

Keele Observatory Annual Report 2015

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From the Director

The year 2015 was as busy as always, and the observatory continues to fulfill its role as a centre for the public understanding and enjoyment of Astrophysics. We were blessed with pleasant weather during the near-total solar eclipse at the final day of Stargazing Live, which saw hundreds of visitors accumulate on the observatory's doorstep and witness the unique event.

Keele Observatory, its history and research facilities and outreach activities were presented at the General Assembly of the International Astronomical Union in Honolulu, Hawai'i, in August, in the form of a poster (which now adorns a wall outside the Physics undergraduate laboratory in the Lennard-Jones Laboratories) and the attendance of the director.

While filming for *The Sky At Night* on location in Herstmonceux, in April, the undersigned made contact with the Science Director at Herstmonceux and discussed the recovery of the 13" astrograph lens. This was followed up by a request in June, but negotiations have since stalled.

While we came tantalizingly close to the installation of the new control system of our 24" research telescope, this again failed to happen but continued pressure is hoped to have the desired effect in 2016.



Figure 1 Archie the silent, loyal member of our crew.

Personnel movements saw some go and others join, like the perpetual rising and setting of eternal luminescent bodies on the celestial sphere.

Jacco van Loon

Administrative report

Personnel

Keele Observatory is operated and maintained by a unique partnership between the Astrophysics Centre in the School of Physical and Geographical Sciences at Keele University, and a core group of skilled and dedicated volunteers: the Observatory Support Team a.k.a "The Observatory Crew". Former director and founder Dr. Ron Maddison, and Lian Bryant are lifetime honorary members of the team.



Figure 2 Teo Močnik, ready for a trip to the Moon.

In 2015 the Crew comprised Dr. James Albinson, Alan Bagnall, Dave Caisley, Stephen Doody, Ian Johnson, Keith Heron, Paul Klimczak, St. John Robinson, Matthew Stretch and John Webb, along with several affiliate members.

Lian Bryant, Rebecca Olubi, David McGhee and Josh Clorley graduated from Keele, but undergraduate Kris Turner and PhD student Teo Močnik joined the team.

The observatory's website was migrated onto the university format, with the expert help of Dave Emley.



Figure 3 Autumn and the rise of the domes.

Finances

The Keele Observatory building is part of the School of Physical and Geographical Sciences. To finance the observatory's equipment we seek to generate a steady income, while offering our services to the public for free or a small donation. Major developments need special funding.

Income was generated by visits of community groups, schools (increasingly popular, and organized by ourselves) and from Adult Education sessions. Science Learning Centre workshops for teachers and community events organized by the Sustainability Hub added to the totals. Donations mostly arise from sales of the Keele Observatory's History booklet, and appreciation of telescope surgeries. We successfully bade to the School for a laptop, worth £799, to run solar and spectroscopic

instrumentation. Two old Dell computers were provided by the Geology department, to replace faulty ones.

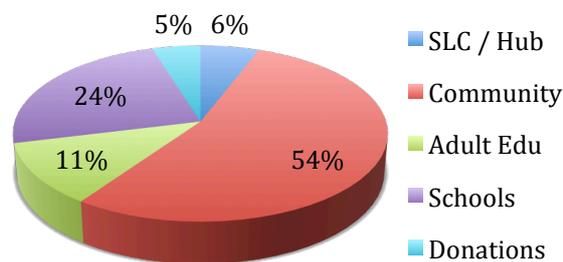


Table 1 Financial account for 2015.

<i>1. Balance brought forward</i>	£4335
Income	
Science Learning Centre / Hub	£85
School activities	£354
Community group visits	£791
Adult Education	£168
Donations	£70
Bid to School for laptop	£799
<i>2. Total income</i>	£2267
Expenditure	
General maintenance	£404
Development	£141
Printing Annual Report 2014	£60
Laptop	£799
<i>3. Total expenditure</i>	£1404
<i>4. Unspent, ringfenced</i>	£979
<i>Surplus (items 1 + 2 - 3; exclude 4)</i>	£5198



Figure 4 Spring and bluebells galore, accompanied by the planet Neptune.

Table 2 Budget for 2016.

1. Balance brought forward	£5198
Income	
Hospitality	£1100
Donations	£100
2. Total income	£1200
Expenditure	
General maintenance	£400
24" upgrade project	£500
Acquisition of equipment	£200
Printing Annual Report 2015	£70
3. Total expenditure	£1170
4. Ringfenced for solar telescope	£979
Surplus (items 1 + 2 - 3; exclude 4)	£5228

Based on the most recent accounts and budget for 2015, we set a budget for 2016. We foresee some expenses related to commissioning an upgraded 24", and allow for additional purchases and contingency.

Safety Audit

With contributions by Paul Klimczak

Regularly, the observatory is inspected on its safety provisions and procedures. The 2013 audit revealed several shortcomings, notably the storage of flammable materials, untidiness of the workshop, lack of testing of the alarm system, and out-of-date PAT tests of electrical equipment. In response, Paul Klimczak accepted the role of safety officer to address the above concerns in an extremely diligent manner. A reassessment of the situation this year was satisfactory, and all improvements duly noted. We have implemented a manual of working practices and safety instructions and a register of approved users for machinery in the workshop. The contents of the chemical cupboard have been recorded and the appropriate COSHH sheets obtained. Risk assessment and COSHH risk assessments were carried out. The fire procedures and log book were updated – the fire alarm is tested at regular intervals. All Health and

Safety paperwork is now stored in a folder. There is still scope – and indeed a need – for further improvement, in the frequency of alarm tests as well as some updating or indeed writing of manuals. Tidiness of the observatory will remain a standing issue, and all are reminded of its importance.

Infrastructure and equipment

With contributions by Dr. James Albinson



Figure 5 Array of small scopes. Credit: Andy Weekes

All PCs in the Observatory were upgraded to Win7/64bit over the course of the year, not without problems en route. Ian Johnson managed to get the 'new' Dell980 to see two screens, which meant that it could replace the underpowered old CCD24 PC.

The ATIK314L camera on the (yet unused) spectroscope suffered a problem and was sent back for repair. The camera was serviced only being charged postage and packaging. Bad weather precluded attempts to obtain a spectrum through the 5" Watson refractor, which was moved to reside on the 12" refractor. Alignment of the two remains to be achieved.

The 8" Davies refractor got a new collar for the declination fine adjustment shaft, and a kicking strap for two-person mounting of the tube. Efforts to make engaging hooks for the tube are ongoing.

Additional projects included James Albinson's 6" 'junkyard' reflector and 12" Kreige/Berry pattern Dobsonian, and a dozen telescope surgeries for the public. Dave Caisley fabricated an ionospheric monitor which saw first signals recently.



Figure 6 James Albinson in a solemn moment at the eyepiece of the 12" Grubb refractor. Credit: Andy Weekes

Patrick Moore's signed drawing of the Moon has been framed and mounted next to his bust. Finally, an outdoor storage solution was inaugurated to keep the BBQ, signboards and other such paraphernalia.

Engineering work on the Thornton

Unfortunately, AWR could still not deliver the upgraded control system in 2015, and so there was no activity related to the 24" Thornton research telescope. However, after repeatedly threatening with legal action AWR have been more responsive and we have now reason to believe that genuine efforts are being made to make progress. Despite promises of a visit before Year's End which never happened, there is a sense of optimism that 2016 will see the long-awaited installation.

Maintenance of the Grubb and its dome

The 12" telescope drive was repaired and stiffened when a loose bolt was found near the worm/sector. The bolt was replaced with a double bolt. The drive was found to run noticeably smoother thereafter.

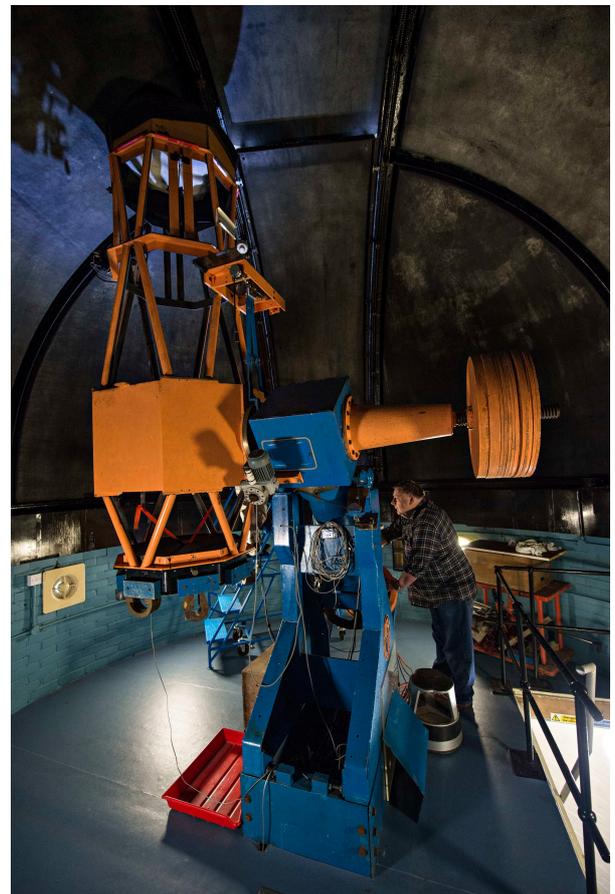


Figure 7 The 24" research telescope in waiting. Credit: Andy Weekes

The dome door chain sprocket wheels were serviced after some problems. The 12" lens is still in need of a good cleaning.

Research activities



Figure 8 Messier 13 with the QSI583 camera on the 10" Meade Schmidt-Cassegrain. Credit: Steve Doody

Hon Poon, a 3rd-year Forensic Science student utilized Keele Observatory's temperature and humidity data for his outdoor fieldwork project.



Figure 9 Jupiter through the 12" Grubb using a DSLR. The top image employed a 26mm Plössl eyepiece. The bottom image reveals Io casting a shadow and Europa. Credit: Steve Doody, Keith Heron & Ian Johnson

Experiments with the QSI583 camera were encouraging. An image of globular cluster M13 was taken with the 10" Meade (Fig. 8) – this is a taster for when the QSI camera will have found its home on the 24".

Solar System observations

A stunning result was obtained of the Moon (overleaf) through the 12" Grubb refractor, and the Lunt 6" H α telescope has proven a little more reliable this year.

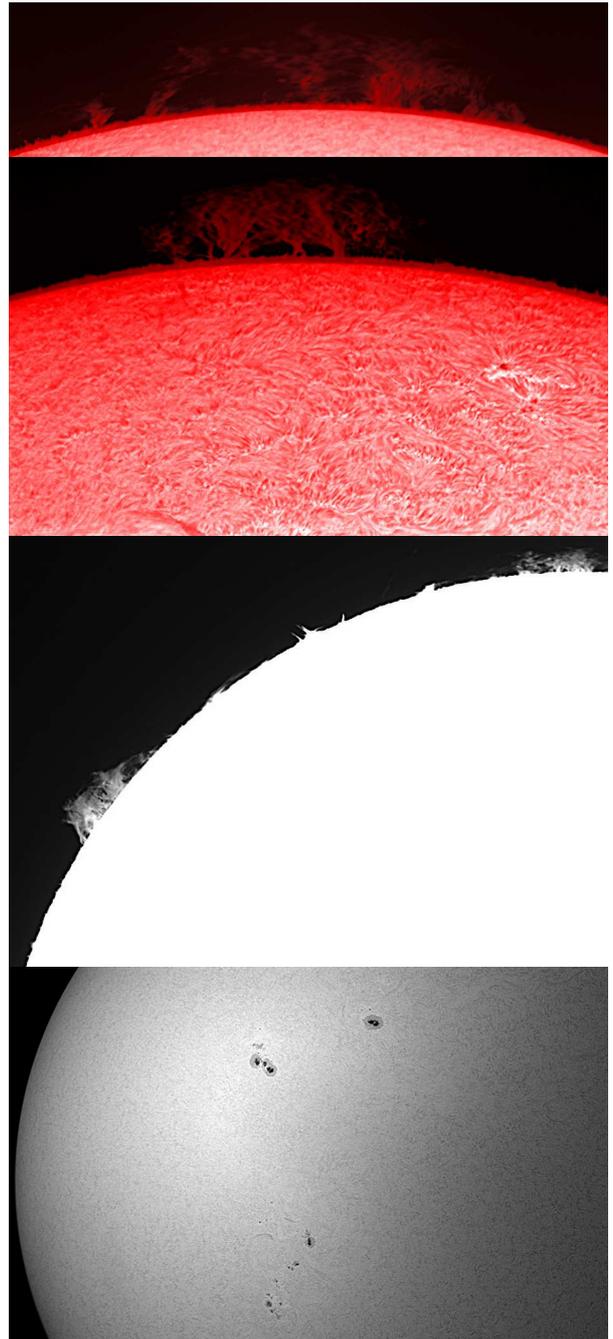


Figure 10 The Sun imaged through the 6" Lunt in H α . Credit: Steve Doody

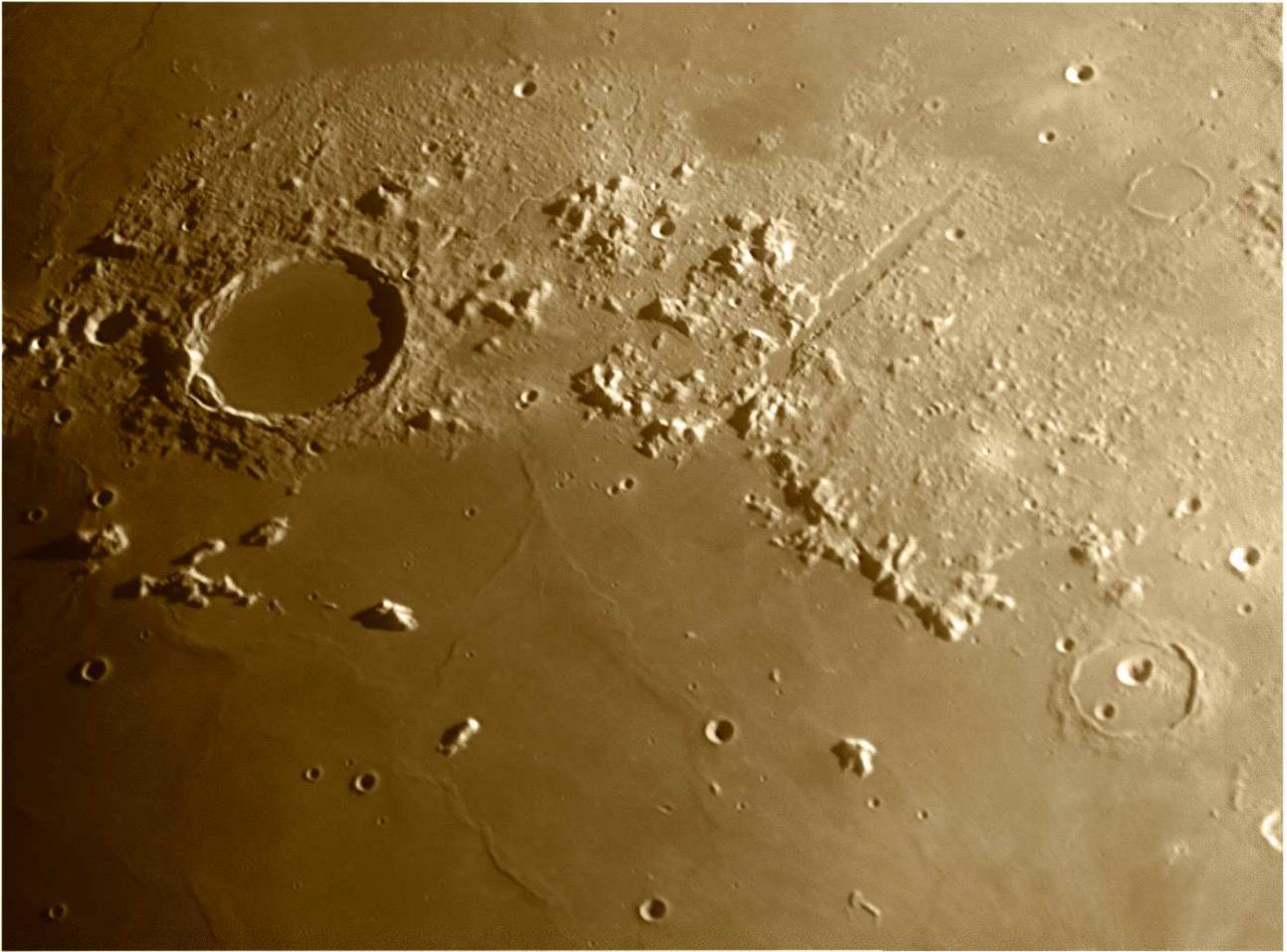


Figure 11 The Moon seen with the 12" refractor, showing off crater Plato and the Alpine Valley. Credit: Steve Doody

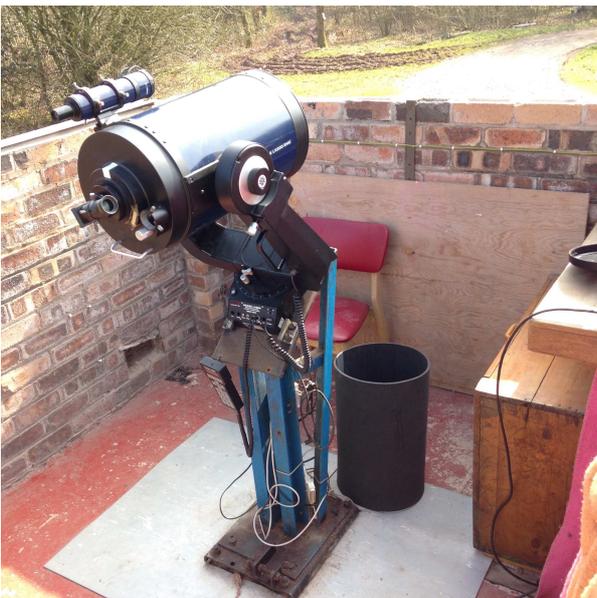


Figure 12 The 10" Meade Schmidt-Cassegrain.

Publications

In 2015 we presented a poster about Keele Observatory at the IAU General Assembly, reaching an audience of several thousand. The abstract has been published by the American Astronomical Society, and it has also been made publicly available on the Astrophysics Database System (ADS):

"Keele Observatory", J.Th. van Loon, J. Albinson, A. Bagnall, L. Bryant, D. Caisley, S. Doody, I. Johnson, P. Klimczak, R. Maddison, StJ. Robinson, M. Stretch, J. Webb, 2015, IAUGA, 2255322

We published 30 copies of the fifth annual report:

"Keele Observatory Annual Report 2014", J.Th. van Loon (ed.). KOP 6

Outreach activities

BBC2's "Stargazing Live"

Keele Observatory took part in the fifth edition of BBC2's "Stargazing Live", which was moved to March to coincide with the near-total solar eclipse. About 350 visitors watched the eclipse in a wide variety of manner, and another 350 visited during the other days and evenings. BBC Radio Stoke and Reuters were present and Signal 1 took an interview; BBC West Midlands Today did a live feature the day before. An impression of the day is shown at the end of this report.

Earth Hour

For the third time, on Saturday 28th March Keele University took part in the World Wildlife Foundation's "Earth Hour". Led as before by Keele Observatory, the campus was partially set in darkness in order to raise awareness of energy waste and light pollution. However, the turnout was even less than in previous editions, with about nine visiting the observatory and about 25 – mostly unaware passers-by – at Union Square where we made a presence with the 5" Watson refractor.

Public viewings

Approximately 1000 people visited the Observatory this year for its free Tuesday evenings and Saturday afternoons public viewings.

Schools and teachers

No fewer than a dozen school visits were hosted, including a school for pupils with learning difficulties (one blind pupil) and a school for pupils with behavioural issues. In this way we reached 315 learners and over 40 teachers.

Open and Visit Days for prospective students, Japanese exchange students and Keele Astrophysics students amounted to about 350 visitors. This year we hosted one work experience student, Saba Nasrolahi, who helped out in two school visits and a solar observing session.

Community group visits

Community Day attracted more than 500 visitors to the observatory, and Family Fun Day another 70. Shy of about 30 specially arranged visits – mainly by societies and scouting groups – saw 250 adults and 350 children make the journey up the hill.

Adult Education sessions

With contributions by Paul Klimczak

Once again the observatory played host to the "Keele Astrophysics Discussion Group". The discussion group has maintained its monthly meetings throughout the year, barring a break during August. Numbers fluctuated around a steady core of 8 or 9 members.

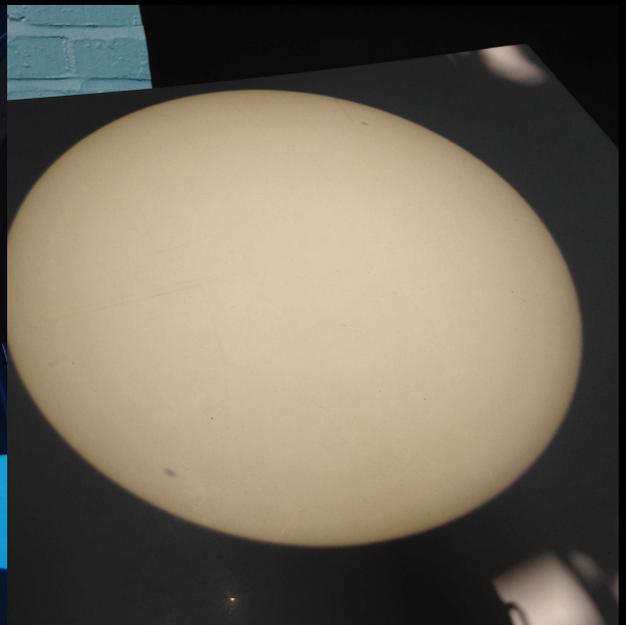
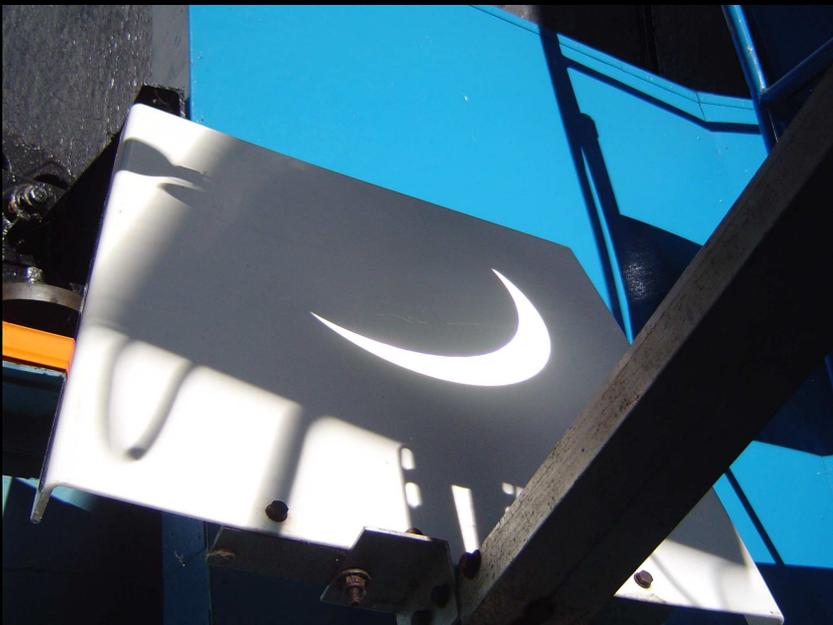
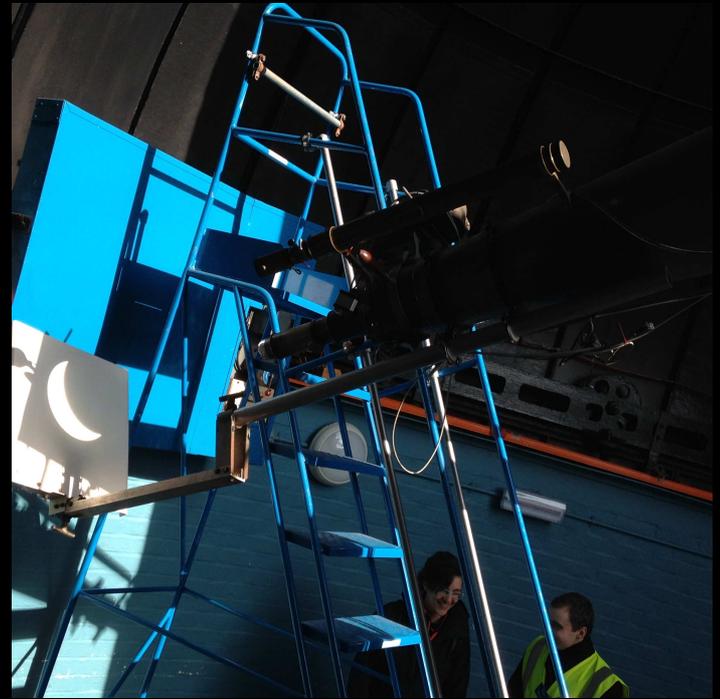
Topics of discussion varied greatly, from the latest space missions, extrasolar planets, the possible oceans on Enceladus, right through to black holes and dark matter. The group followed with interest throughout the year The New Horizons mission to the (dwarf) planet Pluto, and were lucky enough to have a meeting on July 15th, which coincided with the release of the first close up image of Pluto's surface from NASA, taken at closest approach on the 14th of July. Needless to say the image provoked great discussion.

Little observation was done this year, due to the poor weather conditions, though Jupiter and the Orion nebula were observed in January and February.

The aim of the group is to try and increase attendances, and to continue in our vein of member-suggested topics to discuss. It maintains a Facebook page: [KeeleAstrophysicsDiscussionGroup](#).

Following pages: the 90% solar eclipse on March 20th, seen from Keele Observatory. Credits: Jacco van Loon & Joana Oliveira









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Front cover: James Albinson looking through the 12" Grubb refractor (credit: Andy Weekes)