

The sky's no limit

There are lenses for everyone, from stargazers to birdwatchers, writes Franco Darioli

FROM the beginning man has been fascinated by the heavens. Countless hours of free and relaxing stargazing have been spent pondering what is out there.

One such ponderer was Galileo Galilei, the Italian scientist who, by putting together a concave and a convex lens, made the type of telescope still bearing his name.

This was in 1609, a year after a patent application for that design had been filed by Dutch lensmaker Hans Lipperhey, largely forgotten other than having a moon crater named in his honour.

In a mere 400 years we have progressed to having, for well under \$1000, computer-controlled telescopes delivering images many times brighter and sharper and 100 times more powerful.

For the past few decades, astronomy as a hobby has been very expensive and only the most dedicated and well-heeled amateur astronomers reaped the rewards usually associated with large institutions.

Now, hobbyists can set up remarkably powerful observatories and take NASA-style photographs of distant galaxies from their own back yards for less than \$10,000.

Of course, astronomy isn't the only use for telescopes.

Telescope or spotting scope?

FOR a closer look at sporting events or observing wildlife during a walk in a national park, binoculars are best. However, for longer distances a higher magnification is needed. That's when scopes take over.

There are many different types, but let's start with one important point. If you want to look at the heavens, an astronomical (not astrological!) unit is what you want. If you want one for bay views, whale and boat-watching, birdwatching and the like, what you want is a spotting scope.

Many first-time buyers make the mistake of picking a telescope intended for astronomy, thinking it will also be fine for daytime use from their beach house or country home. They soon discover it's just too powerful and difficult to use.

There are a few points in common between the two types. The bigger the front element, the brighter the view and the higher the practical maximum magnification can be.

The other end, the eyepiece, is just as important. Those 2mm to 3mm bits of glass are just not going to deliver any quality at all. Both front and rear elements need to be coated. The better the coating, the higher the light

transmission and the lower the chromatic aberration (colour distortion) will be. Examine the glass: a subtle multi-colour reflection is a sign of good multicoating. A bluish tinge is a bad sign.

The refractor

THE typical entry-level telescope is the refractor. This is just a long tube with one or two lenses at the front and the eyepiece, in line, at the back. Expect to pay anything from \$99 for a toy to several thousands for an exquisite design using ED (Extra-low Dispersion) glass and/or Apo (apochromatic) elements. This type is simple to use and requires little maintenance. The better models are well suited for astro-photography. For a quality unit, consider the Sky Watcher, Vixen and Televue.

The Newtonian

THE other common design for the beginner is the Newtonian, usually a 3-inch to 5-inch tube open at the front with a mirror at the back. Light is collected by the offset eyepiece on its way back out. That's why they are also called reflectors. Starting from less than \$200, they range up to \$3500 for a 10-inch

computer-controlled unit with a solid mount, heavy tripod and good eyepieces.

Schmidt & Co

NEXT we have the glass/mirror combinations, known as Maksutov, Cassegrain, Schmidt, or a combination of two of them, from \$500 for a 3-inch basic unit to \$5500 for the 11-inch Celestron C11S-GT. This group is often used for astro-photography with light and easy-to-use digital cameras priced from \$300 to more than \$10,000. The short tube and the fact they arrive almost fully assembled are advantages of this design. All you need to do is attach the unit to the tripod.

Better brands available locally include Celestron, Vixen, Meade and the emerging Sky Watcher. Some competitively priced units are also available under the Saxon brand.

Ritchie-Chretien

AT THE top we find this unique design consisting of only two hyperbolic mirrors. No lens elements are required. This is the type commonly found inside professional observatories and is capable of resolving details unmatched by the other types.

A variation of this configuration is on offer

from Meade with their RCX series, but for the real thing you have to look at the RCOS range, from 10-inch to 32-inch.

The 12.5-inch version will take your breath away, either by looking through it or reading the price tag — a little more than \$40,000.

Spotting scopes

THE terrestrial units are a lot easier to buy because you can get a good idea of the quality just by looking through them.

Point the unit at a distance similar to the one your subject will be and judge for yourself. If possible, choose a target with detail such as writing on a billboard or the lines of a building.

Take particular notice of the difference in clarity and brightness between the centre and the edge of your view and the amount of colour fringing (that purple or bluish smear at the edge of a line, easy to see with black writing against a white background).

Generally they are sold with a zoom eyepiece around the 20x to 60x range. Anything higher is superfluous. As with telescopes, the size and feel of the eyepiece will give you a fairly good idea of what to expect.

The eyepiece will be either straight or at a

45-degree angle. The straight version is easier to aim at the subject, but the angled one allows a lower placement.

Whichever version you choose, ensure the tripod you buy provides comfortable viewing.

An important part often overlooked is the "eye relief" — that is, the distance between the eyepiece and your eye. If you need your eyeball right up to the glass to get the full view, particularly if you wear glasses, it's not a good design.

Prices start at less than \$100. Spend more than \$200 for a decent unit. Keen birdwatchers will spend more than \$2000 for a top-of-the-line wide aperture unit, usually 80mm, with a razor-sharp eyepiece and ED glass. Top contenders are the Zeiss, Leica, Swarovski, Vixen and Kowa scopes.

With a fully sealed, nitrogen-purged and fully waterproof magnesium alloy body and crystal fluorite elements, the Kowa TSN-883 is one of the best — if not the very best — available. It comes with a fitting price tag, about \$4500.

Nikon and Bushnell's scopes range between entry level and the premium end. Value-for-money scopes can be found among the Olivon, Tasco and Saxon brands.

Look on the digital side

TELESCOPES have joined the computer age. If you can afford one, lash out on a computer-controlled unit.

They are much easier and more fun for home astronomers to use than the older do-it-yourself versions.

Apart from finding the various objects for you, the motorised "Go

To" function is hands-free, resulting in less vibration being transmitted to the unit.

The latest CCD cameras are a huge step forward for avid astronomers. Capture distant galaxies, view them on your own computer screen, and print them out if you like.

There are also digital camera cradles to use with spotting scopes for sport or wildlife shots, or buy an Acuter scope with a built-in camera for about \$1000.

SBIG CCD camera

SBIG's CCD cameras are not the usual cheap USB toys sold on eBay.



The SBIG picture: NASA-inspired technology, and years of research, have resulted in the CCD camera.

The series of cameras produced by the Santa Barbara Instrument Group is the result of 20 years of research and development that started by using technology derived from NASA.

From the original 1/30th of a megapixel CCD (192x164) we now have a 35mm-sized 11MP CCD (by Kodak) with sensitivity five to six times higher than a standard digital SLR and a dynamic range about eight times wider.

The images these cameras can capture are truly stunning, as is their cost. Depending on how keen you are, \$7000 to \$13,000 may sound like a lot of money.

However, that's cheap compared with the fortunes that research observatories had to invest to obtain similar results not so many years ago.

The main picture (left) of the Spiral Galaxy M83 nebula was taken by Advanced Telescope Supplies owner Peter Ward with his 14.25-inch RC Optical Systems telescope on a Bisque Paramount ME and SBIG STL1.1, 000xcm CCD camera. The exposure time: a mere eight hours!

Peter's set-up can be seen in his own observatory dome (inset, left).

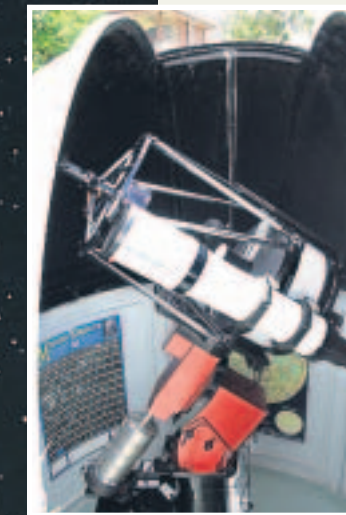
USEFUL LINKS

www.myastrishop.com.au
My Astro Shop is the most informative site I have seen. Great advice and great products. Many thanks to Steve Massey for his help.

www.atscope.com.au
From high-end to out of this world, Advanced Telescope Supplies have it all. Many thanks to Peter Ward for his contribution.

Other sites:

www.bintel.com.au
www.yorkoptical.com.au
www.saxon.com.au
www.telescopes-astronomy.com.au



spotting scopes for sport or wildlife shots, or buy an Acuter scope with a built-in camera for about \$1000.

SBIG CCD camera

SBIG's CCD cameras are not the usual cheap USB toys sold on eBay.

THERE'S SCOPE FOR MORE . . .



◀ Kowa TSN883: pick of the spotting scopes

▼ Vixen VMC110L: a 110mm Maksutov-Cassegrain with Star Book GOTO

◀ Celestron CPC 800 GPS (XLT): portable top-of-the-line astronomical telescope

▲ Vixen Cassegrain VC200L: a 200mm f/9 cassegrain system.

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LOOK SMART

TOP tips for picking telescopes:

- 1 AVOID buying any telescopes via eBay if you are not an expert
- 2 DON'T buy by number. Quantity is not quality.
- 3 IF IT looks and feels flimsy, it is.
- 4 AVOID the sub-\$500 telescopes. Leave them for the kids.

THERE'S NO PLACE LIKE DOME

WHY not have your very own backyard observatory?

For those who appreciate quality and earn an income to match, it's possible to have your own fully computerised and automated observatory. Just walk in, power it up, choose your destination and the universe is yours. A system can be set up so the scope, camera, computer and dome talk to each other — just sit and relax.

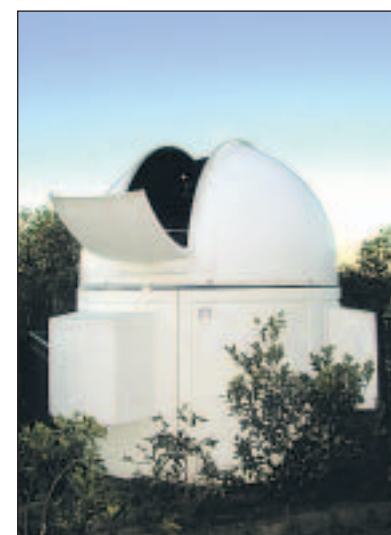
No large-screen TV will match that in wow factor. Amaze yourself and your friends with the stunning vision of the night sky from your own backyard.

Of course, for the best views it is better to be away from the

bright city sky. Because of the amount of detailed knowledge needed for the initial set-up, it's best to leave it to professionals.

Buying bits and pieces from different sources could end up being an expensive mistake. Sirius Observatories' domes are available from NSW-based Advanced Telescope Supplies (www.atscope.com.au) from about \$6000.

New to Australia is the cheaper SkyShed POD (www.skyshedpod.com), which can be ordered from SA-based company Telescopes and Astronomy (www.telescopes-astronomy.com.au) from \$3666.



Dome sweet dome: (above) the SkyShed personal observatory dome.

Star performer: (left) this model is made by Sirius Observatories and is available in Australia from Advanced Telescope Supplies.

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