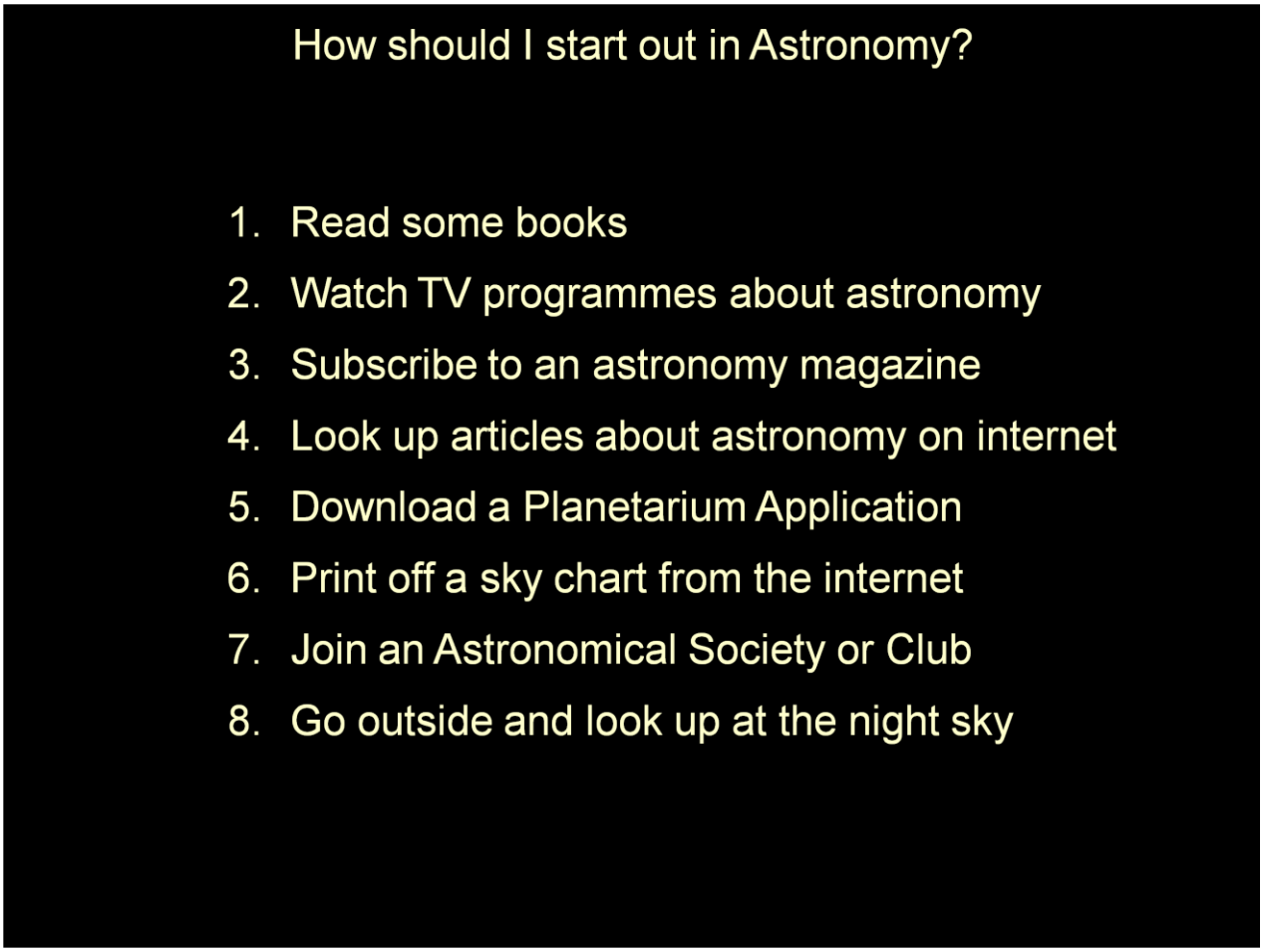
BINOCULARS FOR BEGINNERS

Newbury Beginners

20th October 2021

Steve Harris



It is always difficult to know where to start when thinking about taking up a new hobby.

Interest in Astronomy may be triggered by news or a programme on television.

Astronomy is taught in school today so this does promote interest for children.

In turn the children involve parents through helping with homework or through conversations.

The list above gives some hints for finding out more information about astronomy

What equipment will I need

1. A clear (as possible) view of the sky
2. Find or create a place away from lights
3. A star chart from the internet of a magazine
4. Use a dim or red light to see the chart
5. A reclining chair (garden lounger)
6. Warm clothes
7. Try to identify the brighter stars in the sky
8. Try to relate the chart to the sky
9. Allow a minimum of 10 minutes to adapt to the dark

The main thing is to go outside and have a look at the night sky.

The list above gives some advice about how to start observing.

A view to the south is the best way to look because that is where the Moon and planets can be found.

A tilting garden umbrella can be used as a screen to shield the observing position from annoying lights.

Start with a general look around the sky while your eyes adapt to the dark.

Do not use a bright light, try sticking a piece of card with a hole in over the torch.

Make sure you are sitting comfortably and wearing warm clothes.

About Binoculars

9 x 50 15 x 70 7 x 25 8, 9 or 10 x 50

Magnification x Aperture (Diameter in mm)

Binoculars are often the first visual aid to be used to improve the view of the night sky.

There are many variations of binoculars with different specifications and price.

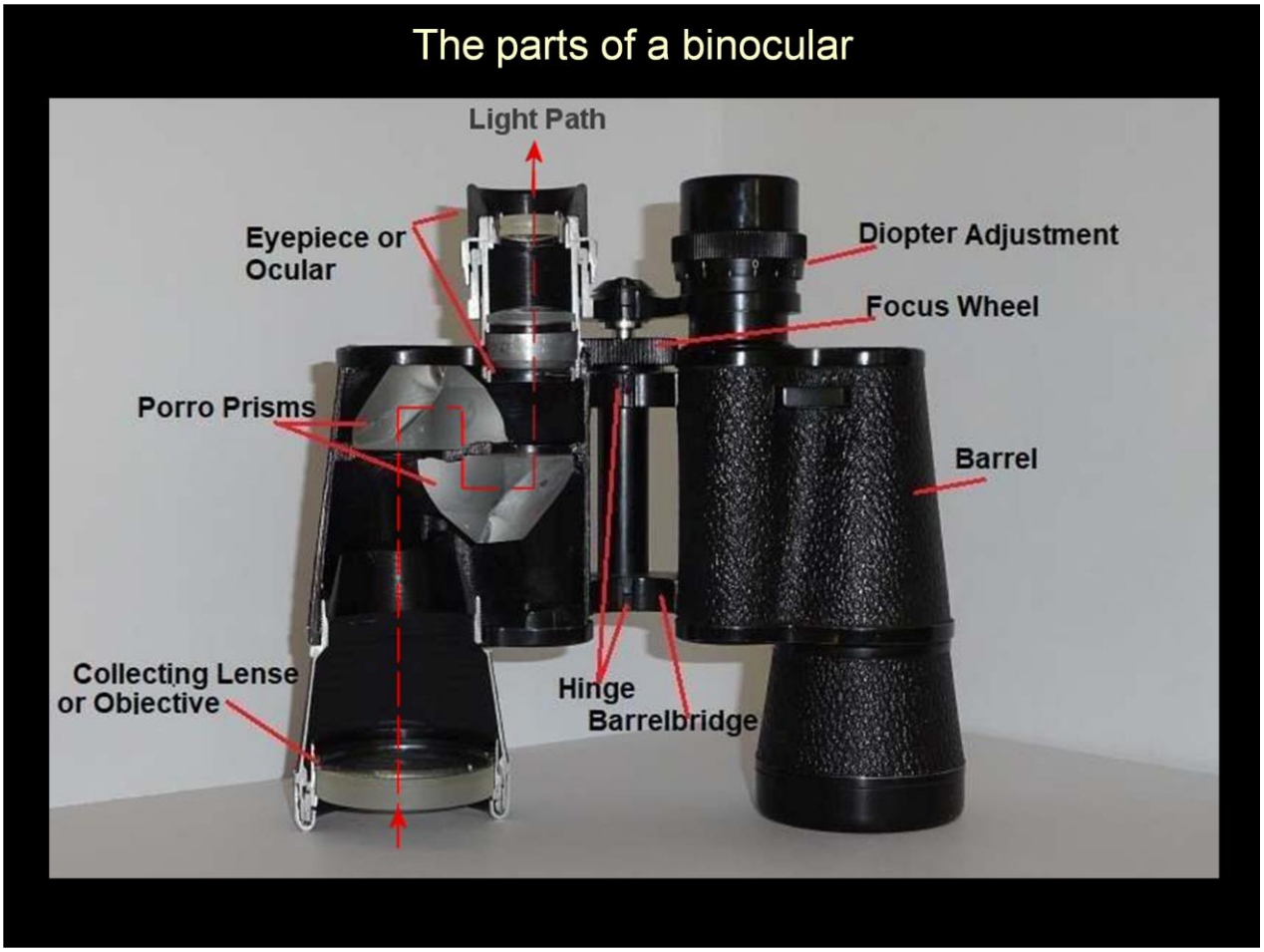
Try to borrow binoculars if possible to get started and to become familiar with the observing concept.

Binoculars can be expensive so have a good think and trial before spending your money.

Binoculars are defined by their inherent magnification and the aperture (diameter) in millimetres (mm).

The usual magnification used is between 7x and 10x so 8x or 9x is most common.

General purpose binoculars usually have an aperture of 50mm, but larger apertures are available but larger instruments can be a bit heavy.



The diagram above shows the typical construction and components of most binoculars.

The Objective Lens is used to collect light and direct it into the view's eye.

The aperture (diameter) is usually 50mm and the light path is shown.

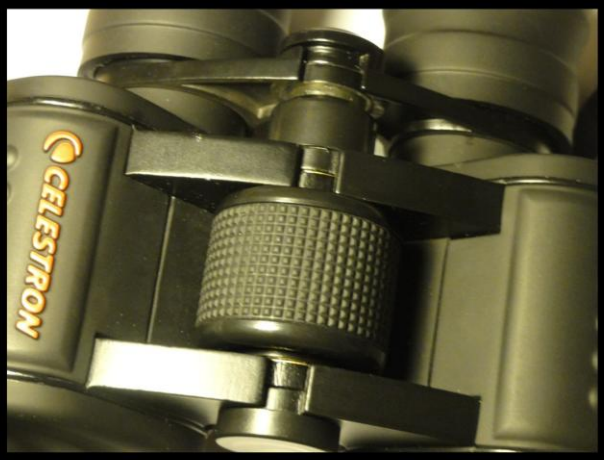
Prisms are used to shorten the binoculars and bring the light paths closer together to match our eyes.

The eyepieces are used to magnify the view and focus the image to suit the observer's eyes.

The central Hinge is used to adjust the eyepieces to suit the spacing of the observer's eyes.

The Focus Wheel moves the eyepiece assembly in and out to adjust the focus to suit our eyes.

Using a Binocular



Focus Wheel

Diopter Adjuster

1. Point the binocular at a bright object
2. Close the right eye adjust focus using the Focus wheel
3. Open right eye, close left eye and focus using the Diopter
4. Open both eyes and focus on the object using the Focus Wheel
5. Do not touch the Diopter again unless you are resetting the binocular

To ensure Binoculars produce the best possible view the Eyepieces can be adjusted individually.

The right hand eyepiece has a rotating focus capability that is called the Diopter Adjuster.

So we start by closing the right eye and focus on an object using the central Focus Adjuster Wheel.

This focusing should be done when looking at the Moon or a bright star.

Adjust the focus until the view of the Moon looks clear or the star appears as a small point of light.

Next close the left eye and open the right eye and focus by rotating the Diopter Adjuster.

Finally with both eyes open focus on the object using the central Focus Adjuster Wheel.

The binocular has been adjusted to suit the observers individual eyes.

Some advice on using binoculars

1. Always keep the dust caps on when not using
2. Keep your binoculars in a box or bag
3. Never remove the neck strap
4. When observing keep the strap around your neck
5. Keep your eyes on the target, you want to look at
6. Raise the binoculars up to your eyes
7. Move the binoculars around in a circle
8. Increase the circle size until the target is found
9. If not found start again from step 5
10. Keep in view and adjust the focus using the wheel
11. It is always best if you can sit down to observe

Protect the lenses by always fitting the Dust Caps when not in use.

It is a good idea to keep the Binoculars in a box or bag to protect it and not loose parts.

The Neck Strap is very important at night because we could stumble and drop the binoculars.

Also we can leave the binoculars hanging round the neck when not in use.

If things are put down in the dark they can be difficult to find.

It is best to keep your eye on the target that you want to look at and raise the binoculars up to your eyes.

It is much more comfortable to sit down (on a lounger) when observing and it stops us swaying around.

Binoculars are good for sweeping across the sky to see many more stars.

Especially impressive is the view of the Milky Way star fields.

An overall and more detailed view of the Moon can be obtained showing the rugged surface.

The larger craters can be seen and the difference in terrain can be made out.

The darker areas called Maria (seas) can be made out as shown above.

Some of the larger star clusters and Asterisms (patterns of stars) can be seen.

The Great Galaxy in Andromeda Messier 31 (M31) is the only galaxy that can be seen.

What can be seen using a Binocular

The Double Cluster in Perseus

M42 the Great Nebula in Orion

Open Clusters are nurseries of young recently created stars. A beautiful pair of Open Clusters can be seen in the constellation of Perseus.

In the winter sky we can see the constellation of Orion the Hunter.

One of the most sought after deep sky objects can be found in Orion, this is Messier 42 (M42).

M42 is a Nebula that is part of a vast cloud of mainly Hydrogen Gas where stars are forming.

Below the three stars that represent Orion’s Belt is the line of stars that form his sword.

Binoculars will show a misty patch in the sword can be seen using binoculars, see the image above.

A telescope is needed to see the nebula in detail.

Larger Binoculars need to be supported

A Large Binocular Support Stand

Binoculars larger than 50mm aperture can be heavy and difficult to hold steady.

This spoils the view and makes it difficult to see the details of the object being observed.

The stand supports the weight of the binoculars and allows fine sighting adjustments to be made.

The stand shown above has a parallelogram construction to stabilise the binoculars.

The binoculars can be moved up and down but the direction they are pointing remains the same.

This enables different sized people to use the binoculars without loosing the object being viewed.

This Support Stand can be used when sitting on a chair or garden lounger.

What are the limits of binoculars?

1. They cannot reveal details on the Moon
2. The planets look very small
3. Binoculars cannot reveal detail on the Planets
4. Most deep space objects are beyond reach
5. All but one galaxy cannot be seen
6. Only a few star clusters can be seen
7. Only bright comets can be seen
8. Magnification beyond 10x needs to be supported
9. Binoculars over 70mm are heavy and need support c

Binoculars have a low magnification and a wide field of view.

As a result they provide a wide view of a large area of sky but the objects within this field of view appear small.

This means binoculars are useful for locating objects but the low magnification (7 to 10 times) does not allow detailed study.

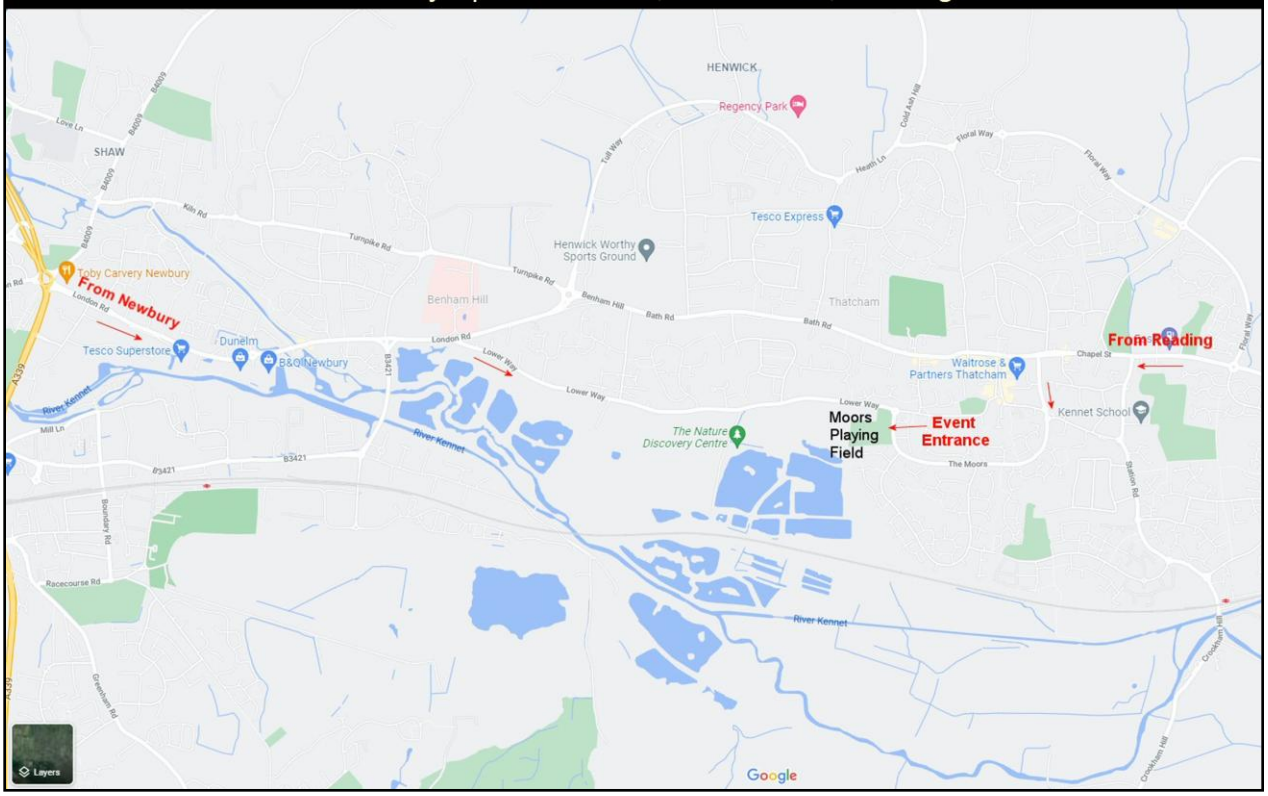
A telescope with a larger (>100mm) aperture and a magnification of between 25x and 250x can be used.

We will consider telescopes next month.

Thatcham Stargazing

An observing evening will be held on Monday 25th October 2021

Venue Lower Way Sports Ground, RG19 3LB, Starting at 18:30



This is a public stargazing event to be held on Monday 25th October 2021. Starting at 18:30.

This will be a special evening open to anyone, to look at the sky using telescopes.

This event will be dependent on the weather so if the forecast is for cloud it will be postpones.

The final decision will be made at 19:00 on Sunday evening so check out the websites on Sunday evening.

If the sky is clear we will be on the field using telescopes so make sure you wear warm clothes.

Further details and directions can be found on the Beginners website: www.naasbeginners.co.uk.

Or the Thatcham Town Council website: www.thatchamtowncouncil.gov.uk.

The next Telescope Workshop will be held on Wednesday 10th November 2021. Starting at 19:30.

This will be a special evening open to anyone, members and non-members, to give advice on using a telescope or what to buy.

These meetings will go ahead regardless of the weather but do bring warm clothing in case the sky is clear and we go outside.

There will be help available for anyone who is thinking about buying a telescope or is experiencing problems with their telescope or just in need of some advice.

If the sky is clear we will go outside to use telescopes so bring your own telescope if you have one or use some of the other members telescopes.

We ask for a donation of £2 towards the cost of the Hall.

Details and directions on the Beginners website: www.naasbeginners.co.uk.

A copy of this presentation, with notes, is available on the Beginners website.
This can be viewed at: www.naasbeginners.co.uk.