Ordinary Meeting, 2006 March 22
held at New Hunts House, Guys Hospital, London Bridge, London SE1

Richard Miles, President

Ron Johnson, Hazel Collett and Nick James, Secretaries

Dr Miles opened the fourth Ordinary Meeting of the 116th Session, and invited Mrs Hazel Collett, Meetings Secretary, to read the minutes of the previous Meeting, which had taken place at the seventh Observers' Workshop in Milton Keynes in February. These were approved by members and duly signed. Before moving on, the President commented that the proceedings of that meeting had included half an hour of observing time booked on the Faulkes Telescope in Hawaii. In the event, the intended observing slot had been clouded out, but the telescope operators had offered to place a 30-minute observation request into an offline queue as compensation. A raffle had been held at the meeting to choose a target, but a month on, it seemed that the weather in Hawaii was still bad, and so the Association's request was still awaiting telescope time.

The President announced that ?? new members were proposed for election; those ?? who had been proposed at the previous meeting were approved by members and declared elected. The President invited any new members in the audience to introduce themselves to him at the end of the Meeting. Mr Nick James, Papers Secretary, announced that six papers had been approved for publication in the *Journal*:

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The next Ordinary Meeting would take place in Liverpool, during the weekend of the Out of London meeting, to be held on April 21-23 in association with Liverpool Astronomical Society. The weekend's programme would include, amongst other distinguished speakers, two talks by Dr Allan Chapman. In the meantime, the Winchester Weekend, this year celebrating its 40th anniversary, would take place on April 7-9. The Alfred Curtis Memorial Lecture, now in its 30th year, would be given by Dr John Mason.

The President then proceeded to invite the evening's first speaker, Martin Mobberley, to present his regular Sky Notes. Before handing over, Dr Miles remarked that Mr Mobberley had recently given notice of his intention to step down from the job of giving these talks after the Exhibition Meeting in June. His ability to mix lively banter with an authoritative guide to the sky would be a hard act to follow, and so instead of looking for a permanent replacement, the President planned to arrange for a series of volunteers to present their own sky diaries at future meetings; any interested members were invited to get in touch.

The March Sky

Mr Mobberley recalled that the Association's Sky Notes had a long history, running back to the 1950s, and that Patrick Moore had presented it at one time. He himself had given his first presentation in November 1990, at the suggestion of Mrs Hazel McGee, then Meetings Secretary. He could hardly have imagined back then that he would still be giving regular presentations sixteen years later. He had retired from the job in 1999, but Guy Hurst had persuaded him to make a return in 2002 for the duration of his Presidency. Having now served through Tom Boles' Presidency also, he felt it time to pass the buck on, and to see what hidden talents lay in the audience.

This month, he opened with a report of recurrent nova RS Ophiuchi's recent outburst, discovered visually at mag 4.5 by Japanese observers Kiyotaka Kanai and Hiroaki Narumi on February 12. This was an unusual object, one of only seven novae which had ever been observed to recur. RS Oph's previous outbursts had been in 1898, 1933, 1958, 1967 and 1985, and so, after 21-years' wait, another had been widely anticipated, even though its timing had not been predictable in advance. The first known BAA observation of the new outburst had been by Gary Poyner on February 15, through cloud breaks and a bedroom window. As an indication of what the latest outburst might do in coming weeks, Mr Mobberley added that the 1985 event had faded at a rate of 0.1 mag/day for its first 38 days, then returning more slowly to its normal brightness over a period of 3-4 months.

Looking further back through recent events, January 25 had seen the occultation by Saturn of mag 7.4 star BV Cancri; a few observers had imaged the merger of the two objects, though the speaker was not aware of any animations or videos. Generally the huge difference in brightness of the two objects had reduced this event's visual appeal.

Turning to the planets, Venus' present apparition was shortly to climax with its reaching dichotomy – i.e. half phase – in the morning sky on March 26. The circumstances of this apparition were not ideal, however: at this time of year the ecliptic was so orientated that the maximum solar elongation of Venus would be a little under three hours of RA, placing it rather low on the horizon in morning twilight. The speaker paused briefly to show a rather pleasing gallery of images by David Arditti of Venus' thin crescent from late January and early February.

Saturn's present apparition had passed opposition on January 27, and the speaker showed a selection of this year's images. Many observers had noted a bluish tint to the northern polar region; this had been widely anticipated, having been seen also on past occasions when one or other of Saturn's poles had emerged from the shadow of the rings. Dave Tyler had captured an image on the exact night of opposition, January 27, and had observed the rings to brighten quite dramatically for a brief time. This phenomenon, caused by the *Opposition Effect*, had been discussed around the time of the previous opposition[1] – it was essentially a result of the near alignment of our line of sight with the direction of the Sun's rays. Tyler's image of the effect this year showed exceptionally brilliant rings, with the planet appearing rather dull behind; the speaker compared its grey appearance to that of a potato. Saturn's surface had generally been fairly uneventful of late, and so Mr Mobberley moved on, but he closed with an animated series of frames by Damian Peach from the night of March 14-15. The passage of white spots across the surface in the Southern Tropical Zone showed clearly the rotation of the planet.

Mars' disk continued to shrink ever smaller following its close approach of October 2005; in April its diameter would pass below 5". For those whose interest was not deterred by this, it could be found in Taurus and would pass eastward into Gemini on April 14 before passing about one twin-separation to the south of Castor and Pollux in late May. Damian Peach had continued to produce some impressive images in recent weeks, of which the speaker showed a selection. He closed with a fine animation of Mars' rotation by Dutchman Richard Bosman, constructed from a compilation of Bosman's best images. All of these frames had been taken with a Celestron C11, although the motion of the moons with respect to the planet had been superposed by software.

Jupiter was now observable again after passing through solar conjunction in 2005 October, but this year's would be a very southerly apparition at around δ=-15°. For comparison, Spica was at δ=-11°, and so it was clear that Jupiter would be very low indeed in the southern sky. Even Dave Tyler had struggled to get much detail of late, though he would shortly be following in Damian Peach's footsteps, setting out on an observing expedition to Barbados, and so fine images were to be expected in a future Sky Notes.

Quoting from John Rogers, the speaker gave a brief account of surface activity to watch out for. In the South Equatorial Belt (SEB), an outbreak of activity discovered by Hideo Einaga in 2005 December was still vigorous. In the North Equatorial Belt (NEB), white spot Z was moving even faster than in previous years. Preceding it, a merger of two dark 'barges' was taking place, the fourth such event to have been seen preceding Z in as many years. Perhaps most exciting of all, Oval BA had been reported by several observers recently to appear unusually red in colour. It was now the only remaining great oval in the South Temperate Region, and it would be interesting to see whether this colour persisted. The oval had been around since 2000, and by Jovian standards, six years was an exceptionally long time for a feature to persist. No one knew how the Great Red Spot (GRS) had formed, and some were asking whether Oval BA might be turning into a new spot. Certain parts of media were already claiming this, as the speaker showed in a recent Science@NASA article[2]. If this were to be true, Oval BA might tell us something about the GRS' history.

Mr Mobberley briefly paused his tour of the sky to express the gladness with which he received the news of Sir Patrick Moore's swift return to health after having an operation earlier in the month to have a pacemaker fitted, as the media had widely reported. Sir Patrick had been taken ill only days after a lavish celebration at his Selsey home in honour of his 83rd birthday.

Turning to comets, there was rather a lack of good observing prospects at present. Over the past few months, C/2006 A1 (Pojmański) had been observed by many; it had been discovered at mag 13 on January 2 by Grzegorz Pojmański of the Warsaw University Astronomical Observatory in images from the *All Sky Automated Survey* (ASAS) – a robotic f/2.8 telephotal lens situated in Las Campanas, Chile, and managed by Pojmański. At perihelion on, February 22, 2006 A1 had fringed upon naked-eye visibility at mag 5, but had now faded to mag 7, and the speaker estimated that it would sink below mag 11 by the end of April. The comet's orbital plane was inclined at i=93° to the ecliptic, meaning that its orbit now carried it rapidly northwards. Presently in Lacerta, it was already verging upon becoming circumpolar; it would drift into Cassiopeia and northwards of Deneb's declination within the first week of April. It remained primarily a morning object for the time being, but was fast becoming evening-observable also.

Comet C/2005 E2 (McNaught) had also recently passed perihelion in late February, though it had been somewhat fainter at mag 9. In Aries, it was still just about observable in evening twilight given a low western horizon.

Looking ahead, the return of 73P/Schwassman-Wachmann – not to be confused with comet 29P of the same name – was an exciting prospect. 73P was known to be breaking apart, and to have already shed half a dozen fragments. This stream of debris would pass the Earth in late April and early May, and over this period, several large fragments would pass the Earth to varying degrees of closeness. The stream itself would make closest approach, passing within 7 million miles of the Earth, on May 12. When, in 1930, it had passed only fractionally closer than this, a meteor shower of fragments had been seen, and Mr Mobberley wondered whether such a show might be repeated. 73P itself would peak at mag ~5, but show a very diffuse coma of ~30'; the speaker recommended the use of a telephoto lens or binoculars rather than a telescope to observe it.

Presently ~5° south of Arcturus in Boötes, 73P's nucleus would pass through Corona Borealis, Hercules and into Lyra over the next five weeks. A photographic challenge would come in the early hours of May 8, when fragment 'C' of the debris stream would pass within ~5' of the Ring Nebula (M57), potentially making a photogenic combination. A gibbous Moon on the western horizon and fast approaching dawn twilight would make for exceptionally difficult photographic conditions, though.

Turning to UK supernova patrolling, Tom Boles had discovered four events in as many days earlier in the month: 2006ao on March 1, 2006ap on March 2, and 2006aq and 2006ar on March 5. These brought to 99 his tally of discoveries; Mr Mobberley wondered when he would make his century. Though not a UK discovery, the speaker also gave mention to 2006X in M100, discovered independently by Shoji Suzuki of Japan and Marco Migliardi of Italy on February 4. Supernovae in Messier galaxies often seemed to be picked up by amateurs rather than professional patrollers, as had happened on this occasion; presumably this was simply because these galaxies were so well observed. 2006X was the sixth supernova to have been seen in a Messier galaxy since 2000, and the fifth in M100 since 1900. Given the brightness of its host galaxy, 2006X was recommended as a comparatively straightforward target for amateur imaging.

The speaker briefly turned to mention a few asteroid-observing opportunities. BAA asteroid spotters might be amused to know that 3697 guyhurst would be at opposition at mag 16.3 on April Fool's Day. There would be many asteroid occultations in the coming month, and so the speaker picked two of the best prospects which would be happening at sociable times. On April 10, Boliviana would occult a mag 10 star at 21h35 UT for a maximum duration of 4 seconds across south-western England, and on April 19, Nina would occult a mag 8 star at 22h40 UT for a maximum duration of 10.5 seconds, also across western parts of the UK.

The period April 19-25 would bring the Lyrid meteor shower, for which the Moon would be in a favourable waning crescent phase. This shower typically produced rather meagre rates of around ZHR 10; in practice 6-8 meteors would be observed per hour in dark skies. However, in compensation, they did produce a fair abundance of bright events with lingering ionisation trails.

To close, the speaker mentioned the forthcoming total solar eclipse, which would be visible across central Africa and Asia on March 29. Greatest eclipse would be seen in Libya at 10h10 UT, lasting for 4m07s. From the UK a modest partial eclipse would be seen, reaching a magnitude of just under 30% in the far south-east, but barely reaching 15% in north-west Scotland. An Explorers' Tours expedition would be observing from a site in Libya close to the point of maximum eclipse, combining the spectacle with a weeklong Mediterranean cruise.

Following the applause, the President added to Mr Mobberley's comments on Sir Patrick Moore's health that he had sent a card to Sir Patrick at the time of his operation on the behalf of the Association. Sir Patrick had asked him to extend his warmest thanks to the membership for the many kind words of support that he had received from them in recent weeks. The President then invited Dr Stewart Moore, Director of the Deep Sky Section, to present the evening's second talk.

Seven Nights on a Bare Mountain

Dr Moore reported that he had recently travelled to Tenerife with Owen Brazell to spend seven days observing in the Teide National Park between 2005 October 30 and November 6. He started by outlining some of the island's attractions for prospective astro-tourists. Being a popular tourist destination, it had cheap and abundant transport links; low-cost airline Ryan Air served it, for example, albeit not directly from the UK. At 3,718 m above sea level, the island's volcanic mountain, Teide, yielded very clear skies. And, being situated 23° to the south of the UK's latitude brought further attractions to the island. Many more of the southern constellations were visible from Tenerife as compared to our native skies, and in the summer, the skies were considerably darker: even in June, Tenerife saw 90 minutes of true astronomical darkness each night, whilst the UK saw none between mid-May and late July.

The attractions to the astro-tourist extended beyond the astronomical, the speaker added – the island's volcanic geology was truly fascinating to see. Geographically, Tenerife was the largest of the seven Canary Islands, an archipelago off the north-western coast of Africa, owned by Spain. The islands remained actively volcanic to this day, and Tenerife's landscape was dominated by the towering heights of one of the volcanos: Mount Teide. Though presently dormant, it had erupted as recently as 1909.

Teide's attractions as an observing site had long been recognised by the professional as well as amateur communities; the history of its use by astronomers could be traced back to the 1856 expedition by Charles Piazzi Smyth, then Astronomer Royal for Scotland, to make experimental observations to test the supposed benefits of mountain-top observing. Smyth had tested the seeing conditions that he found using double stars, and over the three months of his investigation, had concluded that observations were possible in Tenerife which were quite incomparable to anything he had ever achieved in Edinburgh. Systems which he had found utterly irresolvable in Edinburgh became trivially separable in Tenerife. Smyth had gone on to assert that the limiting magnitude of his 18 cm refractor had been extended from mag 10 in Edinburgh to mag 14 in Tenerife. Ever since Smyth had returned his favourable reports, astronomy had continued in the Canaries; Tenerife was now home to the extensive

Observatorio del Teide, meanwhile the neighbouring island of La Palma hosted the better-known *Isaac Newton Group* (ING) of Telescopes.

Turning to describe his own trip, the speaker explained that he had stayed at the Parador Hotel, at an altitude of 2,000 m above sea level, which had a selection of telescopes in a back shed, which the owners allowed experienced observers among their clients to use on occasion (contact details would be given at the end of the talk). The hotel presently housed a 24½" f/4.4 Dobsonian with high quality optics by AE Optics / Jim Hysom, and a 10" f/6 Newtonian; there were plans to extend this collection. The Dobsonian was a huge instrument, but had no drives or setting circles, and so required a user who could star-hop. A large stepladder was required to remove the lens cap, and some care was required; it had been unusable on one of the nights of the speaker's visit due to high winds making it impossible to use the ladder. A second night had been lost to cloud, but five nights of very fine observing had been possible. Dr Moore's only other gripe about the instrument had been that it had been kept in a rather warm shed in the daytime, and the optics had taken a long time to cool to a stable temperature.

Seeing the observing site, the speaker had initially been rather concerned to see the peak of Teide towering above him to the east; it seemed to block a substantial portion of the sky. In the event this had not been much of a problem; being in the east, one simply had to wait for objects to rise over the obstruction. Light pollution had been minimal, bar a few car headlights coming up the mountain pass. Low altitude cloud layers forming below the hotel were helpful in blocking out any light from the sea-level tourist resorts below. Generally, the most annoying source of light pollution was Sirius, appearing as a giant beacon in the sky. The speaker had placed the naked-eye limiting magnitude at ~6.0 on most of the nights of his stay, sufficient for Uranus to be a naked-eye object, though a bit disappointing in contrast to the mag 6.7-6.8 limits which he had experienced on past trips to La Palma.

Dr Moore than turned to describe the range of objects which he had been able to observe. Giving an overview of the parts of the sky accessible from Tenerife in November, Scorpius, Sagittarius and Corona Australis had all been early evening constellations, meanwhile Leo and Hydra had been among those which rose later in the night, as dawn approached. He remarked that Sagittarius was not a constellation that one associated with northern November skies, but it had been quite observable at a latitude of 28°N; this rich part of the Milky Way had been an exceptional sight in such dark, steady skies.

Of the 83 objects which he had observed, a few stood out especially, perhaps the Orion Nebula (M42) most of all. Through such a fine telescope, it had possibly appeared even more beautiful to the eye than John Herschel's drawings of it. The detail accessible in the Veil Nebula (NGC 6960, 6979, 6992, 6995) had been stunning; sweeping the telescope around, nebulosity had appeared everywhere. The speaker wished he had been able to sketch its whole extent, but that would have proven very time consuming.

The Horsehead Nebula (Barnard 33) had also stood out as a remarkable sight, especially with the use of an Hβ filter. Turning the Dobsonian to the Fornax galaxy cluster, eleven galaxies had simultaneously fitted into its field of view; the speaker never recalled having seen so many galaxies in a single field before.

To sum up, Dr Moore concluded that his had been a very rewarding trip, albeit not especially cheap – the final cost had been £734 per person. He felt on balance, though, that this had not been an unreasonable price to pay for the observations he had been able to make. He thus recommended the Parador Hotel to any members who might be interested in following in his footsteps; the 14½" Dobsonian was potentially available to experienced observers on application to Rod Greening[3], though some evidence would be required that users knew how to handle such an instrument. The speaker's observations had, out of preference, been entirely visual, but those wishing to bring their own photographic equipment would also be welcome.

The President thanked Dr Moore for his account, and then introduced the evening's final speaker, Dr Serena Viti of University College, London. Dr Viti's research interests included astrochemistry, the modelling of the clumpy nature of inter-stellar gas, and ultimately, the formation of stars from those clumps. Tonight, she would be talking about recent ground-breaking observations of low-mass stars.

Low Mass Stars, Brown Dwarfs and Hot Jupiters

Dr Viti opened with an apology that her's was not a field which could yet produce nice images; the objects she would be talking about were too faint to be meaningfully imaged. Yet she would be arguing that even without images, a tremendous amount had been learnt from such objects in the past decade, and that there were exciting prospects for the future.

The primary subject of this talk would be Low Mass Stars (LMSs), defined to be those stars of around half the mass of the Sun or less. Apart from their mass, their next most obvious feature was that they were much cooler than larger stars, typically having surface temperatures no higher than 3,500 K. For comparison, the temperature of the Sun's surface was 6,000 K. Their core temperatures were also correspondingly lower, reducing the rates of nuclear fusion within them. This slowing of the nuclear reactions was so significant that it actually took LMSs longer to exhaust their fuel supplies than more massive stars, even though they had less of it to 'burn'. In other words, lower mass stars lived for much longer than more massive stars. In fact, lifetimes of LMSs were so long

that they were invariably much longer than the present age of the Universe, and, to good approximation, it could be said that every LMS that had ever formed was still extant. At the same time, LMSs were very faint, on account of their low surface temperatures, and this explained why they were so notoriously difficult to detect.

Brown Dwarfs, the second class of objects in the speaker's title, were a subclass of LMSs – those which were insufficiently massive to fuse hydrogen nuclei at all – those whose core temperatures were too cool for nuclear reactions to take place. According to theories of stellar structure, stars with less than ~8% of the mass of the Sun (85 Jupiter masses) were expected to fall into this category. Their existence had been theorised since the 1960s, and some had even proposed that all of the dark matter in the Universe might be made up of these cold, faint stars. It had since become clear, though, that a population of brown dwarfs so numerous to explain all of the dark matter in the Universe would be quite conspicuous by its sheer size, and the observational fact was that there had been no confirmed detection of a brown dwarf until that of *Gliesse 229B* in 1994.

Some considered the use of the term 'star' to apply to brown dwarfs rather inappropriate, feeling that only hydrogen-fusing bodies should be called 'stars'. The use of the term 'dwarf' was fairly uncontroversial; the speaker thought that 'failed stars' was a fairly accurate label.

The third and final class of objects that the speaker would be talking about were so-called 'hot jupiters' – Jupiter-like gas giant planets in orbits around stars other than our own. Though they might appear somewhat unrelated to LMSs, the speaker explained that their relevance to this talk was that observationally they were very difficult to distinguish from brown dwarfs. Being planets, hot jupiters did not shine appreciably in their own light, and orbited around parent stars. But if a brown dwarf were to be found in orbit around a larger companion star, it too would share these characteristics. Brown dwarfs did shine a small amount of their own light, but this was also true of Jupiter. Moreover, the two classes of object were physically of near-identical size. Their surface temperatures were their only difference – 900 K and under for hot jupiters, as compared to 1,800 K or more for brown dwarfs – but in such cold, faint objects, temperature was difficult to measure.

Clearly there were many motivations for wanting to understand the processes of planet formation, central to the questions of how our solar system came to be, and what proportion of other stars might host similar planetary systems. This indirectly presented one reason for studying of LMSs: we needed to find ways of distinguishing them from planets. Lacking, as we did, any easy means of distinguishing these two classes of object at present, the number of extra-solar planet discoveries which had been reported to date – around 150 – was really an upper-limit; some of these objects might not be planets at all. And, whilst planets and brown dwarfs might *look* alike, we could not pretend that they were not fundamentally different objects. From a theorist's viewpoint, they were very different, because they formed in different ways. Whilst planets formed by the clumping together of material in planetary discs around stars, brown dwarfs formed like stars, from the collapse of clumps of inter-stellar gas. Theorists wanted to understand the workings of these two processes in separation.

The speaker did not want to suggest, however, that her field of study was only of interest as a source of contamination in another field: to the contrary, there were many reasons for wanting to understand the properties of LMSs. Because of their long lifetimes, and the slow nuclear reactions within them, any LMSs which had formed in the very early Universe would still exist today, and be composed of relatively pristine primordial material. Thus they had potential in the future to provide an insight into the evolution of the chemical makeup of the Universe.

Another consequence of their long lifetimes was that they were expected to be quite pervasive, and so lock up a considerable proportion of a typical galaxy's mass. As mentioned earlier, this could not account for all of the dark matter which was known to exist, but the gravitational contribution of a large population of brown dwarfs might still be sufficient to make a difference to a galaxy's dynamics.

Turning to the process of star formation – the collapse of inter-stellar gas clouds down to form stars – here also, the speaker believed LMSs to have a contribution to make. Within modern astrophysics, the so-called 'initial mass function' – the distribution of masses of newly formed stars – remained a matter of contention. No theory could yet predict its form, but observations broadly suggested that lower mass stars formed much more frequently than their higher mass counterparts. Given the comparatively small number of known brown dwarfs – none up until 1994 – it was not yet clear to what extent this trend continued down to brown dwarf masses. The speaker's suggestion was that the trend was likely to continue down to some critical minimum mass, below which stars could no longer form. If that prediction turned out to match observation, the critical switch-off mass would be a parameter for which theorists could hope to find some physical explanation, as a first step towards the greater question of why stars formed with the range of masses that they did.

As a final motivation for studying LMSs, Dr Viti added that the environment in their vicinities might be curiously well suited for the development of life. Although such stars were very cool, an Earth-like planet in a close orbit could still be warm enough to become habitable. Given the long lifetime of the parent star, there would be ample time for lifeforms to develop. With this in mind, it was proposed that when the European Space Agency came to launch its *Darwin* probe – a specialist instrument for searching for terrestrial planets, presently planned for 2015-20 –LMSs should be amongst the stars it should study.

The speaker then turned to discuss the challenges faced in trying to observe LMSs – essentially that of their sheer faintness, but compounded because such cool objects emitted the bulk of their light in the infrared, rather than at visible wavelengths. Though technology did now exist to observe in the infrared – for example, the United Kingdom InfraRed Telescope (UKIRT) in Hawaii – it was comparatively new, and poor atmospheric transparency remained a plague at these wavelengths. In any event, it was impossible to know anything about objects outside of the immediate neighbourhood of the Sun, as their faintness severely restricted the distance out to which they could be seen.

Measuring the surface temperatures of LMSs was vital, both to estimate their masses, and, as mentioned earlier, to distinguish them from planets. The blackbody spectra of such cool stars peaked well into the infrared, rendering their visible colours rather insensitive to temperature. Infrared spectra could only be taken from space, but here, astrochemistry came to the rescue. The atmospheres of these stars were sufficiently cool that some simple molecules did not dissociate, but could survive for long periods. These gave rise to a plethora of absorption lines in the spectra of LMSs, in contrast to the relatively featureless spectra of hotter stars. The exact details of which molecules were present, and which spectral lines were seen, was incredibly sensitive to temperature – typically a change of 50 K produced a complete change in the line features of a spectrum. Understanding how to relate this chemistry to temperature was a hugely difficult task, but potentially, a vast amount of information could be gleaned.

As an example, the speaker illustrated how titanium oxide (TiO) lines were seen in the hottest LMSs, meanwhile calcium hydroxide (CaOH) was seen in slightly cooler objects. Towards the lower end of the mass scale, methane and water began to dominate. In recent years a huge breakthrough had been made in understanding how this chemistry related to temperature, arising from the recognition that sunspots, being cooler parts of the Sun's material, had a great deal in common with the surfaces of LMSs. Being so much more nearby, they could be studied in much more detail, providing valuable insights.

In conclusion, the speaker summed up that low mass stars were probably very common in the Universe, but also exceptionally tricky to observe. In coming years, however, they might play a central role in our understanding of fields as disparate as star formation, planet formation, galaxy evolution and the search for extra-terrestrial intelligence.

Following the applause, a member asked how many confirmed brown dwarf discoveries had been made to date. Dr Viti replied that there had now been several hundred – many more than the number of known extra-solar planets, of which there were only around 150. The President asked whether amateurs could make any contribution to the field. The speaker suspected that this was one field where amateurs would have difficulty, as had professionals until recent times. Although some brown dwarfs were mag 16 in the V-band, they were often associated with more massive stars and very difficult to resolve from the glare. Moreover, most of the interesting science relied upon high-resolution spectra and infrared observations.

The President then adjourned the Meeting until the Out of London weekend, to be held at the University of Liverpool from April 21-23.

Dominic Ford

References

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