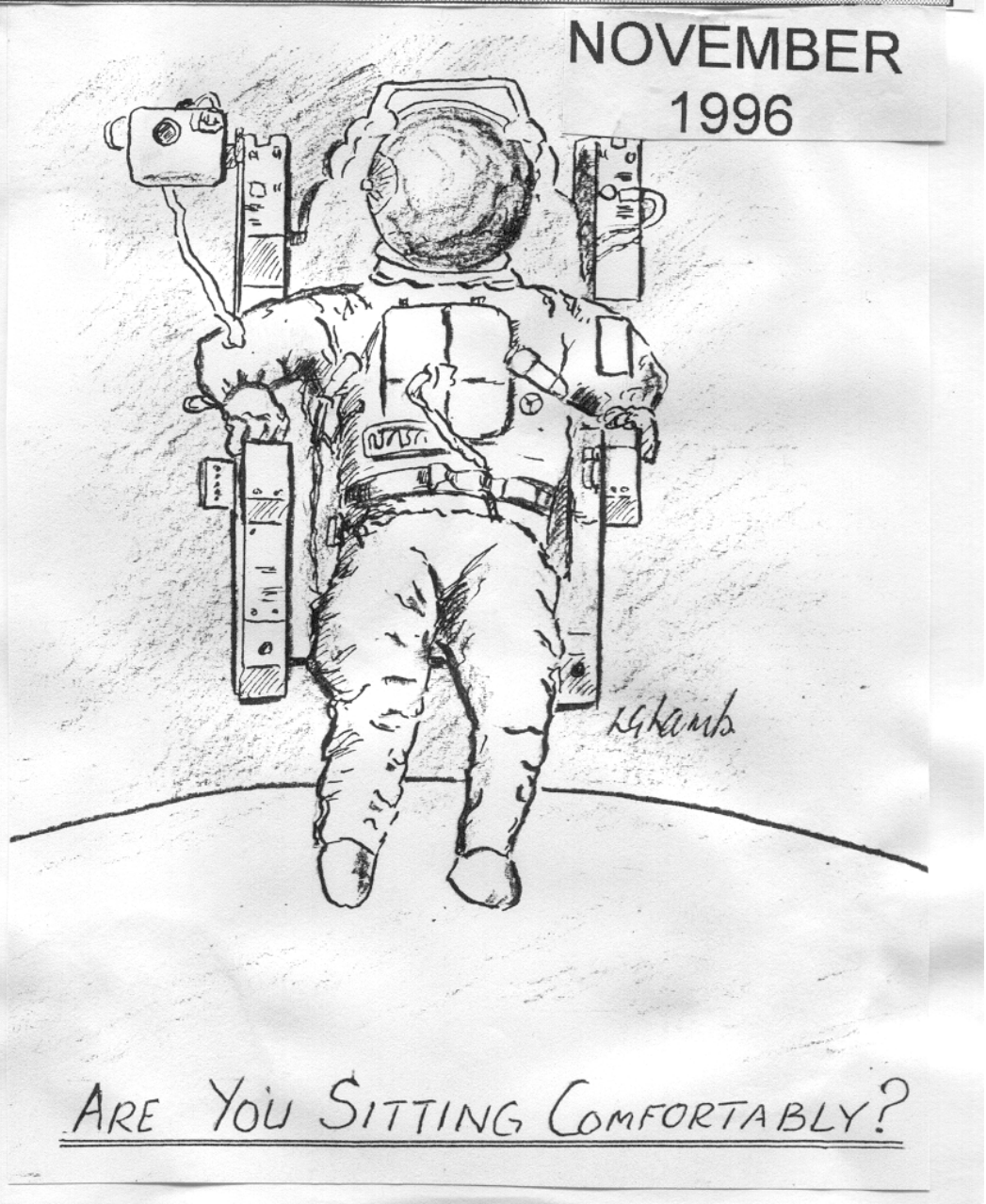
ORWELL ASTRONOMICAL SOCIETY IPSWICH

Charity No 271313

NOVEMBER 1996



NIGHT SKY

All times GMT

SUN

Rises approximately at 07:00 to 07:35
Sets approximately at 16:30 to 16:00

MOON

3rd **11th** **18th** **25th**

MERCURY Mercury will be at superior conjunction on the 1st, and will not be visible this month.

VENUS Venus will be rising at about 04:00 in mid month, and remains were prominent in the predawn sky. Mag. -4.01.

MARS Mars will be rising at about 00:10 in mid month. Mag. 1.2.

JUPITER Jupiter is still visible in the early evening sky,this month. By the end of the month it will be setting at about 18:00. Mag. -2.0.

SATURN Saturn will be visible most of the night. It will be setting at about 01:40 at the end of the month. Mag. 0.8

URANUS Uranus will be setting at about 20:50 in mid month. Mag. 5.8.

Neptune Neptune will be setting at about 20:20 in mid month. Mag. 7.9

OCCULTATIONS DURING NOVEMBER 1996

The table lists stellar occultation disappearance events which occur during the month under favourable circumstances. The data relates to Orwell Park Observatory, but will be similar at nearby locations.

Date	Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Min Dist (radii)	PA (°)	Star (D = double)	Mag
Thu 21 Nov	00:00:54	.80+	-58	22	.80S	122	44 Psc (D)	5.8
Sun 24 Nov	00:50:36	.98+	-56	44	.94S	146	ZC454	5.6

James Appleton

SOCIETY NEWS

1 Committee Meeting

The next committee meeting will be held on saturday 16th November at the observatory, from 1930. This will be an open meeting an any member is welcome to attend.

2 Events for 1996

Christmas Meal

The Christmas meal this year will at the Shepherd & Dog again. The deposit is £5 per person. I have booked 20 places for this event. At the time of writing there are still as few places available.

Roy Gooding

The Discovery of Neptune

David Payne

The timing of National Astronomy Week was selected to commemorate the 150th anniversary of the discovery of Neptune on the evening of 23rd September 1846. Unlike the chance discovery of Uranus by William Herschel the discovery of Neptune was a triumph of mathematical prediction. It was not however without its human drama.

John Couch Adam, born in 1819 the son of a tenant farmer from Launceston, Cornwall, was a brilliant mathematician who was browsing through a Cambridge bookshop one day in June 1841. He came across an article by George Airy (written in 1832 before he became Astronomer Royal) describing the anomalous motion of Uranus which seemed to refuse to adhere to predictions of its orbital position. Adams decided that this looked like an interesting mathematical puzzle and wondered if the peculiarities of the motion of Uranus could be explained by an unseen planet. By 1845 Adams had refined a solution for where the new planet must be and sent his results to the Astronomer Royal (George Airy). Unfortunately Airy who was skeptical about the existence of another planet being the cause of the peculiar motion of Uranus did not respond very quickly to Adams and it was not until the November of 1845 that he wrote to him and even then only to ask if Adams' calculations could explain discrepancies in the distance of Uranus as well as its motion. Feeling snubbed Adams did not bother to reply.

Meanwhile in France another brilliant mathematician Leverrier was also working on the problem and in June 1846 (about eight months after Adams predictions) he published a paper discounting all other explanations for the peculiar motion of Uranus, except for a remote planet and gave the co-ordinates of a ten degree area of sky where the planet should be found. Although French astronomers applauded the work of Leverrier for some strange reason none of them bothered to look for it. In late June of 1846 Airy, who had read of Leverrier's work, wrote to him and asked him the same question as he had of Adams but did not on this occasion mention the work of Adams in his letter. Unlike Adams however, Leverrier replied to Airy.

A few days later Airy did mention the coincidental work of Adams and Leverrier and in July asked astronomer James Challis to search for the new planet. Challis however appears to have taken on the task without any real enthusiasm.

Back in France Leverrier was having an equally tough time trying to interest any French astronomers to search for the planet at his predicted position! Eventually he found a letter from an aspiring assistant astronomer, a Johann Gottfried Galle, working at the Berlin Observatory in Germany. Seeing this as his only hope Leverrier wrote to Galle asking him to look for the planet. Leverrier's letter reached Galle on September 23rd and on that same night Galle and a student assistant Heinrich d'Arrest used the 23cm Berlin telescope to search the sky where Leverrier indicated. While Galle called out the position of the stars d'Arrest noted them against a star map, then the student called out "that star is not on the map" and Neptune was discovered, Leverrier had been spot on!

In England on September 29th Challis found a star that looked very disk like, rather than the usual stellar point, however he did not follow through the observation that night and decided to go to bed! The following day he heard the news of Neptune being observed at the Berlin and Paris observatories. To complete the irony if Challiss had more carefully checked his earlier observations he would have discovered that he had observed the planet on two separate occasions in August!

The Planet Neptune

Neptune is one of the four gas giants of the solar system. It has a diameter of 49,500 km (30,750 miles) and a mass 17.22 times that of the Earth making it slightly smaller but heavier than Uranus.

Neptune has an average distance from the Sun of 4,497,000,000 km (2,794,000,000 miles) and takes 165 years to make one trip around the Sun. The orbit is inclined 1° 46' to the ecliptic with an eccentricity of only 0.0086, only Venus has a more circular orbit. Neptune's axis of rotation is tipped only

28° 48', similar to Earth's 23° 30'. The rotation period of the clouds in Neptun's atmosphere ranges from about 16 hours near the planet's south pole to more than 18 hours near the equator, the rotation of the planet's core was found, from magnetic field measurements made by Voyager 2, to be 16.05 hours.

Visually Neptune is faint and small reaching a maximum brightness of magnitude 7.8 well below naked eye visibility. In a large telescope the planet appears as a small blue disk, 2.3 seconds of arc in diameter. The best observations of Neptune from Earth revel some bright spots/clouds and a bright haze over the south pole. The Voyager 2 spacecraft confirmed these sightings when it reached Neptune in 1989, flying less than 5,000 km (3,100 miles) above the planet's cloud tops on August 25. The spacecraft's cameras revealed many atmospheric features, including a large, dark storm system named the Great Dark Spot for its resemblance to the Great Red Spot of Jupiter.

As with all the gas giants the atmosphere of Neptune consists mainly of hydrogen and helium. About 2.5 to 3% of the atmosphere is methane (CH4) and the cirrus clouds seen in Neptune's atmosphere by Voyager are composed of crystals of methane. It is the Methane in Neptune's atmosphere that gives it its deep blue color.

In 1846, less than a month after the discovery of the planet, the English astronomer William Lassell discovered Neptune's largest moon Triton. Triton is larger than our own moon with a diameter of 2,720 km (1,690 miles) but only has a visual magnitude of 13.5 which with the proximity of Neptune makes it a difficult object for most amateur telescopes. Over a century later in 1949, the Dutch astronomer Gerard Kuiper discovered Nereid, a second moon at magnitude 18.7 and a diameter of only 170 km (105 miles). Both satellites have unusual orbits, Triton moves in a retrograde direction around its primary, Neptune, while Nereid has the most eccentric orbit of any moon in the solar system. Its distance from Neptune varies from 1,400,000 to 9,700,000 km (900,000 to 6,000,000 miles).

During its flyby of Neptune Voyager 2 discovered a further six new moons giving Neptune a total of eight. Interestingly one of them, Proteus, is considerably larger than Nereid with a diameter of about 400 km (240 miles) It has an irregular shape and is much darker than Neried reflecting only about 6% of the sunlight that strikes it (Nereid reflects abourt 12% It is also closer to Neptune (only 73,000 miles) making it much more difficult to observe from Earth.

Neptune has a series of faint rings which had been suggested by observations from Earth. These observations had indicated that irregular arcs, or strands of partial rings, orbited the planet. Photographs from Voyger, however, revealed five rings surrounding Neptune: two bright, narrow rings and three fainter fuzzier ones. Some sections of the bright rings have significantly higher densities than others, and it was these "arcs" of higher density that had first been detected by Earth based telescopes and also led to the suggestion of only partial rings around Neptune. The bright rings are at distances of approximately 53,000 km (33,000 miles) and 63,000 km (39,000 miles). One broad fainter ring is located at 42,000 km (25,000 miles), and another in a zone between the bright rings, a third extended sheet appears to fill the space between the planet and the inner broad ring.

Choosing telescopes and binoculars: a beginners guide

All the information used in this article is taken from a leaflet published by

National Astronomy Week.

Every amateur astronomer wants to own a telescope - and the bigger the better. But for a starting instrument don't overlook binoculars, which are often cheaper and better value than small telescopes, and show you many interesting objects.

Other basics for beginning sky watching include a planisphere (a circular star chart with a mask that rotates to show the stars on view at any particular time and a simple star atlas. Armed with these and a pair of binoculars, you can learn the basic sky sights with little outlay. And the money will not be wasted - the binoculars will always be useful, even if you eventually graduate to a larger telescope.

Binoculars a good first choice

There are many beautiful sights, such as the star fields of the Milky Way, star clusters such as the Pleiades and Hyades, and ghostly comets, which can only be truly appreciated in low -power, wide-field binoculars. These compact, simple devices are the ultimate in portable, easy-to-use equipment, and many observers use them to complement their telescopic observations.

Binoculars are usually marked with figures such as 8 x 40, 7 x 50, or 10 x 50. The first figure is the magnification, and the second is the aperture of the front lenses in millimetres. For general observing 7 x 50 or 10 x 50 binoculars are equally useful. If you find the weight of 50-mm binoculars a problem, go for 40-mm or even 30-mm models.

Avoid binoculars with magnifications greater than 12, which will be difficult to hold steady, unless you have a particular need for a specialist pair. Zoom binoculars should be avoided too , as they generally have narrow fields of view and

poor optics. Good binoculars will have coloured coatings on the optics, similar to non-reflective coatings on spectacles, which improve the image brightness by increasing transmission of light.

Some cheap mail-order binoculars economise by using prisms that are too small, which severely limit the field of view. Look into the front lens - you should see a small circle of light through them, if the circle is cut off or square, you are losing light. Also be aware that very cheap models may have spurious bulges in the barrels to give the impression that they contain prisms when they do not. Such instruments are simply opera glasses with a straight-through optical system having a very restricted magnification and field of view.

Telescopic basics

There are two main types of telescope: refractors (the spy-glass type) which use lenses to collect and focus light: and reflectors, which collect light with a mirror. To choose the right telescope, you need to know the relative advantages of each type.

Telescopes are judged by not their magnification but their aperture, i.e. the diameter of the main lens or mirror. When astronomers refer to a "small" telescope they mean one with a small aperture. The aperture governs how much light the telescope collects - and the more light it collects, the more you can see. Hence it is best to get the largest aperture telescope you can afford, whether a refractor or reflector.

The smallest telescopes, i.e. those with apertures under 75mm or 3 inches, are always refractors. Telescopes with larger apertures are usually reflectors, since large mirrors can be made more cheaply than lenses.

The smallest refractors, of 50 or 60 mm (2 or 2.4 inches) aperture, will show the Moons craters and dark lowlands "seas" (the maria). Saturns rings, Jupiters cloud belts and its four main satellites, some attractive double stars, and various nebulae and galaxies. Small or medium-sized reflectors have apertures of 100 mm (4 inches) or larger. They will usually show fainter objects and finer details than small refractors.

Although a small refractor may appear a good first buy, there is one very important warning. Many low budget refractors are either poorly made or make misleading claims as to their performance. In the worse cases the telescopes may be useless for astronomy, even though their finish may be apparently good. Unfortunately, even some leading stores sell telescopes which are of very poor optical quality.

One of the main failings of simple lenses is that they produce fringes of false colour around objects, an effect known as chromatic aberration. A lens which is corrected for such false colour is termed achromatic so it is worth looking for this in the description, although it still dose not guarantee good performance. Mirrors do not suffer from chromatic aberration.

PROGRAMME FOR NOVEMBER

Mondays from 7.30pm *No Directors available for this night*	*GENERAL OBSERVATION SECTION*
Tuesdays from 7.30pm *Mr D Barnard*	GENERAL OBSERVATION SECTION *daytime only*
Wednesdays from 7.45pm *Mr M Cook*	NEBULA & FAINT OBJECTS SECTION *Mr D Payne*
Thursdays from 7.30pm *Mr P Richards*	OBSERVATORY VISITS FROM OUTSIDE GROUPS
Fridays from 7.30pm 8th - 22nd *Mr J Hood*	DOUBLE STARS *Mr M Barritt*

All members are welcome on any night, but on nights other than Wednesday please check with the director of the night that the observatory will be open.

Lectures and other events:

COMMITTEE MEETING -------- On Saturday 16th November at 7.30pm in the club room at the observatory. All members are welcome to attend.

CHRISTMAS MEAL-------On Wednesday 11th December at the Shepherd & Dog.

e-mail enquires to oasienq@btbcs.bt.co.uk
WWW url http://www.ast.cam.ac.uk:80/~ipswich/

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