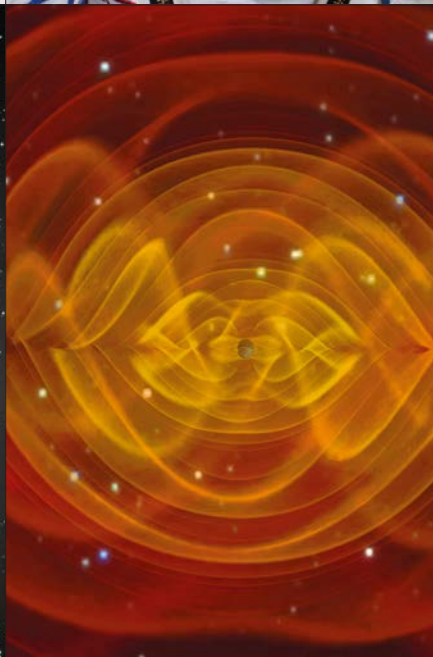
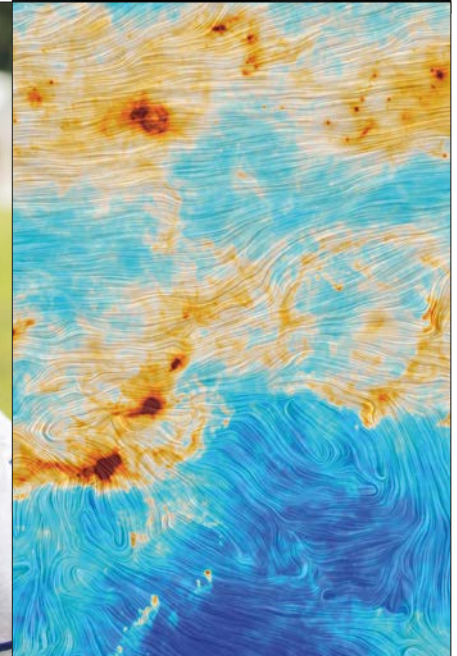
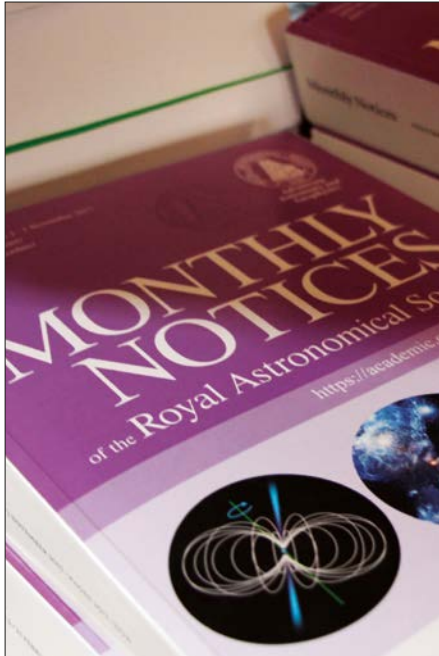
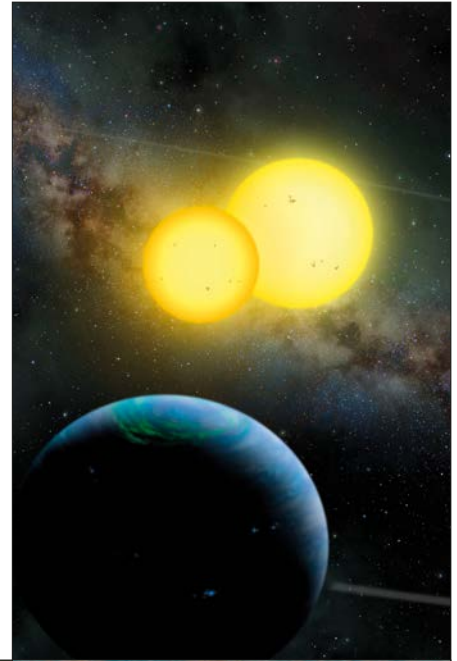




**Royal
Astronomical
Society**

Annual Report & Financial Statements 2018



Royal Astronomical Society

Patron

Her Majesty the Queen

Trustees

The Council members who served during 2018 were:

Prof. John Zarnecki (President, G, until May 2018, Open University)

Prof. Mike Cruise (President, A, from May 2018, University of Birmingham)

Dr Megan Argo (Councillor, A, University of Central Lancaster)

Dr Mandy Bailey (Secretary, A, Open University)

Charles Barclay (Vice-President, A)

Dr Nigel Berman (Treasurer, A)

Prof. Mike Bode (Councillor, A, until May 2018, Liverpool John Moores University)

Prof. William Chaplin (Councillor, A, from May 2018, University of Birmingham)

Prof. Ian Crawford (Vice-President, G, Birkbeck College)

Dr Paul Daniels (Councillor, A)

Prof. Yvonne Elsworth (Vice-President, G, until May 2018, University of Birmingham)

Prof. Lyndsay Fletcher (Senior Secretary, G, University of Glasgow)

Dr Claire Foulton (Councillor, A, from May 2018, University of Exeter)

Prof. Brad Gibson (Councillor, A, until May 2018, University of Hull)

Dr Stacey Habergham-Mawson (Vice-President, A, from May 2018, Liverpool John Moores University)

Prof. Lorraine Hanlon (Councillor, A, from May 2018, University College Dublin)

Dr Caitriona Jackman (Councillor, G, until May 2018, University of Southampton)

Kevin Kilburn (Councillor, A, from May 2018)

Prof. Mark Lester (Secretary, G, University of Leicester)

Jane MacArthur (Councillor, G, from Nov 2018, University of Leicester)

Prof. Steven Miller (Councillor, G, University College London)

Dr Sheila Peacock (Councillor, G, AWE Blacknest)

Prof. Hiranya Peiris (Vice-President, A, until May 2018, University College London)

Prof. Stephen Serjeant (Councillor, A, until May 2018, Open University)

Prof. Giovanna Tinetti (Councillor, A, University College London)

Prof. Mike Watson (Councillor, A, University of Leicester)

Dr Clare Watt (Councillor, G, University of Reading)

Mark Woodland (Councillor, A, resigned Oct 2018)

Prof. Anton Ziolkowski (Vice-President, G, from May 2018, University of Edinburgh)

- Note: "A" signifies all areas of astronomy and astrophysics;
"G" covers geophysics, solar-terrestrial physics and planetary sciences

Senior Staff

Executive Director: Philip Diamond

Deputy Executive Director: Robert Massey

Registered and Principal Office

Burlington House

Piccadilly

London

W1J 0BQ

Charity registration number

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Auditor

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Bankers

HSBC Bank plc

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National Westminster Bank

St James' & Piccadilly Branch

PO Box 2 DG

208 Piccadilly

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SWJ 9HE

Investment managers

Newton Investment Management Ltd

The Bank of New York Mellon Centre

160 Queen Victoria Street

London

EC4V 4LA

Solicitors

Bristows

3 Lincoln's Inn Fields

London

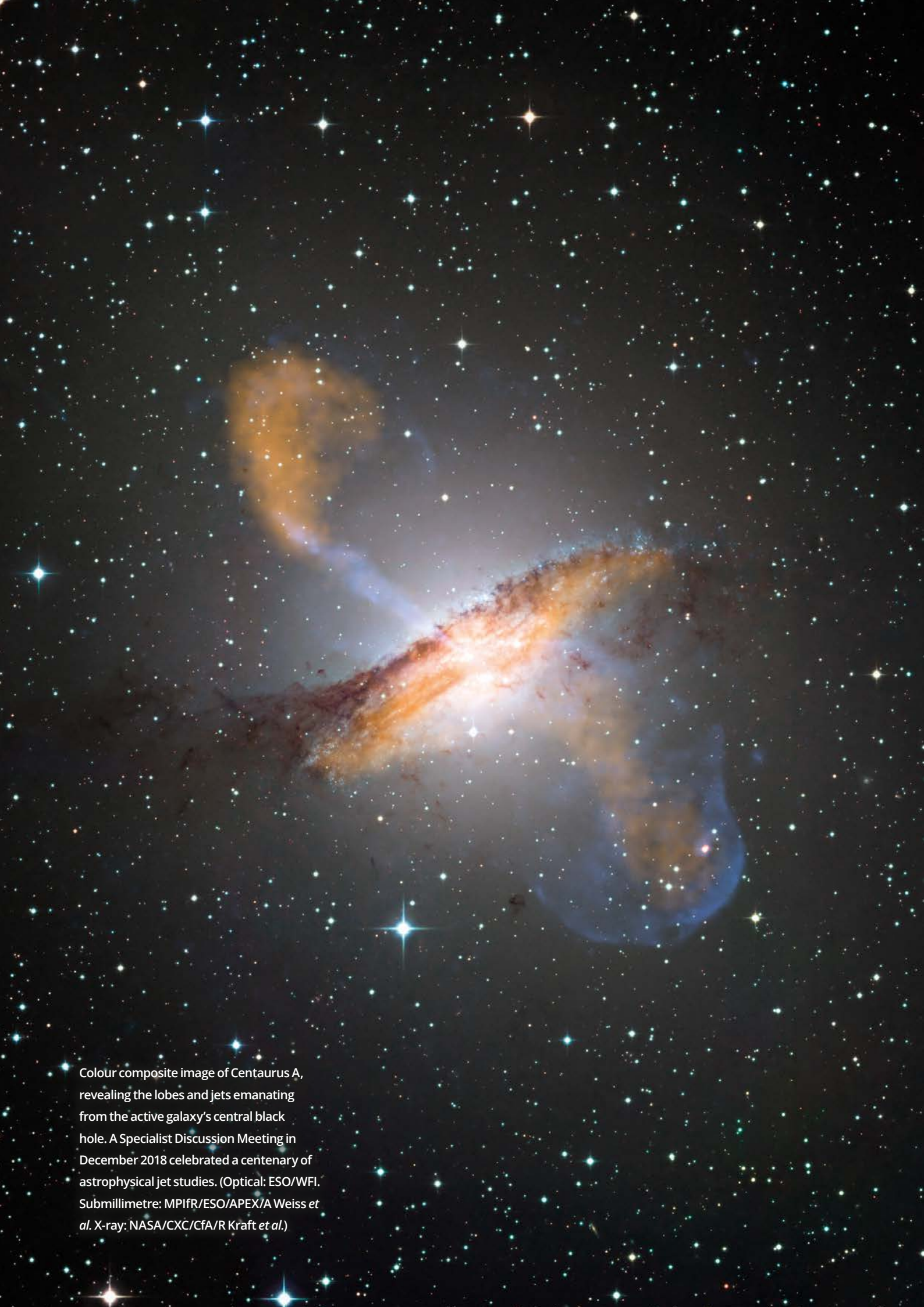
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*Advancing
Astronomy and
Geophysics*

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Colour composite image of Centaurus A, revealing the lobes and jets emanating from the active galaxy's central black hole. A Specialist Discussion Meeting in December 2018 celebrated a centenary of astrophysical jet studies. (Optical: ESO/WFI. Submillimetre: MPIfR/ESO/APEX/A Weiss *et al.* X-ray: NASA/CXC/CfA/R Kraft *et al.*)

From our President

This Annual Report of the Royal Astronomical Society provides an opportunity to celebrate our achievements from the past year, 2018, and to outline our plans for the future, a future which includes the bicentenary of the Society in 2020.

Since its foundation in 1820, the RAS has supported the development of astronomy and geophysics in the UK as these subjects emerged from the early constraints of poor instrumentation and lack of physical understanding. Now our scientific disciplines are among the most exciting and important branches of science which we, and the public, enjoy. The celebrations in 2020 will recognise the long and distinguished heritage of the Society and promote the future opportunities we will have to develop our science and its public impact.

This year we have the pleasure of congratulating Fellows whose work was recognised with national honours in 2018: Prof. Michele Dougherty CBE of Imperial College London, Prof. Kathy Whaler OBE of the University of Edinburgh, Prof. Sir James Hough of the University of Glasgow and Prof. Haley Gomez MBE of the University of Cardiff.

An important task of the Society is to meet the needs of its diverse membership and to take the organisational steps required to encourage and enlarge our scientific community. In 2018, we initiated a series of regional meetings to engage with young scientists and hear what they want from their Society. These visits will be rolled out to other centres during 2019, together with other interactions with our members across the UK and abroad.

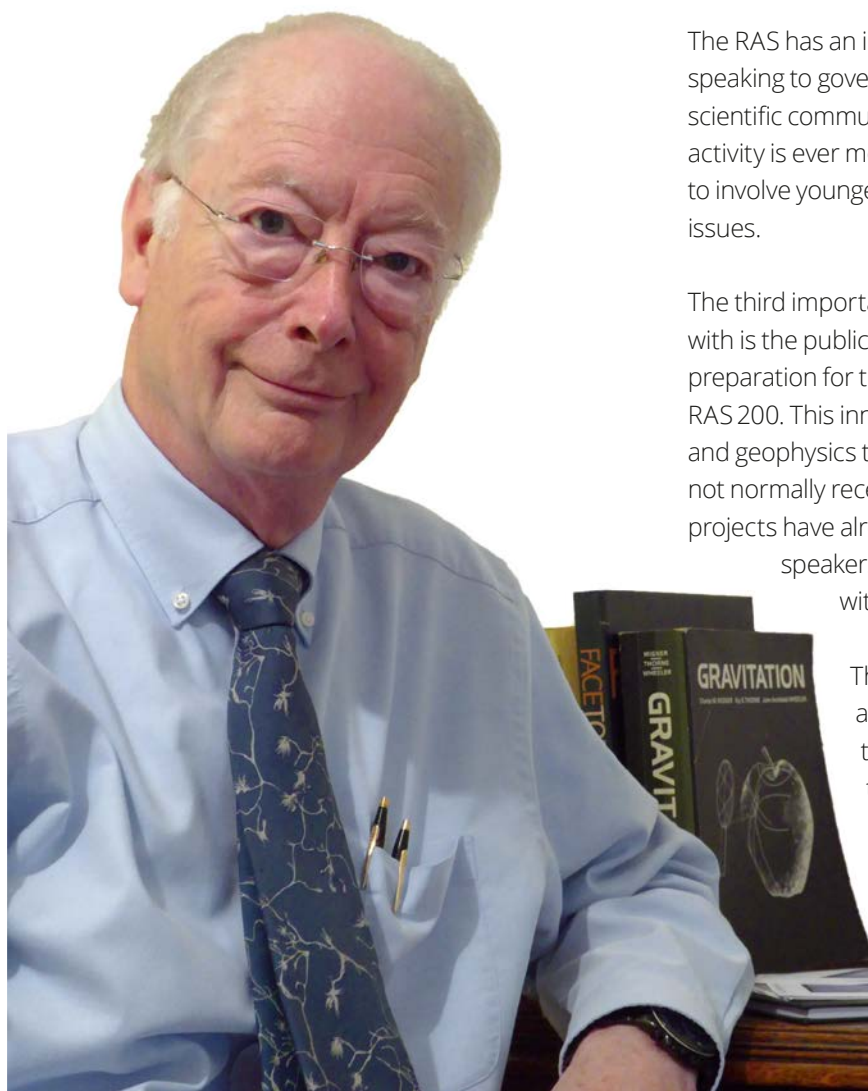
The RAS has an important policy function in the UK, speaking to government and the press on behalf of our scientific community. In these challenging times, this activity is ever more important and we are taking steps to involve younger society members in long-term policy issues.

The third important group that the RAS communicates with is the public and our outreach activities in preparation for the bicentenary have started already with RAS 200. This innovative programme is using astronomy and geophysics to interact with sectors of the community not normally receptive to science. The various RAS 200 projects have already inspired carers, minority language speakers, prisoners and many others, fully in line with our obligations as a registered charity.

The activities of the RAS are expanding, as they should do, but they depend on the continuing support of our members through subscriptions, donations and legacies, volunteering on committees and arranging scientific meetings.

This report gives a glimpse of the opportunities and the challenges the Society is preparing for, with the active support of its members.

Mike Cruise President, 2018–2020



Objectives

The RAS exists to advance, and to record the history of, our understanding of the Earth, the solar system, the stars and galaxies, and the nature of the universe. It does this by promoting astronomy and geophysics, interdisciplinary sciences that encompass and further our understanding of physics, chemistry, mathematics, biology, engineering and computer science to answer deep questions about the origin and fate of the cosmos and the development of life in it. Through this the Society contributes to the growth and dissemination of knowledge and thereby fulfils its charitable objective of serving the public interest.

Our objectives fall within two broad areas: advancing understanding and sharing knowledge; the organization of the Society supports these goals.

Our principal objectives for 2018 were to:

- continue to publish high-quality peer-reviewed journals on astronomy and geophysics
- sustain our support of students and early-career scientists by continuing to provide research fellowships and grants
- continue to recognise achievements in astronomy and geophysics by the award of medals and prizes
- maintain a high-quality programme of Specialist Discussion Meetings, Ordinary Meetings and a Public Lecture series
- continue to support the Friends of the RAS programme
- prepare for the National Astronomy Meeting in Lancaster in 2019
- continue to monitor the impact of Brexit and to lobby for sustained and significant public funding of astronomy and geophysics research
- maintain a programme of education and outreach activity
- continue to provide a Library and Archive service
- continue our work with the other Courtyard Societies to promote Burlington House as a significant cultural hub
- pursue the matter of the lease and explore other accommodation options if necessary.

During 2018, the Society would further:

- conduct a strategic review of all the Society's programme of activities to inform its balance and future direction
- carry out an attitudinal survey of the Fellowship in order to inform the above review
- produce a detailed plan of activity to mark the Society's bicentenary in 2020
- launch the new website
- carry out a benchmarking exercise of staff salaries to ensure the appropriate level of remuneration
- improve access to the Society's heritage collections using the new website.

The Society refers to the Charity Commission's general guidance on Public Benefit when reviewing its aims and objectives and in planning future activities. These disclosures comply with the Charities Act 2011.

Advancing understanding

The RAS is committed to advancing the understanding of our sciences by:

- publishing journals
- supporting scientists financially with fellowships and grants
- organising scientific meetings
- recognising excellence through awards
- running a Library and Archive for research
- producing a magazine for our members
- lobbying government
- promoting diversity in our community

An artist's rendition of the Kepler-35 system. A press release based on research in *Monthly Notices* focused on using artificial intelligence to understand habitability in binary systems. (L Cook/extrasolar.spaceart.org)

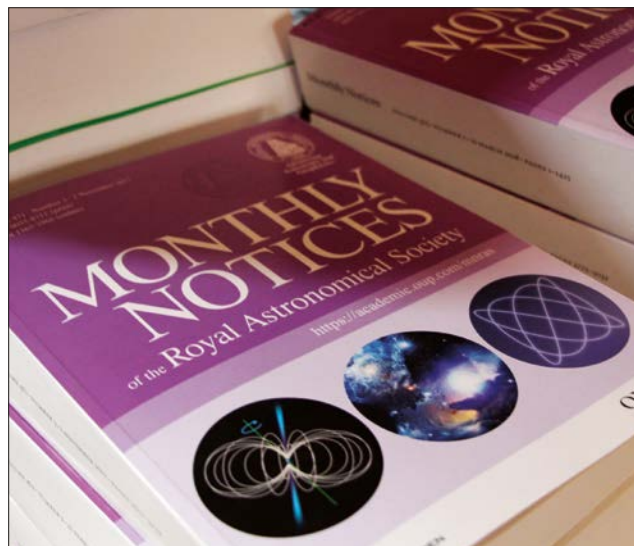
Journals

The Society publishes two academic peer-reviewed journals that are renowned across the world: *Monthly Notices of the Royal Astronomical Society (MNRAS)* and *Geophysical Journal International (GJI)*. *MNRAS* publishes the results of original research in astronomy and astrophysics, including work that is observational, theoretical or concerned with astronomical instrumentation and software. *GJI* publishes articles on all aspects of theoretical, computational, applied and observational geophysics. Both journals receive submissions from authors worldwide. The peer-review process is overseen by an editorial team of seven assistant editors and the editorial office manager. After five successful years with Oxford University Press as our publishing partner, we renewed our contract with them for a second term.

The impact factor of a journal reflects the frequency with which articles are cited in the scientific literature. In 2018, *MNRAS* achieved an impact factor of 5.194 (a 4.7% increase on the previous year), with 2,627,425 article downloads, 4700 articles submitted and 3784 published. Prof. David Flower continued as Editor-in-Chief and the editorial board grew to 26 to manage the increasing number of submissions. *GJI* achieved an impact factor of 2.528 in 2018 (also a 4.7% increase on 2017), published 573 papers, received 1600 submissions and there were 1,246,842 article downloads. Prof. Joerg Renner remained as Editor-in-Chief and there are currently 31 editors.

Editorial board meetings are held annually to assess journal performance through the annual reports prepared by the editorial office and to agree plans for the coming year. The *MNRAS* board meeting took place in March in London, the *GJI* meeting in December in Washington DC and the Publications Management Committee met in April. We have established a new working group to consider the future direction of the journals.

Authors do not pay to publish in our journals, although we have introduced an excess page charge for *MNRAS* papers of more than 20 pages. Authors can pay for open access, but very few do so because they can upload their papers to repositories and free public servers under our self-archiving policy. Some content, such as Zooniverse (citizen science) papers, special issues and *GJI* Express Letters, is freely available online. RAS members also have free online access.



With the launch of the new RAS website, we added new and improved content to highlight the work of the journal team, including profiles of our editors. Details can be found on the Journals page of the RAS website.

We continue to support early-career researchers by running workshops on communicating research effectively.

Journal staff and the Editor-in-Chief of *MNRAS* delivered a workshop for authors and referees at the European Week of Astronomy and Space Science (EWASS) in April, attracting more than 60 delegates. In July, we launched a Journals Twitter account (@RAS_Journals), which has a growing following. The *GJI* student prizes for the best papers in 2018 went to Karianne Bergen and Ophelia Crawford, who received a cash prize and certificate; their papers were also freely available.

there were
1,246,842
downloads of
GJI papers

Research fellowships and grants

The Society supported seven Research Fellowships and the RAS Norman Lockyer Fellowship during 2018. Grants for research, including for undergraduate internships, were also awarded, in two funding rounds. Details of all grants awarded can be found on the Society website. These are the research fellows in post in 2018:

- **Dr Emma Chapman** (Imperial College London):
Detecting and constraining the Epoch of Reionisation using foreground removal and state-of-the-art simulations
- **Dr Elisa Chisari** (University of Oxford):
Accurate astrophysics for the next era of cosmology
- **Dr Joanna Eberhardt (née Barstow)** (UCL):
Nature vs nurture: the effect of stellar irradiation on atmospheric evolution

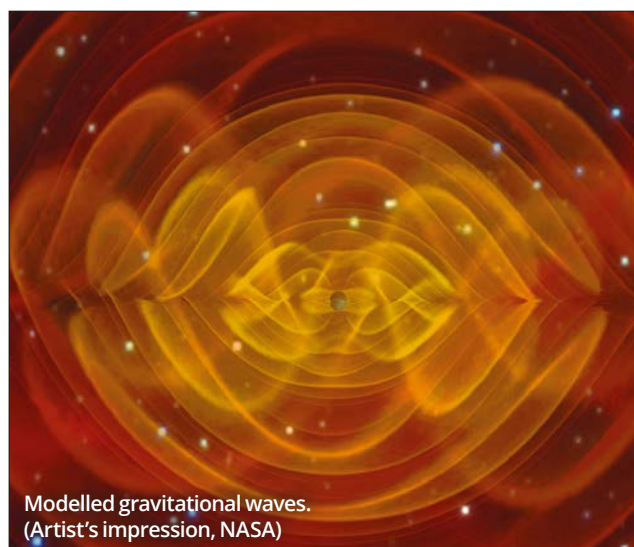
- **Dr Amy Gilligan** (University of Aberdeen):
When subduction stops: understanding tectonic process in post-subduction settings
- **Dr Matt Nicholl** (University of Edinburgh):
Superluminous supernovae: a comprehensive observational and theoretical study of Nature's brightest fireworks
- **Dr Ben Rozitis** (Open University):
Probing solar system processes using extreme asteroids
- **Dr Peter Wyper** (Durham University):
Explaining the onset of explosive magnetic reconnection in the solar corona and its links to the generation of solar energetic particles
- **RAS Norman Lockyer Fellowship**
Dr Vinesh Maguire Rajpaul (University of Cambridge):
Transforming the search for Earth-like planets with advanced modelling tools

Scientific meetings

2018 saw a full programme of research-oriented Specialist Discussion Meetings and Ordinary Meetings at Burlington House. The National Astronomy Meeting took place at the University of Liverpool in April, running concurrently with Magnetosphere, Ionosphere and Solar–Terrestrial and UK Solar Physics meetings, as well as the European Week of Astronomy and Space Science (EWASS). This bumper meeting with 1376 registrants – 379 of them students – saw a mixture of research sessions and plenary lectures with community events – including a plenary lecture on diversity in science from Chi Onwura MP, the shadow Science Minister. The RAS Community session featured presentations from funding bodies the Science and Technology Facilities Council, the UK Space Agency and the European Space Agency.

The 14 Specialist Discussion Meetings held in 2018:

- The Extremely Large Telescope: UK Community Day
- Wave-based heating in the solar atmosphere
- The Epoch of Reionisation: UK community update
- From the outer to the inner solar system: the origin and evolution of comets
- Merging giant-star asteroseismology with the fate of extrasolar planetary systems
- Ground effects of severe space weather events
- The gravitational wave binary black hole opportunity for astronomy
- Dynamics and evolution of Earth's coupled core–mantle system
- The Gaia DR2 astronomy revolution
- Venus: exploring Earth's sibling planet



- The Dark Energy Survey: more than dark energy
- Space dust and space debris in the vicinity of the Earth
- A centenary of astrophysical jet studies: a review of the physics driving the observed jet structure
- 30 years of planetary astronomy with H_3^+

The Ordinary Meetings of the Society had the following speakers in 2018:

- **Prof. Ineke de Moortel** (University of St Andrews):
The role of MHD waves in coronal heating
- **Dr Cosimo Inserra** (University of Southampton):
Winton Capital Award 'A' 2017 Exploring the brightest supernova explosions
- **Dr Jonathan Pritchard** (Imperial College London):
Fowler Award 'A' 2017 Mapping the Cosmic Dawn with the 21cm line
- **Dr David Marsh** (King's College London):
RAS Research Fellowship Studies on axion dark matter: my work as an RAS postdoctoral fellow
- **Prof. Brad Gibson** (University of Hull):
Galaxy-scale catastrophes: why we might be alone in the universe
- **Dr Colin Snodgrass** (Open University):
It came from outer space: interstellar visitor 1I/Oumuamua
- **Dr John Veitch** (University of Glasgow):
Listening to the stars: the dawn of gravitational wave astronomy
- **Dr Rowan Smith** (University of Manchester):
RAS Norman Lockyer Research Fellowship 2014
Filaments and dark gas: the environment of star formation in spiral galaxies
- **Dr Kelig Aujogue** (University of Birmingham):
RAS Patricia Tomkins Thesis Prize 2016 Little Earth Experiment: a journey towards Earth's tangent cylinder

- **Prof. Karin Öberg** (Harvard University):
The Eddington Lecture The chemistry of planet formation and the making of habitable planets
- **Prof. John Zarnecki** (Open University):
2018 Presidential Address Spacecraft I have known and loved: 40 years in space research
- **Prof. Stephen Smartt** (Queen's University Belfast):
RAS George Darwin Lecture Kilonovae and the birth of multi-messenger astronomy
- **Dr Alessandro Morbidelli** (Observatory of Nice):
RAS Harold Jeffreys Lecture Combining dynamical and geochemical modeling: a powerful approach to understand the early history of the Earth and the Moon
- **Dr Kerri Donaldson Hanna** (University of Oxford):
RAS 'G' Winton Capital Award OSIRIS-REx: a sample-return mission to a primitive solar system body
- **Prof. Tim Wright** (University of Leeds):
RAS 'G' Group Achievement Award Monitoring our dynamic planet using satellite geodesy
- **Dr Manesh Anand** (Open University):
RAS Diary Talk The dark side of the Moon
- **Dr David Cuadrado** (UKRI Rutherford Appleton Lab):
RAS Patricia Tomkins Thesis Prize Millimetre-wave low noise amplifiers for the ALMA telescope
- **Prof. Jim Wild** (University of Lancaster):
James Dungey Lecture Space weather: living with our star
- **Prof. George Efstathiou** (University of Cambridge):
RAS 'A' Group Achievement Award The Planck Legacy: inflation and the origin of structure in the universe
- **Prof. Mike Edmunds** (University of Cardiff):
Christmases past: the best popular astronomy books ever

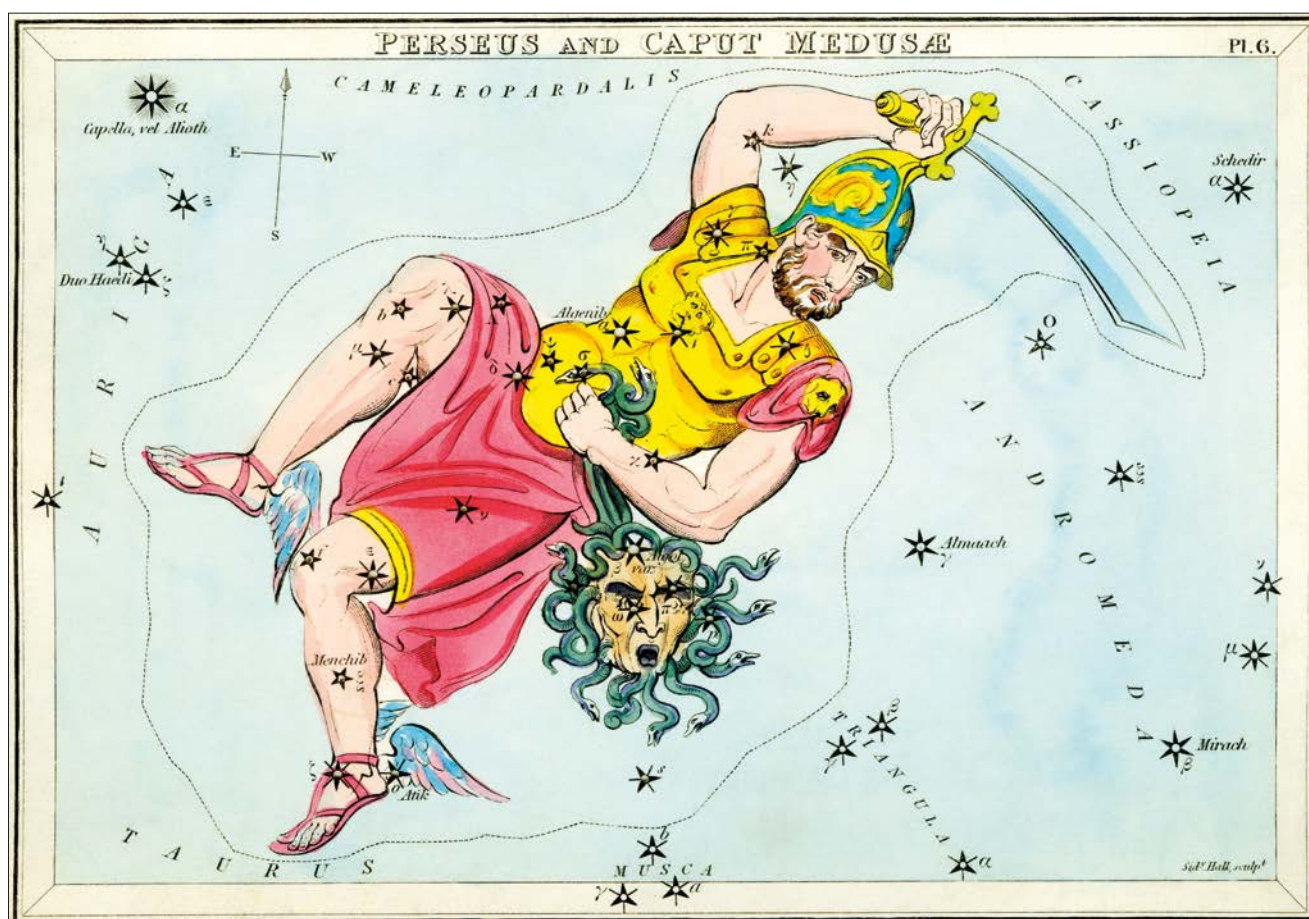


Awards and medals

The Society recognises outstanding achievements among early-career researchers as well as celebrating career-long excellence and service to our sciences. These are the recipients of the 2018 awards and medals:

- **Gold Medal for Astronomy**
Prof. James Hough (University of Glasgow)
- **Gold Medal for Geophysics**
Prof. Robert White (University of Cambridge)
- **Eddington Medal**
Prof. Claudia Maraston (University of Portsmouth)

- **Chapman Medal**
Prof. Emma Bunce (University of Leicester)
- **Herschel Medal**
Prof. Tom Marsh (University of Warwick)
- **Price Medal**
Dr Stuart Crampin (British Geological Survey, Edinburgh)
- **Jackson-Gwilt Medal**
Prof. Wayne Holland (UK Astronomy Technology Centre, Edinburgh)
- **Fowler Award for Astronomy**
Dr Amélie Saintonge (University College London)
- **Fowler Award for Geophysics**
Dr David Jess (Queen's University Belfast)
- **Winton Capital Award for Astronomy**
Dr Rebecca Bowler (University of Oxford)
- **Winton Capital Award for Geophysics**
Dr Kerri Donaldson Hanna (University of Oxford)
- **Service Award for Astronomy**
Prof. Mark Cropper (Mullard Space Science Lab, University College London)
- **Service Award for Geophysics**
Dr Matthew Taylor (ESA)
- **Patrick Moore Medal**
Jenny Lister (St George the Martyr Primary School, Camden, London)
- **Annie Maunder Medal**
Dr Helen Mason (University of Cambridge)
- **Group Achievement Award in Astronomy**
The Planck team
- **Group Achievement Award in Geophysics**
COMET, the Centre for Observation and Modelling of Earthquakes, Volcanoes and Tectonics
- **George Darwin Lecture**
Prof. Stephen J Smartt (Queen's University Belfast)
- **Harold Jeffreys Lecture**
Dr Alessandro Morbidelli (Observatory of Nice Côte d'Azur)
- **Gerald Whitrow Lecture**
Prof. Martin Rees (University of Cambridge)
- **James Dungey Lecture**
Prof. James A Wild (University of Lancaster)
- **Honorary Fellowship for Astronomy**
Prof. Pascale Ehrenfreund (Space Policy Institute, Washington DC, and Leiden Observatory)
- **Honorary Fellowship for Geophysics**
Prof. Jaime Urrutia-Fucugauchi (Mexican Academy of Sciences)



From the Archive: the Perseus constellation, part of a 19th-century astronomical teaching aid called Urania's Mirror. This is one of 32 cards, each pierced with holes so the pattern of the constellations can be seen when held up to the light. (RAS/SPL)

Library and Archive

The Library continued to support scholarship by hosting 325 research visits by Fellows, Friends and external researchers, from A-level and undergraduate students to academics, journalists, museum curators and independent researchers. They came to consult the up-to-date specialist library and the unique and distinctive archive, rare book and photograph collections. Many of these primary materials will feature in books, articles, exhibitions, websites and research-led teaching materials. Researchers travelled to the Library from around the world, but the Librarian also fielded 357 remote research enquiries via email, phone, post and social media. The Librarian raised the profile of some of the oldest books in the collection by speaking at the National Library of Scotland on pre-1500 books from the Grove-Hills bequest in 1922.

In 2018, the Library hosted three talented and enthusiastic students from Queen Mary and Westfield (Astrophysics), City University (MA Library and Information Studies) and

Camberwell College (MA Conservation), whose short-term placements focused on social media, web editing, conservation and preservation.

Collection management successes include sorting, cataloguing and rehousing the RAS lantern slide collection of some 600 plates – although thousands more glass plate negatives remain to be properly archived. Preparations for digitizing the manuscripts of Caroline Herschel have made progress. The painting conservation programme continued: we have conserved the portrait of William Pearson, one of the founders of the RAS, possibly for the first time since it was painted by Arthur Phillips in 1808. Pearson is portrayed pointing out one of his planetary machines to his first wife Frances, and his only daughter, also Frances. The portrait was cleaned and revarnished, giving fuller saturation to the colours. Essential remedial treatment was carried out on the frame, and low-reflect UV protection glazing was installed, so that the newly revived colours of this family portrait will be preserved for the future.

1434
people visited
the Library



Our membership magazine

Fellows continue to support the Society's membership magazine, *A&G*, sharing their work within our community by writing articles. *A&G* published 67 research reviews, reports of RAS meetings and outreach projects, discussion and analysis, as well as some 200 short news items. There were 212,636 downloads of *A&G* articles during the year. A highlight was the collection of articles edited in conjunction with the Magnetosphere, Ionosphere and Solar-Terrestrial physics research community; the MIST group chose to celebrate its 50th anniversary in *A&G*, in recognition of the long-term support for this field from the RAS.

Political engagement

In 2018, the Society continued to engage with partner organizations and policymakers, concentrating on the prospects for astronomy and geophysics after Brexit; we presented data on, for example, funding and immigration policy and the potential impact of the new Industrial Strategy on funding for curiosity-driven research. The Society gave evidence to three parliamentary inquiries, and the Deputy Director gave oral evidence to the Science and Technology Committee (STC); he also attends the quarterly Parliamentary Affairs Committee, which brings together learned societies and MPs on the STC. The RAS

sponsored delegates at the Voice of the Future event in the House of Commons, where early-career researchers question MPs, the Science Minister and his shadow, and the Chief Scientific Advisor. The Society also exhibited at pan-science events at the regional assemblies in Scotland, Wales and Northern Ireland.

The RAS is a member of the Campaign for Science and Engineering, with whom we co-fund a dedicated policy officer post; together we argued for easy movement of scientists to and from the European Union after Brexit. The Society also supported a European Astronomical Society special representative in Brussels, to act as an advocate for European astronomy and space science. We also brought politics to the EWASS conference, with a session including a talk from Clare Moody MEP.

Diversity

The Society continued to expand its work on diversity in astronomy and geophysics: the Education Outreach and Diversity Officer worked with groups ranging from black and minority ethnic school pupils in London (through the charities POC Squared, Generating Genius and BB STEM) to university staff and students at the LGBT STEMinar in January (supported by the RAS and Institute of Physics and attended by 166 people). In October, the Society hosted the UK Students for the Exploration and Development of Space "Diversity in Space Careers" meeting, with 70 delegates and talks covering topics from mental health to visual impairment.

The RAS website now has a dedicated diversity section and a form for anonymous reporting of issues of concern. On Twitter, the RAS Women in STEM account put out a tweet a day on women astronomers and scientists, showcasing black female astronomers during Black History Month, and female LGBT+ astronomers during LGBT History Month.



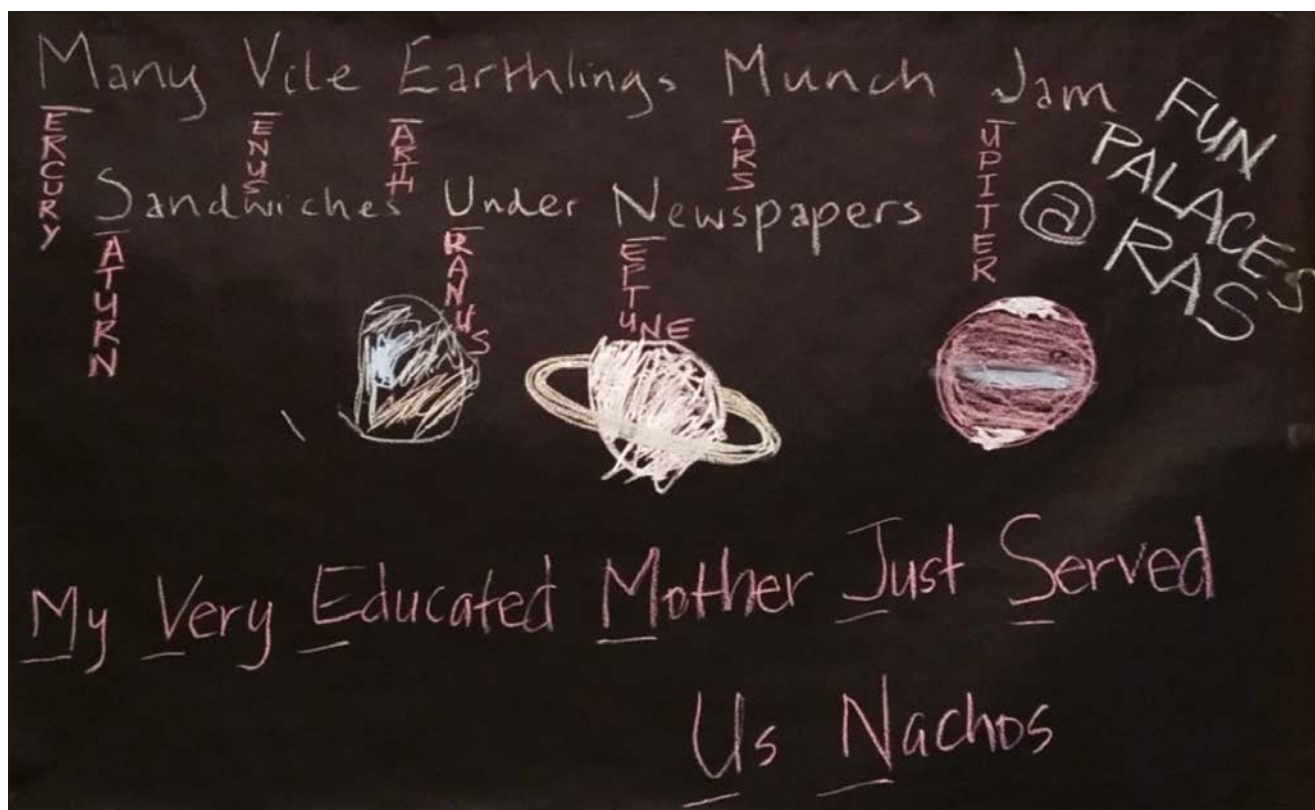
The RAS enabled young scientists to question the shadow Science Minister at the Voice of the Future event. (Royal Society of Biology)

Sharing knowledge

The Society disseminates knowledge to students, the press and the wider public by:

- organising education and outreach events
- supporting the Friends of the RAS
- exploiting the resources of the Library and Archives
- arranging a programme of Public Lectures
- working with specialist partners through RAS 200
- promoting research in the media and social media
- working with other Courtyard Societies as a cultural hub

Magnetic turbulence in the Orion Molecular Cloud from Planck. Magnetic fields in space was the topic of a Public Lecture in March 2018. (ESA and the Planck Collaboration)



How to remember the order of the planets – suggestions thrown up at the Fun Palaces event at Burlington House in October. (L Offer/RAS)

Education and outreach

The Society continued its programme of public engagement, working with schools, voluntary sector organisations, and public sector bodies including the Science and Technology Facilities Council (STFC) and the UK Space Agency. Public engagement events included school visits, group visits to the RAS, talks at music and science festivals, TV and media appearances, astronomy in pubs and prisons, and working with diverse groups from astronomers with visual impairments to children in care. The Society received £18,000 in external funding, comprising £3000 to work with ESERO-UK as Space Ambassadors and £15,000 for a project called AstroBoost, run by Jenny Shipway, investigating the role of amateur astronomy societies in public outreach and engagement and focusing on the James Webb Space Telescope.

The Education and Outreach Officers – both Space Ambassadors – worked with a total of 4450 people face to face, at events running for a total of 132 hours. They have both started teaching a new GCSE Astronomy class (one in London and one in northwest England) with a total of 55 students starting the course ready for exams in 2020.

4450
people attended
outreach
events

In 2018, the Society took part in two events for the first time: the Lambeth Country Show and Fun Palaces. At the Country Show in July we joined forces with other learned societies to meet people of all ages. In early October, the Society hosted Fun Palaces, an event designed to showcase science and art, at Burlington House. This event welcomed families with young children in particular; we had 50 new visitors that day.

Friends of the RAS

The Friends of the RAS scheme allows members of the public with an interest in astronomy or geophysics to support the Society's work, and to have opportunities through the Society to find out more about these sciences. There were 215 Friends of the RAS by the end of 2018. Marcus Hope, the volunteer leader of the Friends programme, provided an impressive programme of lectures; topics included "How we'll live on Mars", "Looking at the universe with photography and artworks" and "The Antikythera Mechanism and the mechanical universe". Groups of Friends visited the Leicester National Space Centre, courtesy of Prof. Anu Ojha, and the Culham Centre for Fusion Energy.

Library outreach

1434 people visited the Library in 2018, a third of them during outreach events such as Open House and the summer Courtyard Lates. In addition to hosting public events, the Library welcomed 381 people in 16 group visits for primary-school children, Brownies, undergraduate and postgraduate students, astronomical societies and voluntary groups, as well as delegates to scientific meetings taking place at Burlington House. The Library also participated for the first time in London History Day, a city-wide celebration organised by Historic England.

More than 100 books, manuscripts and objects from the Society's collections were displayed to visitors during the course of the year. On two occasions the Library displayed items kindly loaned by other organisations, such as observations of Jupiter from the British Astronomical Association archive, selected by John Rogers for delegates to the Europlanet workshop at Burlington House on "New views of Jupiter". One of Michael Faraday's notebooks and a piece of Faraday's optical glass from the Royal Institution were loaned to us on the occasion of Chris Hales' Public Lecture "Magnetic fields in space". The Education, Outreach and Diversity Officer has continued to work with the Librarian to run innovative workshops for primary-school children, using our archives and historical instruments for science education.

The RAS is the custodian of Richard Carrington's observations of the largest recorded solar flare of September 1859, now known as the Carrington event. Fellow Maggie Aderin-Pocock was filmed talking about these historic observations for the August edition of BBC TV's *Sky at Night*. The notebook, including a sketch of the flare, were loaned by the RAS Library and Archives to the Science Museum as part of a major exhibition about the Sun, *Living with Our Star*, which ran from October 2018 to May 2019. So far, 25,000 visitors have had a chance to see these unique documents.

With the generous support of the London Mathematical Society, the RAS was able to lend Augustus De Morgan's charmingly illustrated mathematical biographies for display during the De Morgan Foundation's free exhibition of ceramics by De Morgan's son William, *Sublime Symmetry*. The exhibition at the Guildhall Art Gallery ran from May to October 2018 and received 59,000 visitors.

The Education, Outreach and Diversity Officer and the Librarian have continued to work with the Objectivity YouTube channel, releasing another two videos about interesting items from the collections and the people who created them. One video was about Caroline Herschel, the other focused on the history of RAS publications; each has received more than 18,000 views.

Public Lectures

The Public Lectures arranged by the RAS have proved extremely popular, with tickets selling out at both the lunchtime and evening events; the talks are also recorded and made freely available on the RAS website.

- **Prof. Anu Ojha** (National Space Centre):
Space – so what!
- **Dr Rene Breton** (Jodrell Bank Centre for Astrophysics/University of Manchester):
Einstein's Relativity: tested to the limit with pulsars
- **Dr Chris Hales** (Newcastle University):
Magnetic fields in space
- **Dr Andrew Pontzen** (University College London):
Where next for cosmology?
- **Prof. Tara Shears** (University of Liverpool):
Why antimatter matters
- **Dr Suzie Imber** (University of Leicester):
Adventures in space
- **Dr Sarah Rugheimer**, Caroline Herschel Prize Lecturer (University of Oxford):
Hues of habitability – characterising pale blue dots around other stars
- **Dr Colin Snodgrass** (University of Edinburgh):
It came from outer space: interstellar visitor 1I/Oumuamua



1819
people attended
**RAS Public
Lectures**



Rainbows and Brownies can get into space at the annual Magic and Mayhem weekend. (Girlguiding)



RAS 200

The Society continued the RAS 200: Sky & Earth programme, with 12 projects now supported from the two tranches of funding. The aims of RAS 200 are:

- To have a lasting impact beyond the Society's bicentenary in 2020 and inspire a new generation to broaden their interest in science, technology, engineering, maths and medicine (STEMM)
- To go "where no outreach project has gone before", engaging people from all age groups, ethnic and socioeconomic backgrounds
- To harness the shared ambitions of world-leading researchers and national, local and community organisations.

The RAS is working with specialist partner organisations to achieve these goals. In 2018, evaluators Jenesy recorded that 138 carers took astronomy short breaks and activities with Care for Carers, for example, and there were 1397 entries for astronomy and geophysics themed competitions at the 2018 Eisteddfod yr Urdd. Highlights of 2018 included the premiere of the planetarium show *The Planets 360* at the National Space Centre, and the launch of a new Space badge for Brownies by Girlguiding.

RAS 200 is now established as a ground-breaking programme among the public outreach and engagement community, having been presented at several science communication conferences, and written up in the peer-reviewed online *Journal of Science Communication* (doi:10.22323/2.17040303).

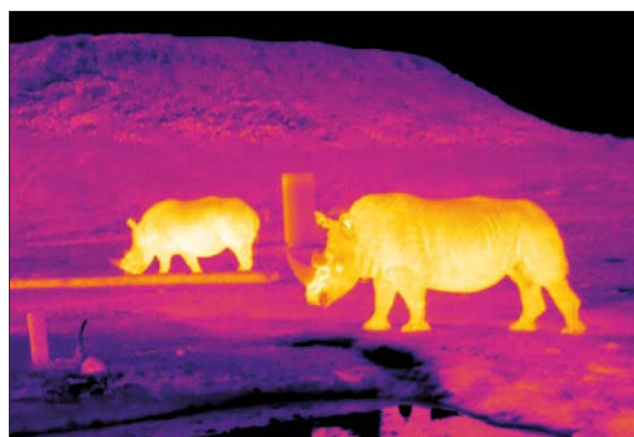
138
carers took
astronomy
short breaks and
activities



An astronaut spirals into Jupiter's Red Spot – part of *The Planets 360* planetarium show at its premiere in 2018. (NSC Creative)

The RAS 200 projects and our partner organisations:

- **Astronomical Data: from Small and Beautiful to Big and Overwhelming** (South African Astronomical Observatory – SAAO, National Research Foundation):
An exhibition on astronomical data from ancient to modern times based in Cape Town
- **Astronomy and Geophysics through the Traditional Culture of Wales** (Aberystwyth University):
Performances, installations, competitions and compositions at the National and Urdd Eisteddfod of Wales
- **Beyond Prison Walls** (Bounce Back Foundation):
Activities in prisons to engage adult prisoners and family members
- **Cornwall – Sea to Stars** (Truro High School for Girls):
A mobile trailer touring Cornwall engaging audiences with astronomy and geophysics activities
- **Geophysics in a Box** (National Youth Agency):
A partnership to engage 9–14 year olds in school and community groups and their teachers/leaders with geophysics
- **Making Space** (National University of Ireland Galway):
Working with arts organisations to engage under-represented groups in the western seaboard region of Ireland with astronomy
- **Open Your Eyes, Look up to the Sky...** (Workers' Educational Association/Liverpool John Moores University):
Engaging with hard-to-reach groups through grass-roots events and new STEM curricula courses
- **Reaching for the Stars: Adventures in Space for Girls and Young Women** (Girlguiding):
Activities to engage girls and young women aged five to 25 with astronomy
- **Space, Earth and Autism** (National Autistic Society):
An access project to support people with spectral needs to access the other RAS 200 projects
- **Stars and Space** (The Prince's Trust):
Training courses and programmes to engage young people not in education, employment or training and develop their confidence and social skills
- **Stepping Out: Astronomy Short Breaks for Carers** (Care for Carers):
Astronomy-themed residential and day breaks for carers in Scotland
- **The Planets 360** (National Space Centre Creative):
A full-dome, immersive, modular planetarium show based around Holst's *Planet Suite*, freely available to all UK planetariums



Astronomical tools to track endangered animals – a popular press release from NAM/EWASS 2018. (Endangered Wildlife Trust/LJMU)

Media and social media

In 2018, the Society issued 37 press releases, publicising results in our journals, papers presented at the NAM/ EWASS conference in Liverpool, and policy and staff announcements. These were picked up by local, national and international news outlets in print and online.

RAS staff gave around 40 TV and radio interviews on topics including space exploration and events in the night sky such as the lunar eclipse in July, as well as four pieces with online podcasts. We also supported journalists in providing quotes for articles, finding UK experts in astronomy and geophysics from our database, and sourcing appropriate images. NAM and EWASS alone generated more than 800 pieces of press coverage, and multiple broadcasters covered the conference. This was supplemented by live broadcasts by Society staff on Facebook Live and YouTube.

7000
people came to the
Courtyard for
Open House

Our social media channels are growing: on Twitter we have nearly 29,000 followers and there are more than 9000 members of the RAS Facebook group. Further Twitter accounts promote the RAS Library, our journals, A&G and our outreach and diversity work. Other staff members have individual Twitter accounts. The RAS YouTube channel hosts video content in support of this, both for press releases and interviews by RAS staff. Twitter is now the most used social media tool for the Society. Many of our announcements that have little exposure in conventional media do well on social media channels; for example, an astronomy joke on National Joke Day reached more than 22,000 Twitter accounts.

A cultural hub with Courtyard Societies

The RAS works with the other societies based in Burlington House: The Geological Society, The Linnean Society of London, the Royal Academy of Arts, the Royal Society of Chemistry and the Society of Antiquaries, collectively known as the Courtyard Societies. We

collaborated on outreach events such as the Open House London weekend in September.

The RAS provides speakers and outreach activities and benefits from the high attendance; 7000 people came to the courtyard for Open House.

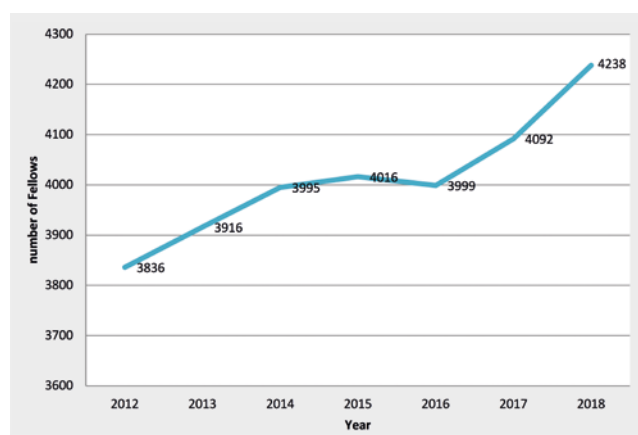
During the summer Courtyard Lates event, the RAS complemented Matthew Genge's talks on "Space rocks – a link between us and the stars" with a Library display on asteroids and minor planets. Because this event took place on the same day as the lunar eclipse, we also displayed historical depictions of lunar eclipses.

Our organisation

The organisation of the RAS supported our objectives by:

- surveying the Fellowship and developing strategic goals
- planning for the bicentenary in 2020
- exploring improvements to our accommodation
- our new website

Artist's impression of two neutron stars merging and generating gravitational waves, the subject of two meetings in 2018. (NSF/LIGO/Sonoma State University/A Simonnet)



We are growing: the increase in the Fellowship since 2012.

The Fellowship

The RAS had 4238 Fellows at the end of 2018, 173 of whom were Honorary Fellows. This is a slight increase on the 2017 level that continues the pattern of steady expansion that has seen the number of Fellows grow by 10% since 2012. In 2018, a quarter of our Fellows (26%) lived outside the UK. 18% of our Fellows were female. 30% of our members were over 65 and 7% under 25.

Fellows' survey and strategic review

The survey of Fellows' opinions about the Society took place in late summer 2018 and more than a fifth of the Fellowship responded (923 people). Responses expressed strong support for the role of the RAS as an advocate for the community, an organisation supporting professional credibility and peer esteem, and a network of like-minded people. Approval of Society activities mirrored this emphasis on support for science, with journal publishing especially highly valued.

Council members and the Executive and Deputy Executive Directors attended a strategy session in Oxford on 27 and 28 September 2018. Over the course of two days, Council discussed the Governance Code, publishing, member views (expressed in the responses to the Fellows' survey), the demography of the Society, the coming bicentenary year and policy.

Discussions highlighted priorities for 2019 and a number of working groups were established to provide more detailed information and planning. These groups will report through 2019 with a view to launching initiatives in our bicentenary year and beyond.

10%
growth in
members
since 2012

Plans for the RAS bicentenary

Christine Losecaat MBE has been appointed as project director for the bicentenary; she is working with Council, the Executive, Fellows and staff to deliver events and initiatives that will not only celebrate the Society's and Fellows' achievements over the past 200 years, but also anticipate our future successes. The celebrations will start with a formal dinner in London in January and continue throughout the year, including at the National Astronomy Meeting. The Society has appointed Johnson Banks to advise Council on refreshing and updating the RAS brand and Boffin Media has been appointed to develop a podcast for 2020.

Lease and accommodation

The Society continued to explore improvements to our lease and our accommodation at Burlington House.

Launching our new website

The Society launched its new website in the summer of 2018. The web development company Yonescat built the site based on migration and rationalisation of existing material. Staff dedicated time to ensuring that the new site met the needs of the different user communities, including the Fellowship, wider public, media, teachers and students. RAS Councillors gave overarching advice on its development. In addition to information on the Society and its work, features on the new site include online application forms for membership, awards and grants, and an education and outreach map.

Improving access to our collections through the website

The development of the new RAS website provided an opportunity to improve access to our collections. It is now easier to find and search the Library catalogue, and the Archive catalogue and list of Fellows' obituaries have an improved format.

Looking forward

The RAS is making plans for 2019 and the future by:

- setting objectives for our activities
- identifying specific goals for 2019

Artist's impression of the Extremely Large Telescope in action, discussed at a UK Community Day in January 2018. (ESO/L Calçada)



The President (left) and the Executive Director attended the 233rd Meeting of the American Astronomical Society from 6–10 January 2019 in Seattle, Washington, USA, where they met AAS President Megan Donahue (right). RAS Gold Medalist 2018 Prof. Sir Jim Hough (centre) gave a plenary address to the meeting and the RAS and our publishers Oxford University Press hosted a reception for Fellows. (AAS)

Objectives

The Society will:

- Publish its high-quality peer-reviewed journals
- Support students and early-career scientists through research fellowships and grants
- Recognise achievement through its medals and prizes
- Maintain high-quality research meetings, including the National Astronomy Meeting, and Public Lectures
- Sustain our Library and Archive service
- Continue our political engagement
- Maintain our programme of education and outreach activity, including the Friends of the RAS
- Promote the work of the Society and Fellows in the media and on social media
- Build our outreach work with other Courtyard Societies.

In 2019, the Society will:

- Review the code of conduct for effectiveness, and provide a statement of Society values
- Monitor our response to the Open Access publishing policy agenda
- Prepare the case for introducing a youth membership scheme aimed at school-level members and interfacing with amateur societies
- Prepare the case for introducing merchandising activity
- Enhance the benefits and support we offer to younger members
- Review our committee structures
- Set up a group of early-career members to support our policy work
- Address the concerns we have about our accommodation in Burlington House
- Increase online accessibility to our Library and Archive
- Finalise the programme of activities to celebrate our bicentenary in 2020.

Events since the year end

The President and Director held a reception for RAS Fellows at the American Astronomical Society meeting in Seattle in January.

In January, we gave evidence to government on the implementation of Plan S for scientific publishing and on the consequences of Brexit for science and scientists.

We have loaned Caroline Herschel's notebook and star atlas and a letter from Mary Somerville and works by William and John Herschel for exhibitions.

Structure, governance and management

The regulations and procedures of the Society:

- Society governance
- Trustee recruitment and appointment
- Trustee induction and training
- fundraising
- organisational structure
- risks

Governance

The Royal Astronomical Society was founded in 1820 and is incorporated by Royal Charter and managed according to byelaws that were revised at the Annual General Meeting in May 2015. The RAS's objectives, charters and byelaws are detailed on the Society's website <https://ras.ac.uk>.

The control of the Society rests with the General Meeting of Fellows. Subject to that, direction and management are the responsibility of the Council (as the Trustees of the charity). The Council consists of a President, a Treasurer and three Secretaries together with four Vice-Presidents and 12 Councillors. In addition the President-elect attends Council for one year prior to taking up post.

Trustee recruitment and appointment

Annually, the full membership of the Society is asked to nominate themselves or other members of the Society to available positions on Council. A nomination must be supported by two other members of the Society. Council approves the ballot list and this together with a narrative on each candidate is sent to the full membership for their consideration prior to casting their votes. Voting can be done electronically, by post or in person at the Annual General Meeting.

Members of the Council are elected by ballot at the Annual General Meeting, for the following normal and maximum terms of office, as set out in the byelaws. In summary:

- President, two years
- Vice-Presidents, two years
- Treasurer and Secretaries, five years
- Councillors, three years.

Trustee induction and training

New members of Council attend a Trustee induction programme before their first Council meeting. All members of Council are asked to complete a conflict of interest declaration and to sign a Trustee declaration form. Trustees have the opportunity to attend training, where appropriate; for example, on The Governance Code in 2018.

Fundraising

The Society is not currently fundraising actively, but if it does so in future it will comply with best practice as outlined by the Charity Commission, and also in compliance with GDPR. The Society offers information and guidance about leaving a legacy to the RAS on the website.

Organisational structure

The RAS Council normally meets six times during the year and its function is to direct, on behalf of the Society, all the affairs and business of the Society. Council appoints standing committees (Publications Management, Editorial (for each journal), Outreach and Education, Finance, International, Membership, Library, Astronomical Heritage, Diversity in Astronomy and Geophysics) and ad hoc committees (e.g. Awards) to forward its objectives.

It appoints the managing editors and editors of the Society's research journals, *Monthly Notices of the Royal Astronomical Society* and *Geophysical Journal International*, who provide their services, as does the Treasurer, for an honorarium.



The Gold Medal, our highest award. (RAS/SPL)

The Society has formal associations with a number of organisations having shared interests, and has less formal arrangements with several other bodies. These include:

- The British Geophysical Association, jointly sponsored by the RAS and the Geological Society of London to represent solid-Earth geophysicists whose interests fall within the remits of both parent societies
- The Paneth Meteorite Fund that the Society administers under the direction of the Paneth Fund Trustees
- The Society is the UK national member organisation of the International Astronomical Union and the European Astronomical Society and is represented on the UK Panel of the International Union of Radio Science
- The Society is represented on a number of organisations including the Science Council, the Parliamentary and Scientific Committee and the Campaign for Science and Engineering



This portrait of William Pearson and family underwent conservation work in 2018. Pearson was a founding member of the RAS.

- The Society recognises the appeal of astronomy and geophysics to the general public by offering annual membership to Friends of the RAS for a small fee. Friends' benefits include a series of Friends'-only lectures, as well as priority seating for the Society's popular Public Lectures, visits to observatories and science centres, use of the Society's Library, as well as a reduced subscription to the Society's members' magazine *A&G*.

Risks

The principal risks and uncertainties identified by the Trustees are:

- Maintenance of the quality of, and income from, publications (a significant income stream of above 60%)
- Open Access Publishing
- Affordability of rent and service charges for the premises at Burlington House.

The Finance Committee regularly reviews the Society's risk register and the Council annually reviews the major risks to which the Society is exposed and the systems that have been established to manage those risks. In regards to the three most significant risks:

The Society insists that rigorous peer review is used to maintain the quality of the two journals and thereby the demand by authors and readers for the highly successful publications and, with the publishers, ensures that it adopts a robust business model for production and sales.

The uncertainty over future rental charges remains an ongoing concern for the Society. The Society, alongside the other Courtyard Societies, continues to seek a satisfactory resolution with the landlord. The Trustees still hold the view previously stated (*Annual Report 2015*) that the Society has the resources to cover increases in rental charges over the current lease period. In the meantime, the Society will explore options for alternative accommodation if a satisfactory resolution cannot be achieved.

Other key risks identified and their mitigation measures include:

- Maintenance of the (listed) premises (by regular repair and refurbishment)
- Maintenance of the size of the membership (by regular review of services and subscriptions and outreach activities to potential new members)
- The implementation of a broad range of statutory regulation, for example GDPR (using expert external assistance where necessary).

The Trustees consider the fluctuations in investment fund values and variability of investment returns to be a risk for the Society. The fund, Newton Growth and Income Fund for Charities, is actively and expertly managed and administered by Newton Investment Management who were reappointed after a competitive tender. Funds are invested in a diverse portfolio comprising commodities, equities, bonds and gilts. This managed strategy mitigates fluctuations in fund values and seeks opportunities for fund growth and income. The Trustees consider this approach mitigates the subsequent exposure to any investment risk.



Minutes of Council Meetings.

Financial statements

Financial activities to 31 December 2018:

- financial review
- Trustees' responsibilities
- independent auditor's report
- statement of financial activities
- balance sheet
- statement of cash flows
- principal accounting policies
- notes to the financial statements

FINANCIAL REVIEW

Total income for the year increased by £301,246 to £4,483,919 (2017 – £4,182,673). Publishing income increased by £285,746. The Society's expenditure increased by £450,197 to £4,568,409 (2017 – £4,118,212), which is mainly due to support costs driven by higher Burlington House rent, staffing costs, increased publication costs and regulatory and compliance costs. The net expenditure before investment gains and losses was therefore £84,490 (2017 – net income of £64,461). Net investment losses for the year were £318,747 (2017 – gains of £692,572).

The Society's total funds decreased from £20,620,630 to £20,217,393 during the year, both figures including a large contribution from the Society's heritage assets (rare books, clocks, telescopes and fine art) which totalled £9,440,879 (2017 – £9,440,879).

Policy on reserves

The reserves policy aims to maintain adequate financial cover for the main risks to the Society and provide in the normal way for an efficient winding-up if that ever became necessary. Working cash reserves are maintained so the Society does not rely on realisation of investments gains, or capital invested. The total funds are now £20,217,393 of which £9,440,879 are held in heritage assets, leaving funds of £10,776,514 (2017 – £11,179,751) to cover the main risks and the operational needs of a going concern.

The requirement for significant reserves falls into two areas:

- The need to have contingency plans in place to maintain publication income if Open Access regulations threaten the current business model for academic journals; and
- The need to make some provision for either substantial increases in rent, and maintaining the premises, or alternatively, a change in the status of our accommodation.

The Open Access Fund and the Burlington House Fund are currently maintained at high levels to support any significant changes to the Society's operations and the General Fund is available to provide further financial support if either of these risks materialise. The General Fund is also available, should it ever be needed, to enable an orderly winding up of the Society. At present the free reserves of the Society, defined as unrestricted, undesignated funds, excluding tangible fixed assets, are £5,310,869 (2017 – £5,829,931) and these would allow operation of the Society for at least 14 months if publishing were continued and expenditure incurred during that period and 33 months if publishing

were halted. The Trustees are satisfied that the current level of reserves is appropriate given the risks and uncertainties outlined above.

It has been the policy of the Society to fund grant activity from the Research and Grants fund, which is now included in the balance of designated reserves.

Investment policy

The Trustees, by resolution, adopted a total returns approach to the invested endowment funds in accordance with the requirements of the Charity Commission believing that this approach is in the best interests of the Society. The fund reconciliation is disclosed in note 12. This approach was applied from 1 January 2015 when the value of the endowment funds at that date of £1,652,682 was used as a proxy for the original value of the endowment funds. In adopting this policy, permanent endowment funds will not be permitted to fall below this original value. The Trustees aim to maintain the real value of the permanent endowment as a measure against the movements in the retail prices index. This was 2.7% for the year (2017 – 4.1%). No amount (2017 – £178,295) was transferred to the restricted funds in the current year due to the fall in value of the fund over the year.

The Society, through its Finance Committee, reviewed its investment policy during the year, shortlisting and meeting with existing and alternative investment managers. After this thorough review, it made no changes to its investment policy, with the funds remaining with BNY Mellon in a Growth and Income Fund managed by Newton Investment Management. The Society's Investment Policy has been agreed by Council with funds being invested in stable, legally constituted bodies chosen to maximise the Society's investment return in the medium and long term.

Grant making policy

The RAS has for many years provided small grants to support the academic research community in activities not funded by the research councils. Primarily these have been awarded to help students at the start of their careers, either with funding for summer bursaries enabling them to experience working in a research environment while still an undergraduate, or to enable PhD students to present work at research conferences. The RAS has also supported scientific meetings in the UK, especially those held outside London. These broad categories of support serve the purpose of encouraging entrants to the profession and extending the activities of the Society to members and the public outside London.

In addition to these grants to individuals the Society funds a series of fellowships to promote the careers of the highest quality young postdoctoral scientists. These currently include RAS Fellowships (on any subject) and the Norman Lockyer Fellowship (in Solar and Solar Terrestrial Physics). The Norman Lockyer Fellow is funded from an endowment fund set up for that purpose.

A further activity funded by the Society is the award of medals to recognise the highest quality work in various categories. These awards are proposed to Council by a separate awards panel and no awards are made to serving councillors.

The grants, fellowships and awards are funded from two sources. The Society has its restricted and endowment funds invested with Newton Investment Management and the income and gains from these investments are used to support the grants expenditure in accordance with the bequests.

The grants panel deliberates twice a year and further grants are awarded by the Education and Outreach Committee. It comprises the Treasurer (Chair) and the three secretaries. About 220 applications are received for the two deadlines in February and in August. Exceptional grant programmes such as RAS 200 (see notes) are overseen by committees convened for the purpose. Panel members observe strict rules on conflict of interest, taking no part in decisions on grant applications from their home institutions. In addition it is usual for panel members to absent themselves from discussions on grant applications from scientists with whom they have had recent close contact, such as research students supervised in the past five years.

Key management personnel

The key management personnel of the charity in charge of directing and controlling, running and operating the charity are the Trustees, the Executive Director and the Deputy Executive Director; the latter two are employees. They are assisted by an accountant, a further three managerial level officers and other staff.

Council ensures that the RAS carries out a salary comparison exercise every 3–5 years. The comparability study compares the staff salaries to other similar external positions to reassure the Trustees that the levels of remuneration are appropriate. The last comparison exercise was carried out during the year.

This analysis included consideration of the job function, complexity and location. For the majority of posts the current salary was well aligned with those of similar posts based in London. The salaries of the key management staff members were compared with those of similar appointees in other learned societies, consideration given to the size of the organisation (financial turnover) and the number of staff employed and salary levels set to ensure that the remuneration was appropriate for the level of managerial responsibility held.

The Society does not have a performance related pay scheme. The Trustees annually consider a salary increase in regards to cost of living that applies to all staff.

Pension scheme

The Society's defined benefit pension surplus and its accounting treatment is explained in note 20 of these financial statements. This scheme is closed to new members and has four deferred members only and ten annuitants. The Society operates a defined contribution group personal pension scheme for current staff.

Legacies and donations

The Society encourages Fellows to include donations to the Society in their wills and receives sporadic donations during the year from Fellows and members of the public. During the year the Society received donations of £2,723 (2017 – £3,976) and no legacies (2017 – £33,021).

Heritage assets

The Society's collection of rare books, fine art, telescopes and clocks was valued in 2011 at approximately £9.5 million. The Society does not regard these as assets which can be converted to their cash value, except in the most dire circumstances.

The Society continues to periodically receive donated items. All such donations are gratefully received and appreciated by the Society. The Society would only obtain a valuation of the donation, if it was deemed to materially affect the overall value of the heritage asset portfolio.

Investment performance

The Newton Growth and Income fund for charities provided income of 2.8% and net losses of 4.1% in the year. Annual management charges of 0.6% are taken from the capital of the fund. Performance of the fund managers is kept under continual review. The fund remains one of the best performing funds in its class as reported by Asset Risk Consultants.

TRUSTEES' RESPONSIBILITIES IN THE PREPARATION OF FINANCIAL STATEMENTS

The Trustees are responsible for preparing the Trustees' report and the financial statements in accordance with applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

The law applicable to charities in England and Wales requires the Trustees to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the charity and of the income and expenditure of the charity for that period. In preparing these financial statements, the Trustees are required to:

- select suitable accounting policies and then apply them consistently;
- observe the methods and principles in Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their financial statements in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102);
- make judgments and estimates that are reasonable and prudent;
- state whether applicable United Kingdom Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the charity will continue in operation.

The Trustees are responsible for keeping proper accounting records that disclose with reasonable accuracy at any time the financial position of the charity and enable them to ensure that the financial statements comply with the Charities Act 2011 and the provisions of the Royal Charter and Bye Laws. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities. The Trustees are responsible for the maintenance and integrity of the charity and financial information included on the charity's website.

The Council of the Society believes that it has carried out these requirements.

AUDITORS

A resolution to appoint Buzzacott for 2019 will be proposed at the Annual General Meeting.

Approved by the Council and signed on its behalf by:

Prof. A M Cruise
President

Date:

INDEPENDENT AUDITOR'S REPORT TO THE TRUSTEES OF ROYAL ASTRONOMICAL SOCIETY

Opinion

We have audited the financial statements of Royal Astronomical Society (the 'charity') for the year ended 31 December 2018, which comprise the statement of financial activities, the balance sheet, the statement of cash flows, the principal accounting policies and the notes to the financial statements. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 'The Financial Reporting Standard applicable in the UK and Republic of Ireland' (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the charity's affairs as at 31 December 2018 and of its income and expenditure for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Charities Act 2011.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the charity in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to going concern

We have nothing to report in respect of the following matters in relation to which the ISAs (UK) require us to report to you where:

- the Trustees' use of the going concern basis of accounting in the preparation of the financial statements is not appropriate; or
- the Trustees have not disclosed in the financial statements any identified material uncertainties

that may cast significant doubt about the charity's ability to continue to adopt the going concern basis of accounting for a period of at least twelve months from the date when the financial statements are authorised for issue.

Other information

The Trustees are responsible for the other information. The other information comprises the information included in the annual report and financial statements other than the financial statements and our auditor's report thereon. Our opinion on the financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Matters on which we are required to report by exception

We have nothing to report in respect of the following matters in relation to which the Charities Act 2011 requires us to report to you if, in our opinion:

- the information given in the Trustees' annual report is inconsistent in any material respect with the financial statements; or
- sufficient accounting records have not been kept; or
- the financial statements are not in agreement with the accounting records and returns; or
- we have not received all the information and explanations we require for our audit.

Responsibilities of Trustees

As explained more fully in the Trustees' responsibilities statement, the Trustees are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the Trustees determine is necessary

to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Trustees are responsible for assessing the charity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Trustees either intend to liquidate the charity or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

Use of our report

This report is made solely to the charity's Trustees, as a body, in accordance with section 144 of the Charities Act 2011 and with regulations made under section 154 of that Act. Our audit work has been undertaken so that we might state to the charity's Trustees those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the charity and the charity's Trustees as a body, for our audit work, for this report, or for the opinions we have formed.

Buzzacott LLP
Statutory Auditor
130 Wood Street
London
EC2V 6DL

Buzzacott LLP is eligible to act as an auditor in terms of section 1212 of the Companies Act 2006.

STATEMENT OF FINANCIAL ACTIVITIES YEAR TO 31 DECEMBER 2018

	Notes	Unrestricted funds £	Restricted funds £	Endowment funds £	2018 Total funds £	2017 Total funds £
Income						
Donations and legacies	1	2,333	390	—	2,723	36,997
Other trading activities		65,230	—	—	65,230	40,106
Investment income	2	156,053	7,368	58,554	221,975	205,590
Charitable activities	3	4,193,991	—	—	4,193,991	3,899,980
Total income		4,417,607	7,758	58,554	4,483,919	4,182,673
Expenditure						
Raising funds		16,833	—	—	16,833	15,130
Charitable activities	5	4,544,764	6,812	—	4,551,576	4,103,082
Total expenditure		4,561,597	6,812	—	4,568,409	4,118,212
Net (expenditure) income before investment gains and losses						
		(143,990)	946	58,554	(84,490)	64,461
Net (losses) gains on investments	12	(223,123)	(10,688)	(84,936)	(318,747)	692,572
Net (expenditure) income and net movement in funds		(367,113)	(9,742)	(26,382)	(403,237)	757,033
Reconciliation of funds:						
Total funds brought forward at 1 January 2018		18,242,920	657,268	1,720,442	20,620,630	19,863,597
Total funds carried forward at 31 December 2018		17,875,807	647,526	1,694,060	20,217,393	20,620,630

All gains and losses for the year are recognised in the above statement. All activities are classed as continuing. The notes on pages 41 to 54 form part of these financial statements.

STATEMENT OF FINANCIAL ACTIVITIES YEAR TO 31 DECEMBER 2017

	Notes	Unrestricted funds £	Restricted funds £	Endowment funds £	2017 Total funds £
Income					
Donations and legacies	1	10,366	26,631	—	36,997
Other trading activities		40,106	—	—	40,106
Investment income	2	144,331	5,222	56,037	205,590
Charitable activities	3	3,899,980	—	—	3,899,980
Total income		4,094,783	31,853	56,037	4,182,673
Expenditure					
Raising funds		15,130	—	—	15,130
Charitable activities	5	4,042,641	60,441	—	4,103,082
Total expenditure		4,057,771	60,441	—	4,118,212
Net income (expenditure) before investment gains and losses		37,012	(28,588)	56,037	64,461
Net gains on investments	12	484,800	17,754	190,018	692,572
Net income (expenditure)		521,812	(10,834)	246,055	757,033
Gross transfer between funds	15	—	178,295	(178,295)	—
Net movement in funds		521,812	167,461	67,760	757,033
Reconciliation of funds:					
Total funds brought forward at 1 January 2017		17,721,108	489,807	1,652,682	19,863,597
Total funds carried forward at 31 December 2017		18,242,920	657,268	1,720,442	20,620,630

All gains and losses for the year are recognised in the above statement. All activities are classed as continuing.
The notes on pages 41 to 54 form part of these financial statements.

BALANCE SHEET AS AT 31 DECEMBER 2018

	Notes	2018 £	2018 £	2017 £	2017 £
Fixed assets					
Tangible assets					
. Heritage assets	11	9,440,879		9,440,879	
. Other assets	11	932,823		1,031,930	
Investments	12	7,406,189		7,724,936	
			17,779,891		18,197,745
Current assets					
Debtors	13	554,526		541,171	
Cash at bank and in hand		4,210,218		4,133,361	
		4,764,744		4,674,532	
Creditors: amounts falling due within one year	14	(2,211,595)		(2,041,318)	
Net current assets			2,553,149		2,633,214
Total assets less current liabilities			20,333,040		20,830,959
Creditors: amounts falling due after one year	14		(115,647)		(210,329)
Total net assets			20,217,393		20,620,630
The funds of the charity					
Endowment funds	15	1,694,060		1,720,442	
Restricted income funds	16	647,526		657,268	
Unrestricted income funds					
. Designated funds	17	12,564,938		12,412,989	
. General funds		5,310,869		5,829,931	
			17,875,807		18,242,920
			20,217,393		20,620,630

The financial statements were approved by Council on 10 May 2019 and signed on its behalf by

Prof. A M Cruise
President

The notes on pages 41 to 54 form part of these financial statements.

STATEMENT OF CASH FLOWS TO 31 DECEMBER 2018

	Notes	2018 £	2017 £
Cash flow from operating activities			
Net cash (used in) provided by operating activities	A	(130,280)	205,904
Cash inflow from investing activities			
Dividends and interest from investments		221,975	205,590
Purchase of tangible fixed assets		(14,838)	(31,358)
Net cash provided by investing activities		207,137	174,232
Change in cash and cash equivalents in the year		76,857	380,136
Cash and cash equivalents at 1 January 2018	B	4,133,361	3,753,225
Cash and cash equivalents at 31 December 2018	B	4,210,218	4,133,361

Notes to the statement of cash flows for the year to 31 December 2018.

A Reconciliation of net movement in funds to net cash flow from operating activities

	2018 £	2017 £
Net movement in funds (as per the statement of financial activities)	(403,237)	757,033
Adjustments for:		
Depreciation charge	113,945	112,515
Net losses (gains) on investments	318,747	(692,572)
Dividends and interest from investments	(221,975)	(205,590)
Loss on disposal of fixed assets	—	1,421
(Increase) decrease in debtors	(13,355)	47,556
Increase in creditors	75,595	185,541
Net cash (used in) provided by operating activities	(130,280)	205,904

B Analysis of cash and cash equivalents

	2018 £	2017 £
Total cash and cash equivalents: Cash at bank and in hand	4,210,218	4,133,361

PRINCIPAL ACCOUNTING POLICIES

The principal accounting policies adopted, judgements and key sources of estimation uncertainty in the preparation of the financial statements are laid out below.

Basis of preparation

These financial statements have been prepared for the year to 31 December 2018.

The financial statements have been prepared under the historical cost convention with items recognised at cost or transaction value unless otherwise stated in the relevant accounting policies below or the notes to these financial statements.

The financial statements have been prepared in accordance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their financial statements in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (Charities SORP) the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) and the Charities Act 2011.

The financial statements have been prepared to give a 'true and fair' view and have departed from the Charities (Accounts and Reports) Regulations 2008 only to the extent required to provide a 'true and fair' view. This departure has involved following the Charities SORP issued on 16 July 2014 rather than the Accounting and Reporting by Charities: Statement of Recommended Practice effective from 1 April 2005 which has since been withdrawn.

The charity constitutes a public benefit entity as defined by FRS 102.

The financial statements are presented in sterling and are rounded to the nearest pound.

Critical accounting estimates and areas of judgement

Preparation of the financial statements requires the Trustees and management to make significant judgements and estimates.

The items in the financial statements where these judgements and estimates have been made include:

- estimating the liability for multi-year grant commitments;

- estimating the useful economic life of tangible fixed assets; and
- estimating the accrual for Burlington House rent.

Assessment of going concern

The Trustees have assessed whether the use of the going concern assumption is appropriate in preparing these financial statements. The Trustees have made this assessment in respect to a period of one year from the date of approval of these financial statements.

The Trustees are fully cognisant of the risks that the Society is carrying such as the uncertainty and risks of increased rental charges for the accommodation in Burlington House, the possible risk posed by Open Access and a possible impact on the business model that relies on the publishing income and also of a low probability, albeit high impact risk, that the quality and success of the Society's publications will decrease.

Whilst recognising these risks the Trustees are content that the Society has strategies in place to manage them and are of the opinion that the Society has adequate free reserves and therefore sufficient resources to meet its liabilities as they fall due. The Reserves Policy in the Trustees' report provides more detail.

The Trustees have concluded that there are no other material uncertainties related to events or conditions that may cast significant doubt on the ability of the charity to continue as a going concern.

The most significant areas of judgement that affect items in the financial statements are mentioned above and detail provided in the section on risks in the Trustees' report.

With regard to the next accounting period, the year ending 31 December 2019, the most significant areas that affect the carrying value of the assets held by the charity are expected to be the same as for 2018.

Income recognition

Income is recognised in the period in which the charity has entitlement to the income, the amount of income can be measured reliably and it is probable that the income will be received.

Income comprises donations, investment income, income from the sale of publications, membership subscriptions, and other related income.

Donations are recognised when the charity has confirmation of both the amount and settlement date. In the event of donations pledged but not received, the amount is accrued for where the receipt is considered probable. In the event that a donation is subject to conditions that require a level of performance before the charity is entitled to the funds, the income is deferred and not recognised until either those conditions are fully met, or the fulfilment of those conditions is wholly within the control of the charity and it is probable that those conditions will be fulfilled in the reporting period.

Legacies are included in the statement of financial activities when the charity is entitled to the legacy, the executors have established that there are sufficient surplus assets in the estate to pay the legacy, and any conditions attached to the legacy are within the control of the charity.

The Society has a contract with Oxford University Press for the publication of journals, which gives a percentage of the surplus made to 31 December each year to the Society. Although payments are received net, income is recognised in the financial statements on a gross basis which reflects that the Society retains the underlying long term rights. All publication income is accounted for on a receivable basis.

Membership subscriptions are payable in respect of a twelve month period in advance. The unearned portion of income received relating to the period after 31 December is carried forward as deferred income.

Investment income is recognised once the dividend has been declared and notification has been received of the dividend due.

Interest on funds held on deposit is included when receivable and the amount can be measured reliably by the charity; this is normally upon notification of the interest paid or payable by the bank.

Expenditure recognition

Liabilities are recognised as resources expended as soon as there is a legal or constructive obligation committing the charity to the expenditure. All expenditure is accounted for on an accruals basis and has been classified under headings that aggregate all costs related to the category.

Expenditure on charitable activities includes all costs associated with furthering the charitable purposes of the charity as described in the Trustees' Report.

Grants payable for the support of research or study in any areas of astronomy and geophysics are recognised in the financial statements as soon as the obligation has been authorised by the Grants Committee, which meets twice-yearly (ca. February and August) to allocate funds, the recipient has a reasonable expectation that they will receive a grant and any condition attaching to the grant is outside the control of the Society.

The costs of raising funds consist of room hire expenditure and RAS diaries bought for resale.

Allocation of support and governance costs

Support costs, including governance costs, represent indirect charitable expenditure. In order to carry out the primary purposes of the charity it is necessary to provide support in the form of personnel development, financial procedures, provision of office services and equipment and a suitable working environment.

Governance costs comprise audit fees, legal advice for Trustees and costs associated with constitutional and statutory requirements, e.g. cost of Trustee meetings and preparing statutory financial statements as well as costs associated with the strategic management of the Society.

Support costs are apportioned based on the proportion of floor area occupied by, or proportion of staff time spent on, the activity.

Taxation

The Society is a registered charity and no liability to taxation arises on the results of its activities as applied for charitable purposes.

Operating leases

Rentals under operating leases are charged to the statement of financial activities on a straight-line basis over the term of the lease.

Pension costs

The Society operates two pension schemes for employees and former employees. The assets of the schemes are held separately from those of the Society.

The Society operates a defined benefit pension scheme for former employees, who joined its service before

1 January 2002, providing benefits based upon final pensionable earnings. Royal London manages the pension scheme, with the investments now 100% held by Royal London.

The latest actuarial valuation at 31 December 2016 shows a pension surplus which is not recognised on the balance sheet as an asset because it is not available to the Society by way of reduced future contributions.

Actuarial gains and losses arising from new valuations and from updating valuations to the balance sheet date are recognised in the statement of financial activities as other recognised gains and losses.

The Society has established a second pension scheme (a defined contribution scheme) for employees who began service with the Society after 1 January 2002. The amount charged in the statement of financial activities in respect of the defined contribution pension scheme is the contributions payable in the year.

Foreign currencies

Monetary assets and liabilities denominated in foreign currencies are translated at the rate of exchange ruling at the balance sheet date. Transactions in foreign currencies are recorded at the rate ruling at the date of the transaction. All differences are taken to the statement of financial activities.

Heritage assets

Heritage assets are included in the financial statements at a historic valuation which is being treated as deemed cost. There are two main classes of heritage assets that the Society possesses, which are:

- Rare Books and Manuscripts
- Fine Art and Collectibles – Historic books, portraits, busts, instruments and antique furniture.

The Society's rare book and manuscript collection is reported in the balance sheet at the latest valuation by Christies in 1996, with a number of items re-valued by B Quaritch Limited in 2011. The valuation basis was High Auction Estimate.

The Society's fine art and collectibles are reported in the balance sheet at the latest valuation by Bonhams in 1992, including index linking, with a number of items revalued by Bonhams in 2011.

The Society continues to periodically receive donated items. All such donations are gratefully received and appreciated by the Society. The Society would only obtain a valuation of the donation, if it was deemed to materially affect the overall value of the heritage asset portfolio.

Depreciation is not charged on heritage assets due to immateriality based on their extremely long useful lives and high residual values.

Other tangible fixed assets

The Society capitalises tangible fixed assets with a cost greater than £250 and an estimated useful life over one year.

Tangible fixed assets are depreciated on cost on a straight line basis from the date of acquisition over their expected useful lives as follows:

- Telephone and security system and computer equipment 4 years
- Leasehold Improvements 20 years
- Plant and machinery 10 years

Investments

Listed investments are a form of basic financial instrument and are initially recognised at their transaction value and subsequently measured at their fair value as at the balance sheet date using the closing quoted market price.

Realised gains (or losses) on investment assets are calculated as the difference between disposal proceeds and their opening carrying value or their purchase value where the investment is acquired subsequent to the first day of the financial year. Unrealised gains and losses are calculated as the difference between the fair value at the year end and their carrying value at that date. Realised and unrealised investment gains (or losses) are combined in the statement of financial activities and are credited (or debited) in the year in which they arise.

Debtors

Debtors are recognised at their settlement amount, less any provision for non-recoverability. Prepayments are valued at the amount prepaid.

Cash at bank and in hand

Cash at bank and in hand represents such accounts and instruments that are available on demand or have a maturity of less than three months from the date of acquisition.

Creditors and provisions

Creditors and provisions are recognised when there is an obligation at the balance sheet date as a result of a past event, it is probable that a transfer of economic benefit will be required in settlement, and the amount of the settlement can be estimated reliably. Creditors and provisions are recognised at the amount the charity anticipates it will pay to settle the debt.

Fund structure

Endowment funds comprise assets which normally must be held as capital. The returns arising therefrom are used to support specific activities determined in accordance with the wishes of the donor.

Restricted funds comprise monies raised for, or their use restricted to, a specific purpose, or contributions subject to donor imposed conditions.

Designated funds represent monies set aside out of unrestricted funds and designated by the Trustees for a specific purpose.

Unrestricted funds represent those monies which are freely available for application towards achieving any charitable purpose that falls within the Society's charitable objects.

NOTES TO THE FINANCIAL STATEMENTS

1 Donations and legacies

	Unrestricted funds £	Restricted funds £	2018 Total funds £	Unrestricted funds £	Restricted funds £	2017 Total funds £
Donations	2,333	390	2,723	3,637	339	3,976
Legacies	—	—	—	6,729	26,292	33,021
Total funds	2,333	390	2,723	10,366	26,631	36,997

2 Investment income

	Unrestricted funds £	Restricted funds £	Endowment funds £	Total funds £
Income from listed investments	149,319	7,153	56,844	213,316
Bank interest	6,734	215	1,710	8,659
2018 Total funds	156,053	7,368	58,554	221,975

	Unrestricted funds £	Restricted funds £	Endowment funds £	2017 Total funds £
Income from listed investments	142,918	5,220	56,031	204,169
Bank interest	1,413	2	6	1,421
2017 Total funds	144,331	5,222	56,037	205,590

3 Income from charitable activities

	Total funds £	Total funds £
Publications (note 4)	3,822,335	3,536,589
Membership	317,144	297,968
Scientific meetings	27,540	47,481
Public policy	453	75
Library	10,944	8,117
Educational	12,900	9,750
Other	2,675	—
Total funds	4,193,991	3,899,980

4 Publications

	2018 £	2017 £
Income		
Monthly notices of the Royal Astronomical Society	2,762,266	2,569,254
Geophysical Journal International	964,533	877,914
Astronomy & Geophysics	89,020	83,279
Other	6,516	6,142
	3,822,335	3,536,589
Expenditure		
Monthly notices of the Royal Astronomical Society	2,197,417	1,989,536
Geophysical Journal International	661,170	610,055
Astronomy & Geophysics	173,120	140,108
Other	19,290	21,160
	3,050,997	2,760,859

5 Expenditure on charitable activities

Expenditure on charitable activities is analysed as follows:

	Direct costs £	Support costs £	2018 £	Direct costs £	Support costs £	2017 £
Publications (note 4)	2,656,007	394,990	3,050,997	2,417,614	343,245	2,760,859
Scientific meetings	93,459	182,427	275,886	95,122	156,268	251,390
Membership	17,162	46,818	63,980	12,849	31,004	43,853
Educational	474,302	49,813	524,115	465,317	40,434	505,751
RAS 200	81,343	4,000	85,343	109,836	3,750	113,586
Library	97,863	348,172	446,035	84,717	243,215	327,932
Public policy	55,174	50,046	105,220	58,324	41,387	99,711
	3,475,310	1,076,266	4,551,576	3,243,779	859,303	4,103,082

Grants, fellowships and awards, in support of research, are principally included under Educational and RAS 200 above to reflect the responsibilities for the management and administration of grants. 162 grants, fellowships and awards totalling £458,814 (2017 – £545,795) were made to institutes and 47 grants, fellowships and awards totalling £23,246 (2017 – £22,465) were made to individuals. Research supported by the Sir Norman Lockyer Fellowship was deferred until 2019, and 1 research fellowship ended resulting in credits to expenditure totalling £4,928 (2017 – £42,440). 1 grant supporting the Milne Travel Fund, awarded in 2016, was unclaimed and written back to expenditure totalling £1,250 (2017 – £18,941).

Total grant making support costs were £25,000 (2017 – £24,750).

A full list of all grantees and analysis can be found on the Society's website.

All expenditure on charitable activities is unrestricted except for £6,812 which is restricted (2017 – credit to expenditure of £60,441).

6 Support costs

Support costs analysed by function are as follows:

	2018 £	2017 £
Executive	133,137	78,298
Finance	68,106	63,949
Facilities	85,417	67,838
Membership	31,382	27,299
IT	56,209	50,110
Policy development and Press	72,875	67,191
Burlington House	147,616	121,364
Other	343,917	273,878
Governance (note 7)	137,607	109,376
	1,076,266	859,303

Staff time (based on a review of staff time apportionment) and floor area, are used as bases of apportioning support costs over charitable activities.

7 Governance costs

	2018 £	2017 £
Auditor's remuneration (note 8)	21,150	20,750
Trustees' and Committee costs	30,668	25,234
AGM expenses	4,948	4,962
Staff time and other expenses	80,841	58,430
	137,607	109,376

8 Net (expenditure) income for the year

This is stated after charging:

	2018 Total funds £	2017 Total funds £
Depreciation	113,945	112,515
Auditor's remuneration:		
. Charity audit	15,000	15,000
. Pension scheme audit	4,000	4,000
. Other services	2,150	1,750
Operating lease rentals		
. Office equipment	12,878	11,536

9 Staff costs and remuneration of key management personnel

	2018 £	2017 £
Wages and salaries	810,378	708,459
Social security costs	77,667	66,336
Pension costs (see note 20)		
. Stakeholder pension scheme	63,820	56,239
. Death in service contributions	5,985	4,091
	957,850	835,125

During the year one employee of the Society earned between £70,000 and £80,000 (2017 – nil) and one employee earned between £60,000 and £70,000 (2017 – one). Employer contributions to the stakeholder pension scheme for employees earning over £60,000 were £13,635 (2017 – £6,490).

The average number of employees was 21 (Administration 6, Outreach 1, Editorial 9, Library 2, House 2, Press & Policy 1) (2017 – 19).

The key management personnel of the charity in charge of directing and controlling, running and operating the charity on a day to day basis comprise the Trustees and the Executive and Deputy Executive Directors. The total remuneration (including taxable benefits and employer's pension and national insurance contributions) of the key management personnel for the year was £165,953 (2017 – £127,824).

10 Transactions with Trustees

The Trustees receive reimbursement for travel expenses actually incurred in attending meetings. The amount reimbursed during the year for 26 Trustees was £14,119 (2017 – £13,837).

Remuneration of £5,691 was paid to one Trustee during 2018 (2017 – £5,489). By agreement with the Charity Commissioners (dated 14 June 2004, case No. 299189, Sealing No. 344/04) the Treasurer is paid an Honorarium.

Grants made to Councillors

The following grants were made to Councillors during the year as part of the RAS grant awarding process. The recipients had no influence or part in the decisions on the award of these grants. For the most part the grant holders were not the main personal beneficiaries as the support was directly received by their students or meeting attendees. Excluding Councillors from the grants round completely is not seen as a satisfactory policy. It would strongly dissuade members from standing for election as Councillors and would be at variance with the accepted practice in Research Councils where members of grants panels are not excluded from applying. The process of grant review and award fully complies with the Nolan Principles and closely follows Government Research Council practice. The grants were:

- Sir Norman Lockyer Memorial Trust as disclosed in note 22 (which shares the same Board of Trustees as the Society)
- Paneth Meteorite Collection as disclosed in note 22. Dr Nigel Berman, Treasurer, is a Trustee
- Flare-driven (3-minute) Oscillations in the Solar Chromospheres, supervised by Prof. Lyndsay Fletcher, University of Glasgow, Councillor and Secretary, Bursary, £1,200 (2017 – £1,200)
- Binding energy of biomolecules on ice-covered grains in the interstellar medium, supervised by Prof. Brad Gibson, University of Hull, Councillor, Bursary £1,200 (2017 – £1,200)
- Support to carry out an observing run in Chile, supervised by Dr Stacey Habergham-Mawson, Liverpool John Moores University, Councillor, Grant, £800
- Mary Adela Blagg Memorial, Kevin Kilburn, Councillor, Grant £500
- Frontiers of Seismology 2019, supervised by Prof. Anton Ziolkowski, University of Edinburgh, Councillor, Grant, £1,500.

Other support funding made to Councillors

- Dr Sheila Peacock, Councillor, is also a committee member of the British Geophysical Association which received funding of £4,000 (2017 – £4,000)
- Prof. M Bode, Councillor, is working with the European Astronomical Society (EAS) as a special representative in Brussels. The Society provided funding to the EAS of £8,755 (2017 – £4,407) to support this work.

11 Tangible fixed assets

(a) Heritage assets

	Rare books and manuscripts £	Fine art and collectibles £	Total £
At 1 January 2018 and at 31 December 2018	4,951,500	4,489,379	9,440,879

In 2015 net disposals for rare books and manuscripts (£100,000) and fine art and collectibles (£48,870) were made. There have been no other recorded movements in the five years ended 31 December 2018.

The rare book collection is preserved by storing in an air-conditioned, temperature-controlled environment; the fine art and collectibles are also continually preserved in order to maintain their values.

Certain heritage assets are on public display at exhibitions. The Society's Librarian controls access to those heritage assets which are kept at Burlington House.

(b) Other assets

	Leasehold improve- ments £	Plant and machinery £	Telephone, security & computer equipment £	Past Presidents' Portraits £	Total £
Cost					
At 1 January 2018	1,878,405	24,825	261,764	9,466	2,174,460
Additions	—	604	14,234	—	14,838
At 31 December 2018	1,878,405	25,429	275,998	9,466	2,189,298
Depreciation					
At 1 January 2018	918,668	5,387	218,475	—	1,142,530
Charge for the year	93,963	2,533	17,449	—	113,945
At 31 December 2018	1,012,631	7,920	235,924	—	1,256,475
Net book values					
At 31 December 2018	865,774	17,509	40,074	9,466	932,823
At 31 December 2017	959,737	19,438	43,289	9,466	1,031,930

12 Investments

	2018 Total funds £	2017 Total funds £
Market value at 1 January 2018	7,724,936	7,032,364
Net unrealised investment losses	(318,747)	692,572
Market value at 31 December 2018	7,406,189	7,724,936
Historical cost as at 31 December 2018	4,917,081	4,917,081

Investments comprise BNY Mellon: Global Growth and Income Fund.

The permanent endowment fund investments and movements in the unapplied total return are set out below.

	Trust for investment £	Unapplied total return £	Total endowment £
At 1 January 2018	1,652,682	67,760	1,720,442
Add: Total return			
. Investment income		58,554	58,554
. Net losses on listed investments		(84,936)	(84,936)
		(26,382)	(26,382)
At 31 December 2018	1,652,682	41,378	1,694,060

	Trust for investment £	Unapplied total return £	Total endowment £
At 1 January 2017	1,652,682	—	1,652,682
Add: Total return			
. Investment income		56,037	56,037
. Net gains on listed investments		190,018	190,018
		246,055	246,055
Less:			
. Allocation to income in the year		(178,295)	(178,295)
At 31 December 2017	1,652,682	67,760	1,720,442

When adopting total applied return with effect from 1 January 2015, in the absence of reliable records of the original donations, the Trustees considered that the market values of the investments as recorded as at 1 January 2015 were appropriate to be considered as the initial value of the trust for investment. Since that figure sets the baseline below which disposals may not be made, taking a higher value than the actual original donations was considered to be prudent.

The Trustees have resolved that they wish to maintain the real value of the permanent endowment using the retail price index as a measure. Due to the net reduction in the fund value, no transfers to the restricted funds were made in 2018.

13 Debtors

	2018	2017
	£	£
Trade debtors	42,769	45,892
Prepayments and accrued income	504,757	489,417
Other debtors	7,000	5,862
	554,526	541,171

14 Creditors**(a) Amounts falling due within one year**

	2018	2017
	£	£
Trade creditors	25,810	40,372
Accruals	435,292	232,436
Grants payable	479,735	520,423
Tax and social security	204,040	202,236
Deferred income	1,030,736	1,019,288
Other creditors	35,982	26,563
	2,211,595	2,041,318

(b) Amounts falling due after more than one year

	2018	2017
	£	£
Grants payable	115,647	210,329

(c) Deferred income

	2018	2017
	£	£
Balance as at 1 January 2018	1,019,288	912,382
Released to income	(1,019,288)	(912,382)
Income received from Fellows in advance	80,736	69,288
Publications income received in advance	950,000	950,000
Balance as at 31 December 2018	1,030,736	1,019,288

15 Endowment funds

	1 January 2018 £	Income £	Investment losses £	31 December 2018 £
Research and Grants funds:				
. Sir Norman Lockyer fund	1,330,237	45,273	(65,672)	1,309,838
. Other funds	133,475	4,542	(6,590)	131,427
	1,463,712	49,815	(72,262)	1,441,265
Benevolent fund	83,772	2,852	(4,135)	82,489
Library fund	39,793	1,355	(1,965)	39,183
Lectures and awards fund	133,165	4,532	(6,574)	131,123
	1,720,442	58,554	(84,936)	1,694,060

	1 January 2017 £	Income £	Investment gains £	Transfers £	31 December 2017 £
Research and Grants funds:					
. Sir Norman Lockyer fund	1,277,845	43,328	146,921	(137,857)	1,330,237
. Other funds	128,218	4,347	14,742	(13,832)	133,475
	1,406,063	47,675	161,663	(151,689)	1,463,712
Benevolent fund	80,473	2,729	9,252	(8,682)	83,772
Library fund	38,226	1,296	4,395	(4,124)	39,793
Lectures and awards fund	127,920	4,337	14,708	(13,800)	133,165
	1,652,682	56,037	190,018	(178,295)	1,720,442

The transfer of £178,295 in 2017 from the endowment fund to the restricted income fund was the extraction of investment income from the total return on fixed asset investments.

16 Restricted income funds

	1 January 2018 £	Income £	Expenditure £	Investment losses £	31 December 2018 £
Research & Grants fund	481,545	3,643	(2,225)	(5,284)	477,679
Benevolent fund	23,927	—	(1,283)	—	22,644
Library fund	29,712	617	—	(895)	29,434
Education fund	91,320	3,498	(1,000)	(4,509)	89,309
Lectures and awards fund	30,764	—	(2,304)	—	28,460
	657,268	7,758	(6,812)	(10,688)	647,526

	1 January 2017 £	Income £	Expenditure £	Investment gains £	Transfers £	31 December 2017 £
Research & Grants fund	346,461	28,637	(53,241)	7,999	151,689	481,545
Benevolent fund	15,685	—	(440)	—	8,682	23,927
Library fund	26,686	547	(3,500)	1,855	4,124	29,712
Education fund	81,901	2,669	(1,150)	7,900	—	91,320
Lectures and awards fund	19,074	—	(2,110)	—	13,800	30,764
	489,807	31,853	(60,441)	17,754	178,295	657,268

The Restricted Funds are consolidated into five groups to serve the Council's priorities and address modern needs: Research & Grants, Benevolent, Library, Education and Lectures & Awards. A detailed fund summary can be found on the RAS website.

The restricted funds were classified to either Restricted (R), Endowment (E), Designated (D), or General (G) funds:

Research & Grants fund

E AG Stillhamer Trust Fund (1937)
D EW Brown Trust Fund (1939)
E Plummer Bequest (1946)
G General
R Victor Nadarov Fund (1950)
E Sir Norman Lockyer Memorial Trust (1990)
R Hosie Bequest (2000)
D Mrs J.M. Jelley-Freeman Bequest (2000)
D CAG Bearpark Trust (2000)
R Patricia Tomkins Fund (2011)
G Special Purposes Fund
E E A Milne Travel Fund (2013)
R R Potter Research Fund (2017)

Benevolent fund

E Lee & Jansen Trust Fund (1834/1879)

E Gerald Merton Fund (1986)

G Donald R. Barber Fund (2001)

Library fund

E Turnor Fund and Horrocks Memorial Fund (1853/1876)
E Harry Watson Memorial Fund (1923)
E Warin Bushell Fund (1964)
E Gaythorp Bequest (1969)
E Ian Ridpath Conservation Fund (2006)
R Dewhurst Fund (2013)

Education fund

R Newbigen Fund (1990)
R Michael Penston Memorial Fund (1991)
R Sir William Hunter McCrea Memorial Fund (2000)

R Paul Ruffle Memorial Fund (2014)

D Education Committee

Lectures & Awards fund

E Hannah Jackson-Gwilt Trust Fund (1861/1893)
E George Darwin Lectureship Fund (1926)
E George Darwin Support Fund
D AS Eddington Commemoration Fund (1948)
E Harold Jeffreys Lectureship Fund (1962)
E AT Price Medal Fund (1999)
E Gerald Whitrow Memorial Lecture Fund (2001)
E Fowler Prizes Fund (2004)

17 Designated funds

	1 January 2018 £	New designation £	Utilised/ released £	31 December 2018 £
Burlington House fund	928,692	—	(93,964)	834,728
Heritage Asset fund	9,440,879	—	—	9,440,879
Building fund	935,766	—	93,964	1,029,730
Open Access fund	400,000	—	—	400,000
RAS 200	434,716	—	(81,343)	353,373
RAS 2020	—	400,000	(10,541)	389,459
Research and grants fund	272,936	—	(156,167)	116,769
Total designated funds	12,412,989	400,000	(248,051)	12,564,938

	1 January 2017 £	New designation £	Utilised/ released £	31 December 2017 £
Burlington House fund	1,022,796	—	(94,104)	928,692
Heritage Asset fund	9,440,879	—	—	9,440,879
Building fund	841,662	94,104	—	935,766
Open Access fund	400,000	—	—	400,000
RAS 200	544,552	—	(109,836)	434,716
Research and grants fund	393,227	—	(120,291)	272,936
Total designated funds	12,643,116	94,104	(324,231)	12,412,989

(i) Burlington House fund

Under lease agreements signed in 2005 with the Department of Communities and Local Government (previously Office of the Deputy Prime Minister – ODPM), the Society and four others in the Burlington House courtyard secured future occupancy on the basis of paying rent and additionally, being responsible for the external fabric of the building, following a renovation programme, carried out by the ODPM in mid-2006. In 2006–7, the Society executed a refurbishment project on the interior of the apartments. Expenditure incurred on the project has been capitalised and designated as the Burlington House fund.

(ii) Heritage Asset fund

A fund has been established to include the Society's heritage assets to recognise that there is no intention to dispose of these assets and the amount is not readily available to meet expenditure.

(iii) Building fund

The repairs and maintenance of the exterior of the building, its insurance and some security costs are carried out by the landlord for all the occupants and a proportion recharged to the Society. The Building Fund should provide for internal and external maintenance of the building and provide for the possibility, at the end of lease, if necessary, to obtain a building for the Society's use. The Finance Committee will recommend how much more to accumulate in this fund and at what rate. The timescale for expenditure is difficult to forecast but in principle could start within five years.

(iv) Open Access fund

A fund has been established to provide against the risk of the possible collapse of the current business model for learned publishing due to various forms of open access. The timescale for expenditure is difficult to forecast but could in principle start within five years.

(v) RAS 200

The original fund balance of £1,000,000 was the total committed grant expenditure for RAS 200. RAS 200 grant expenditure is being charged to this fund from 2015 to 2022.

(vi) RAS 2020

This represents the estimated expenditure associated with the RAS bicentenary celebrations, associated events and activities.

(vii) Research and grants fund

This represents those funds to be used for research and grants.

18 Analysis of net assets between funds

Fund balances at 31 December 2018 are represented by:

	General funds £	Designated funds £	Restricted funds £	Endowment funds £	2018 Total funds £
Tangible assets					
. Heritage assets	—	9,440,879	—	—	9,440,879
. Other fixed assets	92,301	840,522	—	—	932,823
Investments	3,562,826	1,501,777	647,526	1,694,060	7,406,189
Current assets					
. Debtors	554,526	—	—	—	554,526
. Cash at bank and in hand	3,122,359	1,059,982	27,380	497	4,210,218
Current liabilities	(1,971,143)	(212,575)	(27,380)	(497)	(2,111,595)
Non-current liabilities	(50,000)	(65,647)	—	—	(115,647)
Total net assets	5,310,869	12,564,938	647,526	1,694,060	20,217,393
	General funds £	Designated funds £	Restricted funds £	Endowment funds £	2017 Total funds £
Tangible assets					
. Heritage assets	—	9,440,879	—	—	9,440,879
. Other fixed assets	103,238	928,692	—	—	1,031,930
Investments	4,024,302	1,455,127	525,065	1,720,442	7,724,936
Current assets					
. Debtors	541,171	—	—	—	541,171
. Cash at bank and in hand	3,006,447	930,206	134,568	62,140	4,133,361
Current liabilities	(1,753,995)	(222,818)	(2,365)	(62,140)	(2,041,318)
Non-current liabilities	(91,232)	(119,097)	—	—	(210,329)
Total net assets	5,829,931	12,412,989	657,268	1,720,442	20,620,630

19 Leasing commitments

At 31 December 2018, the charity had total future minimum commitments in respect of non-cancellable operating leases as follows:

	2018 £	2017 £
Office equipment		
Amounts payable within one year	11,824	10,687
Amounts payable between two and five years	5,240	15,513
	17,064	26,200

20 Pension schemes

The Scheme's actuary carried out a triennial review of the defined benefit scheme as at 1 January 2016; the actuarial valuation showed that the market value of the Scheme's assets was £721,000, which represents 155% of the benefits that accrued to members after allowing for expected future increases in earnings. The actuary has calculated that no contributions are payable from 1 January 2016.

Pension costs comprise £63,820 (2017 – £56,239) in respect of the defined contribution scheme and £5,985 (2017 – £4,091) in respect of Death in Service contributions.

Retirement benefits disclosure under FRS102

The actuarial valuation for FRS 102 purposes, at 31 December 2018, shows a pension surplus of £362,000 (2017 – £353,000) which cannot be recognised as this is not available to the Society by way of reduced future contributions.

The amounts recognised in the balance sheet are as follows:

	2018 £'000	2017 £'000
Present value of funded obligations	(461)	(493)
Fair value of scheme assets	823	846
Surplus not recognised	(362)	(353)
Surplus in scheme at end of the year and available to the Society	—	—

Changes in the present value of the defined benefit obligations are as follows:

	2018 £'000	2017 £'000
Opening defined benefit obligation	493	426
Interest cost	12	11
Re-measurement arising from changes in assumptions and experience	(44)	56
Closing defined benefit obligation	461	493

Changes in fair value of scheme assets are as follows:

	2018 £'000	2017 £'000
Opening scheme assets	846	795
Interest Income	21	21
Actual return on plan assets, excluding interest income	(44)	30
Closing scheme assets	823	846

The amounts recognised in other recognised gains and losses are as follows:

	2018 £'000	2017 £'000
Remeasurement of defined benefit obligation	(44)	56
Return on plan assets	44	(30)
Effect of surplus restriction	—	(26)
Total	—	—

The actual return on scheme assets was negative £23,000 (2017 – £51,000).

The major categories of scheme assets as a percentage of total scheme assets are as follows:

	Fair value of scheme assets	
	2018 %	2017 %
Equities	40	46
Bonds	19	16
Property	15	16
Cash	8	5
Gilts	18	17
	100	100

Principal actuarial assumptions at the balance sheet date (expressed as a weighted average):

	2018 %	2017 %
Discount rate at 31 December	2.9	2.5
Retail Prices Index	3.4	3.4
Consumer Prices Index	2.5	2.5
Increases in deferment	2.5	2.5
Future pension increases – pension earned before 6 April 1997	0.0	0.0
Future pension increases – pension earned after 6 April 1997	3.4	3.4

The current mortality rate assumptions include sufficient allowance for future improvements in mortality rates. The assumed life expectancy for a pensioner retiring at 65 on the balance sheet date is:

	2018	2017
Retiring now		
Male	21.8	21.9
Female	23.7	23.8
Retiring in 20 years		
Male	22.8	23.1
Female	24.9	25.0

Amounts for the current and previous four periods are as follows:

Defined benefit pension scheme:

	2018	2017	2016	2015	2014
	£'000	£'000	£'000	£'000	£'000
Defined benefit obligations	461	493	426	301	301
Scheme assets	823	846	795	721	707
Surplus	362	353	369	420	406

21 Grants committed

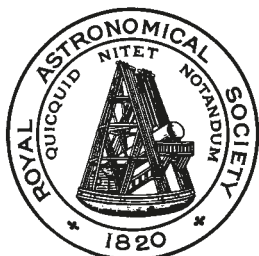
Grants, principally fellowships and travel and research grants to the value of £715,000 have been committed for future payment, subject to certain conditions, specified by the Society, having been met (2017 – £500,000). These grants were not approved or communicated to the recipients until after the year end and therefore have not been accounted for in the year ended 31 December 2018.

22 Connected Charities and related party transactions

Since 2001, the Society has been the administration agent for the Trustees of FA Paneth Meteorite Collection, a charity connected to the Royal Astronomical Society. The Paneth Trustees decided that its income should support research in cosmochemistry by graduate and postdoctoral students. The accumulated net expenditure of £27,380 (2017 – £26,115), is included in other creditors. 8 grants were awarded totalling £9,495 (2017 – £9,100). Total income was £10,761 (2017 – £10,299).

The Society also administers the Sir Norman Lockyer Memorial Trust, (charity registration number 900135). By agreement with the Charity Commission the Society includes the following information within these financial statements. Each charity remains a separate legal entity. The Norman Lockyer Fellowship is awarded to enable an outstanding researcher to devote the majority of their time to research on an astronomical topic, including solar system and planetary science. They are named after Sir Norman Lockyer (1836–1920), pioneering solar astronomer and discoverer of helium. The fellowship is available every three years, with applications sought in the years 2013, 2016, 2019 etc for fellowships starting in the following year. The fellowship is open to those who hold a doctorate from a recognised institution of higher education at the time of taking up the award. Applicants must normally be 30 years of age or younger on 1 October of the year of appointment. The Society funds Fellows between spine points 35 and 40 (inclusive) on the UCU HE Framework single pay spine. The Norman Lockyer Fellowship is currently funding a three year fellowship from October 2017, totalling £156,000. The fund balance, including the unspent balance in the restricted fund is £1,662,552 (2017 – £1,680,988).

Transactions involving Trustees are disclosed in note 10.



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