



Current Notes



View of the Godlee Observatory from Whitworth Street.

The Journal of the Manchester Astronomical Society
January 2014

Contents

Opening Remarks. <i>Editor – Barry Henshall F.R.A.S.</i>	Page 2
<u>Jerry Grover F.R.A.S. 1943-2013</u> <i>Kevin Kilburn</i>	Page 3
<u>Looking Back 40 Years</u> <u>British Astronomical Association - Lunar Section Meeting</u> <i>Kevin Kilburn</i>	Page 7
<u>Photographic Competition 2012/2013</u> <i>Barry Henshall</i>	Page 10
<u>Workshop evening 14 March 2013</u> <i>Mike Oates</i>	Page 14
<u>The Manchester Lord Mayor's Fund</u> <i>Barry Henshall</i>	Page 14
<u>Member wins PST</u> <i>Barbara Isalka</i>	Page 15
<u>The Lord Mayor's Visit December 12th 2013</u> <i>Barry Henshall</i>	Page 16
<u>R Coronae Borealis: an observational challenge.</u> <i>Kevin Kilburn</i>	Page 18
<u>Major Meteor Showers in 2014</u> <i>Barry Henshall</i>	Page 22
<u>The Surveyor Landing Sites</u> <i>Norman Kissoon</i>	
<u>Officers and Council, 2013—2014</u>	
<u>Minutes of the Annual General Meeting April 2013</u>	
<u>Cover Photograph;</u> View on 1 Sept 2011 from Whitworth Street. <i>Mike Oates</i>	

Opening Remarks

As many of you will be aware Current Notes has not had an editor for a number of years. It has been left, mainly to myself, to prepare and distribute, the last issue being September 2012. I believe this long delay has been the result of two factors: my increased involvement in new ventures which have, by necessity, taken up a lot of my time and secondly lack of contributions from members. I have said this on a number of occasions and I will say it again 'without you, the members, contributing the future of Current Notes is at risk.

Perhaps this type of publication has run its day. The easy access to information via the internet makes armchair astronomy very attractive. No need to buy equipment, no need to stand outside in the cold, no need to travel to a dark site, in fact no outdoor astronomy at all.

Will this approach to astronomy lead to the demise of astronomical societies such as ours? I sincerely hope not. I have not done any serious observing for some time but I still delight in standing outside and looking up to the heavens knowing that what I am seeing is history - light that has travelled for light years to reach my eyes. Would you watch a solar or lunar eclipse on TV. I hope not.

As I have said this issue comes some 15 months after the previous and many items may seem out of date. However, I consider Current Notes to be a history of our Society and as such have been included.

It is with great sadness that this issue contains an obituary for one of our most well loved members, Jerry Grover. He was well known for his colourful language, his sharp wit but also for his kindness and help that he gave to members new and old.

Early last year we had a visit from the Lady Mayoress of Manchester following a successful donation from the Lord Mayor's Fund that provided us with a digital camera and projector. Thanks must go to Guy Duckworth for his rôle in ensuring the success of our application. The current Lord Mayor also visited the Godlee during November 2013.

Almost a year ago we held an instrumental workshop which was very much appreciated by members and a short article written by Mike Oates is contained in this issue. A similar workshop is planned for February this year.

During the summer we were heavily involved with the British Astronomical Association who had organised a one day meeting at the Manchester Metropolitan University on Oxford road, Manchester. We were very well attended with a large display and throughout the day opened the Godlee to visitors.

We continue to be involved with the Museum of Science and Industry with 3 events during the last 12 months, 2 of which have been Science Saturdays, the last on 11th January coinciding with the BBC Stargazing Live. Also to mark this event we are opening the Godlee to the general public on 4 consecutive Tuesdays starting the 14th January. More information about our involvement with Stargazing Live can be found on our website.

Do not forget that the photographic competition will be held in March so if you have not got an entry ready then there is very little time left.

Finally our AGM will be held in April and a sheet for nominations will be posted on our notice board at the end of February/beginning of March. Please take time how you, our members, can help to make Manchester AS a thriving and active society.

Barry Henshall

Jerry Grover F.R.A.S. 1943-2013



Founder Member and Councillor of the Society for the History of Astronomy, Jerry Grover, died at home 28 February 2013 following a long illness. In the eleven years that I knew him he became a good and highly respected friend and was, from its inception, a solid supporter of SHA.

Jeremy (Jerry) Grover was born 2 July 1943 in Marlborough, Wiltshire;

twin brother of Timothy born 1 July. The twins were elder brothers to sisters Ann and Janet. Their parents were Gerald C. Grover and Mabel I. R. Osgood who had married at Marlborough in 1941. Jerry's father was a Captain in the Royal Hampshire Regiment and at the end of the war the family moved first to Singapore and Japan and then, via India, to Quetta in Pakistan where they employed servants and enjoyed a comfortable lifestyle for several years until the boys were about ten years old. Jerry had a narrow brush with death in 1948, whilst living in Japan, when he caught typhoid from which he took a long time to recover. Living abroad and growing up with the 'officer class' in the post-war colonial army towards the end of the British Raj, Jerry had already acquired his distinctive 'BBC English' accent by the time the family returned to Blighty.

In 1953 the family returned to England living first in Purley, in the London borough of Croyden, before moving to Stockport, Cheshire, where Jerry's father became a sales manager with a newly acquired subsidiary of Schweppes, supplying carbonated drinks. Tim recalls that at school in Stockport he and Jerry played havoc with practical jokes in class and in the school corridors, where once they painted white lines to direct traffic, to the annoyance of their teachers. They were often on the receiving end of the headmaster's cane. With his father's work the family again moved, this time to Northallerton, North Yorkshire, where Jerry and Tim attended grammar school. But having lived in five countries and having been taught in eighteen different schools, Jerry didn't do particularly well in exams and left school in his late 'teens without going on to university.

At 19 he joined the BBC as a trainee engineer working there for a couple of years before joining the pirate radio station, Radio Caroline North, where he spent just over six months between June 1964 and January 1965 living aboard ship off the Lancashire coast. Jerry thoroughly enjoyed his brief spell of offshore broadcasting but left under acrimonious circumstances relating to money that was owed to him. In 1965 he married Barbara Foley at Wallasey, on the Wirral. They lived in Warrington and had two sons, Chris and Nik, before their marriage ended in divorce. For several years Jerry worked as a sound engineer in school language laboratories and for a

time in the early 1970s at the recording studios of Strawberry Studios in Stockport where he would have worked with bands such as 10cc and Barclay James Harvest. Other major artists recording at the studios at that time included Neil Sedaka and Paul McCartney. It was during this period that he met and subsequently married his second wife, Carole, nee' Bibby, a school teacher, in 1972.

Jerry joined Manchester's first commercial radio, Piccadilly Radio, later Piccadilly Radio 261, which began broadcasting from the city centre in April 1974, working there for the next 16 ½ years. He later moved to BBC Greater Manchester Radio, later renamed BBC Radio Manchester, working at New Broadcasting House, Oxford Road, from where he regularly travelled to other BBC studios at Liverpool, Leeds and Blackburn and was involved with many outside broadcasts. He recalled driving Sir Bernard Lovell back home to Swettenham following a studio recording in Manchester and chatting about astronomy all the while during the journey.

In the early 1980's Jerry and Carole moved to a spacious detached house with a large garden and small orchard at Cheadle Hulme, near Stockport, which was to become their home for the rest of his life. Both Jerry and Carole were keen gardeners and joined Cheadle Hulme Flower Show Society of which Jerry was to become Chairman. (Jerry's later motto was, 'never volunteer'!) Jerry had a well-paid job in radio broadcasting and Carole was a teacher. They had no children. They both took early retirement in 2000 by which time diabetes, which he had started with in the early 1990s, added to a life-long smoking habit, was beginning to take a serious toll of his health.

The history of British astronomy in Victorian times particularly interested Jerry. In retirement he was able to concentrate on researching his great, great, grandfather, Charles Grover (1842-1921), who according to his biographer, Barbara Slater, was born into a working class household in Buckinghamshire. He was an apprentice brush maker before joining the London telescope maker, John Browning, where his interest in astronomy and telescopes was encouraged.

Head-hunted by the Royal Geographical Society to accompany an expedition to Australia, Charles became the paid observer and handyman to Sir Cuthbert Edgar Peek, whose father was Sir Henry William Peek, a partner in the Peek-Freen and Co. biscuit company, established in 1857. In 1881, Peek had set up a small observatory with a 3-inch equatorially mounted refractor at his father's home in Wimbledon. The following year, Sir Cuthbert, accompanied by Charles Grover, travelled to Jimbour, Queensland, Australia, to observe the transit of Venus with a 6.4-inch Merz refractor that Browning had acquired and had offered for sale. They didn't see the transit, cloud intervened. Charles Grover immediately returned to England while Sir Cuthbert travelled around Australia and New Zealand before returning to England in 1883.

The Rousdon Observatory, in Devon but close to Lyme Regis, Dorset, was erected by Sir Cuthbert Peek in 1884 and housed the equatorially mounted 6.4-inch Merz, a transit room, a computing room, photographic dark room and a library. Charles Grover was employed to make observations of variable stars and to manage the observatory. Sir Cuthbert died at the early age of 46 in July 1901 and during the next twenty years the observatory gradually fell into disuse but not before publishing variable star observations made by Charles in R.A.S. Memoirs Vol. LV (Peek) in 1904.

The importance of the Rousdon Observatory and his great, great grandfather's association with it fascinated Jerry and he was able to trace and subsequently retrieve and copy one of the two observing logbooks, long thought to have been lost, that Charles Grover had kept. The 6.4-inch Merz, was later donated to the London Science Museum by the Grover family. He was immensely proud of his ancestral connection with Rousdon and especially with the transit of Venus. In 2004 Jerry saw the rare transit of Venus with his own eyes, a sight denied to Charles Grover.

In June 2012, Jerry and Carole accompanied me and MAS member, Michael Gilligan, to the 1000ft elevation of Mellor Moor in the northwest corner of Derbyshire. The cool, quiet ambience of that memorable dawn, looking across the high moors of the Peak District, was accompanied by the plaintive cries of the Pewit and the evocative calls of the Curlew but as with Charles in 1882, clouds that morning prevented our observation of the last transit of Venus to occur in our lifetime.

I first met Jerry following some short e-mail correspondence with him on the day of the SHA founding in 2002 at Oxford. He lived about five miles from me and we had arranged to meet on the train from Manchester. That morning saw the first inaugural run of the new Virgin fleet of pendolino trains on the main west coast line. I boarded the train at Macclesfield and found Jerry already sitting in a very crowded and noisy carriage and looking irritated. No room for me, so I moved up the train to an empty carriage and sat down to enjoy a very comfortable and smooth run to Oxford; unbeknown to me my carriage had been pre-booked by a group of rail enthusiasts intending to join the new train as it neared London. We alighted at Oxford, me calm and collected and Jerry very irascible and muttering curses. It was the beginning of a long friendship and many curries as it became a tradition that we would always find an Indian restaurant wherever the SHA conferences were held. Jerry and Carole were so fond of a Saturday evening curry at the Red Fort in Cheadle Hulme that if for whatever reason they didn't arrive, the proprietor, Mr. Das, would ring them to make sure they were alright!

During the next ten years Jerry and I attended most of the SHA conferences, council meetings and events. Initially we took turns to drive but after a while Jerry made it plain that he didn't like my driving; I was too slow. His impatience to arrive dictated that he had to drive, fast and furiously. He rarely drove below the motorway speed limit, usually nearer 90-95mph while I navigated. He didn't like the tone of voice from his satnav and cursed it, particularly when it told him to do a U-turn on the M6, and preferred me to give directions, even then often too late for him to avoid veering off in a wrong direction at roundabouts or a road interchange, much to his annoyance. But we always got to our destination safely. I particularly recall us going to Greenwich on the M25. It was a hot Friday afternoon and he fumed and swore as we sat in baking sunshine crawling along in a long tailback. As we neared the QEII high level bridge over the Thames Jerry, clutching a sweaty handful of pound coins was ready for the automatic toll booth. We got there; Jerry flung the coins and missed the basket! They fell onto the road and rolled under the car. His language was, to say the least, colourful as he scabbled about for more money, refusing to get out and crawl under the car to retrieve the cash!

Jerry joined Manchester Astronomical Society and the Royal Astronomical Society shortly after becoming a member of the SHA. At MAS he always sat in the same seat in the Godlee observatory and listened attentively but often impatiently to the presentation or informal discussion. He hated music accompanying some of the

presentations and would curse the speaker if it was too loud. To new members his irascibility could initially be off-putting but to most of us it became a much loved trait that he probably played up deliberately.

Jerry's diabetes worsened; his blood sugars demanded almost hourly monitoring and he was liable to faint if his sugars weren't quickly re-balanced. About six years ago he suffered inoperable kidney failure and was fitted with a by-pass stent to support his diabetes-damaged organs. He gave up smoking and alcohol and his condition was more or less stabilised although he could not walk far without becoming breathless. In August 2012 Jerry phoned me one afternoon; we rarely phoned each other and his call was unexpected. He had been admitted to hospital with jaundice and had just been diagnosed with liver failure. He wept as he told me. During his lifetime Jerry had burned the candle at both ends and eventually the wick had run out.

Jerry Grover was a much loved friend and astronomical colleague. He loved the SHA and avidly supported the society as a member of Council as long as he could; taking on the task of organising its membership files after Peter Hingley's untimely death in the summer of 2012 by which time Jerry's own health was in terminal decline.



On 13 March, I represented SHA at Jerry's funeral at All Saints, Cheadle Hulme and later, along with Janet Maresh, another friend from Manchester AS, at Stockport Crematorium. Several other members of MAS attended the church service. I was privileged, at Carole's invitation, to say a few words from the pulpit in tribute to him as a historian of astronomy and a friend, following his brother, Tim, and his son, Nik, who spoke of him from their own perspective as close family. His ashes have been scattered in his garden at Cheadle Hulme that he so loved.

We shall long remember Jerry as an irascible but loyal and very generous man whose dry humour, acerbic wit and warm friendship will be sorely missed.

Kevin Kilburn

April 2013

My thanks are to Carole and Tim Grover for helping me compile these notes and for correcting my mistakes and to Chris for continuing the Grover astronomical tradition as a member of SHA. Roger Jones also provided important genealogical details of Jerry's ancestry.

Kevin Kilburn

Looking Back 40 Years

British Astronomical Association - Lunar Section Meeting

On 1974, March 9th, the Lunar Section of the British Astronomical Association held their first Provincial Meeting in Manchester at the invitation of the Manchester Astronomical Society. The meeting, held in room R.E.7 of the Renold Building, U.M.I.S.T., was attended by some of the most well-known astronomers from all over Britain and the standard of the lectures given was certainly impressive.

Commencing at 1400 UT., the meeting was opened by the President of the M.A.S., Mr. M. Duckworth, who welcomed the B.A.A. Lunar Section and said that although the Manchester Society had, in fact, once been the North-Western Branch of the B.A.A., since breaking away in 1903 to become the Manchester Astronomical Society in its own right this was only the second time since then (the first being in 1967) that the M.A.S. had acted as hosts to the B.A.A. and the first time that the B.A.A. Lunar Section had held a Provincial Meeting in Manchester.

The President then stepped down and handed the chairmanship of the meeting over to the Director of the B.A.A. Lunar Section, Mr. P. Moore.

Mr. Moore said that the Lunar Section were delighted to be holding a meeting in Manchester and he hoped that there would be others in the near future held in conjunction with the M.A.S.

Turning to the official business of the day he went on to say that the Lunar Section Handbook was now being reprinted but he did have a few copies of the first edition with him if anyone wanted a copy.

Mr. Moore also said that observations of Transient Lunar Phenomena (T.L.P's) were now being coordinated by the Mills Observatory, Dundee, and that these observations were to be one of the topics on the agenda for that afternoon. This by way of an introduction, he was pleased to ask Mr. Harry Ford of the Mills' team to speak about T.L.P. observing.

Mr. Ford began his talk by explaining that the first requirement for the observer wishing to search for T.L.Ps must be a sound working knowledge of the lunar surface under all lighting conditions. For this, large instruments were necessary for regular work, at least 4" for refractors and 6" for reflecting telescopes. High magnification, in the region of X 250 — X 350 was needed but again he emphasised that observer experience was the most important factor in this type of work.

He explained that although T.L.Ps has been seen in nearly every part of the moon, the edges of the circular maria should be watched in particular for signs of activity. T.L.Ps were of two types—red glows and obscurations. Red events, he said, could be detected by observing alternately through a red then a blue filter. The red glow would be invisible through the red filter but would appear dark in the blue one. By rapidly switching from one to the other any red T.L.P. could be made to blink. This method of dimensions of the T.L.P. would be dependent on the volume of gas and the rate of expansion would dictate how long the phenomenon was visible. Although

large volumes of gas would produce large, bright T.L.Ps which fade gradually, small emissions would give a quick flash of light and would be gone.

His theory, outlined above, did fit a large T.L.P. in the crater Alphonsus seen by P. Morgan on two consecutive nights, July 29th and 30th, 1972.

Mr. Fitton then went on to describe a photoelectric device that he had made.

Employing a silicon photo-transistor manufactured by Motorola, with a silicon cell only 1/50th of an inch square, the device was claimed to measure accurately and consistently the albedo of a small area of the lunar surface. It could be calibrated by using the moon's limb as a datum with a known meter reading. The instrument was fully adjustable for telescopes of various sizes and was not affected by seeing conditions.

There then followed an active discussion on Ford's and Fitton's lectures which, unfortunately, resulted in the meeting running a little behind schedule. However, in the few minutes left before tea, Mr. W. Leatherbarrow was able to say a few words about banded craters and the moon's South Polar regions. Both of these were neglected by observers yet in these fields useful work could still be done by the amateur.

Although many of the banded craters were photographed by the Lunar Orbiters the bands were very difficult to make out because the crater interiors tended to be overexposed on the film. Surprisingly enough, even the bands associated with Aristarchus were still not properly mapped and a handful of careful observers could do much interesting work here. Mr. Leatherbarrow suggested that observers pay attention to Aristarchus with the following aims in mind:—

To determine exactly when the bands appear:— there was much disagreement between observers on this point.

The production of an accurate chart of the band system in its entirety, needing observations under all angles of illumination.

A study of the nature of radial bands in general.

Harold Hill's South Polar survey also deserved more support, but this work was very demanding. A large part of this area was still poorly charted and a lot of work still needed to be done. One particular technique involved grazing occultations. By carefully timing the disappearance and reappearance of a star behind the peaks on the moon's southern limb a picture could be built up of their relative positions. Grazing occultations at this limb at various degrees of libration produced an even more detailed picture of this area.

What was the value of work like this? Certainly it would be of little interest to the professionals, but our knowledge of these regions was inadequate and these investigations would, without doubt, lead to knowledge,

irrespective of whether it was of value. The amateur could not hope to contribute to an understanding of the fundamental problems posed by the moon but non the less, original and absorbing work could be done.

After a short break for refreshments in the lower observatory, during which time visitors were shown round the observatory and telescope, the next speaker was Mr.

C.A. Cross whose subject was drawing at the telescope. Mr. Cross's reputation as an astronomical artist had recently been rewarded when he was asked by N.A.S.A. to produce the first detailed maps of Mars from photographs taken by orbiting spacecraft.

Mr. Cross explained that of the three possible ways of recording observations:— detailed written records, photography and drawing — the latter had the advantage of producing a pictorial record containing all of the information seen at the telescope but which, unlike photography, was not too dependant on seeing conditions. A further advantage was that it was possible to concentrate on a small area and get detail.

There were several methods of producing a drawing:—
Using pencil on white paper. This was fine for recording fine detail but tended to be rather tedious when shading in large areas such as maria.

Pencil and chalk on grey paper. This allowed good drawings to be made in a relatively short time.

Using charcoal and stump to produce controlled shadings on white paper by laying in the background and adding detail with charcoal pencils and a fine eraser.

Of these three methods, it was thought that the last produced the most realistic picture of the lunar surface and he briefly described how a charcoal drawing was made.

It was very important to start with an outline of the area to be drawn. This should not be rushed as accuracy at this stage was important in putting features in their correct relative positions. Every detail should be correctly positioned before the shadow areas could be filled in with charcoal pencil. Then using a small, hard, artists stump with a small piece of charcoal, the detailed topography could be put in the drawing. The final stage was to fill in the large areas with a broad, soft stump and to spray the completed drawing with fixative to prevent smudging.

Artists stumps could be bought at most good art shops but could easily be improvised at home. Those lollipop sticks made out of tightly rolled paper, if sharpened with an ordinary pencil sharpener, were ideal for manipulating small pieces of charcoal to put in fine details. Softer shadings could be introduced with a rolled wad of newspaper suitable charged with charcoal. Stumps were used simply by rubbing the charcoal into the drawing until the desired effect and shade had been achieved.

Erasers, whether soft or hard, were useful for putting in highlights after the background shades had been laid down.

Mr. Cross then showed his own collection of drawing implements and ended his talk by showing slides of drawings he had made using the techniques that he had described.

To round off the afternoon, Dr Maddison and Mr. Moore chaired a discussion on the Lunar Argument. Although the Apollo moon landings and photo-reconnaissance had provided the most detailed examination of the lunar surface, still it was not known what mechanism was responsible for the lunar craters.

Dr. Maddison's argument was that most of the craters had sharp outlines, not disturbed by volcanic processes. New minerals had been discovered on the moon which could only have been formed by the high pressures associated with meteoritic impact and the presence of ray systems could be explained as impact ejecta. These, and other evidence, suggested to him that the main cratering agent was the impact of matter onto the moon.

Whilst Mr. Moore agreed that some impact cratering had taken place, he still felt that this was not the main cause of the moon's features. He pointed out that the craters were certainly not distributed at random, as would be expected with meteorite craters but, were closely associated with the lunar grid system of faults. The presence of overlapping craters showing no signs of wall damage further suggested that violent activity was not responsible for the craters but that they had been formed by a much gentler process from within the moon.

The topic was then thrown open to discussion, lasting for about an hour, during which many points were raised for both sides of the argument. As expected, there was no conclusive evidence to sway the controversy either way and the discussion was brought to a close with both sides agreeing to differ.

The meeting had again run over time and Mr. Moore closed the proceedings with a vote of thanks to the M.A.S. for their hospitality.

K. J. Kilburn.

May I express my warmest thanks to all those friends and members who helped in organising the above meeting. Particular thanks go to Mr. and Mrs. Brierly for organising the catering and, indeed, for providing the food.

Thank you all.

K.J.K.

Kevin Kilburn

Photographic Competition 2012/2013

The Manchester Astronomical Society Photographic Competition was held on Thursday April 4th 2013 and was open to all members. As last year there were two categories

- 1) Astronomy
- 2) Atmospheric phenomena

and each category was split between beginners and previous winners of the competition (advanced). This year Daryl Giles, a guest who was thinking of joining the Society let slip that he was also a member of Hyde Camera Club and had done judging before. Needless to say he was persuaded to judge our members entries.

The entrants in the Beginners Astronomy Section were:

Annabeth Orton with four entries - Jupiter over Arndale, Moon over wheel, Venus and Pleiades and Venus setting North

Dave Walker with four entries - Ha Detached, Horsehead, M101 and Sharp moon

Dave Wilkinson with four entries - "The Silver River" - Sep 2012, Lake District, 10x images stacked using Deep Sky Stacker. Nikon D300s at ISO6400 for 30sec with Nikon 10.5mm Fisheye lens, "The Orion Nebulae" - M42, Jan 2013, Middlewich, 40x images stacked using Deep Sky Stacker. Nikon D300s with Celestron 102 at ISO800 for 30secs, "The Seven Sisters" - M45, Jan 2013, Middlewich, 40x images stacked using Deep Sky Stacker. Nikon D300s with Nikon 300mm F4 lens at ISO800 for 30 secs., and "A perfect place to camp" - Orion and Jupiter, Feb 2013, Maine-USA, Single image. Nikon D300s with Nikon 10.5mm fisheye lenses at ISO3200.

David Escot with four entries - M41, Moon full image, Moon and Moon

Louise Mayoh with four entries - Full moon (lucky shot!) taken 27/01/13 (freehand), Waxing Gibbous moon (at 99%), taken 24/02/13 with the camera mounted on a tripod., Waxing Crescent moon, taken 15/02/13 with the camera mounted on a tripod and A blend of 3 images of the moon in first quarter ~ before sunset, at sunset and after sunset. Taken 17/02/13 with the camera mounted on the tripod.

The entrants in the Beginners Atmospheric Section were:

Annabeth Orton with Hazy sunset

Dave Walker with Solar Halo and Sundog

Dave Wilkinson with "Hazy Sun" - Sun Halo, Jan 2013, Maine-USA, Single Image with Nikon D300s and "Camera Stars" - Snow Flakes on camera-Camera operating at -20c preventing snowflakes from melting, Feb 2013, Maine-USA, Single image with iPhone4s.

The entrants in the Advanced Astronomy Section were:

Anthony Jennings with four entries - Europa, Iona, Ganymede, Jupiter and Callisto, Moon, Orion Nebula and Panstarrs

Mike Oates with four entries - Double cluster, M31, M45 and Orion Belt region

The entrants in the Advanced Atmospheric Section were:

Anthony Jennings with Double Rainbow

Mike Oates with Double Rainbow

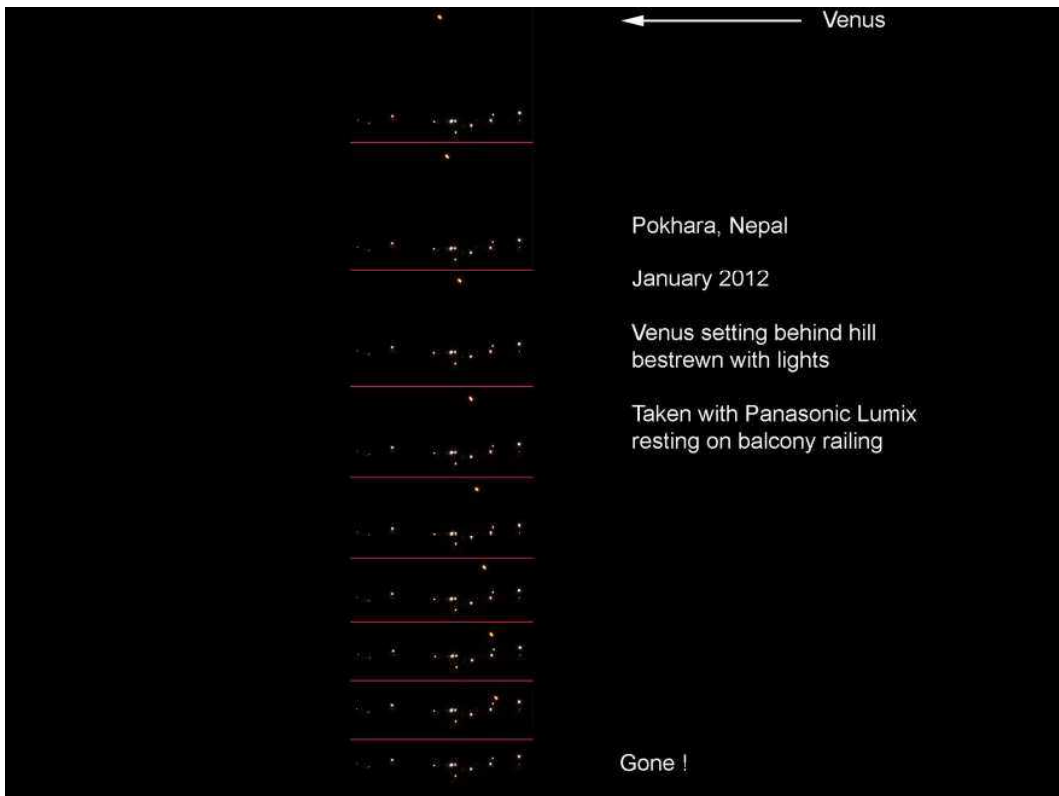
The winner in the Advanced astronomy section was Anthony Jennings for his image of Messier object M1



whilst the Earth Atmospheric section was won by Mike Oates with his image of noctiluscent clouds.



The winner of the Beginners astronomical section was Janet Maresh with her image of Venus setting in Nepal. This was a composite of a number of individual shots.



whilst the Earth Atmospheric section was won by Tony Cross with his image of a circumzenithal arc.



Overall the evening was a great success and a big thank you to all those members who entered the competition this year. I am sure that with clear skies, warm clothing and enthusiasm next year's competition will be an even greater success.

Barry Henshall

Workshop evening 14 March 2013

A trial workshop evening was arranged to be held in the Godlee Observatory on a normal Thursday evening. The theme was Telescopes, Mountings and Astrophotography with the main aim of helping new or potential members with any problems they are having, or just to obtain advice. My part in this event was astrophotography. The aim was to have items of equipment on hand to demonstrate how to use it

I set out a table with various cameras, lenses, photos and other bits of equipment that maybe useful in taking images of the night sky. This seemed to generate a lot of interest and I think one can gauge the success of an evening purely on the basis that I never seemed to stop talking to members and guests all evening. We did not start to pack away till past 9:30pm as people did not seem to be rushing away.

I aimed the advise mainly for beginners, emphasising that you don't need a telescope to take astrophotos. A camera, camera lens and tripod are all that is needed, progressing later to a driven mount to allow longer exposures. Many members of the public and beginners are under the apprehension that to be an amateur astronomer requires the use of a telescope. Of course a telescope will bring a greater range of objects to photograph, but rushing out to buy one is often a mistake and good money can be wasted buying the wrong equipment. A great deal can be recorded without taking photos through a telescope.

Based on this trial workshop, I believe it was a great success and that that we should make time for more 'Workshops' on various subjects in the future.

Mike Oates

The Manchester Lord Mayor's Fund

As most readers will no doubt be aware early in 2013 we received a grant of £1000 from the Lord Mayor's Fund for the purchase of a digital camera and a high definition projector.

I think it is worthwhile to consider why we took the actions we did and who was the main person involved in our successful bid.

Comments had been made for some considerable time that the projector we were using was not doing justice to member's images. Technology never stands still and computers and laptops are now providing a means of projecting in high definition of which our aging projector could not take advantage.

The 12" reflector has had little use over the last few years due to the difficulty of locating an object and problems of visual observation because of the eyepiece being some 8 feet above the ground. Experiments have previously been carried out using a Phillips Toucam attached to the eyepiece with the images fed downstairs and projected on the big screen. However the results were disappointing. Refurbishment of the 12" has recently been completed with re-aluminisation of the primary mirror and the fitting of a 5" Wray refractor as a spotting scope. A pair of step ladders were

also purchased to ease access to the eyepiece. It was felt that a better camera fitted to the eyepiece and an update to the projector would enable the reflector to be brought back into service to the benefit of the Society members.

It was realised that the Society did not have the funds to buy the necessary equipment. Mention was made that perhaps we could obtain a grant from the Manchester Lord Mayor's Fund. Guy Duckworth took on the responsibility of completing all the paperwork required. Considerable time was spent by Guy in ensuring that our application met all the required criteria and was presented in the best possible light. All Guy's efforts proved successful and an offer of a £1000 grant was made to the Society.

On Thursday the 24th January 2013 a visit to the observatory was made by the Manchester Lord Mayor Councillor Boyes who was accompanied by the Lady Mayoress Linda Geoghegan, sister-in-law to Councillor Boyes.



As members are aware the grant enabled us to buy a Canon 600D digital camera and a BenQ W1070 High Definition projector. An adaptor for the 12" was required in order to bring images into camera focus. Trials have shown that images can be successfully viewed in the Octagon room.

The camera is for general use both for the 12" and our 8" refractor.

Conway Methobi, Lord Mayor, Guy Duckworth

Once again I would like to thank Guy and all those involved in the refurbishment project.

Barry Henshall

Member wins PST

What a memorable weekend! There we were, having a drink in a cosy Welsh pub, making new friends, picking up tips on astronomy and how to survive cold, damp night weather conditions, when the announcement came that the team "Llygad yr Haul" was the winner of the astronomy quiz. We could hardly believe our luck – we had become owners of a brand new Coronado Personal Solar Telescope!

So let me introduce my husband Harry and myself: we are both slowly starting to get to grips with this hobby – something that, like many others, we've been wishing to do for more years than we like to admit to. I had recently joined the Manchester Astronomical Society and was also enjoying being a "student" again (Liverpool John Moores distance learning in astronomy). How good to rattle those rusty old neurons with physics and maths again! Thanks to MAS, I heard about the Baker Street Irregular Astronomers and Ralph Wilkins (BSIA) kindly provided details about the weekend astrocamp being planned for September 2012, in Cwmdu, near Brecon.

We took the easy option of staying in our own accommodation near Lampeter and then drove to Cwmdru early on the Saturday morning. Everyone we met was so welcoming and relaxed and friendly. The organisers had prepared notes and information that was very helpful and useful for that weekend's viewing. One of the events was the social in the pub and the quiz.

The quiz was great fun and involved knowing a bit of history, being able to identify the odd crater on the lunar landscape, manipulating minor maths around telescopes, remembering the scientific names of the comets and similar. We gave ourselves a Welsh team name – the Eye of the Sun – which is the name of our home, and chuckled at Ralph's pronunciation and his concern that he might inadvertently be using swear words!



As we proudly set up our new PST that afternoon, our fellow camper-astronomers came to admire the scope and to give us some advice on how to use it. What fun it was, returning to Manchester and MAS, to show off the prize!

Our next challenge is to make use of the Tilting Sun programmes and figure out how to put those solar axes and grid lines on photos. Kevin, Tony, I hope that is on the list of teaching topics being planned at MAS!

Barbara Isalska

The Lord Mayor's Visit December 12th 2013

Councillor Naeem ul Hassan, the Lord Mayor of Manchester, visited the Godlee Observatory following an invitation from Council. Councillor Hassan expressed keen interest in the Society and its activities, particularly our Winter series of lectures held at the MMU and also our overall involvement with the general public both at the Godlee and also at other venues within Manchester. Time was put aside to show Councillor Hassan the telescopes but unfortunately the weather was unkind and no viewing was possible. There was also opportunity to meet other members of the Society. Councillor Hassan also signed a photograph, provided by Daryl Giles, of our involvement with the BAA summer exhibition held at the MMU.

Barry Henshall



The Lord Mayor with the President Barry Henshall and Publicity Officer Tony Cross



The Lord Mayor with comet discoverer Mike Oates.



The Lord Mayor and President Barry Henshall



Have telescope will travel!

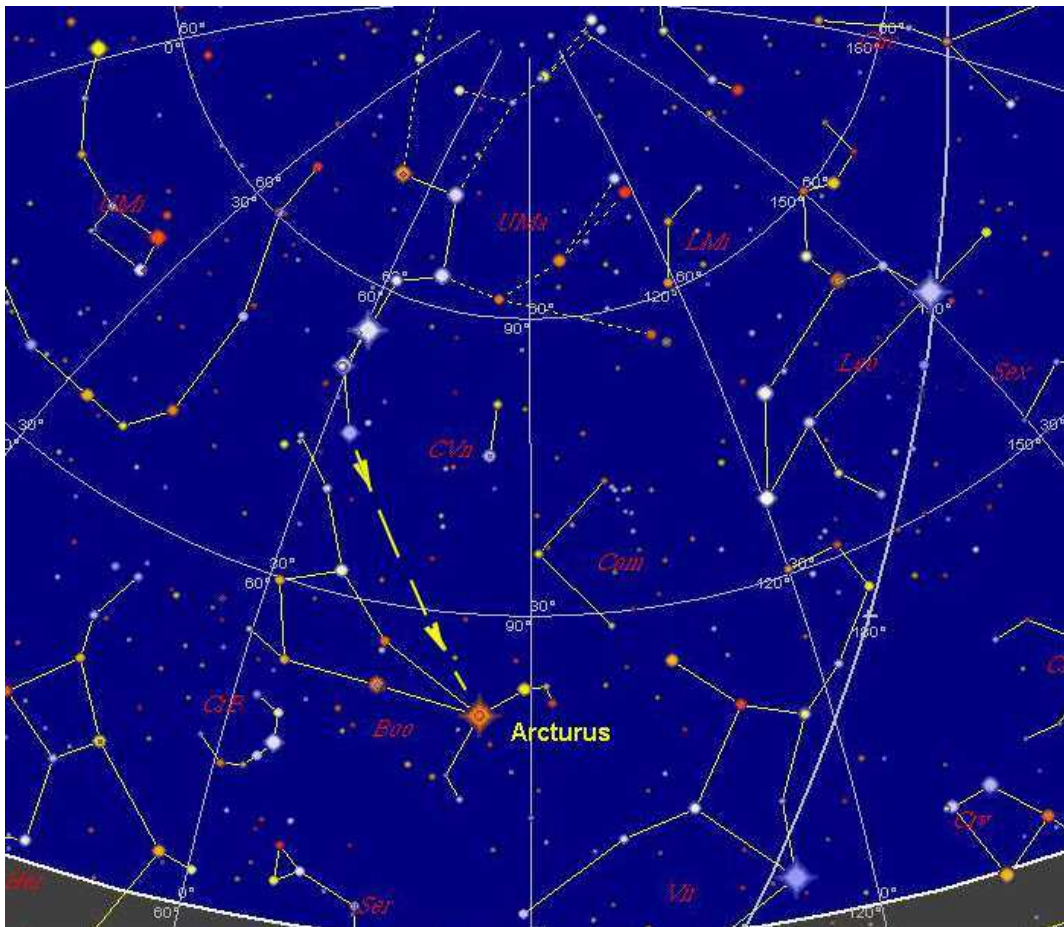


Kevin Kilburn and Tony Cross explaining the intricacies of operating the 8" refractor

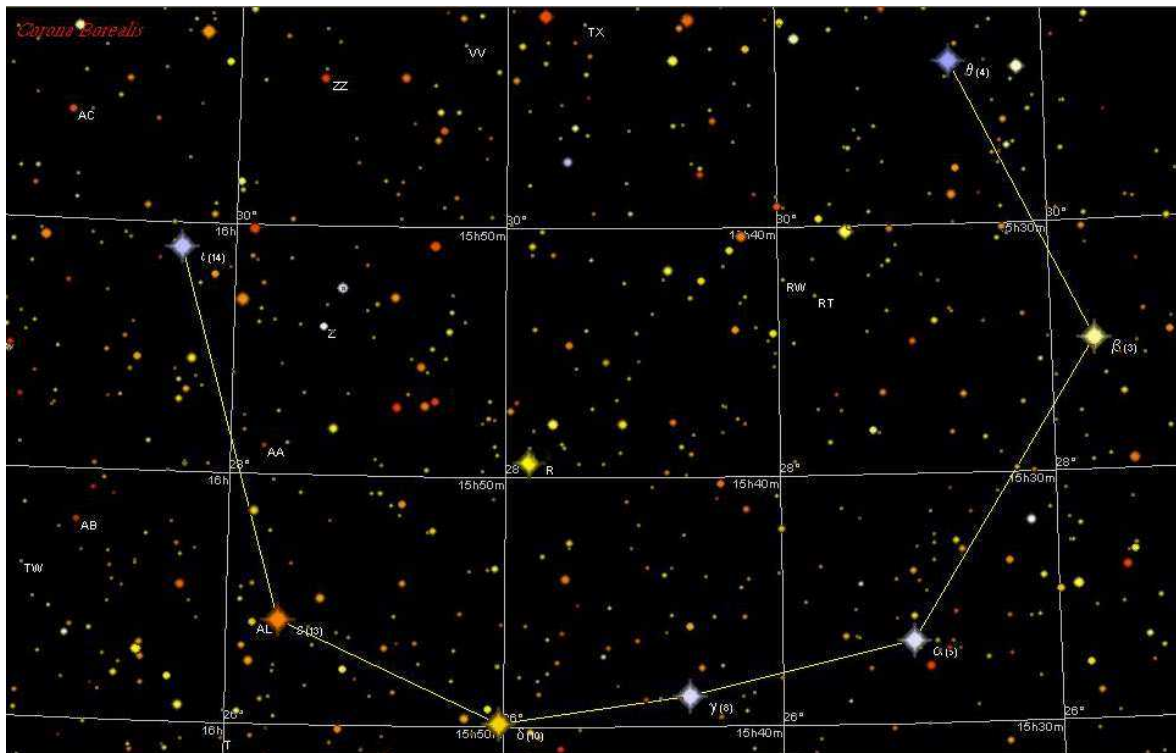


R Coronae Borealis: an observational challenge.

As the late winter early mornings dawn and as the milder spring-time nights beckon us to get observing, Arcturus, a first magnitude orange star, and second brightest star in the northern hemisphere attracts our attention to the 'P' or kite-shaped constellation of Bootes, the Herdsman, rising in the eastern pre-dawn sky. Arcturus is easy to find by using the familiar asterism of the Big Dipper in Ursa Major and following the handle downwards, continuing its curve, until the bright orange-coloured star, second only to Vega in the northern hemisphere comes into view.



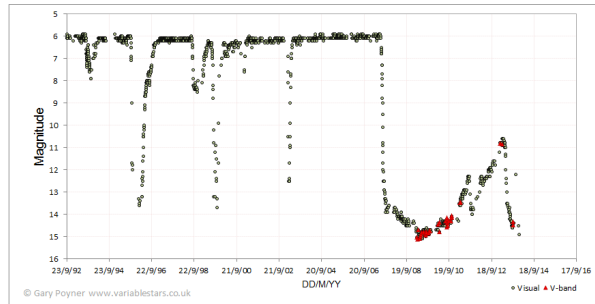
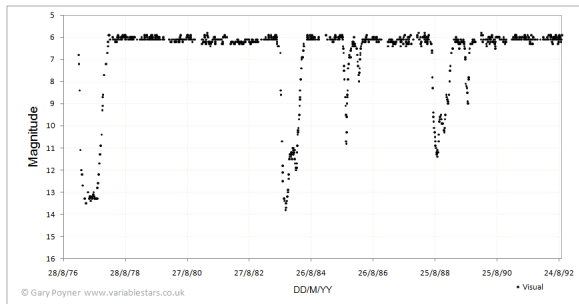
To its left, a very obvious circlet of seven stars marks the smaller but even more conspicuous constellation of Corona Borealis, CrB, the northern crown. Within this circlet is one of the most curious of variable stars, R CrB or R Cor Bor to its friends and followers. It's easy to locate (if it's visible!) at RA 15h 49m +28deg 7m. As a long-time NON-observer of variable stars, I have tended to regard variable stars as a figment of an over-developed imagination. (I'm kidding!) But R Cor Bor is so easy to observe that I do make time, from late winter onwards, to look for it with my 10x50 binoculars.



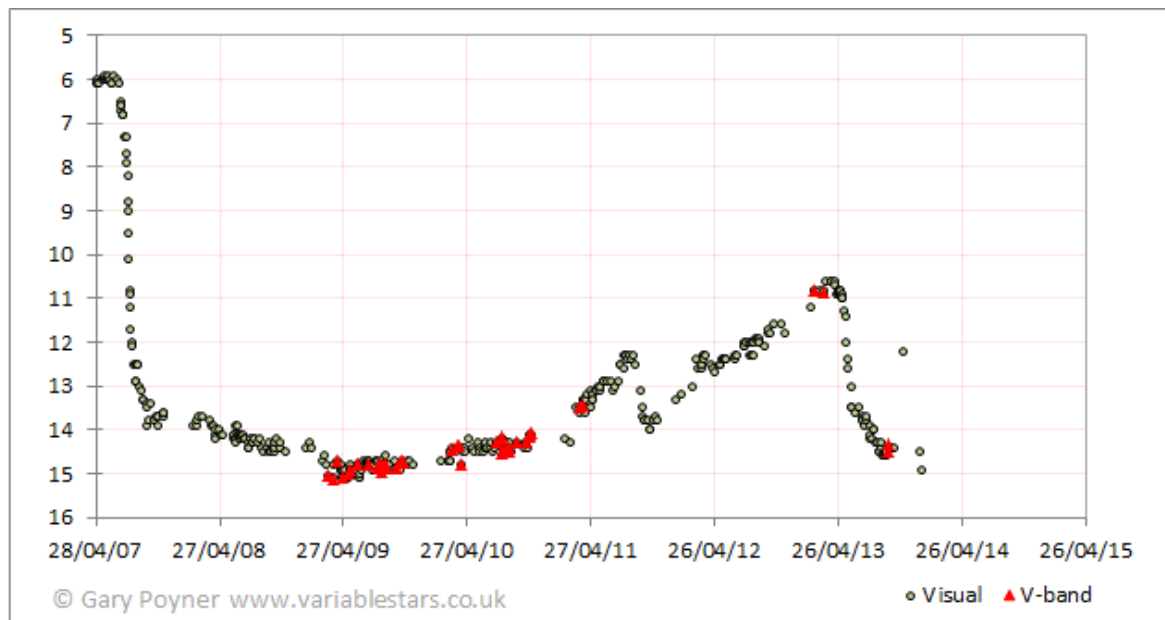
R Cor Bor is a reverse nova; a very remarkable irregular variable star. It was discovered by the English observer E. Pigott in 1795. For long periods it remains visible in binoculars at a nearly constant brightness around 6th magnitude, then it will begin to fade and within a few weeks will have fallen to any magnitude between 7th and 14th, well beyond most amateur telescopes, before returning to visibility within a few months, usually in less than a year.

R Cor Bor has a peculiar spectrum, variously classified as type F, G or M. It is now thought to be an ancient supergiant F7 star with strong absorption bands caused by

carbon in the star's outer atmosphere. The light variations are thought to be caused by the occasional rapid accumulation of a 'soot cloud' around the star that then takes time to be dispersed by radiation pressure, thus allowing it to return to visibility. During the early part of the 19thC it hovered around 6th mag with just an occasional dip to 12th. From about 1863 until 1873, it fluctuated erratically between 10-14th magnitude before returning to 6th mag in 1874. There were a few dips below 12th mag 1908-1912 but for most of the 20thC it has been more or less constant at 6th mag with occasional dips to 14th lasting no more than a few months; that is until the 21st C.



In April 2007 R Cor Bor shone at 6th magnitude then faded rapidly to 14th mag six months later. It continued to dim, reaching 15th mag in April 2009 before very slowly brightening. After an exceptionally long fade lasting, thus far, for over 6 years, in April 2013 it had risen slowly to attain 11th magnitude. It was imaged (without photometric calibration) from Cheddleton, at an estimated mag c10.5. It looked as though it might be coming back into visibility. Then it suddenly faded again, to below 14th magnitude in June...and continued to fade once more.





The veteran BAA variable star observer, Colin Henshall (Altrincham AS), observing from his current home in Saudi Arabia, visually with a small telescope and photometrically with his DSLR camera, put R Cor Bor at 10.9mag on 5 May (confirming my observation) before it faded. On Christmas Eve 2013, Colin reported... 'The latest (December) edition of "The Astronomer" gives the following information about R CrB: Rise from 12.5mag on Nov 1.8 to 11.4mag by Nov 12.8 fading to 12.3mag by Nov 22.7 It is clearly still at minimum, though it is a bit brighter than it has been. This minimum is an all-time record, and one can only speculate as to how long it will continue.' Obviously something happened to the carbon envelope

shrouding the star. Having started to clear in April 2013, it suddenly increased in opacity but now, at the end of the year, seems to have become variable in density. For over a decade I have been monitoring R Cor Bor as it's easy to scan the area with binoculars no matter whether the moon is in the sky or not. But considering its extraordinary behaviour in recent months, R Cor Bor desperately needs monitoring both photographically and with telescopes and, when it eventually brightens above 8th magnitude, with binoculars. It will certainly repay study. It may be entering an unstable phase never before seen and we simply can't predict what it will do next. Photographic observations (dated and timed, please) are especially useful to enable comparison with nearby stars.

*Kevin J Kilburn FRAS
Cheddleton
January 2014*

Major Meteor Showers in 2014

Shower	Radiant and direction	Morning of maximum	Best hourly rate	Parent
Quadrantid	Draco (NE)	Jan. 3	60-100	2003 EH ₁
Lyrid*	Lyra (E)	Apr. 22	10-20	Thatcher (1861 I)
Eta Aquarid	Aquarius (E)	May 6	20-60	1P/Halley
Camelopardalids	Camelopardalis (N)	May 24	100-1,000	209P/LINEAR
Delta Aquarid*	Aquarius (S)	July 29	20	96P/Machholz
Perseid*	Perseus (NE)	Aug. 13	60-80	109P/Swift-Tuttle
Orionid	Orion (SE)	Oct. 21	10-20	1P/Halley
Leonid*	Leo (E)	Nov. 17	10-20	55P/Tempel-Tuttle
Geminid	Gemini (S)	Dec. 14	100	3200 Phaethon

* *Moonlight will wash out fainter meteors in these showers.*

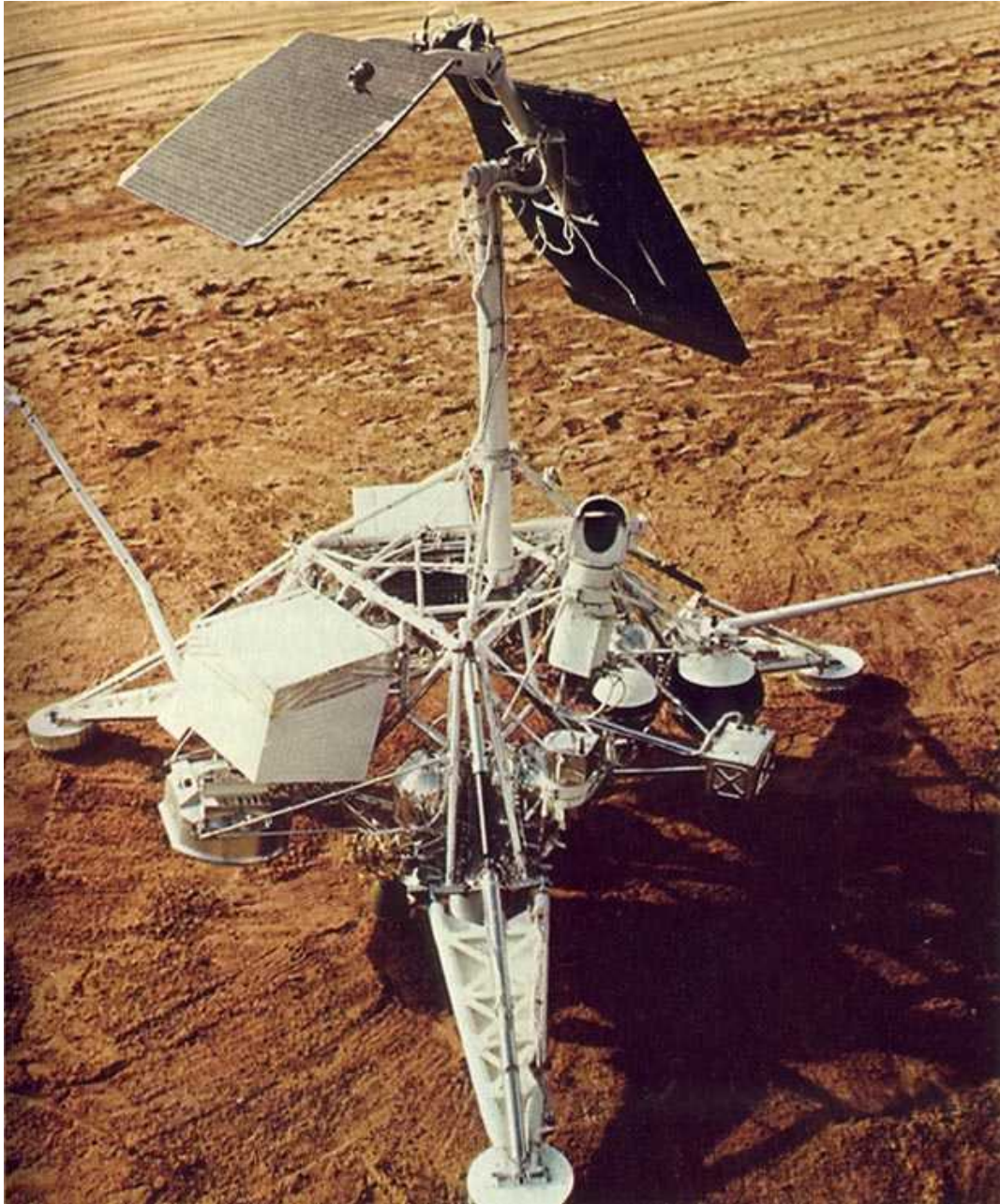
For more information see <http://www.skyandtelescope.com/observing/home/Meteor-Showers-in-2014-238017821.html>



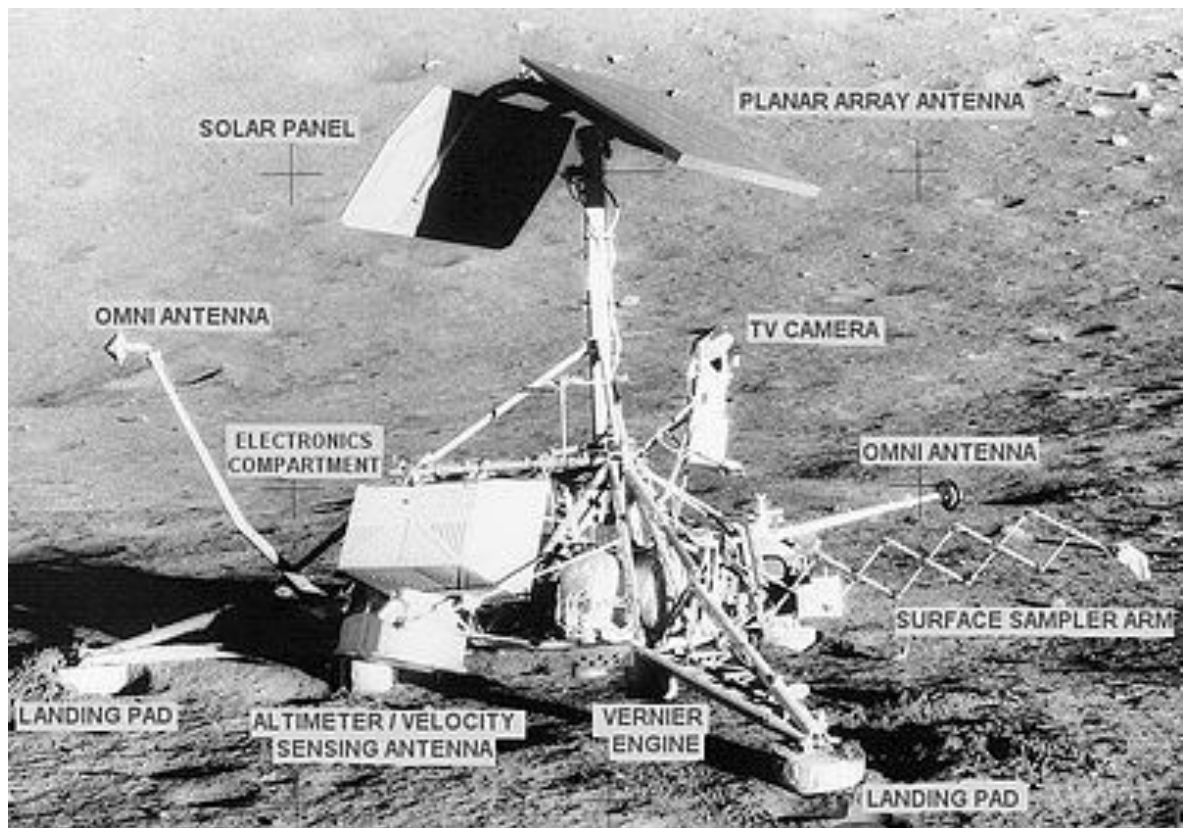
**The Surveyor landing sites
a brief guide
by Norman Kissoon**

U.S. Surveyor Landers

The Surveyor soft landers proved the lunar surface was sufficiently flat and strong to allow the Apollo Lunar Module to land. (Prior to the soft landings by Luna 9 and Surveyor 1 in



1966, some believed the Moon to be covered by a deep sea of dust, into which any lander would sink, never to be seen again.) Surveyor probes were equipped with steerable cameras which provided panoramic views of their landing sites. Later Surveyors carried a robotic scoop which could excavate soil, move rocks, and deposit soil into instruments for analysis, which provided the first on-site data about its composition.



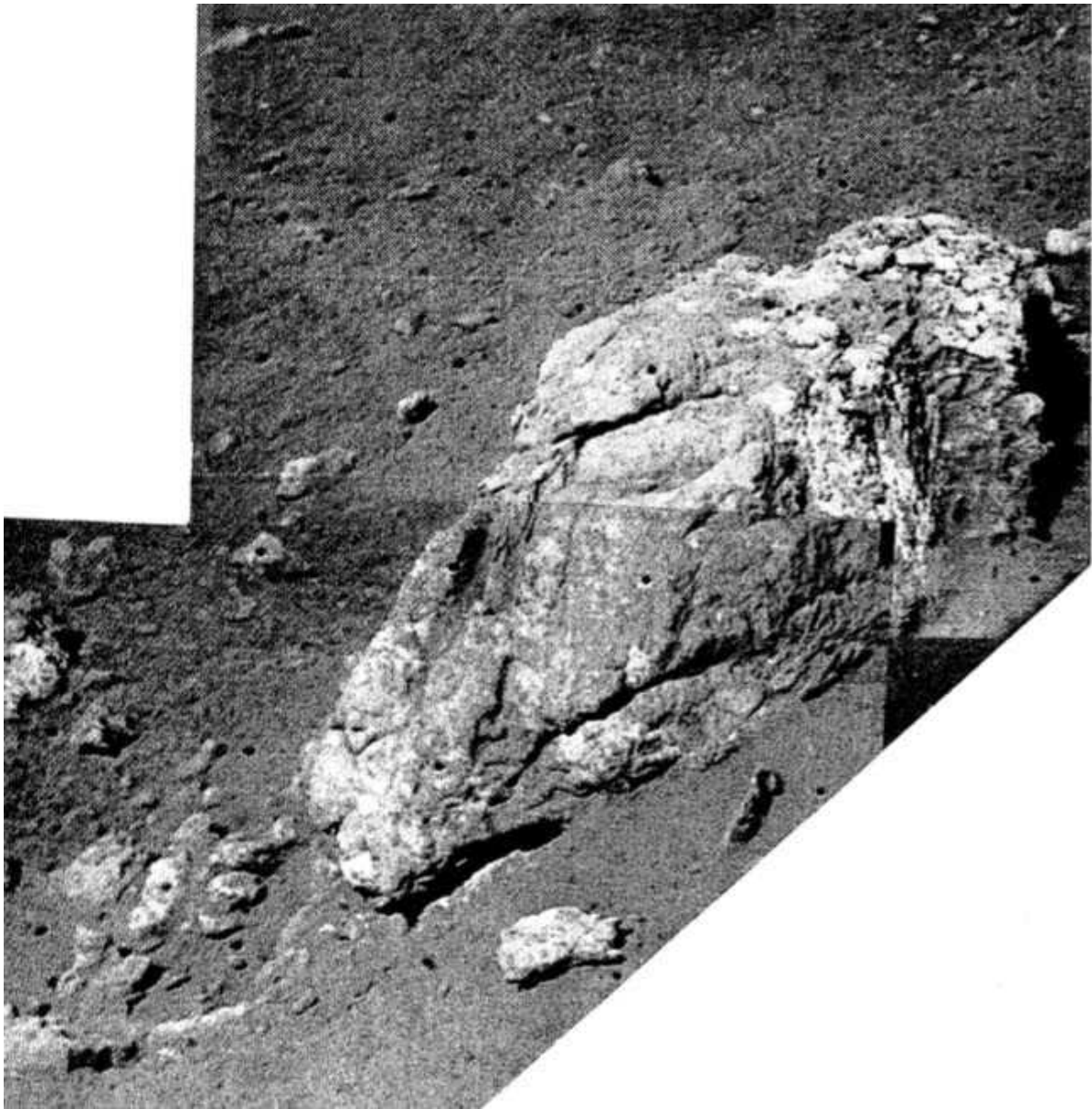
Surveyor 1 was the first lunar soft-lander in the unmanned Surveyor program of the National Aeronautics and Space Administration (NASA, United States). This lunar soft-lander gathered data about the lunar surface that would be needed for the manned Apollo Moon landings that began in 1969. The successful soft landing of Surveyor 1 on the Ocean of Storms was the first one by an American space probe onto any extraterrestrial body, and it occurred just four months after the first Moon landing by the Soviet Union's Luna 9 probe. This was also a success on NASA's first attempt at a soft landing on any astronomical object.

Surveyor 1 was launched May 30, 1966, from the Cape Canaveral Air Force Station at Cape Canaveral, Florida, and it landed on the Moon on June 2, 1966. Surveyor 1 transmitted 11,237 still photos of the lunar surface to the Earth by using a television camera and a sophisticated radio-telemetry system.

The Surveyor program was managed by the Jet Propulsion Laboratory, in Los Angeles County, but the entire Surveyor space probe was designed and built by the Hughes Aircraft Company in El Segundo, California.



Surveyor 1 - Image



Surveyor 1 ~ Moon rock

Surveyor 2

Launched 20 September 1966

Crashed on Moon 22 September 1966

Vernier engine failed to ignite - southeast of Copernicus Crater

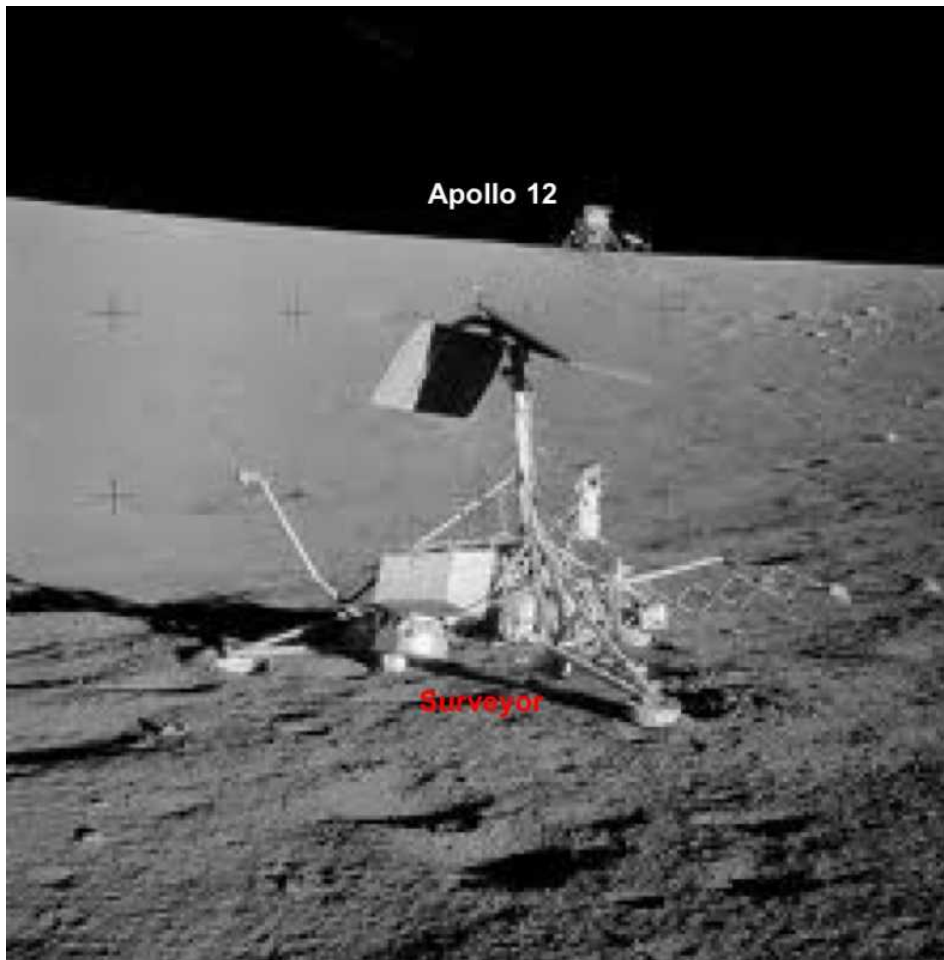


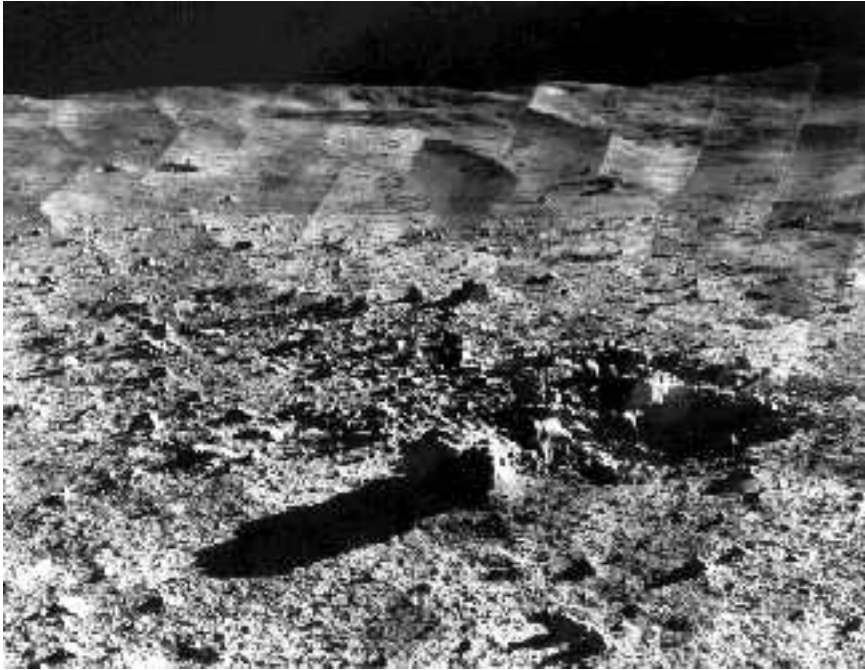
Surveyor 3

Launched 17 April 1967

Landed 20 April 1967, 00:04:53 UT

Latitude 2.94 S, Longitude 23.34 W - Oceanus Procellarum (Ocean of Storms)





Surveyor 3 Panorama

Surveyor 3 was the third lander of the American unmanned Surveyor program sent to explore the surface of the Moon. Launched on April 17, 1967, Surveyor 3 landed on April 20, 1967 at the Mare Cognitum portion of the Oceanus Procellarum (S3° 01' 41.43" W23° 27' 29.55") . It transmitted a total of 6,315 TV images to the Earth.

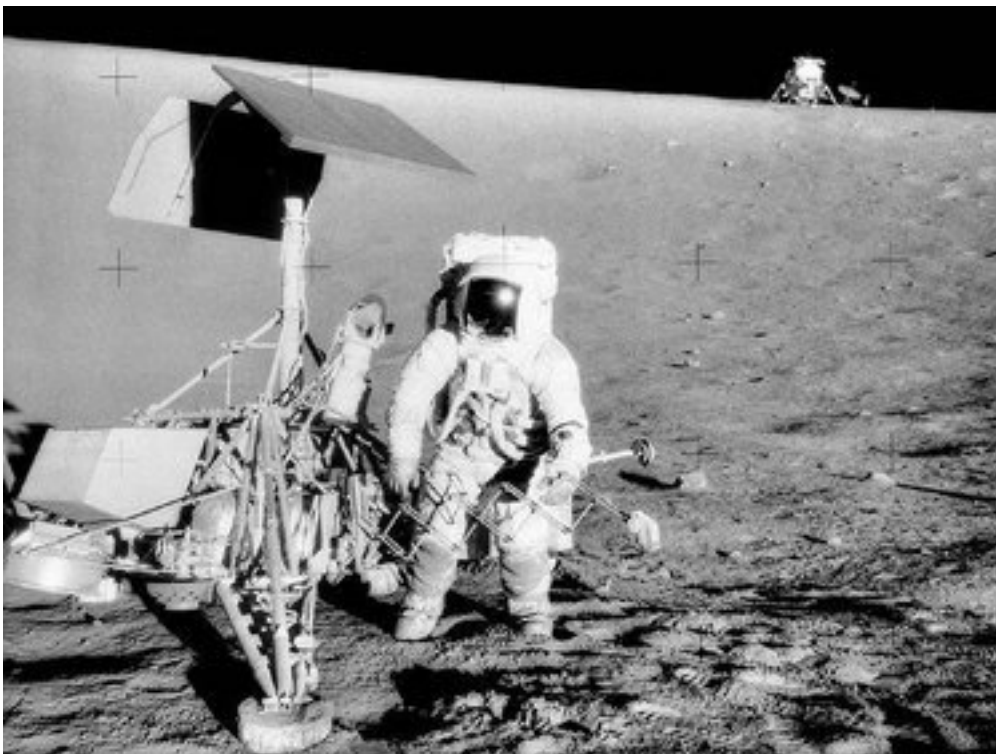
As Surveyor 3 was landing (in a crater, as it turned out [1][2]), highly reflective rocks confused the spacecraft's lunar descent radar. The engines failed to cut off at 14 feet (4.3 meters) in altitude as called for in the mission plans, and this delay caused the lander to bounce on the lunar surface twice. Its first bounce reached the altitude of about 35 feet (10 meters). The second bounce reached a height of about 11 feet (three meters). On the third impact with the surface — from the initial altitude of three meters, and velocity of zero, which was below the planned altitude of 14 feet (4.3 meters), and very slowly descending — Surveyor 3 settled down to a soft landing as intended.

This Surveyor mission was the first one that carried a surface-soil sampling. This mechanism was mounted on an electric-motor-driven arm and was used to dig four trenches in the lunar soil. These trenches were up to seven inches (18 centimeters) deep. Samples of soil from the trenches were placed in front of the Surveyor's television cameras to be photographed and the pictures radioed back to the Earth. When the first lunar nightfall came on May 3, 1967, Surveyor 3 was shut down because its solar panels were no longer producing electricity. At the next lunar dawn (after 14 terrestrial days, or about 336 hours), Surveyor 3 could not be reactivated, because of the extremely cold temperatures that it had experienced. This is in contrast with the Surveyor 1, which was able to be reactivated twice after lunar nights, but then never again.

The Apollo 12 Lunar Module landed approximately 160 meters from the Surveyor 3 spacecraft. The crew retrieved several pieces of the Surveyor, including the TV camera and associated electrical cables, the sample scoop, and two pieces of aluminum tubing. These items were returned to Earth and analyzed to determine how they were affected by exposure to the lunar environment.

A number of microscopic craters were observed on the returned pieces. Some were probably the result of micrometeorite bombardment of the Moon. Many of these craters were on the side of the Surveyor facing the Lunar Module. It is likely that these are the result of a sand-blasting effect from dust that was blown away from the Apollo landing site by rocket exhaust. Some darkening of painted surfaces due to the effects of solar radiation was also observed. Several nuts, bolts, and screws were disassembled after being returned to Earth, and none were found to have become cold-welded by their exposure to space.

A particularly important aspect of the Surveyor 3 analysis was the search for living material on the spacecraft. Surveyor was not sterilized prior to launch, and scientists wanted to know if terrestrial microorganisms had survived for two and a half years in space. One research group found a small amount of the bacteria *Streptococcus mitis* in a piece of foam from inside the TV camera. They believed that these bacteria had survived in this location since before launch. They only found evidence for living material in one of 33 samples from various parts of Surveyor that they cultured. Another research group found no evidence of life inside a section of electrical cable. Some people associated with the curation of the Surveyor 3 materials have suggested that the one positive detection of life may be the result of accidental contamination of the material after it was returned to Earth.



Surveyor 4

Launched 14 July 1967

Radio contact lost 17 July 1967

2.5 minutes from touchdown - Sinus Medii



Surveyor 4 was the fourth lunar lander in the American unmanned Surveyor program sent to explore the surface of the Moon.

Launched July 14, 1967; landed July 17, 1967

Weight on landing: 625 lb (283 kg)

This spacecraft crashed after an otherwise flawless mission; telemetry contact was lost 2.5 minutes before touchdown.

This spacecraft was the fourth in a series designed to achieve a soft landing on the moon and to return photography of the lunar surface for determining characteristics of the lunar terrain for Apollo lunar landing missions. Equipment on board included a television camera and auxiliary mirrors, a soil mechanics surface sampler, strain gauges on the spacecraft landing legs, and numerous engineering sensors. After a flawless flight to the moon, radio signals from the spacecraft ceased during the terminal-descent phase, approximately 2.5 min. before touchdown. Contact with the spacecraft was never reestablished, and the mission was unsuccessful. The solid fuel retro rocket may have exploded near the end of its scheduled burn.

Like Surveyor 3, Surveyor 4 was equipped with a surface claw (with a magnet in the claw) to detect and measure ferrous elements in the lunar surface. The mission was completely successful until all communications were abruptly lost 2 seconds prior to retrorocket cutoff at 02:03 UT on 17 July 1967, with only 2.5 minutes left to landing on the Moon. The landing target was Sinus Medii (Central Bay) at 0.4° north latitude and 1.33° west longitude. NASA concluded that the lander might have exploded when contact was lost.

Surveyor 5

Launched 08 September 1967

Surveyor 5 landed on Mare Tranquillitatis. A total of 19,049 images were transmitted to Earth.

The mission experienced a helium leak in the system that pressurized the liquid-fuel vernier engines that could have resulted in failure. An improvised landing sequence which started the retrorocket just 42 km above the moon (about half the usual height) allowed vernier engines to bring the craft down in 106 seconds from a height of only 1340 m (about 10% of the usual). This brought the craft down with a helium pressure on the edge of what would have shut the engines down from lack of pressure.

The landing, however, was successful, and data was received for 2 weeks after the landing. A miniature chemical analysis lab using an alpha particle backscatter device was used to determine the lunar surface soil consisted of basaltic rock. A similar instrument, the APXS, was used onboard several Mars missions.

Surveyor 5 was the third spacecraft in the Surveyor series to achieve a successful lunar soft landing. The spacecraft had a basic triangular structure of aluminium tubing that provided mounting surfaces for engineering and scientific equipment. The objectives were to obtain post landing television pictures of the lunar surface, conduct a Vernier engine erosion experiment, determine the relative abundance of the chemical elements in the lunar soil, obtain touchdown dynamics data, and obtain thermal and radar reflectivity data. Instrumentation for this spacecraft was similar to that of the previous Surveyors and included landing legs, a Vernier propulsion system, and numerous engineering sensors. An alpha-scattering instrument was installed in place of the surface sampler, and a small bar magnet attached to one footpad was included to detect the presence of magnetic material in the lunar soil. The spacecraft landed at 00:46:44 UT on September 11, 1967 (7:46 p.m. EST September 10) in Mare Tranquillitatis, at 1.41° N latitude and 23.18° E longitude (selenographic coordinates), within the rimless edge of a small crater on a slope of about 20 deg. The spacecraft transmitted excellent data for all experiments from shortly after touchdown until October 18, 1967, with an interval of no transmission from September 24 to October 15, 1967, during the first lunar night. Transmissions were received until November 1, 1967, when shutdown for the second lunar night occurred. Transmissions were resumed on the third and fourth lunar days, with the final transmission occurring on December 17, 1967. Pictures were transmitted during the first, second, and fourth lunar days.

The TV camera consisted of a vidicon tube, 25 and 100 mm focal length lenses, shutters, color filters, and iris mounted along an axis inclined approximately 16° to the central axis of the spacecraft. The camera was mounted under a mirror that could be moved in azimuth and elevation. Camera operation was totally dependent upon receipt of the proper command structure from earth. Frame by frame coverage of the lunar surface was obtained over 360° in azimuth and from +40° above the plane normal to the camera z-axis to 65° below this plane. Both 600-line and 200-line modes of operation were used. The 200-line mode transmitted over an omnidirectional antenna and scanned one frame each 61.8 seconds. A complete video transmission of each 200-line picture required 20 seconds and utilized a bandwidth of 1.2 kHz. Most transmissions consisted of the 600-line pictures, which were telemetered by a directional antenna. These frames were scanned each 3.6 seconds. Each 600-line picture required nominally 1 second to be read from the vidicon and utilized a 220 kHz bandwidth for transmission. The television images were displayed on a slow scan monitor coated with a long persistency phosphor. The persistency was

selected to optimally match the nominal maximum frame rate. One frame of TV identification was received for each incoming TV frame and was displayed in real time at a rate compatible with that of the incoming image. These data were recorded on a video magnetic tape recorder and on 70 mm film. During the first lunar day, which ended on September 24, 1967, 18,006 high quality television pictures were transmitted. After being shut down during the lunar night, more than 20 days, the camera responded to commands and transmitted an additional 1,048 pictures between October 15 and October 23, 1967. Another 64 pictures were transmitted on the fourth lunar day, but the quality of pictures taken after the first lunar day was poor due to camera degradation resulting from the lunar night temperatures.

The alpha-scattering surface analyzer was designed to measure directly the abundances of the major elements of the lunar surface. The instrumentation consisted of six alpha sources (curium 242) collimated to irradiate a 100 mm diameter opening in the bottom of the instrument where the sample was located and two parallel but independent charged particle detector systems. One system, containing two sensors, detected the energy spectra of the alpha particles scattered from the lunar surface, and the other, containing four sensors, detected energy spectra of the protons produced via reactions (alpha and proton) in the surface material. Each detector assembly was connected to a pulse height analyzer. A digital electronics package, located in a compartment on the spacecraft, continuously telemetered signals to earth whenever the experiment was operating. The spectra contained quantitative information on all major elements in the samples except for hydrogen, helium, and lithium. The experiment provided 83 hours of high quality data during the first lunar day. During the second lunar day, 22 hours of data were accumulated. However, detector noise posed a problem in the reduction of data from this second day.



Mare Tranquillitatis ~ site of the Apollo 11 landing

Surveyor 6

Launched 07 November 1967

Landed 10 November 1967, 01:01:06 UT

Surveyor 6 landed on the Sinus Medii. A total of 30,027 images were transmitted to Earth. This spacecraft was the fourth of the Surveyor series to successfully achieve a soft landing on the moon, obtain post landing television pictures, determine the abundance of the chemical elements in the lunar soil, obtain touchdown dynamics data, obtain thermal and radar reflectivity data, and conduct a Vernier engine erosion experiment. Virtually identical to Surveyor 5, this spacecraft carried a television camera, a small bar magnet attached to one footpad, and an alpha-scattering instrument as well as the necessary engineering equipment. It landed on November 10, 1967, in Sinus Medii, 0.49 deg in latitude and 1.40 deg w longitude (selenographic coordinates) - the center of the moon's visible hemisphere. This spacecraft accomplished all planned objectives. The successful completion of this mission satisfied the Surveyor program's obligation to the Apollo project. On November 24, 1967, the spacecraft was shut down for the 2 week lunar night. Contact was made on December 14, 1967, but no useful data were obtained.

Lunar soil surveys were completed using photographic and alpha particle backscattering methods. A similar instruments, the APXS, was used onboard several Mars missions. In a further test of space technology Surveyor 6's engines were restarted and burned for 2.5 seconds in the first Lunar liftoff on November 17 at 10:32 UTC. This created 150 lbf (700 N) of thrust and lifted the vehicle 12 feet (4 m) from the Lunar surface. After moving west 8 ft (2.5 m) the spacecraft was once again successfully soft landed. The spacecraft continued functioning as designed.

The TV camera consisted of a vidicon tube, 25 and 100 mm focal length lenses, shutters, polarizing filters (as opposed to color filters used on the previous Surveyor cameras), and iris mounted nearly vertically and surmounted by a mirror that could be adjusted by stepping motors to move in both azimuth and elevation. The polarizing filters served as analyzers for the detection of measurement of the linearly polarized component of light scattered from the lunar surface. An auxiliary mirror was used for viewing the lunar surface beneath the spacecraft. The frame by frame coverage of the lunar surface provided a 360 deg azimuth view and an elevation view from approximately +90 deg above the plane normal to the camera z axis to -60 deg below this same plane. Both 600 line and 200 line modes of operation were used. The 200 line mode transmitted over an omnidirectional antenna and scanned one frame each 61.8 seconds. A complete video transmission of each 200 line picture required 20 seconds and utilized a bandwidth of 1.2 kHz. Most transmissions consisted of the 600 line pictures, which were telemetered by a directional antenna. The frames were scanned each 3.6 seconds. Each frame required nominally one second to be read from the vidicon and utilized a 220 kHz bandwidth for transmission. The optical surfaces were the cleanest of any mission because of a redesigned mirror hood. The television images were displayed on a slow scan monitor coated with a long persistence phosphor. The persistence was selected to optimally match the nominal maximum frame rate. One frame of TV identification was received for each incoming TV frame and was displayed in real time at a rate compatible with that of the incoming image. These data were recorded on a video magnetic tape recorder and on 70 mm film. The camera performance was excellent in terms of both the quantity and quality of pictures. Between lunar landing, lunar 'second' landing, and the lunar first day sunset on November 24, 1967, 29,914 pictures were taken and transmitted.

Alpha-Scattering Surface Analyzer

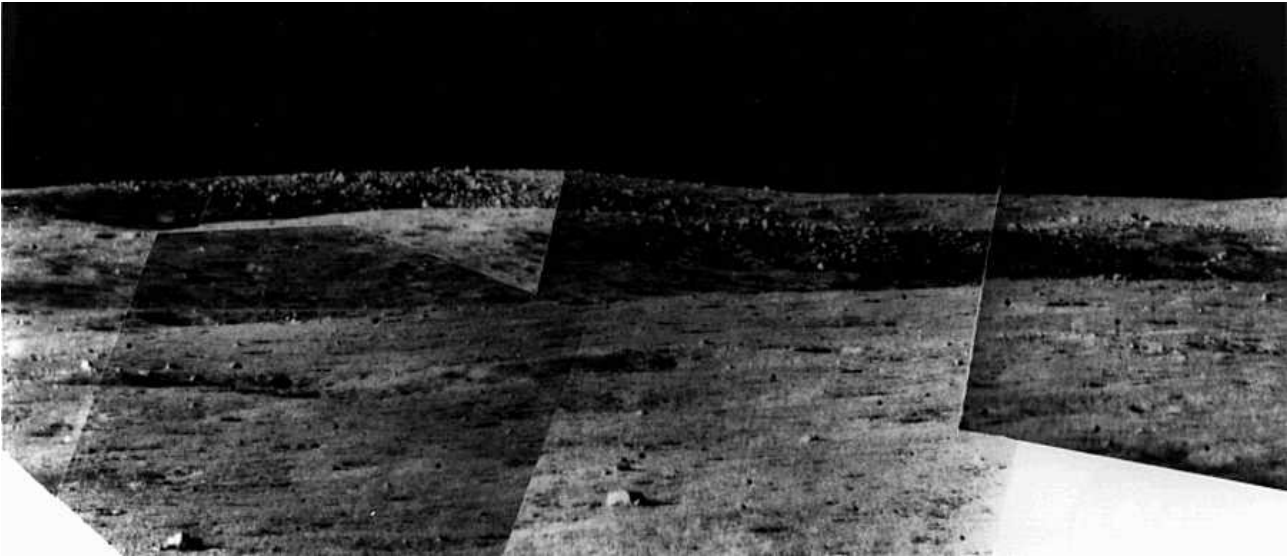
The alpha-scattering surface analyzer was designed to measure directly the abundances of the major elements of the lunar surface. The instrumentation consisted of an alpha source (curium 242) collimated to irradiate a 100 mm (3.94 in) diameter opening in the bottom of the instrument where the sample was located and two parallel but independent charged particle detector systems. One system, containing two sensors, detected the energy spectra of the alpha particles scattered from the lunar surface, and the other, containing four sensors, detected energy spectra of the protons produced via reactions (alpha and protons) in the surface material. Each detector assembly was connected to a pulse height analyzer. A digital electronics package, located in a compartment on the spacecraft, continuously telemetered signals to earth whenever the experiment was operating. The spectra contained quantitative information on all major elements in the samples except for hydrogen, helium, and lithium. Curium collected on the collimator films and was scattered by the gold plating on the inside bottom of the sensor head. This resulted in a gradually increasing background and reduction of the sensitivity technique for heavy elements. One proton detector was turned off during the second day of operation because of noise. A total of 43 hours of data was obtained from November 11 to November 24, 1967. The final data was obtained 4 hours after local sunset. However, after the spacecraft 'hopping' maneuver on November 17, 1967, the sensor head was upside down. Measurements were continued in order to obtain information on solar protons and cosmic rays. Therefore, data for the purpose of the chemical analysis of lunar surface material were obtained only during the first 30 hours of operation. During this period, 27 hours and 44 min of data were known to be noise free.

[edit]Accomplishments

Surveyor 6 was the first rocket launch from the moon's surface which was monitored by the Jet Propulsion Laboratory in Pasadena. It used its liquid-fuelled vernier engines to lift itself from its original landing site to a position some 10 feet away.



View of Sinus Medii



View of Sinus Medii

Surveyor 7

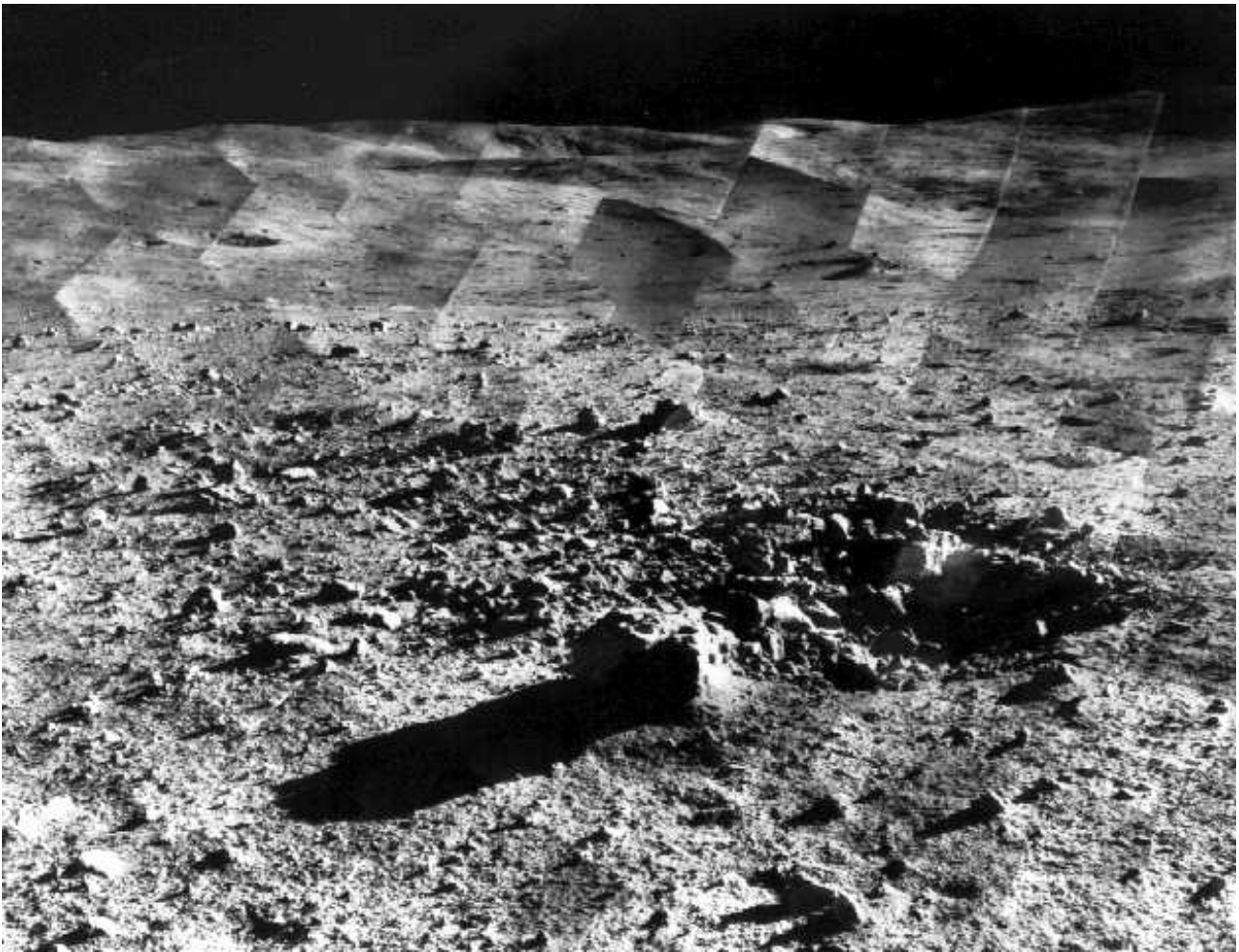
Launched 07 January 1968

Landed 10 January 1968, 01:05:36 UT

Latitude 41.01 S, Longitude 11.41 W - Tycho North Rim



Crater Tycho



Photomosaic of a panorama taken by Surveyor 7 of its landing site.

Surveyor 7 was the seventh and last lunar lander of the American unmanned Surveyor program sent to explore the surface of the Moon.

Launched January 7, 1968; landed January 10, 1968

Weight on landing: 305.7 kg (674.0 lb)

A total of 21,091 pictures were transmitted to Earth.

Surveyor 7 was the fifth and final spacecraft of the Surveyor series to achieve a lunar soft landing. The objectives for this mission were to: (1) perform a lunar soft landing (in an area well removed from the maria to provide a type of terrain photography and lunar sample significantly different from those of other surveyor missions); (2) obtain postlanding TV pictures; (3) determine the relative abundances of chemical elements; (4) manipulate the lunar material; (5) obtain touchdown dynamics data; and, (6) obtain thermal and radar reflectivity data. This spacecraft was similar in design to the previous Surveyors, but it carried more scientific equipment including a television camera with polarizing filters, a surface sampler, bar magnets on two footpads, two horseshoe magnets on the surface scoop, and auxiliary mirrors. Of the auxiliary mirrors, three were used to observe areas below the spacecraft, one to provide stereoscopic views of the surface sampler area, and

seven to show lunar material deposited on the spacecraft. The spacecraft landed on the lunar surface on January 10, 1968, on the outer rim of the crater Tycho. Operations of the spacecraft began shortly after the soft landing and were terminated on January 26, 1968, 80 hours after sunset. On Jan. 20, while the craft was still in daylight, the TV camera clearly saw two laser beams aimed at it from the night side of the crescent Earth, one from Kitt Peak National Observatory, Tucson, Arizona, and the other at Table Mountain at Wrightwood, California.[1][2]

Operations on the second lunar day occurred from February 12 to 21, 1968. The mission objectives were fully satisfied by the spacecraft operations.

The spacecraft landed near the large lunar crater Tycho, named for the famous astronomer. This crater is visible to the naked eye from Earth with luminous rays of impact ejected material emanating radially from it. Surveyor 7 was the final spacecraft in the Surveyor program. It landed perfectly, less than two miles (3 km) from the navigational target. The alpha backscattering instrument failed to deploy properly. Mission controllers successfully used the surface soil sampler claw to push the alpha backscattering instrument into the proper position to conduct its experiments. Battery damage was suffered in the first lunar night and transmission contact was subsequently sporadic. The spacecraft was last in contact on 20 February 1968.

Surveyor 7 was the first probe to detect the faint glow on the lunar horizon after dark that is now thought to be light reflected from electrostatically levitated moon dust.



**Manchester Astronomical Society
Officers and Council, 2013—2014**

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Treasurer

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Other Council Members

Kevin J Kilburn FRAS
Marion Mills
Michael Gilligan
Michael Oates

Non-elected Posts

Editor of Current Note – Vacant

IT – David Shakeshaft

Librarian – Marion Mills

Public Lecture Organiser – Kevin
Kilburn

Safety Officer - Michael Oates

Contributions to Current Notes

MANY THANKS to all the members that have contributed to this issue of Current Notes. Contributions are welcomed from all members of the Society, and can cover any area of astronomy, from beginners' initial experiences, to more advanced and specialized aspects. Remember, this is your forum for letting other members know who you are and what are your interests.

Distribution of Current Notes

Current Notes is available in two formats: paper copy and a digital version. The digital version will be e-mailed to members whose e-mail address is registered with the secretary. Paper copies are also mailed free of charge to members without an e-mail address. The website version will be uploaded to the Member's Section on the Society's website (www.manastro.org) following the issue of the next edition.

Guidelines for Submissions

In the absence of an editor for Current Notes please submit a copy of any contribution on floppy disk or as e-mail attachment to maspresident@btinternet.com in either MS Word format, PDF or as plain text file. If possible, please also submit a hard (printed) copy. Hand-written or typed contributions are also welcome, although to limit the editorial workload, these should ideally be kept short in length. Finally, any data submissions (e.g. statistics, observations, measurements) should be submitted either in a suitable digitized format (e.g. Excel spreadsheet, completed graphs) or with clear instructions as to how the data should be presented in Current Notes. If in doubt, please contact the editor.

Manchester Astronomical Society

Minutes of the Annual General Meeting 18th April 2013

Held in the octagon room of the Godlee Observatory

Meeting opened at 18:48 UT

1. Apologies for absence

Apologies for absence were received from Peter Ainsworth, Michael Gilligan, Colin Harrison and Conway Mothobi.

2. President's Opening Remarks

First of all I would like to thank members who have taken the trouble to be here tonight. An AGM is important as it not only gives the opportunity for everyone to review the past year but also to have their say about what they would like to see in the forthcoming year

I would also like to thank Council members and others for their time in preparing presentations and discussions throughout the year. Our Secretary will no doubt be giving more details in his report. A special mention must go to Kevin Kilburn for the time and effort he has given to the Society in organising our public lectures at the Manchester Metropolitan University. I would also like to thank Conway Mothobi for his support and for providing a venue at Manchester Metropolitan University for our winter lectures. I hope that you will agree with me that this last series of lectures were a huge success

Thanks must go to David Shakeshaft for maintaining our computer network and more recently taking over the running of the website from Mike Oates. Also mention must be given to Anthony Jennings for ensuring that our financial status stayed out of the red, Marion Mills for looking after the library and Michael Gilligan for knowledge and enthusiasm during the telescope upgrades. Also mention should be made to Chris Taylor for organising a raffle and providing refreshments on a Thursday evening.

This year we have had a large influx of new members influenced, no doubt, by the BBC programmes hosted by Brian Cox, especially Star Gazing Live. I hope that the time you spend here at our Society will encourage you to push the boundaries in your observing and interest in astronomy.

I should also like to thank Anthony Cross, as Publicity Officer, for organising a number of visits to the Godlee. I want to mention here that if it were not for certain members of the Society, mainly Tony, Anthony, and some others, our funds would not be sufficient to keep the society going as these members bring in paying visitors to the observatory. So I thank all those that have contributed in this way, for their time and effort in showing the visitors around the Godlee and also giving talks. The money raised from these visits ensures that we maintain a respectable balance as Anthony Jennings will no doubt verify.

Events held at the Godlee were the NWGAS workshop, an invite to Manchester University staff to visit us, a visit by John Armitage and a group from Staffordshire, a visit by Prestwich cubs and a visit by the Lord Mayor and Lady Mayoress of Manchester following a donation of £1000 from the Lord Mayor's Fund. We also opened the observatory to the general public during National Science and Engineering Week. More recently the BBC filmed at the Godlee, with Paul Martin, for the program "FLOG IT." I am led to believe that the program will be aired sometime in September this year.

Perhaps I should mention that the £1000 received from the Lord Mayor's Fund went towards a Canon 600D DSLR for observational work using both the 12" reflector and the 8" refractor. We have also purchased a new projector that should provide us with better image detail and contrast than our existing model.

Other events held here were the successful workshop hosted by Mike Oates, David Shakeshaft and myself, the quiz night, the photographic competition and the Christmas Buffet. Some of you may not be aware that on the 11th of December there was a marriage proposal, and acceptance, up in the dome by two of our guests. We cater for everyone.

I would also like to mention that our oldest member, Dame Kathleen Ollerenshaw reached her 100th birthday in October last year and I am sure we all wish her well.

On the 28th of February this year one of our members, Jerry Grover, died. He had been very ill for a number of months but insisted in being kept in touch with the Society. Jerry had been a member for some 10 years. Many of you will remember him sitting by the door giving words of encouragement, comment and other remarks in a way that only Jerry could. There was a Service of Thanksgiving for the Life of Jerry at All Saints Church, Cheadle Hulme, Cheadle on Wednesday March 13th 2013 followed by a committal at Stockport Crematorium. A number of members attended the service on behalf of the Society. Jerry will be sorely missed by many of us.

Finally I must thank everyone who has contributed to the functioning of this Society, in whatever way, during the past year and I apologise to any member who I have failed to mention personally.

Dr Barry Henshall, F.R.A.S.

President of the Manchester Astronomical Society.

3. Minutes of the last Annual General Meeting held on 21st April 2011

The president stated that the minutes of the previous AGM have been displayed on the notice board and circulated by email and suggested that we assume the minutes as read. This was agreed and the meeting proceeded to matters arising.

Matters Arising

3.1 The Tom Hill telescope has been returned in poor condition. We should be careful with future loans.

3.2 The Hadfield Lunar Atlas has been replaced, the new copy is for reference only.

3.3 The catalogue of equipment has been brought up-to-date by Guy Duckworth.

3.4 If members wish to access the Godlee observatory at times other than a Thursday evening they can do so by contacting a warden, these details are now on the notice board.

Acceptance of the previous Annual General Meeting minutes

The minutes were proposed for acceptance by David Baker and seconded by Steve Hodkinson.

4. New members applying for election

Five new members applied for election and signed the members book, they were then welcomed into the Society.

5. Secretary's Report

This is my first term as secretary and I would like to start by thanking my predecessor Mike Oates for help and advice throughout the year, in particular for continuing to manage the membership records and the loan of a sound recorder to enable me to record meetings.

Equipment upgrades

Following the refurbishment of the observatory last year members have undertaken upgrades to the equipment in the observatory including new Crayford focusers fitted to the scopes in the dome. The 12" is now ready for use having had its mirrors recoated and a 5" Wray refractor fitted as a finder scope. An investigation into a new stepper motor drive system has been carried out. There are too many people to mention here but I would like to thank everyone involved in these upgrades.

We have been awarded a £1000 grant from the Lord Mayor. I wish to thank Guy Duckworth for leading the grant application. This has enabled us to purchase a new Canon 600D camera and a Benq full HD projector. The Lord Mayor visited the observatory on 24th January and observed the moon through the 8" refractor through gaps in the clouds.

Observatory openings

The observatory was opened on 57 occasions during the past year, 44 of these were normal Thursday meetings. The council met on three occasions in the back room. The average attendance was 24 including 4 guests. The meetings have covered a wide range of topics including, monthly skynotes which were delivered this year by Guy Duckworth, Barry Henshall, Anthony Jennings and Kevin Kilburn. We had a talk from Colin Henshaw updating us on the astronomy he is doing in the Middle East and a talk on "Astronomy in Art" by Steve Warbis from Macclesfield AS. The "Annual Quiz Night" was hosted this year by Barry Henshall. In March we held a practical workshop with various themes, telescopes and mounts, astrophotography, solar observing and portable setups. The attendance was 37, the highest attendance at a meeting in the observatory this year. So thank you to everyone who helped out.

As in the previous year the photographic competition was split into two categories "Astronomy" and "Earth Atmospherics" with Advanced and beginners sections. The competition was judged by one of our newest members, Daryl Giles.

Beginners section:

Astronomy: Dave Walker, Sharp moon

Earth Atmospherics: Dave Walker, Sundog

Advanced section:

Astronomy: Anthony Jennings, Europa, Iona, Ganymede, Jupiter and Callisto

Earth Atmospherics: Anthony Jennings, Double rainbow

I would like to thank Chris Taylor for providing refreshments at these Thursday meetings and for organising a raffle in aid of society funds. I also want to thank Anthony Cross for arranging a store room allowing us to declutter the observatory.

The other observatory openings include the North West Group of Astronomical Societies imaging workshop in April. At which around 30 people from around the North West discussed the latest imaging techniques. There was a visit by 30 members of the Swinton and Mexbrough AS in July. The 22nd Prestwich cubs visited in November. There was a public open evening as part of national science and engineering week. The BBC came to film for the program "flog it" in March.

Lectures

The attendance for the lectures this year was 384 (of which 219 were guests) an average of 64 per lecture, (last year the average was 49 per lecture). We have Conway Mthobi from the Manchester Metropolitan University (MMU) to thank for providing the lecture rooms for our lectures at no cost to the society and thanks go to Kevin Kilburn for organising the lectures. We have had five lectures this year held in the John Dalton Building, "The Quantum Universe" by Professor Jeff Forshaw, "The Aurora in History" by Dr. David Gavine, "Differentiated Asteroids: 4 Vesta and the Dawn Mission" by Professor Lionel Wilson, "Starlight" by Dr. Keith Robinson and "Magic of the Cosmos - A matter of some Gravity" by Professor John Brown. The presidential lecture, "Are we heading for disaster? Near Earth objects and their impact" was given by Dr. Barry Henshall and held in the Godlee observatory.

Outreach

Members participated in several outreach activities during the year including "stargazing in the city" in May where members were located outside the museum of science and industry with their telescopes. Members of the public were shown views of the sun in white light and Hydrogen alpha. We also had our display boards on show inside the museum promoting the society.

We were present at a Stargazing Live event hosted by the BBC at Tatton Park in January. This was well attended by our members, Kevin Kilburn gave presentations on the basics of stargazing while most of the members manned the MAS stand where telescopes, images and information were on display. June Blackburn and Anthony Cross were interviewed on Radio Manchester and Anthony Cross and Paul Stoddard were interviewed on TV.

There was also a stargazing event at Stockport academy in January, this was attended by Anthony Cross, Colin Harrison, Dave Walker and myself. We had our telescopes outside, objects observed include Jupiter, Orion nebular and the Pleiades. Dave Walker delivered a presentation on the basics of astronomy and the activities of the MAS.

A big thank you to all those who helped with these events, in particular Anthony Cross for his efforts in organising these events.

Membership

We currently have 67 ordinary members, 8 student members and 8 honorary members, giving a total membership of 83. Sadly one of our members, Jerry Grover passed away in February. There will be full obituary in the next issue of current notes.

My apologies if I have missed some people out in this report, all assistance given to help the society is most welcome and very much appreciated.

David Shakeshaft.

Secretary of the Manchester Astronomical Society

Acceptance of the Secretary's report

The Secretary's report was proposed to be accepted by Anthony Jennings and seconded by Mike Oates.

6. Treasurer's Report

The treasurer handed out a copy of the financial report and went through some of the items. The treasurer stated that owing to personal circumstances they had not been able to fulfil the role until January and during this period the President had been acting treasurer.

The Bank balance on 31st March 2012 was £1,585.90 with petty cash holding £61.00, so the Society is currently in credit to the sum of £1,646.90. The membership stands at 60 of which 4 are students and 7 are honorary members. No donations from visits were received during this year as the observatory had been closed for several months. The society has received £57.80 from sales of the Bevis CD. This is down from the previous year as the company which promotes the CD in the USA has started sending payment by cheque in dollars. This has caused the society to incur bank charges on this income. It was therefore decided to discontinue the sale of the Bevis CD through this company. The cost of printing current notes has been reduced to £22.00 as most members now receive an electronic copy by email.

The full report can be obtained by contacting the secretary or treasurer.

Acceptance of the Treasurer's report

The Treasurer's report was proposed to be accepted by Steve Hodgkinson and seconded by Paul Stoddard.

7. Library report

The librarian stated that 6 members currently have overdue books on loan. They will be contacted and asked to return them. There are some books that need to be added to the catalogue. It was suggested to try and reorganise the library into sections to make it easier to find a book on a particular subject. The librarian said it was not always possible to do this, currently books of a similar size are put together to maximise space efficiency.

Acceptance of the librarian's report

The librarian's report was proposed to be accepted by Kevin Kilburn and seconded by Paul Stoddard.

8. Reports on Society Instruments on loan

C8 Nigel Longshaw Telescope on loan to Anthony Cross

This telescope has been used on no less than 190 occasions to capture White Light images of the Sun, using a Canon 550D camera at prime focus, recording many ARs of solar activity, light Bridges, Faculae, Flare activity usually seen as very bright regions within a sunspot area, Granulation.

All these images are emailed out to various people who wished to be added to my email list of Daily Solar Observations.

The condition of the telescope is fine with the odd occasion of having to retighten the screws on the tripod, which can slacken off during general use.

A recent purchase of a new sheet of Mylor Film by the society will enable me to continue the solar project to observe and capture images during the present Solar Maximum, which is due to peak by mid 2013 ?,

I am restricted to daytime observing because of severe light Pollution

On the odd evening I have managed to capture a few lunar images and a transit of the I.S.S. on 2 evenings.

Also I might add that using my own PST 40mm HA scope, I have recorded over 190 images, displaying various limb features, Prominences of all categories, one such capture was of a large Plasma cloud of such proportions that Jupiter was placed in the image alongside for scale, the plasma cloud was of equal dimensions, whilst using the Mono facility on the camera, have been able to record a series of active regions in flare outburst.

C11 Telescope on loan to David Shakeshaft

The C11 optical tube assembly is on loan, new losmandy dovetail bars have been fitted to enable use with my equatorial mount. A new counterweight for my mount had to be purchased to allow counterbalance. Thanks go to fellow member Colin Harrison for the modification of this counterweight. The scope has been used in conjunction with the Philips toucam to image the moon and Jupiter. I aim to image more planets and creators on the moon over the coming year. I also hope to improve the quality of the images I produce.

Acceptance of the Instruments on loan reports

The Instruments on loan reports were proposed to be accepted by Marion Mills and seconded by David Escott.

9. Election of Council members for the year 2012/2013

The council then retired while the Guy Duckworth (former Immediate Past President), standing in for the Immediate Past President, Graham Hodson, welcomed Barry Henshall as being unopposed and therefore elected as President and thanked him for all his efforts in the past year. The President then read out the names of the nominees for council. All officers and council members were unopposed and duly elected. The results are as follows:

Officers:

President:	Barry Henshall
Vice President:	Guy Duckworth
Secretary:	David Shakeshaft
Treasurer:	Anthony Jennings
Public Relations Officer:	Anthony Cross
Immediate Past President:	Graham Hodson

Council Members:

Public Lecture Organiser	Kevin Kilburn
Librarian	Marion Mills
Safety Officer	Michael Oates

10. Presidential Assessment on the Forthcoming Year

Towards the end of the year we are promised the appearance of a spectacular comet. You are no doubt aware comets are notorious for not doing what the experts are expecting of them. They can suddenly flare or fade. they can disintegrate or just behave as predicted. They are also the harbingers of doom, or so we are told. Beware. However, whatever happens we should have a great photo opportunity, either with telescope or with camera and lens.

I would also like to remind you that we have a solar filter that can be attached to the 8" refractor. So why not arrive a little earlier on a Thursday and carry out a little solar observing. The sun is more active than last year and it is an opportunity to bring your camera and take a few shots for our photographic competition. If you do not have a camera then bring a stick, use our camera and transfer the images.

We will also be continuing with Sky Notes every month but please, could we have a few volunteers. You may feel you would like to see a different approach to the evening, the use of different software or just a different presentation style. I like to see variety in our Thursday meetings

I also hope that we will be able to continue the publication of our journal 'Current Notes'. Our last issue was in September last year. I have edited a number of issues but we need someone to take over that role for the next issue. So, any volunteers? Of course we also need copy. We do have some but more is needed as I said at last week's

meeting. There are a few events planned that will take place outside our normal Thursday evening meeting.

- 1) Imagining workshop to be hosted by Macclesfield AS and organised by members of the NWGAS – Saturday July 27th. The topic this year is 'Science from photographs'
- 2) BAA Exhibition meeting in Manchester held at the MMU on 22nd June when the Godlee will be open to delegates
- 3) 24th International Congress of History of Science, Technology and Medicine in Manchester 22nd July - 28th July. Visit to the Godlee on the 25th July.
- 4) The Manchester Science Festival, 26th October – 3rd November 2013

It is not only Council members who are allowed to organise events or activities on a Thursday evening. Any member can organise an activity. All that is needed is a quiet word with Council beforehand, especially if Society funds would be needed. We cannot run a successful society without your help. In conclusion I hope that we can all look forward to an enjoyable and stimulating 12 months here at the Godlee.

Dr Barry Henshall ,F.R.A.S.
President of the Manchester Astronomical Society.

13. Any Other Business

13.1 BAA Exhibition Meeting 22/06/2013. The BAA will hold their exhibition meeting in the John Dalton Building at Manchester Metropolitan University. There will be tours of the Godlee Observatory by society members.

13.2 2013 – 2014 Lecture series. Kevin Kilburn stated that two lectures had now been arranged. The Kopal memorial lecture on 17/10/2013 will be delivered by Dr. Katherine Joy, School of Earth, Atmospheric and Environmental Sciences at The University of Manchester. The lecture is titled “Geological History of the Moon from Sample Analysis.” The lecture on 20/02/2014 will be delivered by Dr. Caroline Smith, Curator of Meteorites at the Natural History Museum. lecture is titled “Mars Sample Return - meteorites vs missions.” Kevin Kilburn is now arranging the rest of the season and welcomes suggestions for lectures and/or topics from members.

13.3 Manchester Science Festival (MSF) 26/10/2013 – 03/11/2013. We have been asked to confirm our involvement with MSF this year. The Museum of Science and Industry (MOSI) have suggested we hold an event in the Godlee observatory. Barry Henshall will contact MOSI to discuss plans.

13.4 24th International Congress of History of Science, Technology and Medicine (ICHSTM). Delegates to ICHSTM are due to visit the Godlee observatory on 25/07/2013. Society wardens will be on hand to show them around and describe the history of the observatory, instruments and rare books. This is expected to be a full day event, refreshments will be provided by ICHSTM.

13.5 Opening of the Godlee observatory on Thursday evenings. Members asked what time the observatory is open from on Thursday evenings. It was noted that recently the observatory had been opened at varying times. It was decided to open at 18:00 LT. A specific warden will have the responsibility of opening on a particular Thursday.

There being no other business the President declared the meeting closed at 20:55 UT

David Shakeshaft
Secretary of the Manchester Astronomical Society

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