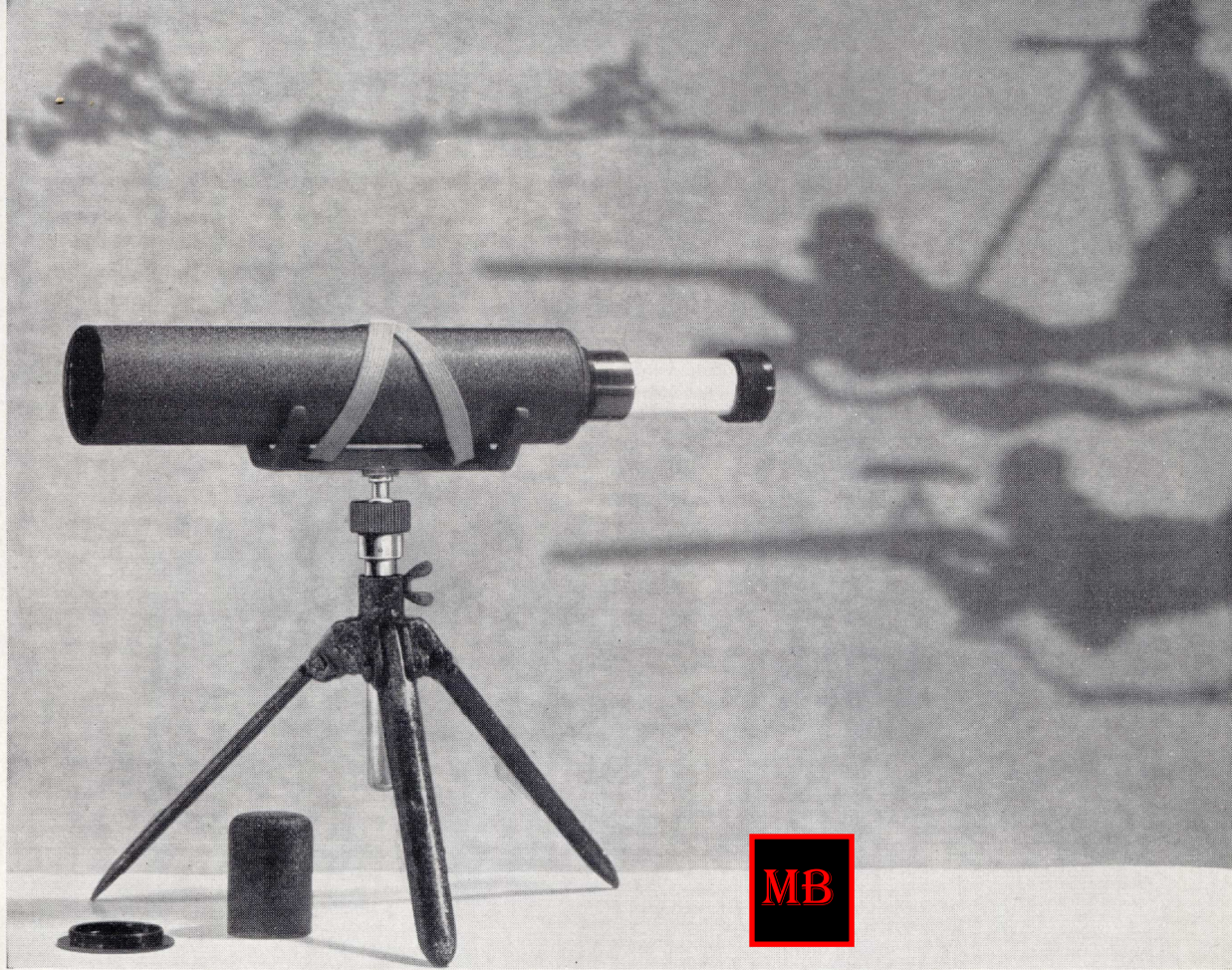
The rifleman will find that he can gather those extra points that win many a match with the aid of a Bausch & Lomb Spotting Scope, N.R.A. Model, which was designed by riflemen for riflemen. The range of magnifications makes this scope as effective on an indoor pistol range as out in the open. We received the

following communication from Captain Edward C. Crossman, Brentwood Heights, California.

**Captain Edward C. Crossman,
writer and editor of Gun
Column, says**

“Your Spotting Scope has been given competitive tests against four other models which I own, and the B & L has them all licked in every way. No question but that the B & L is the highest development of the spotting scope to date, and head and shoulders above the foreign aluminum body glasses in optics, strength, appearance and ability to focus on very short distances. The quick setting focus is a mechanical delight, and a surprise to everyone trying it.

“As I have sat behind a scope as an officer of a number of American International Rifle Teams, and coach of the California Civilian Team in 1916, I can appreciate what a spotting scope should be. The B & L is the nearest thing to the ideal spotting scope ever turned out.”



for small bore spotting—a service for which the ordinary scope of medium price is unsuitable.

Its power is 20X, ideal for all ranges used in small bore work. Therefore, only one eyepiece (which is furnished) is necessary. Its field of view of 7½ feet at 100 yards is ample for all ranges at which it will be used.

Its minimum range of focusing is 22 feet, suiting it to indoor as well as outdoor ranges.

A special micrometer focusing adjustment provides for push-pull coarse adjustment and screw fine adjustment. The draw tube extends far enough to eliminate the danger of knocking the tripod with the elbow, and any standard tripod can be used.

The body is made of aluminum alloy and has a durable handsome black wrinkled finish. The draw tube is of brass, chromium plated for durability and appearance. Threaded metal cap shields protect the lenses so that the scope can be carried safely in a shooting kit.

Draw Tube Spotting Scope

Right: Edward C. Crossman, Jr. using the Draw Tube Spotting Scope.





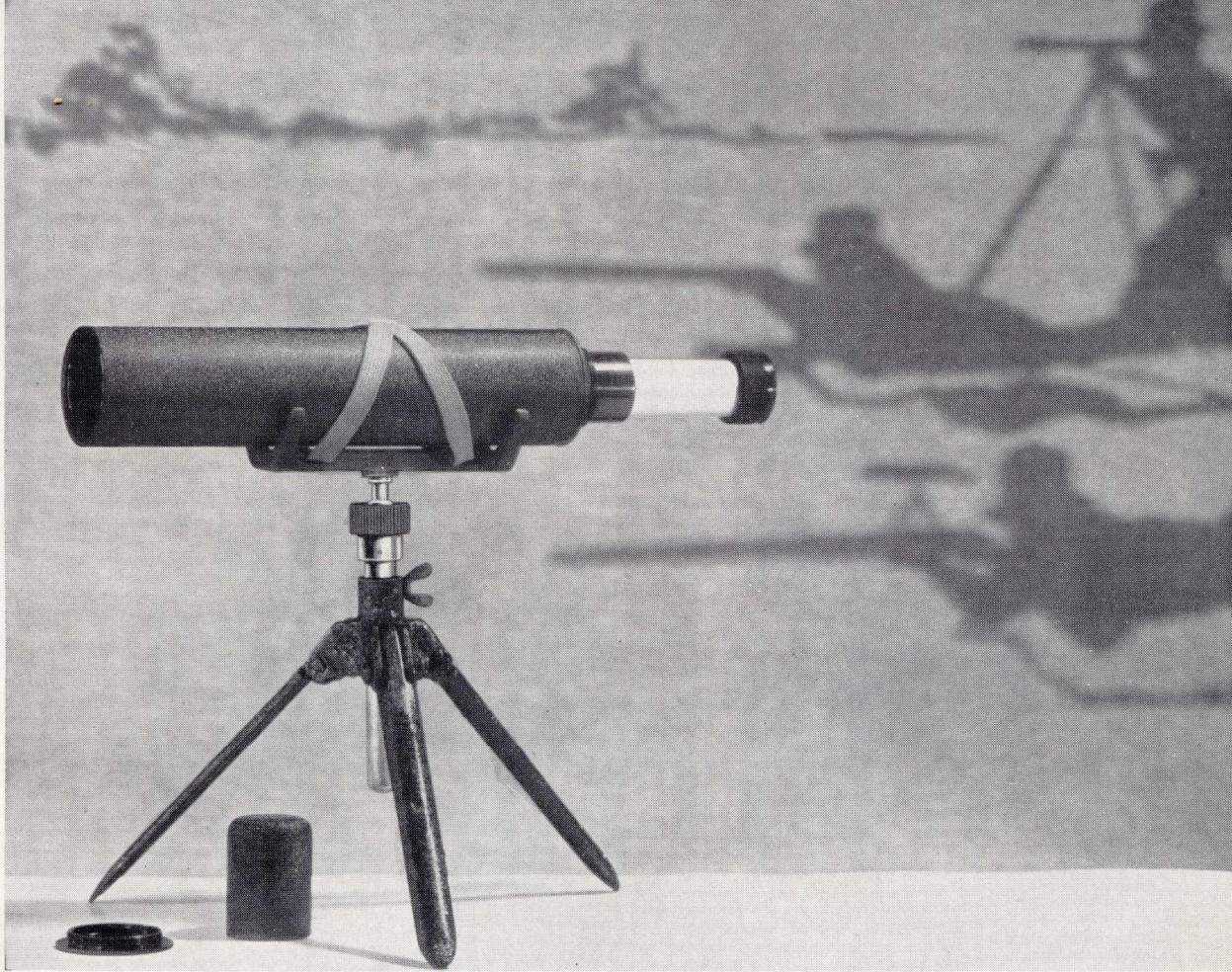
The Olympic Team

The illustration above shows (left to right) riflemen Rom Stanifer, William Harding (high man in the Olympic team) and Dr. Edward Shumaker. They are using B & L Spotting Scopes with 19.5X eyepieces. Col. Wm. Tewes, famous shooting coach, is using an adjustable wooden tripod to support his scope which is equipped with a 26.5X eyepiece, sensitive to wind drift and mirage.

The Draw Tube 'Scope

Riflemen everywhere are expressing enthusiasm over this new Bausch & Lomb Draw Tube erecting type Spotting Scope. It meets the long felt need of a medium priced scope

Left: The beautiful bronze trophy executed by the famous cowboy artist Russell presented by Bausch & Lomb to the National Rifle Association for annual award to the high National Guard Team in the Herrick Trophy Match.



for small bore spotting—a service for which the ordinary scope of medium price is unsuitable.

Its power is $20\times$, ideal for all ranges used in small bore work. Therefore, only one eyepiece (which is furnished) is necessary. Its field of view of $7\frac{1}{2}$ feet at 100 yards is ample for all ranges at which it will be used.

Its minimum range of focusing is 22 feet, suiting it to indoor as well as outdoor ranges.

A special micrometer focusing adjustment provides for push-pull coarse adjustment and screw fine adjustment. The draw tube extends far enough to eliminate the danger of knocking the tripod with the elbow, and any standard tripod can be used.

Right: Edward C. Crossman, Jr. using the Draw Tube Spotting Scope.

The body is made of aluminum alloy and has a durable handsome black wrinkled finish. The draw tube is of brass, chromium plated for durability and appearance. Threaded metal cap shields protect the lenses so that the scope can be carried safely in a shooting kit.

Draw Tube Spotting Scope





THE SPORT GLASS

The Sport Glass meets universal favor because of its light weight, extremely large field and compact size. The smooth black finish is as handsome as it is durable. Its sturdy calfskin case is designed to give long service and yet the Sport Glass and case combined weigh very little and can be carried in the pocket.

The Sport Glass is excellent for watching baseball, football or opera, and for the aviator in identifying landmarks, other planes, and locating and observing the nature of landing fields. It has the widest field of view of any glass of its type made. Its special optics give a field 843 feet wide at 1,000 yards.

61-26-01-01 B & L Sport Glass, in Calfskin Case



THE COMPANION GLASS

MB

The Companion Glass is halfway between the Sport Glass and the 6× Binocular, magnifying four times. It is excellent for bird study, for watching football or baseball, for its large objective lenses furnish high light transmission and a wide field.

The aviator needs a glass which he can hold steady in spite of the

vibration and motion of the plane. We, therefore, recommend the B & L Sport Glass, or the Companion Glass for observation from a plane.

Its weight is 10½ ounces. The field of view 382 feet at 1,000 yards. It is 3¼ inches long. It is sold complete with an attractive durable leather case and shoulder strap.

61-26-40-20 B & L 4× Companion Field Glass with Leather Case and Shoulder Straps

SPECIFICATIONS



Code Word	Catalog No.	Description	Power	Objective Diam. in mm	Exit Pupil in mm	Relative Brightness	Field of View at 1000 yds.	Wt. in oz.	Length in In. (Open)
<i>Faicy</i> <i>Fepox</i>	61-26-01-01	Sport Glass.....	2	27.4			843 ft.	7	1 $\frac{3}{4}$
	61-26-40-20	Companion Field Glass.....	4	38.1			382 ft.	10 $\frac{1}{2}$	3 $\frac{1}{4}$
<i>Fesub</i>	61-21-60-01	Binocular C.F.....	6	30	5	25	445 ft.	19 $\frac{1}{2}$	4 $\frac{11}{16}$
<i>Fetax</i>	61-21-61-01	Binocular I.F.....	6	30	5	25	445 ft.	19 $\frac{1}{2}$	4 $\frac{11}{16}$
<i>Faixt</i>	61-21-70-01	Binocular C.F.....	7	35	5	25	381 ft.	26	5 $\frac{3}{4}$
<i>Faizw</i>	61-21-71-01	Binocular I.F.....	7	35	5	25	381 ft.	26	5 $\frac{3}{4}$
<i>Fadex</i>	61-21-75-01	Binocular I.F.....	7	50	7.1	50.4	381 ft.	42	7 $\frac{7}{16}$
<i>Fesex</i>	61-21-80-01	Binocular C.F.....	8	30	3.8	14.3	445 ft.	22	4 $\frac{11}{16}$
<i>Fesoz</i>	61-21-81-01	Binocular I.F.....	8	30	3.8	14.3	445 ft.	22	4 $\frac{11}{16}$
<i>Fajab</i>	61-21-90-01	Binocular C.F.....	9	35	3.8	14.4	381 ft.	26	5 $\frac{11}{16}$
<i>Fajec</i>	61-21-91-01	Binocular I.F.....	9	35	3.8	14.4	381 ft.	26	5 $\frac{11}{16}$
<i>Facew</i>	61-21-04	Binocular I.F.....	10	45	4.4	19.4	231 ft.	36	8 $\frac{1}{8}$
<i>Fadoz</i>	61-21-05-01	Binocular I.F.....	10	50	5	25	272 ft.	41	7
<i>Faesm</i>	61-41-25-19	NRA Spotting Scope with 19.5X Eyepiece..	19.5	50			112 ft.	36	13
<i>Faevp</i>	61-44-70	12.8X Eyepiece.....	12.8				164 ft.		
<i>Faexs</i>	61-44-65	26.0X Eyepiece.....	26.0				62 ft.		
<i>Faezw</i>	61-44-63	36.5X Eyepiece.....	36.5				64 ft.		
<i>Ferix</i>	61-41-20	Draw Tube Spotting Scope.....	20	45			78 ft.	32	17 $\frac{1}{8}$

C.F.—Central Focusing Eyepieces I.F.—Independently Focusing Eyepieces

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GLOSSARY OF OPTICAL TERMS

Alignment—as it pertains to binoculars, is discussed on page 10. Optical alignment must be extremely precise in order to give good vision, without strain on the eyes, through a binocular.

Angular Field—Means the angle between the two lines drawn from the binocular to the two edges of the field of view.

Definition — means clearness or sharpness of the objects in the field of view.

Diopter Scale—is the name of the markings on the eyepieces. A diopter is a unit for measuring inaccuracies in human vision.

Eyepiece—is the group of lenses closest to the eye.

Exit Pupil—the small bright spot seen in the eyepiece when holding the binocular at arm's length and looking through the eyepiece.

Field of Vision—is the area that can be seen with the binocular.

Interpupillary Adjustment — is the adjustment for the distance between the eyes and the scale on the binocular measures this distance in millimeters.

Linear Field—is the measurement of the diameter of the field at a certain distance, measuring from the objects as seen at one edge of the field to objects seen at the other edge.

Magnification—is defined on page 8.

Objective—is the large lens at the end of the binocular that is pointed toward the objects.

Prism—is a ground and polished piece of glass so shaped as to bend light in some particular way. Binocular prisms are right angle prisms, the two short surfaces of which act as reflectors.

Relative Brightness — A number equal to the square of the diameter of the exit pupil, and which is indicative of the brightness of image seen through one glass as compared to that seen through another. It is assumed, of course, that other factors, such as light absorption and reflection in the binocular, are neglected, or are equal in the two binoculars compared.

Spotting Scope—is the name given a telescope used in locating hits in the target, in rifle matches.

Stereoscopic Effect—is discussed on page 11.

ILLUSTRATIONS IN THIS BOOK

The catalog illustrations of B & L Binoculars, such as the ones on pages 16, 21, 23, 25, etc., are from photographs made with the Binocular in front of a translucent screen on which a view in silhouette has been projected from the rear by a B & L Model B Balopticon. The

photographic lens used on the camera was a Bausch & Lomb Process Anastigmat—a twenty-five inch focus lens designed for hair-line sharpness and finest quality.

Bausch & Lomb IC Tessar lenses were used to make most of the other photographic illustrations.



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BAUSCH & LOMB PRODUCTS

The Bausch & Lomb Optical Company manufactures a wide variety of optical equipment. A few products are listed below. Descriptive literature for these products is available.



TELESCOPES
MAGNIFIERS
BINOCULARS
MICROTOMES
MICROSCOPES
CENTRIFUGES
SCOPIETERS
PHOTOMETERS
OPTICAL GLASS
COLORIMETERS
SPECTROSCOPES
SACCHARIMETERS
READING GLASSES
REFRACTOMETERS
SPECTACLE LENSES
*ORTHOGON LENSES
REDUCING GLASSES
PROJECTION LENSES
OPTICAL MACHINERY
SEARCHLIGHT REFLECTORS
OPHTHALMIC INSTRUMENTS
METALLURGICAL EQUIPMENT
SPECTROPHOTOMETRIC OUTFITS
PHOTOMICROGRAPHIC APPARATUS
SPECTACLE AND EYEGLOSS FRAMES
INDUSTRIAL OPTICAL INSTRUMENTS
PHOTOGRAPHIC LENSES AND SHUTTERS
PROJECTION APPARATUS (BALOPTICONS AND ACCESSORIES)

*These are "wide vision" eye-glass lenses designed by the Bausch & Lomb Scientific Bureau and afford perfect correction from center to edge. Ask for them when having your eyes examined.

