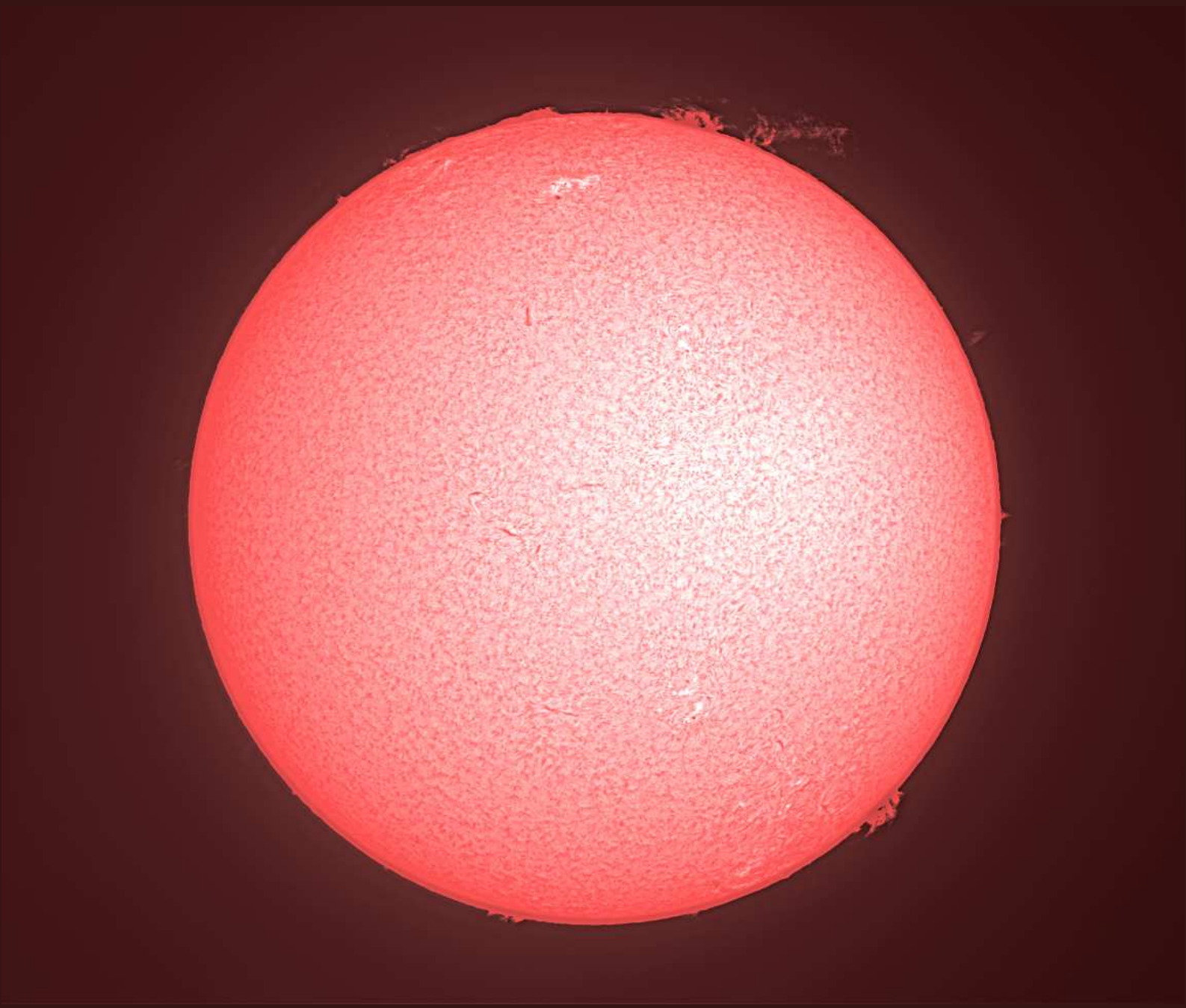
Keele Observatory Annual Report 2014



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From the Director

The year 2014 was in many ways similar to previous recent years, with around 3400 visitors to a wide spectrum of observatory events, and the 24" telescope upgrade still awaiting completion. Similar too was the devotion by the crew and students to the observatory and its activities, for which a big thank you is always deserved.

We participated in a large number of special events including the recurring BBC2's Stargazing Live, Earth Hour and Community Day but also a musical project: Earth Rise – whose director John Watson sadly left us all too soon after.

Solar observing has always been one of the observatory's interests, and the Lunt Hα telescope has seen some good use but with some delicate behaviour we have yet to fully comprehend. Meanwhile, we are investigating possibilities to develop our capabilities for radio observations.

The year 2015 will no doubt be very busy as usual. We anticipate taking the 24" research telescope back into operation – while this has been said more than once before it is now becoming a real possibility. With students coming and – unfortunately – going, and some crew members not able to attend as much as we would have liked, one of the challenges will be to ensure that we can rely on enough, skilled volunteers.

Jacco van Loon

Administrative report

Personnel

Keele Observatory is operated and maintained by a unique partnership between the Astrophysics Group in the School of Physical and Geographical Sciences at Keele University, and a group of skilled and enthusiastic volunteers: the Observatory Support Team a.k.a "The Observatory Crew". Long-standing and/or particularly active members have been granted the status of "Keele University Honorary Associate".

In 2014 the Crew comprised James Albinson, Alan Bagnall, Dave Caisley, Ed Doody, Stephen Doody, Nicholas ("Nick") Haselgrave, new (and active) member Ian Johnson, Keith Heron, Paul Klimczak, Alan Mason, St.John Robinson, Matthew Stretch and John Webb, with an advisory role by the former Director and founder of Keele Observatory, Ron Maddison.

Keele undergraduate students Lian Bryant, Rebecca Olubi (Twitter) and David McGhee (Facebook) continued their roles, with Josh Clorley joining the ranks in 2014.

Lian Bryant was awarded the first "Keele Observatory award", on December 16th, for her contributions to observatory operations and events beyond the call of duty. She was also nominated for a Student Union's Volunteer of the Year award.

Finances

The Keele Observatory building is part of the School of Physical and Geographical Sciences, and the directorate of Estates are called upon to service and maintain it. The observatory's equipment needs regular attention, carrying expenses with it. Therefore we seek to generate a steady income, while offering our services to the public for free or for a small donation. Major developments need special funding.

Income was generated by visits of (and to: £480 from the girl guides "Unity" camp) community groups and from Adult Education sessions. While two Science Learning Centre workshops went ahead these were provided for free. We did host nine visits by schools ourselves but these classes were relatively small. Donations included sales of the Keele Observatory's History booklet, appreciation of telescope surgeries et cetera, and a £260 windfall when setting up a dedicated observatory account. Donations in kind included books for our growing library by Paul Blurton.

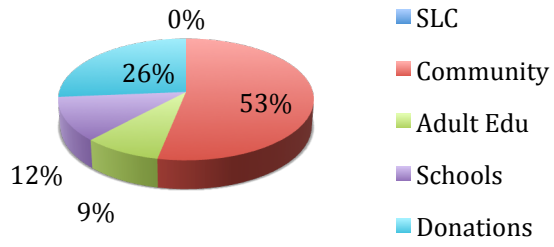

Table 1 Financial account for 2014.

1. Balance brought forward	£3051
Income	
Science Learning Centre	£0
School activities	£186
Community group visits	£845
Adult Education	£140
Donations	£418
2. Total income	£1589
Expenditure	
General maintenance	£228
Printing Annual Report 2013	£77
3. Total expenditure	£305
4. Unspent, ringfenced	£979
Surplus (items 1 + 2 – 3; exclude 4)	£4335

Table 2 Budget for 2015.

1. Balance brought forward	£4335
Income	
Hospitality	£1000
Donations	£200
2. Total income	£1200
Expenditure	
General maintenance	£300
Acquisition of equipment	£800
Printing Annual Report 2014	£80
3. Total expenditure	£1180
4. Ringfenced for solar telescope	£979
Surplus (items 1 + 2 – 3; exclude 4)	£4355

Based on the most recent accounts and budget for 2014, we set a budget for 2015. We foresee (possibly) purchasing display cabinets, postponed from previous rounds. We may also expect some expenses related to commissioning an upgraded 24".

Safety Audit

Regularly, the observatory is inspected on its safety provisions and procedures. Last year's 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 has kindly assumed the role of safety officer, overseeing a register – and PAT testing – of electrical equipment. The alarms have been tested more regularly, and the workshop has been tidied up and made safer. Tidiness of the observatory will remain a standing issue, and all users and Crew are reminded of its importance.

Infrastructure and equipment

With contributions by Dr. James Albinson

As reported elsewhere, a great deal of effort was expended in cataloguing, PAT testing and triaging electrical equipment, with thanks to Alan Bagnall, Paul Klimczak and Ian Johnson.

As part of the health and safety implementations, the support brackets were improved that are used for storing the 8" Davies refractor hanging from the ceiling of the lecture room.

Around a dozen telescopes were brought to the observatory for collimation, and some work was done on building and upgrading telescopes belonging to Crew members themselves.

The Meade 10" drive was serviced and the keypad replaced after failure at the end of the Stargazing Live sessions.

The door lock of the run-off roof observatory and the mount of the 8" Davies refractor fell victim to minor vandalism but thankfully without serious loss.

Engineering work on the Thornton

Unfortunately, AWR could not deliver the upgraded control system in 2014, and so there was no activity related to the 24" Thornton research telescope.

The "William Boulton Observatory" bronze sign was polished using kitchen detergent and fizzy drink, and remounted onto the 24" pillar in the control room.

Maintenance of the Grubb and its dome

A lot of repair work was done on the 12" dome doors, which required Keele Estates to "arcoprop" it back onto the rail.

The 12" refractor needs servicing – in particular cleaning the OG (front lens).

The Baade Herschel Wedge was tested on the 12" with a mylar (front-end) filter to cut down the incident power from 100 W – four times the handling capacity of the Herschel Wedge. This provided safe full resolution visual observation of sunspots. A 6" aperture stop was also tested, without the mylar filter. This was also satisfactory. Typical atmospheric conditions will not show more detail using the full aperture. The Herschel Wedge was also successfully tested on the 8" Davies refractor, using the same 6" aperture stop.

The Solar Telescope Project

The tuning of the new Lunt 6" Hα refractor had not been working. It was sent back to the European branch of Lunt, who returned it in working order but without explaining the cause and nature of the fault. It has since worked well on some, but not on other occasions and therefore continues to be a cause of concern.

A new trolley was built to carry the heavy C-GEM mount, and it now *just* fits through the door of the lecture room.

The Radio Telescope Project

Steps have been taken towards acquisition of a radio telescope, to be placed on the grassy area in front of the observatory building. The Sweden-based firm POAM Electronics was identified as a potential supplier; we are considering their 4.5m or 6.3m dishes with receivers for HI (21cm), OH (18cm) and higher frequencies (for continuum in particular). The costs are envisaged around 70k for the 4.5m, and 100k for the 6.3m dish (figure 1), of which 30k alone is for the foundations and power supply to be put in place by Keele Estates. A bid to the Faculty of Natural Sciences in Autumn was unsuccessful but it is being considered for the next financial year (August 2015). Failing that, a fund-raising campaign will need to be initiated.

Figure 1 POAM Electronics 6.3m radio telescope.

The Planet Trail

The Sustainability Hub, in partnership with local artists, have constructed a planet trail along Observatory Walk, over Observatory Hill and down the footpath to Home Farm. The gas giant planets are all made of metal, with Neptune surrounded by blue bells, Uranus on its side, Saturn boasting rings and Jupiter large enough to climb into; the terrestrial planets are all small painted ceramic balls, and the Sun is represented by a sundial. The planets' sizes are to scale, as are their distances.

Figure 2 Explanations in the vicinity of Neptune.

The planet trail was inaugurated on the 31st of May with drinks, canapés and speeches, followed by a walk along the trail (figure 2) and a tour of the observatory.

Research activities

Solar System observations

Stephen Doody, using a Lumenera camera and with help from Lian Bryant, captured more stunning images of the Sun, this year not only through the "good old" Coronado 4cm (figure 3) but also through the new Lunt 6" Hα telescope (figure 4).

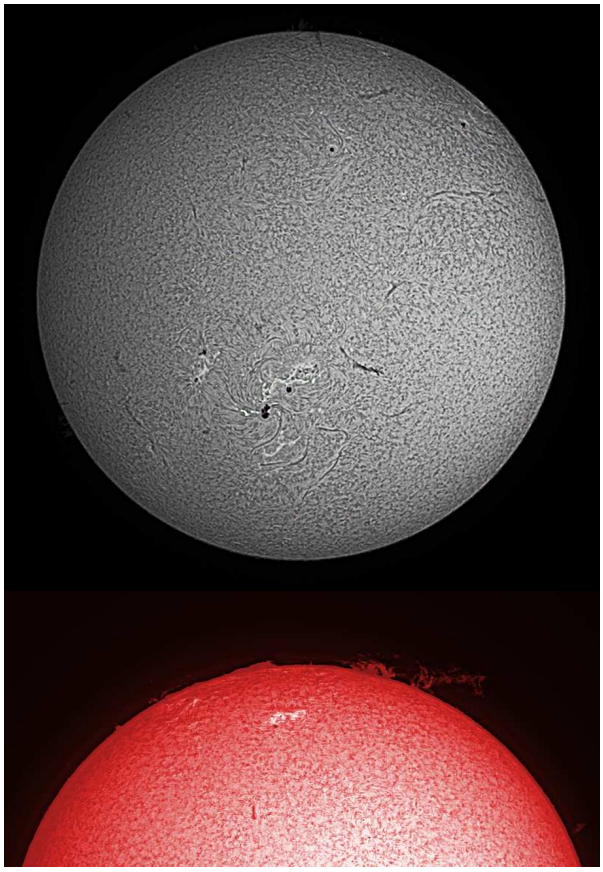

Figure 3 The Sun in the 4cm Coronado, on January 9th (top) and June 1st (bottom). (credit: Stephen Doody)

Radio observations

Nick Haselgrave experimented with radio receivers, "listening" to Jupiter, the Cosmic Microwave Background and assessing the ionospheric conditions. He demonstrated some of this to the public, from within the 24" control room.

Figure 4 The Sun (top) imaged through the 6" Lunt (below), on August 9th. (credit: Stephen Doody)

Publications

In 2014 we published

"Keele Observatory Annual Report 2013", J.Th. van Loon (ed.). KOP 5

(the fourth annual report, in 30 copies).

An inventory of the historical maps and atlases was completed, with a view to making this information available and restoring and displaying some of them.

Outreach activities

BBC2's "Stargazing Live"

Keele Observatory took part in the fourth edition of BBC2's "Stargazing Live", on the 7th to 9th of January (figure 5), welcoming about 800 visitors. The weather conditions varied from abysmal to perfect. As usual, a large number of Crew, students and staff helped out.

Figure 5 Stargazing Live (bottom right: Lian Bryant).

The Sentinel newspaper featured an interview and pictures with Lian Bryant, while BBC Radio Stoke interviewed Lian Bryant, Josh Clorley and the director.

Earth Hour

For the second time, on Saturday 29th March Keele University took part in the World Wildlife Foundation's "Earth Hour". This is a global event joined by institutions, private groups and individuals to raise awareness of climate change and energy sustainability. Led by our Observatory, lights were switched off across much of the campus. As before, the Observatory opened its doors, and we stationed ourselves at Union Square in the centre of campus with the 5" brass refractor on the C-GEM mount. About 100 people visited us, and the event was covered again by The Sentinel and BBC Radio Stoke.

Earth Rise

The Astrophysics Group and Observatory collaborated with the Keele University Concert Band in "Earth Rise", on the 4th of April. This space-themed set of musical pieces was incepted and conducted by the inspiring John Watson, interspaced with impressions of related astrophysical concepts projected and presented by Prof. Rob Jeffries and the Observatory Director. Of the musicians and audience, about 40 stayed on for a visit to the observatory and a view of Jupiter and the Moon.

Watching the Moon through the 12" refractor had been a profound wish of John Watson, whose life ended within a month.

Public viewings

Some 1060 people visited the Observatory this year for its free Tuesday evening and Saturday afternoon public viewings.

Schools and teachers

Nine school visits were arranged directly with the Observatory. We also offered free sessions for the "Shake it Up!" seismology and "Out of this World" events. In this way we reached 370 learners and 40 teachers.

Open and Visit Days for prospective students, Japanese exchange students and Keele Astrophysics students amounted to about 300 visitors. This year we hosted no fewer than ten work experience students: Victoria Sumner, a group comprising Dayle Corden, Sophie Evans, Brandon Gratton, Becky Hartland, Christopher Nixon, James White and Matthew Whitehouse, Michelle Chan, and Torr Fischman.

Community group visits

Community Day drew some 300 visitors to the observatory, and over 500 people of all ages visited on many other specially arranged occasions. These included ten scouting groups, mostly cubs and beavers – one colony camped overnight in front of the observatory, guarded by Lian Bryant.

Joana Oliveira and Jacco van Loon took the 6" Lunt solar telescope on four consecutive days to the "Unity" festival of girl guides, on the Shugborough estate, entertaining about 150 of them (figure 6).

Adult Education sessions

Once again the observatory played host to the "Keele Astrophysics Discussion Group" where we swapped our views on the latest discoveries in astronomy and astrophysics, including observing if the weather permits. Paul Klimczak leads these sessions.

This year there were 9 meetings, attended by an average of 8 visitors. This is down from previous years, but we could advertise it better and perhaps have Keele PhD students present their work.

These meetings are free (a nominal donation to the upkeep of the observatory and its activities of £2 are welcomed) and open to the general public. You can find out meeting dates and times and what we are likely to be talking about at our Facebook page KeeleAstrophysicsDiscussionGroup.

Figure 6 The Solar System activity at Shugborough for the Unity girl guides camp. (credit: Joana Oliveira)

Facebook activities

By David McGhee

Keele Observatory had an exciting year on-line, with thousands of people from all over the globe reached and many hundreds enthused to visit. Stargazing Live saw the year off with great success and Earth Hour soon followed, enthusing many newcomers to astronomy whilst also letting Keele University and Stoke-on-Trent know of our work. In addition to usual observatory events, tips were provided on how to observe the heavens, including how to photograph meteor showers and the Sun with some members capturing wonderful images as a result.

Throughout the year there was a recurring topic as we followed the progress of the European Space Agency's comet chasing mission – Rosetta. Over one thousand people stayed tuned until Philæ lander's descent on 12th November onto comet 67P (Churyumov-Gerasimenko) and with the new academic year underway, many new faces were seen. In addition to usual public interest, we also started receiving interest from BBC Radio Stoke and a permanent contact was established.

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Keele Observatory – http://www.astro.keele.ac.uk/Observatory

Front cover: the Sun, taken through the 4cm Coronado on June 1st (credit: Stephen Doody)