

# W.A.S. 50

Booklet to commemorate the 50<sup>th</sup>  
Anniversary of the Worthing Astronomical  
Society. 1965 to 2015



**Edited by**  
Alex Vincent

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### **Acknowledgements**

I wish to thank members who have submitted articles and photographs for this commemorative booklet. Special thanks also go to others who have helped such as Charles Walker.

### **Editor's comments**

I have thoroughly enjoyed putting this 50<sup>th</sup> anniversary commemorative booklet together. I thank all those who have contributed to it. I raise my glass to WAS and here's to the next 50 years.

Front Cover : WAS Observatory at Windlesham House School

Rear Cover Top :

Rear Cover Bottom :

## **A Short History of WAS**

The Worthing Astronomical Society began with its first meeting in September 1965 as The Astro Circle. It began in the summer of that year when Derek Prince started an astronomy group. At the first meeting, Derek Prince, Jim Murray, Arthur Pywell and Graham Boots were present. Two other members joined in December 1965 who were Deirdre Levers and Wendy Dunkerley. These members met monthly at Derek's house at 5 Winton Place.

The group was small, but it was not informal as there were sections such as solar, planetary, lunar, meteor and instruments. Observing was taken very seriously and there were get togethers as well. The society became the Newtonian Observatory Astronomical Society (NOAS) in 1966 and in January 1967 a society constitution was outlined. NOAS was renamed Worthing Astronomical Society in 1982. The society came into being as a result from Mr J L White's classes.

As well as meetings, eating and drinking, other activities have taken place such as visits to places of astronomical interest such as the Royal Greenwich Observatory, Mullard Space Centre and others. On August 2 1975 we went to an exhibition at Greenwich to celebrate the 300<sup>th</sup> anniversary of the Royal Greenwich Observatory (RGO). 1975 was also our 10<sup>th</sup> anniversary where we held a convention at the 6<sup>th</sup> Form College in Worthing.

We also held astronomical exhibitions in St Paul's Church Hall in August each year where telescopes, star charts etc were on display. At our old meeting venue at the WEA in Union Place, we held a moon rock exhibition in January 1990. This was also held at Worthing Library in the autumn of 2009. We had stands at various other events in the past to promote the society and set up telescopes to view sunspots. We have also held social events such as barbecues and we have held public viewing events like at Worthing Pier. In recent years, we have got involved with Stargazers Live.

We have our own observatory, which has been widely used over the decades (see separate article). We have photographic albums in our archives, which are a collection of photographs of the various events and

members over the years. There are also display boards of astronomical objects such as the Moon and planets taken by members either at the observatory or with their own equipment.

We celebrated our 25<sup>th</sup> anniversary in 1990 by having an anniversary dinner at the Ardington Hotel in Worthing. This event was well attended with guests attending such as J L White (our president at the time) and Heather Cooper. We also had a commemorative booklet then, which was edited by Pam Spence. We celebrated our 40<sup>th</sup> anniversary in 2005 with good lectures on the history of the society and the observatory. At our September 2005 meeting we had a social. I wish to thank all the members past and present who have made WAS what it is.

Alex Vincent. 2015.



**The Astro Circle in 1967. Wendy Dunkerley.**

## Past WAS events



Moon rock on display at Worthing Library. 12.10.09.

# Our Observatory

## Graham Boots

The astronomical observatory came into being in 1969 when our society was given by a member a basic 12" f5.6 Newtonian reflecting telescope. This telescope was cited in the back garden of a member that faced south in Goring. From the very beginning it was made available for all the existing members to use. The curator from the beginning was Graham Boots.

In 1972 another member gave £50 for a wooden observatory to be built around the telescope. This was completed within the year. It was a strange design having seven sides and two large hatches, which open towards the sky from the horizon to the zenith, using ropes and pulleys. It was turned round manually on wheels standing on a concrete square base.

The observatory was used visually and lunar occultations were timed. The timing results were sent to the lunar section of the British Astronomical Association and the International Lunar Occultation Centre in Japan for many years. In 1976 we began lunar photography ; this was carried out by Graham Darlington achieving excellent results, which are still displayed today.

One of our most important members was Charles Stiff who for 18 years was the observatory engineer who along with Peter Montgomery transformed the telescope with many modifications and fitted many accessories. Very important was the electric equatorial drive system and the 3" finder scope. The main parabolic mirror was refigured at a cost of £400. Most of the work was completed in 1984.

The local street lights were converted to full cut off by the West Sussex County Council lighting engineers thus reducing sky glow, this resulted in gaining a whole extra magnitude. We found we could now see the spiral structure of the Pinwheel Galaxy, M51. A big thank you goes to Mr Richard E Bird who was the chief lighting engineer who began the street lighting changes to get rid of unnecessary sky glow.

In 1993 we successfully obtained a grant from the Worthing Borough Council Lottery Fund for £2600 for a new three metre fibre glass dome and a new square concrete base. This meant our observatory was much easier to use and the interior remained dry.

Around 1995 we began using Charge Couple Devise (CCD) cameras, which were much more sensitive to light than film cameras. We had a Web Cam to begin with and obtained very pleasing results when imaging Mars this way.

In 2004 the decision was taken to move the telescope and observatory to a dark site away from the light polluted skies of Worthing into the dark unlit skies of the South Downs. The main street lighting changes have only taken place recently around 2012 to 2015. We approached land owners in the area and chose Windlesham House School in the parish of Washington just seven miles north of Worthing Pier. This is a countryside designated area, which later became the South Downs National Park giving very dark night skies. In 2005 the observatory was successfully moved to a new site.

In 2009 we obtained a grant from the National Lottery for a new computerised modern telescope with GoTo facility. This means with the aid of an electronic handset by pushing buttons the telescope will move to a celestial object of your choice and centre it in the field of view of the telescope and there are thousands of objects in the data base. The telescope we chose to buy was an 11" fr. 10 Celestron APO 11. Mounted piggyback is another telescope, which is a Teleskop Service 90mm fr. 6.3 wide field refractor.

The school have been very good to us. They provide us with a suitable site, electricity and toilets, also legal licence and insurance cover. Over ten years we have been at the school, we have given astronomy lectures to the pupils and had groups come to the observatory on clear evenings to see the Moon and planets through telescopes.

As well as members using the observatory, we have had many visitors and the very young pupils at Little Windlesham who come to see the telescope working and the observatory rotating during the day.

I feel our greatest success is with children groups such as Cubs and Brownies. One year when the observatory was still in my back garden we had 126 Brownies who came to the observatory over several evenings. I find children are so receptive when you talk to them about stars and planets. They are very interested and keen to learn. Long may it continue.



WAS 12" Telescope circa 1969



WAS Observatory in 1972

# Venus Occultations and (Transits)

Alex Vincent

As well as transits, Venus is sometimes occulted by the Sun, which can only happen when the planet is at superior conjunction. These events also take place at intervals of eight years and due to Venus being further away, there are more of them. In fact there are ten such events lasting 72 years as opposed to two transits in eight years.

Transits and occultations of Venus occur together with the former taking place in the centre of the sequence. For this reason occultations occur in the months of May/June and November/December. The last occultation of Venus took place on June 9 2008 and the next will be on June 6 2016. The latter event will be almost central.

The present sequence began with an occultation on June 18 1976 and occurs every eight years until the last one on May 28 2048. The next after this will take place on December 19 2081. They occur at intervals of  $33\frac{1}{2}$  years (June to December) and  $65\frac{1}{2}$  years (December to June). Venus occultations in May/June go north to south and those of November/December from south to north.

The Venus transit of June 6 2012 marked the centre of the sequence as it was 36 years from the first occultation in 1976, and 36 years from the last occultation in 2048. The second transit of the June transits is the centre of the sequence, and the first transit of the December transits being the centre of the sequence.

Regarding transits, it is possible to observe a coronal transit, where Venus only transits the Sun's corona. This can only happen when the planet is close to the Sun, mainly eight years before or after transit seasons. These events are near miss transits like at the inferior conjunction on June 10 1996, where Venus was only 14 minutes of arc south of the Sun's limb. The next near miss transit takes place on June 3 2020 where Venus passes just 13 minutes of arc north of the Sun. At this event, a fake eclipse (using a coronagraph or Lasco 3) is needed to view the corona and to observe Venus as a small black dot going across it. Hope this event will be widely observed. The next near miss transit after this will not be until December 13 2109. The near miss transit of June 6 2263 (eight years

after the 2247 and 2255 transit season) coincides with a total solar eclipse. This means that Venus will be seen as a small black dot in transit across the Sun's corona during totality.

Regarding occultations, they also need to be observed by a fake eclipse by using an occulting disc such as Lasco 3 in order to see Venus go behind the solar disc. Hopefully this will be achieved at our next occultation of Venus on June 6 2016.

## Table of occultations and transits 1838 to 2396

Occultation	Transit
December 18 1838	December 9 1874
November 26 1910	December 6 1882
June 18 1976	June 8 2004
May 28 2048	June 6 2012
December 19 2081	December 11 2117
November 27 2153	December 8 2125
June 21 2219	June 11 2247
May 31 2291	June 9 2255
December 22 2324	December 13 2360
November 29 2396	December 10 2368

In the case of the occultations, only the first and last one of the sequence is given in this table. All the transits are given.



**1**Occultation of Venus. June 9 2008. Transit of Venus. June 8 2004  
Photographs taken by Alex Vincent.

# Our Good friend the late Sir Patrick Moore

Graham Boots

My colleague, Keith Peters and I got to know Sir Patrick during the last few years of his life. Unable to use his telescopes because he was no longer able to walk to let others use them. From early 2007 Keith and I used his largest telescope, made very many years ago by Fullerscopes, which was the 15 ½ inch f10 Newtonian Reflector. This opportunity was very convenient to us as Sir Patrick lived just 26 miles from Worthing.

This we found was a marvellous telescope still of good optical quality with a stout wooden octagonal tube. It had seen better days but was still serviceable. From early 2007 we were able to use this grand old telescope many times up to Patrick's death at the age of 89 at his home in Selsey, West Sussex on December 9 2012.

Keith and I usually arrived on a Friday evening when he sky was clear. The house keeper would greet us at the front door and take us to the study where Sir Patrick would be. He was very kind and generous and would lend us his box of eyepieces. After a short discussion we would go out into his garden to the large metal observatory, where we would spend the evening till late. His garden was very dark. Keith and I would take our astronomical cameras and image planets. We presented Sir Patrick with framed photographs of both Mars and Saturn we had taken with his telescope that he hung in his study. He was very pleased with them.



Image of Mars Presented to Sir Patrick

# Galileo's Telescope

Graham Boots

Early in the 17<sup>th</sup> century, Galileo heard about the invention of the telescope. In 1609 he decided to build one and use it to observe celestial objects for which he became famous. He was not the first person to do so; he was beaten by a few months by the Englishman, Thomas Harriot who used it to draw the first lunar map. During Galileo's life he was to build about a hundred telescopes and two survive in a museum in Florence, Italy.

I was very pleased to discover that it was possible to buy a beautiful coloured cardboard working model kit to make one of Galileo's telescopes. As an enthusiast model maker since I was a child, I decided to make one. The source was a firm that dealt with science replicas such as astroblades, sextants and sun dials.

Printed, pre-cut cards and instructions enabled me to construct a working model. Upon completion I found the optical acrylic lens gave good images. Galileo had to make his own glass and grind his lens, which must have been poor quality for the time, yet he made ground breaking discoveries with it.

Once complete, I was able to follow Galileo's footsteps. Only a little magnification is necessary, in this case twelve times, yet I could see craters and mountains on the Moon, the four larger satellites of Jupiter and the phases of Venus. When pointed to the stars, I could see many more fainter ones and this is what Galileo saw when he inspected the Milky Way. Although I could not see the rings of Saturn, something different in so far as it was elongated and not round like other planets.

The field of view is narrow and to use the telescope more easily, it was necessary to tie it with string to a steady tripod. **NEVER USE THIS OR ANY OTHER TELESCOPE TO LOOK AT THE SUN.**

What Galileo had discovered lead him to understand that the Sun was at the centre of the Solar System and not the Earth, which contradicted the church and he spent the rest of his life under house arrest.



**Model of Galileo's Telescope**

# Inca Astronomy

## Graham Boots

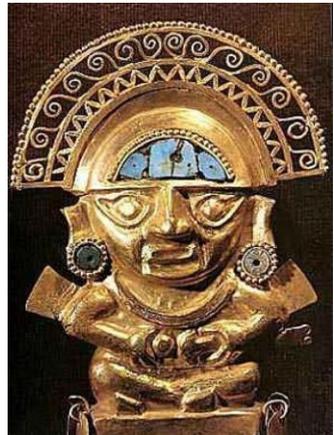
The Inca Empire with temples that remain today reflect the close connection the Inca people had with celestial objects. Astronomy deeply affected their religious beliefs and their way of life. The Inca Empire gradually came into existence around 1100 AD and would grow and flourish for over 400 years. It stretched from the Pacific coast over the Andes mountain range, through what are today parts of Chile, Peru, Bolivia, Columbia, Ecuador, Brazil and Argentina and into the Amazon Basin.

Communications were maintained by relays of message-carrying runners who could cover up to 400Km a day. The runners had resting places known as “Post Offices”. The Empire was divided into four quarters: with the capital city Cusco in what is today southeastern Peru. The runners would have needed to be very fit as Cusco is at an altitude of 3380m (about 10,000 feet). However the runners were helped by an excellent road system.

Although the Incas had no written language they were advanced, wealthy and orderly civilization with laws, a tax system and successful mountain terraced crop growing system.

Worship to the Sun God, Inti, was very much encouraged. Inti was believed to give warmth, light and protection to the people. Many Inca buildings had direct astronomical connections. The Sun Temple at Cusco is a fine example that can still be seen today. One building had so many stones removed by the Spanish for their own building works that it is not known what it once was. It is believed to have once been an observatory.

The astronomical knowledge of the Incas came from regular observations of the movements of celestial objects. The “Moon Year” calendar provided an orderly basis for all aspects of Inca life.



Agricultural and herding activities, the celebration of state and provincial rituals and the performance of public works were all coordinated with clockwork precision by calendar specialists in Cusco and other administrative centres throughout the Empire.

Stone towers were set up at appropriate places on the horizon to mark the points of sunrise and sunset on the days of the solstices and equinoxes. Observations of moonrise and moonset as well as recording the phases of the Moon combined with solar observations provided month-like units of time and an overall greater precision in the annual calendar.

The Inca knowledge of the stars and constellations was rich and as complex as that of any other ancient civilizations. Celestial recordings may have been kept on knotted strings called “Quipus” and astronomical records were stored at Cusco and at other administrative centres.

High in the Andes, the Incas would have had a marvellous view of the heavens and the Milky Way, as it stretched across the southern sky throughout much of the year. The Incas called the Milky Way “Maya” or “Mayu” and believed it was a river upon which the Sun floated. They could determine annual water cycles from the position of the Milky Way in the sky; thus acted as a guide to when to plant and harvest their crops.

The open star cluster we know as the Pleiades or Seven Sisters in the constellation of Taurus was considered to be a storehouse and they observed it regularly. In the clean high altitude of the Andes, the Pleiades was seen to contain 13 stars and not the familiar six or seven that we see on a clear night in the UK.

The demise of the Inca civilization began around 1525. At this time, the ruling Monarch, “Huayna Capac” died and his sons “Huascar” and “Atahualpa” waged a civil war between themselves over the Empire. This coincided with the spread from Central America of highly contagious European diseases from which the Incas would have no immunity. Smallpox alone claimed 60 to 94% of the population.

The Spaniards also arrived in the region, with orders to conquer and take all that was of meaningful value to Spain. The Spanish were a much superior fighting force due to their steel swords, armour and cavalry. They

recruited thousands of natives who wanted to fight and rid themselves of the control of the Incas. Thus the Inca civilization vanished.

# Past life on Mars

Alex Vincent

The discovery that water once flowed on Mars, and also being salty (suggesting a sea), makes it more likely that life did exist on the planet at one time. Now we need to find past life in the form of fossils embedded in the Martian rocks, that is, if the life was capable to fossilize. Life of some sort may still exist on the Red Planet today.

In 1996, a meteorite, which was discovered in the Antarctic, which is believed to have come from the surface of Mars, was found to contain what is thought to be a fossil of a creature looking like a lug worm. This, if it was once a living thing, either lived on Mars and was fossilized before entering into space after a meteorite impact, or was it contaminated here on Earth?

If fossils are found on Mars, it is possible that they may be in meteorites, which came from Earth as both planets exchange them, and so that would mean the life did not belong to the Red Planet. For this reason, when searching for past life on Mars, it is also worth investigating the rocks themselves where the sea once existed. Some of these rocks may well be the remains of sea creatures, which existed on Mars many millions of years ago. This would mean that the life can only have come from Mars.

We have this here on Earth, where some rocks are the remains of marine life or vegetation millions of years ago. For example, where there is chalk and flint such as on the North and South Downs, the sea once covered the area. The chalk is pure limestone which is composed of minute grains of calcium carbonate, which have an organic origin. Flint is mainly found in the upper chalk and was probably formed in seawater as a silica gel. Why not the same situation for Mars?

## Picture Gallery



Moon. 18.08.14.  
Alex Vincent.

# WAS Members Experiences of Solar Eclipses

Richard Godley

Astronomy provides many wonderful sights for the amateur and solar eclipses are certainly at or near the top of the list. Following the creation of the Society, the first partial solar eclipse observed by members was on May 20<sup>th</sup> 1966.

Many other partial eclipses were observed by members in the early years of the Society. These were recorded by Alex Vincent in our 25th anniversary booklet. He made reference in his article to the eclipses of February 25<sup>th</sup> 1971 (65% of the Sun eclipsed at maximum), July 10<sup>th</sup> 1972, June 30<sup>th</sup> 1973 (a mere 1.6%), December 24<sup>th</sup> 1973, April 29<sup>th</sup> 1976, July 20<sup>th</sup> 1982, December 4<sup>th</sup> 1983 (3.3% this time) and May 30<sup>th</sup> 1984. Alex observed sunspots during the last of these eclipses.

Between 1984 and 1994 we endured the longest known period without a partial solar eclipse occurring in our part of the world. There have been numerous further partial eclipses seen by members since. Amongst those observed, some were neither total nor annular anywhere in the world, including that of October 12<sup>th</sup> 1996. We ran a public event on Worthing seafront on January 4<sup>th</sup> 2011, in conjunction with the first series of Stargazing Live, but clouds prevented observation. The event was well attended.

With four companies specialising in solar eclipse observation and the greater opportunities for independent travel, members of the Society began “chasing the shadow”, travelling to different parts of the world to observe total and annular eclipses. Over a period of 40+ years if there was a total solar eclipse occurring somewhere on the planet there was a strong chance that at least one member of the Society would be there to witness it, or hoping to witness it anyway. First of these was Phyllis Randle who went on a ship called Monte Umbia off the west coast of Africa to observe the total solar eclipse of June 30 1973. She had a good view of totality, although there were hazy conditions. The duration of this eclipse was just over seven minutes.

In June 1983 Nick Quinn travelled with Explorers Tours to Surabaya on the Island of Java in Indonesia. On the morning of totality (June 11<sup>th</sup>) he was in a large convoy of buses, accompanied by police motorcycle outriders, going to the eclipse site near Tuban, north-west of Surabaya. The actual site was on a hill overlooking the Java Sea. There was a special compound for professional scientists and amateur observers were not to interfere with their work. Totality lasted for five minutes and sky conditions were excellent and Nick was able to observe the magnificent corona and prominences. The local population was just as thrilled at the eclipse as the eclipse chasers.

In 1988 Richard Godley also went to Indonesia with Explorers. This time the observation site was on a beach on the east coast of the island of Bangka, off the east coast of Sumatra. This eclipse on March 18 was in the early morning and the sky was clear for the 2 minutes and 5 seconds duration. Some American astronomers chose to travel to a less accessible beach to observe a longer totality – by about 15 seconds – while another of their group travelled to the northern limit to observe a momentary totality in order to carry out an experiment involving the observation of Baily's Beads.

The next total solar eclipse was on July 22<sup>nd</sup> 1990 and the destination was Finland. Nick Quinn and Paul Carter travelled independently to eastern Finland and chose a site overlooking Lake Koitere at a point where an island with a few trees on it was in the middle ground. An opportunity for a scenic view of totality. Sadly cloud prevented any view of totality, but some of the partial phases were seen, including soon after totality.

Richard Godley encountered the same problem on a trip with Explorers. An early hours of the morning flight from Helsinki, where the sky was clear, was meant to be followed by observation near the town of Joensuu in eastern Finland. Due to the conditions a decision was made to drive back west as far as possible in the hope of finding clear skies. Ten minutes before totality the coaches stopped; and everyone rushed out and frantically set up equipment. All that was seen was Venus and a division between the brighter skies to the north and the shadow of the Moon everywhere else. The actual site was thought to be about seven miles east of a town called Varkaus.

The following year there was a long eclipse on July 11<sup>th</sup>. Richard Godley, Nick Quinn and Paul Carter were all with Explorers. Richard went to Hawaii, while Nick and Paul went to Mexico. In Hawaii, where totality was around four minutes, Richard stood in the top of a cloud many thousands of feet up the extinct volcano Mauna Kea, while Nick and Paul had seven minutes of totality at the southern end of Baja California with the Sun almost overhead. The track of totality continued to Columbia from which country the Society acquired a new honorary member who had contacted us for information of the eclipse.

There were two worthwhile eclipses in 1994. On May 10<sup>th</sup> there was an annular eclipse. Richard travelled to Pasco in Texas with Explorers. Dave Storey went to Arizona with Journeys of Special Scientific Interest (JSSI). Both groups were successful.

Nick and Paul went to Morocco, where they hired a car, and headed to a site in the Middle Atlas mountains. Their plane was to try to observe the eclipse at the end of track, which meant the Sun was very low in the sky. They chose a spot on a hill near the town of El Kebab and were in luck, the Sun being visible through thin cloud and little filtering was required. Apart from a goat-herder a few hundred metres away they were alone in the area. The Sun set only a few minutes after the end of annularity and Nick Paul may have been the last people on Earth to observe the annular phase of that eclipse.

November 3<sup>rd</sup> saw the second central eclipse of the year. This one was total and a number of WAS members were in the Peruvian Andes, near the border with Chile, to observe it, and with the added attraction of a smoking volcano in the distance. On October 24<sup>th</sup> 1995 Nick Quinn was among WAS members observing a total eclipse in northern India. He also visited the Jantar Mantar observatory in Jaipur, which consists of 19 architectural astronomical instruments, and was completed in the 18<sup>th</sup> century.

On February 26<sup>th</sup> 1998 a total eclipse passed over parts of South America and the Caribbean. Various WAS members were there. Nick Quinn observed from the Paraguana Peninsula in northern Venezuela, while a few minutes later Pam Spence, Paul Carter, Richard Godley, David Storey

and Linda Storey observed from Knip Beach in Curacao. The day of the eclipse had started with cloud and a little drizzle in Curacao, but by the time of the eclipse around midday, the sky was clear and the shadow was particularly well seen as it crossed the sea.

1999 saw mainland UK's first total eclipse since 1927. WAS members observed this eclipse, which occurred on August 11<sup>th</sup>, from a number of locations, with varying degrees of success. Those who stayed in the Worthing area were treated to a 99% partial eclipse. Richard went to Penzance on an old train, which attracted train spotters during the night time journey. With cloud building up there, he got on another train to try his luck in Plymouth, but was clouded out seeing only a little of the partial phase. Alex Vincent and Colin Thomson were also unlucky in Nyon in France, seeing parts of the partial phases. Alex noted the swallows that stopped flying and roosted for perhaps ten minutes before and after totality.

Other members were more successful with their observations of totality. Brian Halls saw it from the English Channel. Graham and Eileen Boots observed totality from Bulgaria. Nick Quinn and others were in central Turkey where skies were also clear and shelter from the 40 degrees Celsius had to be provided.

This eclipse whetted the appetites of many first-timers and several WAS members were on their travels for the next total eclipse on June 21<sup>st</sup> 2001. Paul Carter and Brian Halls bumped into each other on the bed of a small river in Zimbabwe, near the border with Mozambique. At this eclipse the oft hoped for but rarely seen shadow bands appeared, Paul describing the long wavy lines about 20 to 30 centimetres apart as being like a sidewinder snake moving across sand. There was also a huge pinkish detached prominence on view. Vanessa Wegner also observed this eclipse from Fringella, near the Zambian capital, Lusaka.

On December 4<sup>th</sup> 2002 Richard saw a very short eclipse, totality lasting only about 25 seconds, from near the old rocket-testing range at Woomera in Australia. The Sun was only 7 degrees above the horizon at totality and set while still partially eclipsed, giving the appearance of a yellow shark fin sinking behind the ridge. Accommodation provided by Explorers had

previously been used by scientists working at Woomera, but had not been occupied for some time.

An annular eclipse occurred on May 30<sup>th</sup> 2003. Alex Vincent was clouded out in Scotland. Many members got out of bed at dawn to see a large partial eclipse. Our speaker at the WAS meeting was Jerry Workman and he had observed the annular phase of the eclipse in northern Iceland and he contributed an article about this, which is in the July 2003 issue of WAS News (number 166).

WAS members had by this time seen total eclipses in Europe, Asia, Australia, North America, and South America. All that was left was Antarctica, and on November 23<sup>rd</sup> 2003 Paul Carter was there to witness totality on that continent. Only 300 people were thought to have observed this totality due to the remote location.

Nick Quinn, Linda Croft, Dave Storey and Linda Storey observed the annular phase of a hybrid eclipse in Panama on April 8<sup>th</sup> 2005. This eclipse had been total over a track in the Pacific Ocean. On October 3<sup>rd</sup> that year there was another annular eclipse almost on our backyard, the partial phase being observed by a number of WAS members. Alex Vincent was in Ibiza to observe the start of the annular phase before patchy cloud intervened. Other WAS members had clearer skies from the Spanish mainland around Valencia.

On March 29<sup>th</sup> 2006 another eclipse was visible in the UK, and a number of WAS members went on excursions to see totality. Graham Boots and Alex Vincent were in Turkey. Alex reported that from Side in southern Turkey the sky was clear throughout with good views of the corona and prominences. Venus was visible for some time afterwards, appearing as bright as it does in the evening sky after sunset.

Dave and Linda Storey also encountered clear conditions in Libya, camping in the Sahara Desert in order to be on the spot, while Richard Godley, Brian Halls and Janet Young, accompanied by Brian's son were nearby, having been driven around 300 miles from Benghazi where the cruise ship MV Peria was moored awaiting their return to continue their

cruise. Shadow bands were observed on the desert sand as totality approached.

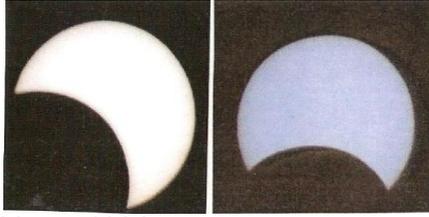
On August 1<sup>st</sup> 2008, Brian and Janet were in the Gobi desert in north-western China for another total eclipse. The partial phase could not be seen from most of the UK. A few WAS members saw it several times, but there was about 80% cloud cover in Worthing.

Most recently on March 20<sup>th</sup> Richard Godley received an offer to join his cabin-mate from the MV Perla, Edward Luscombe of Plymouth, to attempt to observe the total eclipse on another cruise ship MV Azores. The observation location was at 60 degrees 56.6 minutes north 10 degrees 26.4 minutes west, which is roughly halfway between the south-east of Iceland and the Faroe Islands. Conditions were cloudy, but there were some glimpses of the partial phase, including for a few seconds at greater than 90% eclipse. Thanks to Captain Antonio Morais seeking out thinner cloud in the region those on board the MV Azores were amongst the few people who saw the partial phases at sea out of the many ships that had sailed to the North Atlantic for this eclipse.

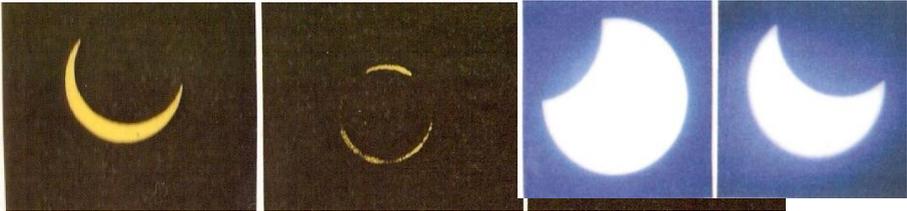
WAS members remaining in Worthing also encountered cloud, but Eileen Boots captured an image of the Sun at around the 86% maximum eclipse for our location. Those who viewed it from Worthing Pier only saw the beginning and end of the partial phases.

Perhaps WAS members will continue to travel the world in the coming years, maybe Indonesia in 2016, the USA in 2017, or South America in 2019 or 2020, to continue the tradition of the Society's observation of total solar eclipses.

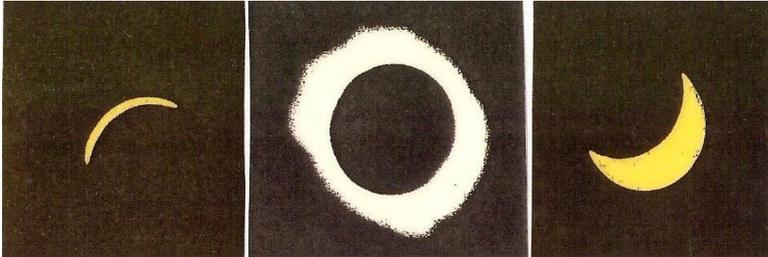
My thanks go to Alex Vincent and Nick Quinn for their memories of eclipse trips and to other members, past and present, whose reports in WAS News or to the Society at meetings formed the basis of this article.



Partial solar eclipse. 30 May 1984. and Partial solar eclipse. October 12  
Alex Vincent



Annular solar eclipse. October 3 2005. Alex Vincent.



Total solar eclipse. March 29 2006. Alex Vincent.

# Future WAS anniversaries

Alex Vincent

There are several astronomical events taking place during other anniversary years of WAS, which are worth mentioning here for the future. Many major discoveries will be made by these years and we may well discover life elsewhere by our next anniversary.

**75<sup>th</sup> Anniversary (2040).** In this year there will be a close conjunction of the planets Jupiter and Saturn during the spring in Leo. On November 18 there will be a total lunar eclipse visible in the early evening. Mid eclipse is at 19.02 UT.

**100<sup>th</sup> Anniversary (2065).** On February 5 there will be an 84% partial solar eclipse at 09.51 UT. In our 100<sup>th</sup> anniversary year there will be a very rare event. This will be the occultation of Jupiter by Venus. This is the next time that there will be a planetary occultation. This will take place on November 22 at 12.49 UT. This will be in daylight and only eight degrees west of the Sun. However a very close conjunction of the planets will be visible before sunrise. This last took place in 1818.

**125<sup>th</sup> Anniversary (2090).** In this anniversary year there will be a total solar eclipse on September 23 (our anniversary month) and will be total from Worthing half an hour before sunset. Members at the time could view this from the west side of Worthing Pier or from the top of Highdown Hill. This will be a Saturday and after the eclipse a meal at a pub or hotel would be an idea. This is the first total solar eclipse to be visible from Worthing since 1724 and the last until 2600. We also get two total lunar eclipses in 2090 on March 15/16 (mid eclipse at 23.45 UT) and September 8 (mid eclipse at 22.49 UT). Note there will be two total eclipses (one solar and one lunar) in our anniversary month in 2090.

At our 160<sup>th</sup> anniversary in 2125 there will be a transit of Venus on December 8 with mid transit at 16.06 UT. This will take place at sunset and will be the last transit anywhere in the world until 2247. The above are known events, which will take place. Hopefully a few great comets may be visible then as well.

This booklet comprises of a series of articles written by members of the Worthing Astronomical Society to commemorate the 50<sup>th</sup> anniversary of the society. We started in September 1965. We have had very good speakers over the years and we have our own observatory where members have observed and photographed many astronomical objects like the Moon, planets and deep sky objects.