BULLETIN

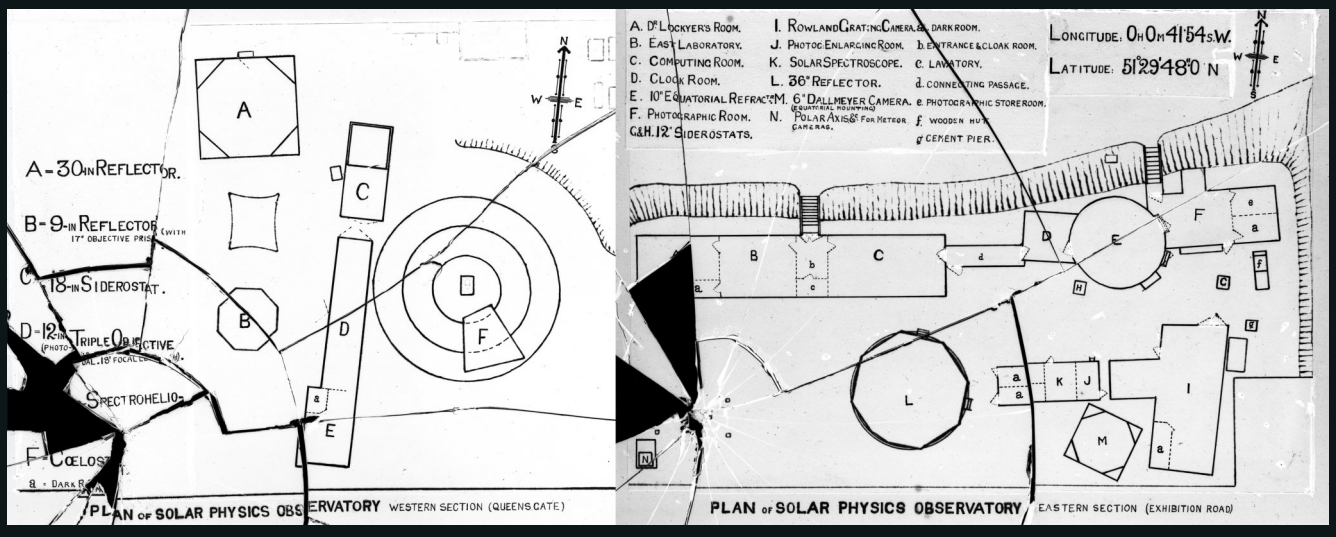
ISSUE 37 SPRING 2022

South Kensington's Solar Observatory

When was James Bradley born?

Michael Hoskin remembered

20th Anniversary Quiz



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EDITORIAL

A lot can happen in two decades and it is possible to reflect on the years since 2002 with a vast range of emotions and reactions. The SHA has formed and blossomed in that time and continues to thrive and now has two new Vice-Presidents. The study of how Astronomy has evolved and burgeoned has occurred alongside the development of the subject itself and there will always be fresh revelations and interpretations to share. Prof. Virginia Trimble is an eminent astronomer whose considerably body of work stretches back a good deal further than twenty years and, as we publish the second part of her article, it is a delight to hear of her recent election as a fellow of the American Academy of Arts & Sciences. At the same time, we lament the passing of Dr Michael Hoskin, who served as our Vice-President with dedication and distinction and for which we are enormously grateful. We reflect with fondness on his life of accomplishments in an obituary and he is sadly missed but will have shared our joy and pride in this anniversary year.

KAPW

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From feminine shadows: some female influences in the life of Eddington (Part 2)

In this, the second of two articles, the distinguished astronomer **Virginia Trimble** *discusses, from a personal perspective, how a number of women may have influenced Arthur Stanley Eddington.*

Allie Vibert Douglas

Allie Vibert Douglas (15 December 1894, Montreal, Canada - 2 July 1988, Kingston, Ontario, Canada, Figure 1) was primarily a Canadian astronomer, probably the first Canadian woman with a PhD in the subject and definitely the first woman president of the Royal Astronomical Society of Canada (RASC). She spent time in England, first as a child with her older brother, George, after their parents died, then during World War I, again with him, but doing statistical work for the UK defence effort, for which she was awarded an MBE. Finally, she spent time in Cambridge, 1921 - 23, while she was working on her PhD, awarded in 1926. That Cambridge period was spent partly under the tutelage of Eddington, making her the only female co-author he ever had [1]. The middle name shared with her brother suggests that their mother's birth surname might have been Vibert. She was baptised at St James in Montreal, so there may be relevant records there.

Alan H. Batten calls her Alice in the Canadian Encyclopaedia, (one of many short articles that comes up when you ask Google to tell you about her) though she was Allie to her closest friends. She was probably psychologically and spiritually in tune with Eddington. In 1938 [2] she expressed faith that there is order in the universe and that cosmic harmony exists. She also emphasizes, writing in 1929, the unity of the sciences, saying that "you cannot solve the riddle of the stars without invoking the aid of the atom, nor can you fully comprehend the atom without the aid of the stars".

Brother George earned honours in mathematics and physics at McGill in 1912. Her early degrees (BA and MSc) were from Montreal in 1920 and 1921. Her PhD came from McGill University when she was part of the Faculty of Physics and Astronomy until 1939 when she moved to Queen's University, Kingston, Ontario as Dean of Women (1939 - 58), after serving also as a professor of astronomy until retirement in 1964 at the age of 70. She remained an active attender of astronomical conferences and writer of short articles for JRASC essentially until her death. She also published papers on stellar astronomy, often using data from the Dominion Astrophysical Observatory. She was RASC president 1943 - 45 (with many of the male members undoubtedly being employed in war work) and received honorary degrees from McGill, Queensland University (Australia) and Queen's (an LLD in 1975). Asteroid 3269 and a crater (patera) on Venus were named for her after her death.

Douglas was a fellow of the Royal Astronomical Society and president (1947 - 50) of the International Federation of University Women. One source and (certainly until recently) her Wikipedia page claim her as the first Canadian president of the International Astronomical Union, which is definitely not true (there has never so far been a Canadian president).

Her death was somewhat belatedly reported in Information Bulletin No. 62 (page 38) as "Dr A V Douglas (Canada) 27 Juillet 1988". (That same issue has D S Evans among the resignations.) She attended 12 IAU GAs by her own count and provided reports on many of them in the journal of the RASC.

Now, years after Eddington's death, many of his papers were dispersed or destroyed [3]. Thus, when sister Winifred Eddington asked friend Charles John Agnew Trimble to write a biography of her brother, this was already going to be a challenge starting as late as 1952, when he appealed to readers of *Observatory* to help out [4]. Some other things became available after her death in 1954 but, meanwhile, Winifred and Charles had asked AVD to provide an astronomical, technical part for the biography. Trimble decided he could not write

Figure 1: Allie Vibert Douglas , 1884 - 1988 (Wikimedia Commons)

it at all, and handed it over to Dr Douglas. He gave her the notes, assorted correspondence and clippings he had collected and provided many personal reminiscences of holiday expeditions with Eddington, of which she made considerable use.

It is clear from Douglas [5], especially in the closing chapters, that she was firmly of the opinion that Eddington's three philosophical books, spiritual ideas and the work towards a fundamental theory (somehow combining relativity and quantum mechanics, as Einstein continued to attempt for another decade) were as sound and as important as his work on stellar structure, radiation pressure, stellar velocities and so forth. ASE himself said that perhaps seven people would understand what he was trying to do. I am definitely not one of them and never even tried after Richard Feynman said the first mistake (of a mathematical nature) occurred on the seventh page.

AVD is not at all intrusive in her own book, but she makes clear that she has started working at the Cavendish Lab (then under Ernest Rutherford) and came to astronomy with Eddington's encouragement. He did not need to tell her to leave England if she wanted to be an astronomer because she was already planning to return to Canada. She was not yet in England to attend the famous 1919 Lecture at Trinity College but provided a description by "Mr L A Pars of Jesus College" who was not overwhelmed in quite the way that Cecilia Payne was. Her description of a session of his lecture course and of a session in the observatory office with him are wholly laudatory: "His helpfulness and patience were unfailing". Of course, he also had very firm arguments with Jeans and others, both at RAS meetings and in print, and she soft-pedals his treatment of Chandrasekhar to the point where one is left feeling that Eddington might have been right.

On the other hand, letters, articles, etc, dealing with political, philosophical and religious or spiritual issues cited by Stanley do not appear in her list of Eddington's publications, which was taken over whole by Evans [6]. The readily accessible photographs of Douglas show her fairly late in life, but on at least one occasion, she appears in colour at age 78 wearing lipstick—I don't think Payne ever did.

A Modest Puzzle

Cecilia Payne and A. Vibert Douglas overlapped in Cambridge, England, 1921 – 23. Both conversed with Eddington, used the observatory library and were invited to tea by his mother and sister. They were surely the only women seriously interested in astronomy there and then. Nevertheless, neither mentions the other in the books featured here, Payne's autobiography and Douglas's biography of Eddington. Douglas does mention Harwood, Vinter-Hansen and Dr Anna N. Bidder of the Cambridge Friends Meeting and a few other women, but not Cecilia.

On the other hand, indeed in Haramundanis's *The Dyer's Hand* [7], appear several of Payne's friends from her Newnham College days and a number of her women colleagues from Harvard, but not a word about Allie.

How they Lived

The address from which Trimble wrote to *Observatory* Magazine in 1952 was 151 Yarborough Road in Lincoln. Google maps provided a front view of a semi-detached, two-storey Victorian building. Because it is for sale, or has been recently (for something like £330 000) another website provided a bunch of photographs and a floor plan. After staring for a moment, I was astounded to realise that I have lived in that house—or, at any rate, in a house with precisely the same floor plan at 24 Eltisley Avenue in Cambridge. Evans [6] describes

the floor plan of the Weston-super-Mare house in which Eddington grew up: just the same, except limestone rather than red brick. And he goes on to say that "we can be quite confident of the interior arrangements, since I was born in a somewhat less opulent house of similar plan, and many of my relatives lived in such houses—though over time they tended to undergo interior modification and gentrification". That last point is clearly true: 151 now has one and a half bathrooms (the half at the back of the ground floor and the full carved out of one of the four upstairs bedrooms). Number 24 in my time had a sort of indoor bathroom at the back and hot and cold water both upstairs (which was rented out separately) and down.

Another indication of how life was lived at that time are examples in the two Usherwood and Trimble *Practical Mathematics* [8]. Exercise XXXVIII begins: "The workers at a factory are 235 men, 171 women and 29 children." Child labour was clearly not forbidden and stay-at-home women not very common. XLII.5 says: "A carriage wheel of diameter 7 feet makes 60 revolutions per minute. Find the speed of the carriage in feet per second and miles per hour. Pi = 3 1/7." About the same as the average speed on the Hollywood Freeway (around 5 mph) and our wheels are smaller.

Likewise, from a certificate examination, question II: "In a working week of 52 hours a youth earns 16s 3d. What should he earn if his week were shortened to 48 hours but his working speed increased 10 per cent?" An English pound was worth 4.87 USD. Question XL. 2: "A motor car travels 18 miles in 54 minutes…" Not much faster than that carriage and the only person I've ever heard call them motor cars without humorous intent was Malcolm Longair, who grew up in Scotland.

Yes, life was different 100 years ago, but let us return to Eddington with two last problems from Usherwood and Trimble. Problem VI.2: "The distance between two towns is *m* miles. A cyclist leaves one town and cycles towards the other at 12 miles an hour for two hours. How far away is he from the other town?" ASE is well known to have been an enthusiastic cyclist having, toward the end of his life, cycled at least 61 miles on 61 days (and yes, the Eddington Cycling Number long exceeds the h index). In fact, Vibert Douglas [5] quotes from his cycling journal 171 entries of 65 miles or more, speed not mentioned, but with the single-geared cycles of the time, 12 mph was probably reasonable for an expert.

And to return to the houses, Exercise III.7 gives us: "If the frontage of a house is 30 feet and there are 25 such houses in a terrace and there are no spaces between the houses, what is the length of the terrace?" The front rooms of 151 Yarborough Road and 24 Eltisley Avenue were more like 15 feet than 30 wide so the exercise must mean a pair of mirror image homes or a more prosperous neighbourhood then theirs. Evans suggests a likely pre-WW1 price for the canonical house of about £300 or less (page 41).

Further mentions

Vibert Douglas in the preface acknolwledges "Mrs. Isabel C. Eddington of Norwich whom I was privileged to visit in 1955." Since ASE had no brothers, the closest connections these could be are wives of male cousins, sons of brothers of Arthur Henry Eddington (1850 - 1884). Mentioned as present at the memorial service in Trinity College Chapel on 27 November 1944 is John Eddington, a cousin of Winifred and therefore of ASE. English census and parish records exist for the late 19th and early 20th centuries and a skilled hunter could surely learn more about these family members. But C. J. A. Trimble was also at the memorial service and it is high time we turned to him. Eddington, incidentally, was cremated and "the casket interred….behind the Observatory in St Giles' cemetery beside the grave of his mother.

In 1980, Ellen Dorrit Hoffleit (b. 1907 Florence, Alabama, d. 2007, New Haven, Connecticut; PhD 1938, Harvard, under Harlow Shapley) was compiling an obituary of Payne-Gaposchkin. In the process, she asked Allie Vibert Douglas (presumably by mail) for her recollections of Payne as an undergraduate at Cambridge. A three-page reply exists as a photocopy in the archives of the Bohr Library at the American Center of the History of Physics. Unfortunately, at the time of writing, the ACHP is closed and no-one from the director down is allowed in the building. An emailed scan of the letter, however, makes clear that they attended some of the same lectures by Eddington, Smart and Milne; won a Newnham College student canoe race, with Cecilia paddling bow and Allie stern; and met many times over the years at IAU and other astronomical gatherings, including that 1924 Toronto meeting where they both signed the same menu back. Some lines are missing from the scan, but after Eddington died, there was apparently some question of Cecilia writing the biography but his sister felt that he would have wished Allie to do it. AVD wrote, however, "she would have done a great job, I am sure" and, earlier in the letter, "Cecilia was a remarkable woman." ASE gave them both tickets to the Royal Society receptions honouring the 100th anniversary of the RAS and they went together in long dresses and white gloves.

Other Women Astronomers

Margaret Harwood (1885 - 1979, Figure 2) makes an appearance in the Douglas biography, [5] on page 33, because she and Eddington were both among the 261 participants at the Leiden General Assembly of the IAU in 1928. Each had there, at one of the receptions, what they claimed was their first glass of champagne and possibly their second and third as well. Harwood held degrees from Radcliffe (1907) and the University of California (1911).

She was a Unitarian, belonging to the American

Figure 2: Margaret Harwood, 1885 - 1979 (Wikimedia Commons)

Astronomical Society (AAS) and the RAS as well as the IAU. She was the first director (1919 - 1957) of the Maria (pronounced Mah-rye-a) Mitchell Observatory, founded as a memorial to the first American women astronomer. Harwood received the 1962 Annie J. Cannon Award of the AAS and asteroid 7040Harwood is named for her, She was succeeded at Maria Mitchell by Ellen Dorrit Hoffleit, mentioned in an earlier section and who did not think very highly of her [9]. Harwood gave the "thank you" talk at the 1948 IAU GA in Zurich on behalf of the "accompanying guests", a task normally assigned to the wife of the president or the like. Her primary scientific interests were variable stars and asteroids.

Maire Vinter-Hansen (1890 - 1960, Figure 3) was primarily associated with the University of Copenhagen and its Observatory where she was the first woman staff member. The International Central Bureau for Astronomical Telegrams was placed at Copenhagen Observatory University at the 1922 Rome General Assembly [10]. It was primarily the responsibility of the elder Stromgren, but Vinter-Hansen was for a time the director and editor of the Circulars, as well as editing a Nordic scientific journal. She received the AAS Cannon Award in 1940 and an obituary appeared in QJRAS [11]. Tivoli Gardens was Eddington's favourite place in Copenhagen and Victor-Hansen appears on page 36 of Douglas [5] in the following anecdote:

"One summer evening, Miss Vinter-Hansen of the Royal Observatory of Copenhagen was at one of the outdoor restaurants in Tivoli when she saw Eddington walking by. She called to him and he joined her for supper, after which he suggested they visit the merry-go-rounds, the swings, the switchbacks and the game booths. He told her that he liked "Tivoli" not only because of its lovely gardens with their gay, yet quiet atmosphere, but because its amusement section exemplified the practical application of the two subjects most dear to his heart—gravitation and probabilities!"

A likely time and place for this encounter is the August 16 - 20, 1926 meeting of the Astronmische Gesellschaft in Copenhagen. Eddington joined in 1913 and held on to his membership until his death, holding a minor office from 1930 to 1936. Vinter-Hansen joined in 1921 and disappears from their records in 1945 (Schlielicke 2013—Germans keep good records!). Eddington is seated next to Shapley in the conference photograph from that AG [10].

Annie Jump Cannon, who classified nearly all the stellar spectra in the Henry Draper catalogue and whose will supplied the initial funding for the AAS Cannon Awards features even more transitorily because she and Eddington had both been at the 1913 Boon (last) meeting of what is usually called Hale's Solar Union. He wrote to her after the outbreak of World War I [3] saying "it is very sad after the jolly days in Bonn, that this division should come between us and our German colleagues (letter of 3 July 1915 , when the US was still neutral). Victor-Hansen was actually one of the first two women elected to membership in the AG along with Helen Kempf of Potsdam, who also disappears from the records in 1945. Others appear over the next few years including, from our story, Annie Cannon in 1926, Margaret Harwood in 1928 (though both quit in 1939) and Cecilia H. Payne in 1933 (but you already know about her

Figure 3: Mairie Vinter-Hansen. 1890 - 1960
(Wikimedia Commons)

presence at the 1933 meeting in Gottingen from the story of how she rescued Sergei Ilarionovich). The first woman to join AG after WWII was Erika Bohm-Vitense, then of Kiel—that is, the first after Eddington's death. The last AG that Eddington could have attended would have been August 7 - 11 in Danzig but only 72 of the 470 members attended so he probably did not. But up to that time there had been 23 female AG members whom he could have met.

Meanwhile, women were also forcing open the doors of the Royal Astronomical Society in which ASE was also very active. Annie J. Cannon was made an honorary member in 1914 while the first three women elected to regular membership in 1868 were **Annie Maunder** (1868 – 1947, Figure 4, of the sunspot cycle) and **Mary Proctor** (1862 – 1957, known primarily for popular writing and lectures—her father, Richard Proctor, better known as an astronomer, was elected to the RAS in 1866 [12]). **Mary Adela Blagg** (1858 – 1944, who brought some order into the chaos of lunar nomenclature in the early 20th century) was also elected. She was one of four women involved in the founding of the IAU as a member of Commission 17, Lunar Nomenclature, under R. H. Turner. Ceclia Payne-Gaposhkin, meanwhile, was put in charge of a subcommission in 1938 (Stockholm), the same General Assembly where Eddington became president, dying in office in 1944.

Two Non-astronomical Women: a friend and a foe.

Dr **Anna McClean Bidder** (1903 - 2001) was a marine biologist with a Cambridge PhD (1934) for a thesis on the morphology of the cephalopod digestive system. She joined the Society of Friends in 1926 and participated regularly in the Jesus Lane Friends Meeting, eddington's usual religious affiliation. She was the first president (about 1965 – 1972) of the Lucy Cavendish Collegiate Society (now Lucy Cavendish College) founded to provide a place in the Cambridge system for mature women students. She was part of the Society of Friends Peace Committee (1939 – 46), which must have been a deuce of a task, and was one of the eleven authors (including two other women, one Jewish) of "A Quaker View of Sex" published in 1963. This pamphlet advocated decriminalization of homosexuality and suggested that marriages could survive extra-marital affairs and even be strengthened by them. Since she herself never married, there was a good deal of flak. She was a heavy smoker much of her life, perhaps genetically robust because her father also lived well past his 90th birthday.

Figure 4: Annie Maunder, 1868 - 1947
(Wikimedia Commons)

She is here because Douglas ([5], page 98, giving the middle initial erroneously as N) quotes Bidder's description of Eddington as an unostentatious worshipper at the Meeting House in Jesus Lane: "He sat silent through Meeting after Meeting—sometimes with closed eyes, usually looking out of the window at the sky. I always had the feeling that his religious experience was expressing itself to him in terms which would have been unintelligible to most of us. Once he rose and recited one short verse of a poem, once a whole poem of three or four verses, making no comment whatsoever. For many years he audited the Meeting's accounts - a piece of simple, humble service…". I would guess this came from some publication like The Friends Quarterly, but have not attempted to locate it and was probably part of a memorial of some sort after Eddington's death.

Prof. **Lizzie Stebbing** (generally L. Susan Stebbing, 1885 – 1943) was the first woman to hold a professorship in philosophy in England (University College London). Like Douglas, she was orphaned early and unlike Cecelia, she was a Girton girl (1904), though her higher degrees are from Londondon. I do not know whether she had nice legs. Stanley introduced us to her because she wrote a series of articles in the 1930s criticising the "nebulous philosophy" of Jeans and Eddington and a book [12] that summarised her arguments. She is harder on Jeans than on Eddington but, at least professionally, had no use for either. Both were censured for the desire to be entertaining in their writings and for appealing to emotion at "the level of a revivalist preacher". Most of the book was dedicated to showing that Eddington's expositional strategies made him unreliable as an authority (Stanley's words). She objected to both content (Eddington's attitude to mental and material worlds as separable) and to style, saying that the imprecision of his language was a sign of his confused thinking.

Eddington attempted only one defence, in a lecture series published in 1935 as "New Pathways in Science" (Cambridge University Press). He apparently made no response to the more coordinated attack in the 1937 book. Douglas's version of this is that "Eddington challenged the keenest thinkers of his time". She mentions Stebbing along with Bertrand Russell and Herbert Dingle. Dingle is perhaps known to historically-minded astronomers as the chap who made fun of state cosmology by pretending to call a spade a "perfect agricultural implement". He never accepted even Special Relativity, though G. J Whitrow wrote his obituary for the Quarterly Journal of the Royal Astronomical Society [13].

There must be sources that would indicate whether Eddington and Stebbing ever met in person, but I have not tried to find out.

A word about ASE's sister, Winifred Eddington. Stanley [3] describes her as "fulfilling all the social roles of a professor's wife (page 41). I had thought this might not include attending conferences with him (since he was available to take Cecilia in to dinner) but a photograph of the participants in the 1924 Toronto meeting of the BAAS (p 42 in K Haramundanis in David Philip and Koopman) shows her standing in the front row. She did not sign that lunchen menu, where Eddington, Payne, Vibert, Douglas, Harwood, two or three wives and van Biesbroek (who is next to Winifred in the photo) appear.

Eddington died in 1944, while he was president of the International Astronomical Union, when Walter S Adams (Mt Wilson Observatory) stepped up to the plate. When the Union could finally meet again, the Transactions say that the telegrams of greetings were sent to the widows of several distinguished astronomers and IAU officers who had died in the intervening decade and to "Miss Eddington".

A recent biography of Sir James Jeans (by his son, Christopher—yes, really) has a reference that indicates some sort of panel discussion on which both Eddington and Stebbing might have participated.

Final thoughts

A charming photo (preceding page 19, Douglas) shows Winifred looking on while Eddington and his mother play chess. It dates from before his appointment as Plumian professor (1914) since the women, at least, are still living in Weston-super-Mare. He took Winifred to Bayreuth one year, where, says AVD, they wallowed in Wagner.

The Royal Astronomical Society celebrated its centenary two years late, with formal events at the end of May, 1922. The social gathering on the evening of the 29th at Burlington House was described in Monthly Notices LXXXII as a conversazione at which "Prof. Eddington, supported by his sister and by other officers of the Society and their wives" welcomed something like 300 participants.

The conference photo from the next day (MNRAS 82, plate II) includes a number of women: Miss Cook, Miss Dodwell, Lady Dyson (wife of the Astronomer Royal), Countess de Rivas, Mrs. Shapley (herself an astronomer, birth name Martha Betts) and Mrs. Merton but not Winifred Eddington. They could by then all have been FRAS's because, as Dreyer pointed out (p 438 of that issue of MN), the new charter of 1915 permitted the election of women, almost 30 of them by 1922.

The very next RAS meeting, with ASE as president in the chair, and with the report immediately in

MNRAS, saw the election of Miss Caroline Furness (Vassar), Miss Margaret Harwood (Maria Mitchell), Miss Frances Lowater PhD (Wellesley) and Miss Anne Sewell Young (Mr Holyoke) as fellows. A small number of well-known male American astronomers were elected as fellows at that same meeting. It was presumably the first opportunity after the end of the Great War.

Winifred Eddington accompanied her brother in another significant context. He has joined, back in 1906, the Friends' Guild of Teachers (devoted to improving education at what we would now call the K-12 level more than at universities). He was active in the Guild for the rest of his life, President for a couple of years, and attended "nearly all" of the annual meetings, held all over the United Kingdom, many with his sister ([3], page 41).

It would be interesting to know about some of his finances. Did he pay for his sister's travel out of his salary as Director of the Cambridge Observatory. Did she have use of the income from the estate left by their father to their mother, who died in 1924? The will of Arthur Henry Eddington drawn up in 1880 carried the "compulsory" signatures of William Eddington and Rachel Eddington ([6], page 37) his parents then both alive. ([5], page 200). Their acquiescence was presumably required because some portion of his estate would normally have gone to parents (or siblings) and not all to his wife.

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Anniversary Quiz

(answers at foot of ins)

1. Sir Patrick Moore contributed to the society's first newsletter in 2002, writing about which observatory in Sussex?

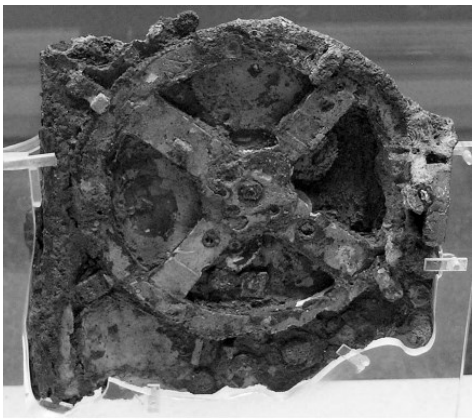


Figure 1: A fragment of…. what? (Question 6)

2. Which future Vice-President of the society was its first Chair?
3. What was the fate of the Galileo spacecraft in 2003?
4. Name two of the three rovers exploring Mars in 2004.
5. The cover of the 2005 September newsletter of the society was adorned by a drawing of an engraving of the 'Great Equatorial' at Greenwich. Who commissioned this telescope?
6. In 2006, using new computer technology, further secrets of an ancient astronomical artefact were revealed. What is the name of this artefact, a main fragment of which is shown in Figure 1?
7. The 50-year anniversary of what was celebrated in 2007—an example, perhaps, of what the Astronomer Royal, Sir Harold Spencer Jones, referred to as 'bunk'?
8. In 2008, NASA announced that the Hubble Space telescope had taken the first visible -light image of what?
9. Who is shown in Figure 2? She famously collaborated with her husband and kept her hair short to avoid it getting tangled in instruments.
10. The Japanese spacecraft *Hayabusa* managed a first in 2010. What was it?
11. Which historic astronomical structure in Canterbury, New Zealand, was sadly destroyed in February 2011?
12. What was widely predicted to end in 2012 but did not?
13. There was an SHA Summer Outing to *Carr House* in 2012. With which astronomer is this site associated?
14. Which planet became the subject of close attention in 2015?
15. Dr Mary Brück was a founder member of the SHA and was honoured in 2016 when a building was named after her. Where?
16. What distant visitor caused a stir in 2017?
17. What did the *Event Horizon* telescope array reveal to the world in 2019?
18. An image of what circular Bronze Age artefact, currently being exhibited in the British Museum, featured in an edition of *The Bulletin* in 2020?
19. Why was a parachute, made in Devon, of such planetary interest in 2021?
20. To whose former home will the SHA be paying a visit in June 2022?

Figure 2: She worked with her famous brother, but who is she? (Question 9)

When was James Bradley born?

Bruce Vickery

James Bradley (Figure 1) was the third Astronomer Royal, serving for 20 years from 1742 to 1762. Almost all sources quote the date of his birth as some time in March 1693; indeed, his year of birth is stated as 1693 on his grave. However, the record of his baptism reveals that Bradley was actually born several months earlier, in late September or early October 1692. This paper seeks to explain why his date of birth is so often given incorrectly.

The registration of birth, marriage and death

The problem has arisen due to the manner in which births, marriages and deaths (BMD) have been recorded over the years, and also to calendar changes that were made as a result of the Calendar Act of 1751. It is only since 1837 that the Government has been in charge of the registration of BMD information, by way of the General Register Office (GRO). Between 1538 and 1837 it was the churches that had to keep registers of these events. Such registers were collected together on a county basis after 1837. Bradley was born in Gloucestershire, and so information about him therefore resides in the Gloucestershire Archives. However, the churches did not record dates of birth or death. Technically they did not know these dates. Instead, until 1837, the registers contain the dates of baptism, marriage and burial. Sometimes the birth/death date was added. At these times families tended to put birth, marriage and death dates on the flyleaf of the family Bible. In 1598 the government passed a law requiring all parishes to make regular copies of their registers and send them to the Bishop (or Archdeacon). This provided an "off-site" back-up copy. These copies became known as Bishops' Transcripts. There was also a modest change in 1812 when the government published a standard form for the collection of these important dates. Prior to that, most information had been recorded on blank sheets.

Changes to the calendar in 1752

On the continent there was a major change to the calendar in 1582. Until then the Julian Calendar had been in use since 45 BC. But it had a well-known deficiency in that the date of Easter was moving inexorably towards the beginning of the year. Rules brought in by Pope Gregory XIII led to the establishment of the more accurate Gregorian calendar.

England did not adopt the Gregorian calendar immediately as it was seen as a Roman Catholic "plot" to take over the world, but eventually it had to come into step. Eleven days were removed from September of 1752 to align the calendar with that on the continent. But there was another change that introduced a myriad of problems for the researcher. The first day of the year was changed to 1 January. Previously it had been 25 March. This latter day is called "Lady's Day" and is traditionally the day in which the Angel Gabriel informed Mary of the Virgin Birth – 9 months hence.

Prior to the Calendar Act, the day after 31 December 1751 would have been 1 January 1751. But now it would be 1 January 1752. The former is called an Old Style (O.S.) date and the latter a New Style (N.S.) date.

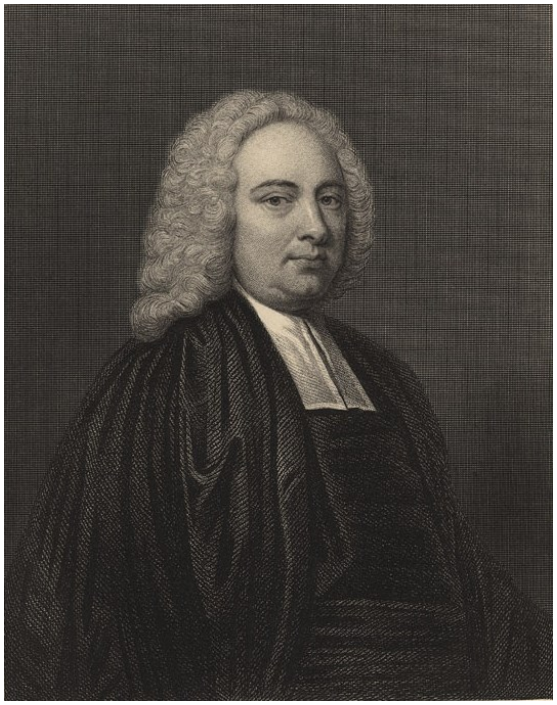


Figure 1: James Bradley, 1692 – 1762….? (Wikimedia Commons)

This change affects only dates between 1 January and 24 March, with all other dates remaining unchanged. An interesting example is Isaac Newton who was born on Christmas Day, 1642, and was baptised a week later on 1 January.

If you seek the appropriate Church Register you will find that he was born on 25 December 1642 and baptised on 1 January 1642.

It is recorded that Bradley matriculated on 15 March 1710 and that he was in his 18th year at the time. We can see that the new year—1711—was only 10 days after his matriculation. Rigaud's analysis showed that for the date and age of matriculation and death the only days on which Bradley could have been born are 16–24 March 1693, where these are New Style dates. Nearly all current sources follow Rigaud and carry the information that James Bradley was born late March 1693 (the Dictionary of National Biography is a notable exception). To confirm or deny Rigaud's conclusion, we need to refer to the Registers at Gloucestershire Archives. Rigaud was correct in that the relevant Registers are missing. In fact they are missing to this day.

Figure 2: Bishops' Transcript recording the date of Bradley's birth.

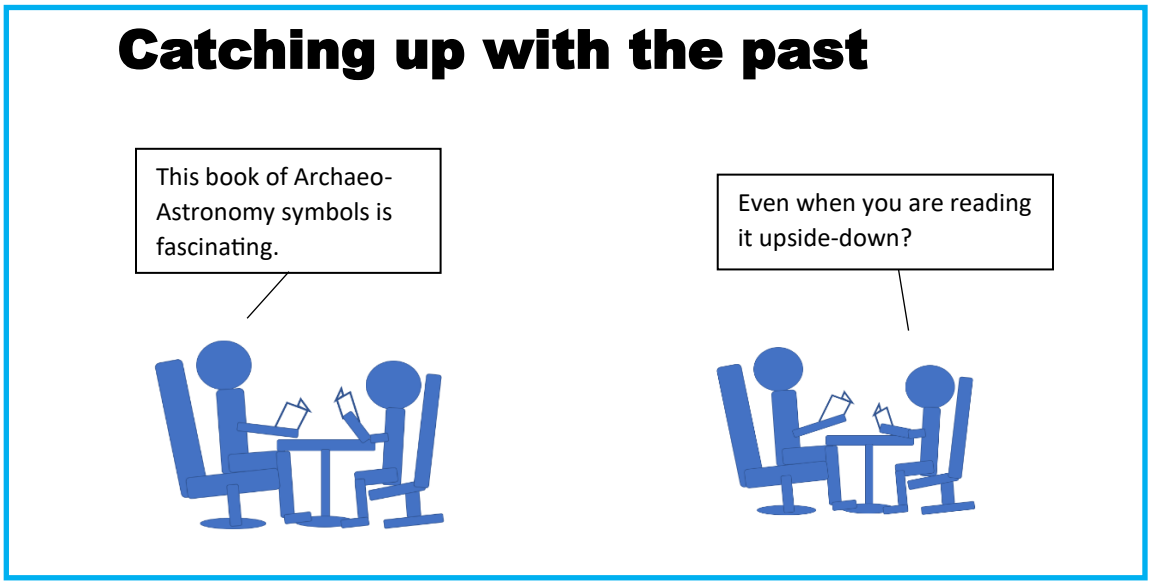
Stephen Rigaud's research

Stephen Rigaud was Professor of Astronomy at Oxford University when he published *Miscellaneous Works and Correspondence of the Rev. James Bradley, D.D. F.R.S. etc, etc* in 1832. Rigaud prefaced this book with a biography of James Bradley. In it he quoted an "approximate" date of birth in March 1693 for Bradley and gives his date of death as 13 July 1762. The death date is correct, but the date of birth given by Rigaud does not stand up to scrutiny. Where did he go wrong?

Rigaud was hampered by the fact that the Registers containing Bradley's baptism were missing, which he explained as a time that the church was being rebuilt. He found that there were only two dates in existence from which the birth of Bradley could be established. One is the date of death, and the intimation that Bradley was then aged 69. The other is when he entered Balliol College in Oxford.

The Registers

However, there is a fall-back which Rigaud did not consult – the Bishops' Transcripts. Have they survived? The answer is "Yes". And, as Figure 2 shows, they tell us that "James the Son of William Bradley and Jane his wife was Baptized October 3d 1692". There is no dubiety. James Bradley was not born in March 1693 but some six months earlier. This means that on matriculation he was 18 and not "in his 18th year". A very simple error – but perhaps even Bradley himself did not know the exact date of his birth.



Book Review and Reflections

Mystery of the Ashen Light of Venus: investigating a 400-year-old phenomenon by John C. Barentine

William Sheehan

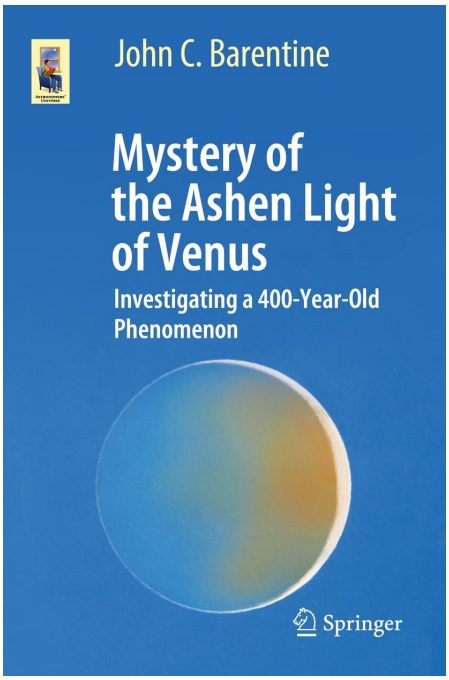
Mystery of the Ashen Light: investigating a 400-year-old phenomenon, by John C. Barentine (Springer), Sept. 2021, pp. 273 (paperback, £17.07) ISBN 3030727149

The principal subject of John C. Barentine's interesting book is the "Ashen Light of Venus," which has been called the "Loch Ness" of planetary astronomy and the "oldest unsolved mystery of the Solar System." It is one of those cases from the archives of astronomical history of which the late Richard Baum—to whom the book is dedicated—was so fond; cases which Baum was fond of calling "oddities from the cabinet of curiosities," and explicating with a quote from William James: "Anyone will renovate his science who will steadily look after the irregular phenomena. And when the science is renewed, its new formulas often have more of the voice of the exceptions in them than of what were supposed to be the rules."

The "Ashen Light" certainly qualifies as an "irregular phenomenon," and as an exceptional case. It was first reported by the Jesuit astronomer Giovanni Riccioli in 1643, who claimed to see "a partial circle of light … enclosing the otherwise dark side of the disc" of Venus through a notoriously poor telescope built by the Italian lawyer and amateur astronomer Fontana—which is best known for showing an indisputably dark "pill" in the centre of images of Venus and Mars. Nearly four hundred years later it remains, in the words with which Barentine sums up his somewhat quixotic quest (p. 240), "paradoxical, shadowy, and mysterious, neither proven nor disproven, ruled in or ruled out, acceptable or accepted." For my part, I would rather invoke the verses of "Antigonish" by Hughes Mearns, which goes:

> "Yesterday, upon the stair,
>
> I met a man who wasn't there!
>
> He wasn't there again today.
>
> Oh, how I wish he'd go away."

The Ashen Light is a kind of man upon the stairs that isn't there. I have often looked for it. I have never seen it. It is a phantom that has played hide and seek across almost four centuries of planetary observations. Usually it "isn't there again today," and yet—at least so far—it has refused to go away.



Even the term "Ashen Light" is problematic. As Russian planetary scientist Vladimir Krasnopolsky points out, the term is no longer used in Venus science—instead the appropriate term is "Venus night airglow."

Historically, "Ashen Light" has been used to refer to a rather confusing jumble of clearly disparate phenomena: for instance, though classically the term has been applied (as in the case of Riccioli's observation) to a feeble glowing of the night side of Venus when the planet appears as a narrow crescent seen against a dark sky background, analogous to the phenomenon of "Earthshine on the Moon," many reports involve the planet seen against a bright sky background where the interior

to the crescent appears darker than the sky. Though the celebrated astronomy writer Patrick Moore, who directed the B.A.A. Mercury and Venus section in the 1950s section in the 1950s and was one of the most enthusiastic supporters of the reality of the Ashen Light, waived off the latter as a subjective "contrast effect," he failed to explain why it could not just as easily be so in the former case. In addition to vagaries about just what is meant by the term "Ashen Light," we are faced with the fact that even if it is a real phenomenon (not simply an illusion of some kind), there is no natural phenomenon ready to hand that will explain it. Venus, of course, has no moon. Thus, the Ashen Light if it exists cannot have the same explanation as Earthshine. Nor is the Earth—despite being far more brilliant than Venus in that planet's sky than Venus is in ours—sufficient to the task. There have of course been many theories offered—most have been ruled out—but the situation is still as Percival Lowell described in 1909, "the phenomenon has seemed the weirder for the difficulty of explaining it." The Ashen Light is an effect of uncertain validity desperately searching for a cause.

Like persons who either love cilantro or think it tastes like soap, some skilful observers have reported seeing the Ashen Light (though not always agreeing in their descriptions, especially with regard to its colour) while others equally reputable have not. Those who have seen it include Rev. T.W. Webb, Percy Molesworth, Richard Baum, Patrick Moore, Dale P. Cruikshank, Alan Binder and Bill Hartmann. All of them saw something they identified as the "Ashen Light" (and in the cases of Baum and Moore, on multiple occasions). Those who have not include the Rev. W. R. Dawes, G. V. Schiaparelli, E. E. Barnard, and E. M. Antoniadi who never saw it. (Neither, for the record, has Barentine.) Extensive lists of putative observations have been compiled (of which one of the most extensive was prepared by Baum in 1957). They are not entirely reassuring, and rather resemble the catalogues of Transient Lunar Phenomena (of which Moore was also the principal advocate, and which have now largely been debunked).

Such data can be looked at in various ways. A histogram of all the Ashen Light reports from 1720 to 2017, for instance, shows a dramatic spike in the 1950s, accounting for a quarter of all reported observations during the three centuries included. This corresponded to a period when solar activity was intensifying around the sunspot maximum. This is certainly intriguing, but probably less relevant than the fact that it also coincided almost exactly with Moore's becoming Director of the Mercury and Venus Section and the publication of his book *The Planet Venus*, which is certainly among the best things Moore ever did, and which awakened a long-slumbering interest in the planet. Though solar activity of some kind is still among the dwindling viable explanations of the Ashen Light, it is noteworthy that at the favorable elongation of Venus in 1967 which occurred during the build-up to the next sunspot maximum—at which the experience of the late 1950s should have been repeated—then Mercury and Venus Section Director J. Hedley Robinson noted that the Ashen Light was not reported even once by Section observers! Nor did a major observing campaign launched in 1988 by Chris Russell of the University of California and his then graduate student (and later three-time Space Shuttle astronaut) John Phillips, bear fruit. The timing coincided with when the Pioneer Venus Orbiter was still providing data from orbit around the planet and the Sun was approaching another strong solar maximum. For the record, I well remember the campaign, and made my own series of observations of Venus in pursuit of the elusive phenomenon; without success. Barentine asked Russell (p. 163) what, with hindsight, he thought of the results. The response was, "For me it did settle the question." Russell noted that many of the reports received during the 1988 campaign were made under relatively poor seeing conditions, and that evidence for the reality of the Ashen Light failed to materialize. Nevertheless, he noted the persistence of belief in the phenomenon: "With any controversy there are adherents who tenaciously hold on to their position forever."

Barentine considers in detail the possibility—one of the last still standing—that solar charged particles, probably protons, from coronal mass ejections and co-rotating interaction regions (explained on p. 179) might produce intensification of a green emission line of oxygen in lower altitudes of Venus's ionosphere that may account for (some) Ashen Light observations. But even he seems to admit that this is quite a reach.

In the end, physiological explanations rise to the fore, and Barentine's discussions of the nature of vision provided—for me—the most rewarding aspect of the book. There has, of course, been a great deal of attention paid to all this by historians and philosophers of science—mostly regarding the case of the celebrated "canals" of Mars (to which Barentine devotes a somewhat unnecessary first chapter). I am not unbiased, but to me the canals of Mars afford a better case study of the application of the various models of perception that, roughly, began with that of Hermann von Helmholtz in 1860, in which perception is understood as a process of probabilistic, knowledge-driven inference (and which have now led to the exciting Bayesian brain theories of Karl Friston and his colleagues at University College London who have effectively argued that brains are essentially prediction machines). I fear that with the Ashen

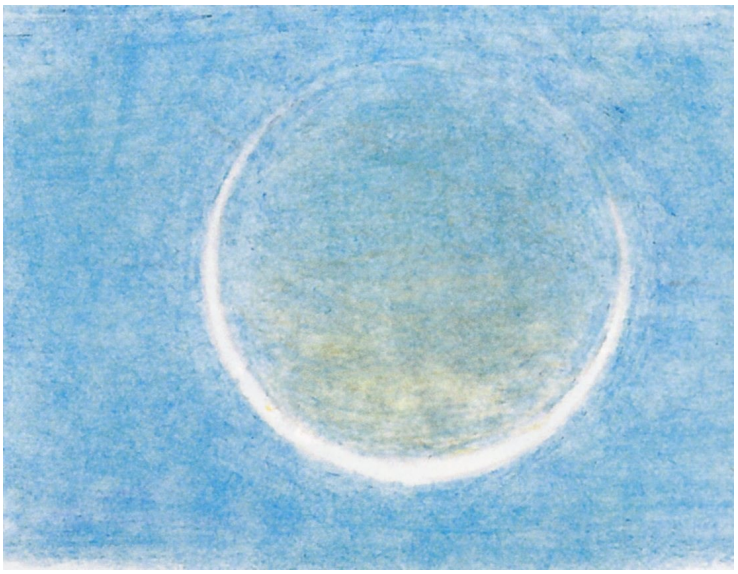


Figure 1: A typical observation of the Ashen Light. American planetary scientist and space artist William K. Hartmann's colored pencil drawing of Venus as it appeared to him in daylight on November 12, 1962, when he and Dale P. Cruikshank both observed a distinct "discoloration" of the night side of the planet. From: John C. Barentine, *Mystery of the Ashen Light of Venus*, p. 156.

Light, Barentine has chosen a leakier boat to try to navigate these choppy seas, if only because the phenomenon itself is so diffuse and ill-defined. Nevertheless, he explains many of the important concepts from perceptual physiology and psychology with admirable clarity. Most of what he writes has discernible relevance to the general topic of the Ashen Light (though I found his fondness for digressions at times excessive and annoying, not necessarily in the psychological sections but in his musings about the goddess Venus's place in history, and his long and not particularly relevant segue into the well-known stories of the discovery of Neptune and the search for the putative planet Vulcan, both of which have been extensively written about many times). But he often presents unexpected and surprising information and makes intriguing connections. For example, the following summary of work on decision-making by researcher Benedikt Ehinger at the Donders Institute for Brain, Cognition and Behavior in the Netherlands (p. 217) provides a remarkably succinct explanation of one of the factors involved in many wrong inferences (not only in astronomy): "when people process incomplete information, they often reach the conclusion first: a percept that is partially inferred is paradoxically considered more reliable than a percept based on external input." In other words, people [tend] to 'fill in' missing information under such circumstances, and their intuition treats those half-truths as more real than authentic experiences." (This sounds to me rather precisely like the well-known Dunning-Kruger effect).

I won't give away what Barentine himself finally concludes about the Ashen Light, and given the rather esoteric nature of the subject matter, the book will be of interest only to the most passionate students of the history of visual planetary observation. But he is certainly to be congratulated for having produced a thoughtful, well-researched book on a challenging and in some ways rather eccentric topic—the Loch Ness of planetary astronomy—while Springer are also to be congratulated for publishing it. Meanwhile, as Richard Baum used often to say, "The mystery endures."

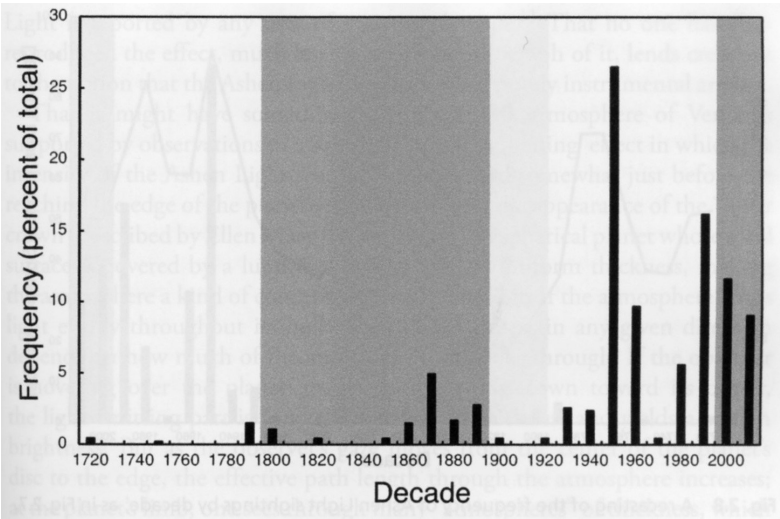


Figure 2: A histogram showing the frequency, by decade, of 465 Ashen Light reports between 1721 and 2017. The pronounced peak around 1957 -58 corresponds with the sunspot maximum, which may be significant—though it also follows on the heels of Patrick Moore's becoming Director of the Mercury and Venus Section and the publication of the first edition of his book *The Planet Venus* (both 1956). This suggests the influence of suggestion. From: John C. Barentine, *Mystery of the Ashen Light of Venus*, p. 37.

References

[1] Richard Baum, *The Haunted Observatory: curiosities from the astronomer's cabinet*, p 37, Amherst, NY: Prometheus Books (2007)

[2] Patrick Moore, *The Planet Venus*. London, Faber and Faber, 1st edition (1956)

[3] See, for instance, Richard Baum and William Sheehan, *In Search of Planet Vulcan: the ghost in Newton's clockwork universe* New York: Plenum Books (1997)

The South Kensington Solar Observatory: a study of archive images

Paul Haley

Joseph Norman Lockyer (1836–1920) had a recent centenary—he died 16 August 1920 (Figure 1). In 2010 the writer digitally scanned a collection of glass plates held by the Institute of Astronomy (IoA), Cambridge, with the kind support of Mark Hurn. This sparked an interest in the history of the Solar Physics Observatory (SPO) at Kensington. A paper by Kevin Johnson [1], provides an introduction to the SPO. This case study explains the writer's attempt to investigate the layout of the observatory site using key information from two IoA plates whose fragments had to first be reassembled (Figure 2).

Figure 1: J. Norman Lockyer (1836–1920) was elected Fellow of the Royal Society in 1869, when he was 34 years old.

South Kensington SPO (1879–1913) was the first British astrophysics observatory; its contemporaries were in Harvard, Meudon and Potsdam. Lockyer had transferred (1876) from the War Office to the Department of Arts and Sciences in South Kensington and began using the southern end of the Royal Horticultural Society gardens (1862). An assortment of canvas, wooden and corrugated iron buildings were erected and the SPO was founded. At this time (1879) Lockyer had 7 children but his first wife had passed away. He became Director of the SPO (1885) and also Professor of Astronomy at the Normal School of Science (later the Royal College of Science (1872), or RCS). SPO huts were used for practical tuition, laboratory techniques and observations. The largest telescopes were the 10-inch (Kensington) f/16 Cooke refractor (1885), a 36-inch reflector mounted on a Hammersley equatorial fork (1889) and a 30-inch reflector (from Westgate). The mirrors of the reflectors are credited to A. A. Common (1841-1903), but his technician Alfred James Wooldridge initially made his optics and larger sizes were purchased from George Calver (1834-1927). Telescopes were

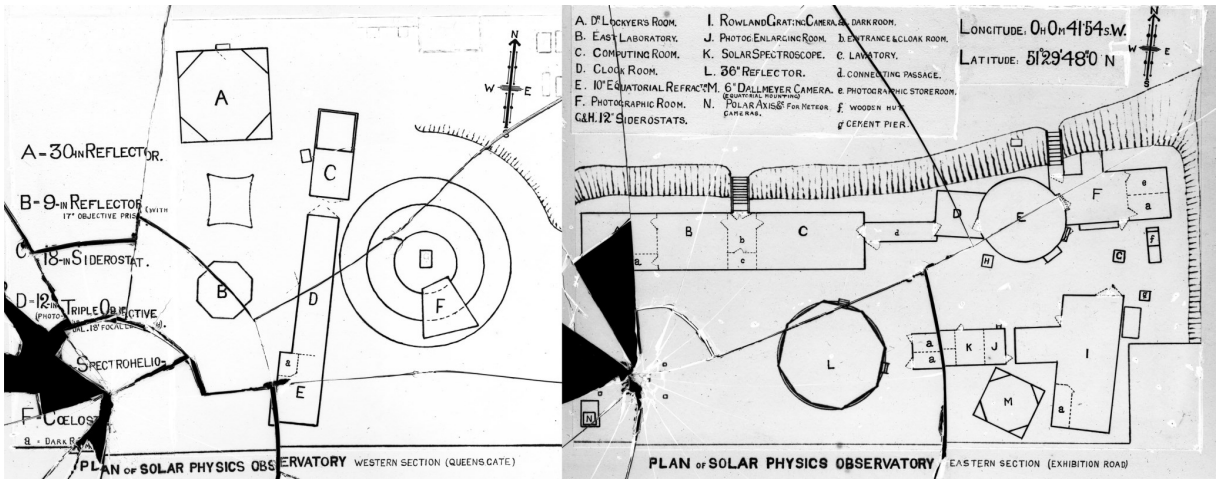


Figure 2: Re-combining the 20 fragments of two glass plates revealed the layout of both the west and east sections of the Solar Physics Observatory in South Kensington, *c.*1907.

housed in rotating sheds with photometry, photography and spectroscopy steadily developed. A Hale -type spectroheliograph (1902) was limited by the low altitude of the site and nearby trees and buildings. Student sessions stopped when Lockyer retired from the RCS (1901).
Five years later Lockyer began the search for a new observing site. Fosterdown, near Caterham, was proposed (1907) but Cambridge was approved (1909). A disgruntled Lockyer, with the support of the McClean family, relocated the Kensington telescope to Salcombe. Two years later (1914) the huts were removed and the site redeveloped for the Science Museum.

The IoA glass plate collection for the SPO dates from the 1907-9 period. To correctly identify each observing hut the labelled diagrams from the two broken plates were important. It was necessary to identify the skyline buildings surrounding the former RHS garden site – this served as both a cross-check for each smaller image showing individual huts and/or telescopes and to help identify the location from where each photograph was taken. A paper copy of the site layout was marked with arrows to show each camera direction and a decision made for the panoramic views on which additional images would be helpful to illustrate the whole site in a montage. Care was taken to ensure images were not laterally inverted. The writer particularly wanted to include details of instruments and the activities undertaken within key buildings—to give a better understanding of how the SPO operated in practice. Some of the plates were taken in winter under snow conditions, adding an additional insight. Three montages were developed by combining high resolution images.

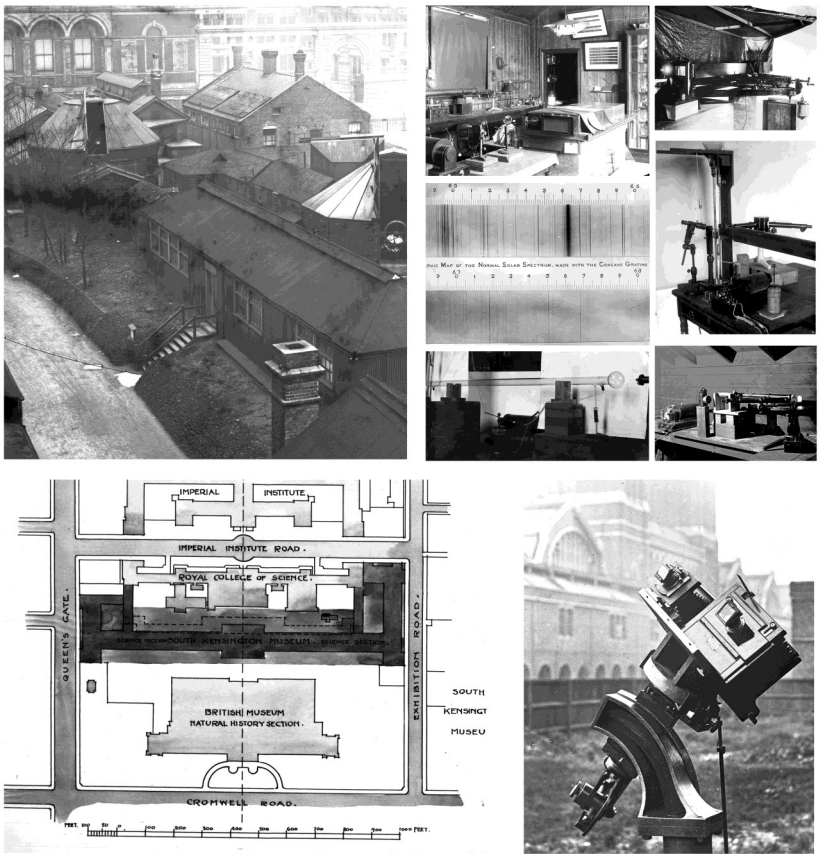


Figure 3: The eastern end of the SPO, including details of the laboratory equipment used in the huts.

In the first group (Fig 3) a map locates the SPO, sandwiched between the British Museum (National History) (1881, NHM) and the Royal College of Science (RCS), spanning from Queen's Gate in the west to Exhibition Road in the east. The site photograph shows a view looking SE from the RCS, with the 10-inch Kensington dome on the L, the 36 -inch dome on the R and the NHM in the background.
The final image shows the polar axis mount for the meteor camera (N) with the NHM beyond.

For the second group (Fig 4) the panoramic view, looking west from Exhibition Road, shows the eastern section of SPO. The twin ventilation towers of the NHM are on the L, the RCS is in the middle and the 287-foot Queen's Tower (QT) of the Imperial Institute (1893) on the R. (The latter building was demolished in 1957, but the QT was saved during the expansion of the Imperial College.) In the closer view the 36-inch observatory is clearly visible, the 10-inch Kensington dome shutter is open and the RCS is top R. The top middle diagram shows the path of the Sun at the winter solstice, indicating the limited times in December when the Kensington telescope could be used for solar work. The Cooke twin-telescope design is shown, with the 10-inch used visually and a 9-inch refractor with a 45° prism used for spectroscopy. The winter scene includes the 36-inch dome with NHM twin towers beyond. Details of the 3-foot Grubb reflector are shown bottom L, including the Hammersley spectroscope. Bottom R is the 6-inch

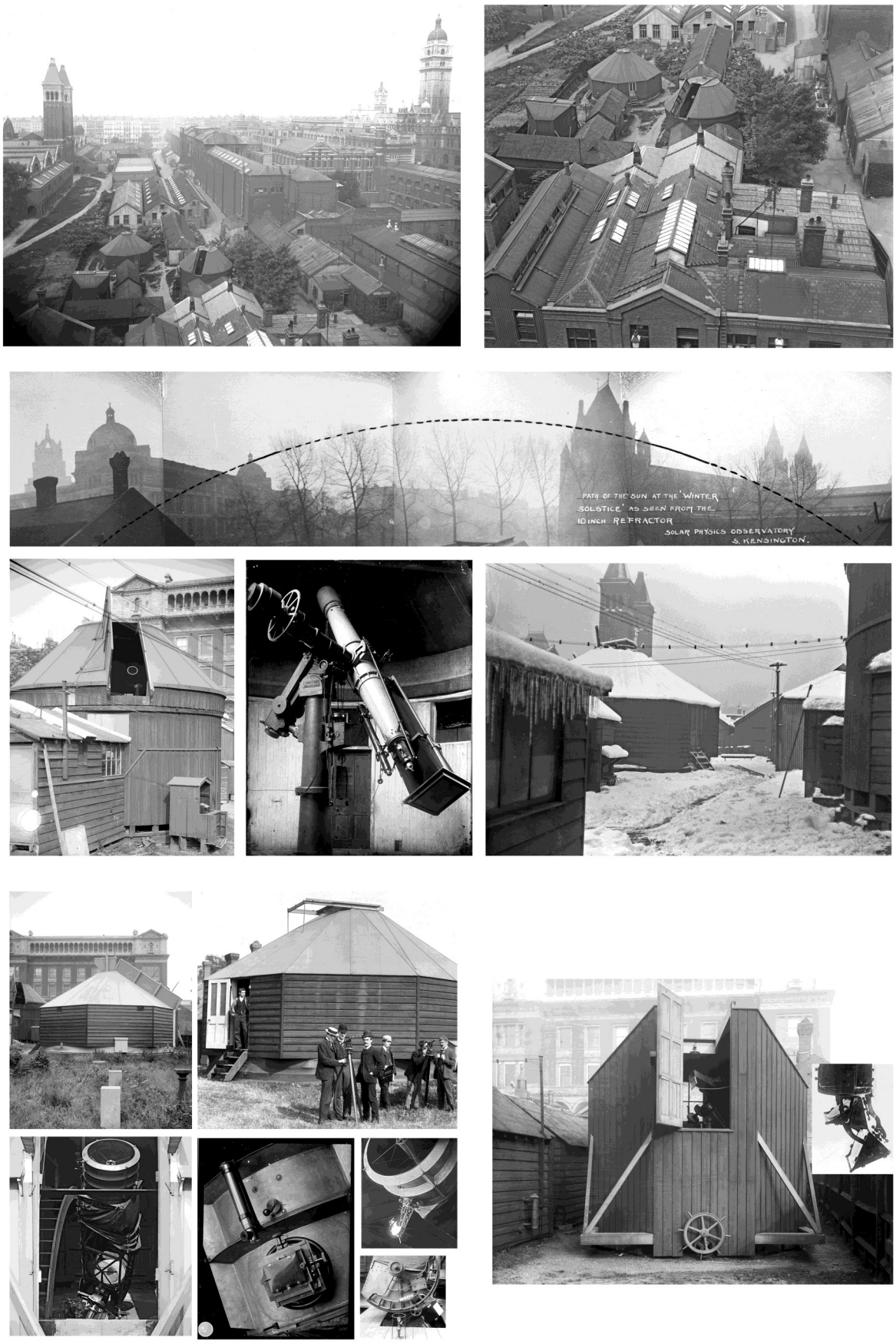


Figure 4: More views and details of the eastern end of the SPO, including the 10-inch f/16 Kensington Cooke refractor and the 3-foot Grubb reflector.

Figure 5: The western end of the SPO, including the layout of the spectrohelioscope

Dallmeyer prismatic camera, with an inset showing its double-prism arrangement.

In the final group (Fig 5) the panoramic view, looking east from Queen's Gate, shows the western section of SPO. The QT is top L and the RCS is in the middle. Just R of the NHM twin towers is the top of the Victoria & Albert Museum (1909), which was then under construction; to the L of the twin towers is the Royal College of Art (1896). In the closer view the entrance to the SPO leads to the 30 -inch dome, whose Grubb instrument was initially used at Westgate, but the tree obscures the other huts. These are better seen in the bottom photograph taken looking south-west. (The camera is positioned at the top right-hand corner of the western section of Fig 2, near the compass symbol.) The 30-inch dome shutters are open and the 9-inch With-Browning reflector (1870) hut is to the L, the 36-inch dome on the R and the NHM in the background. The middle huts include an 18-inch siderostat (C) feeding a 12-inch triple objective of 18-foot focus (D) and spectroheliograph (E). The coelostat hut (F) is on the L, mounted on a circular track.

A possible challenge for SHA members might be to create a **virtual reconstruction** of the Solar Physics Observatory, allowing anyone to walk through the observing site online. The idea could potentially be extended across many observatory sites to show how equipment and techniques developed across the world. The idea is ambitious but would be a fascinating future use of archives to bring the history of astronomy to new audiences. Please note that the Institute of Astronomy, Cambridge should be credited for ownership of the original plates, with many of the images now available on Cambridge DSpace.

Reference

[1] Johnson, K,, *The Sun Spotteries* ATSO 15 22, 1998

Obituary

Michael Hoskin

Michael Hoskin was born in London in 1930, to a tax official and a school teacher. He attended a Catholic grammar school in west London, through the war years. The school's focus meant Hoskin spent his last two years exclusively studying Latin and Greek.
After leaving school, Hoskin gained a BA and MA in pure mathematics at London University. In 1952, he transferred to Peterhouse, Cambridge, for his doctoral thesis in algebraic geometry.

He spent a year in military research before returning to Cambridge in 1956, as Research Fellow at Jesus College. However, he could not help comparing his own mathematical ability to that of fellow doctoral student, Michael Atiyah, later a highly renowned mathematician. This led to Hoskin starting to look for a career outside mathematics.

History of Science Lectureships
He spotted an inaugural lectureship in a subject called 'History of Science' at Leicester University, which appealed to him. Hoskin was appointed to the post, ahead of ostensibly more suitable candidates, and instructed to learn all about the discipline in three months.
A lectureship in Cambridge became available only two years later, and Hoskin was appointed. At first, his only colleague was a philosopher of science and they taught a joint course, with Hoskin having to single-handedly cover the whole of the history of science and medicine. He spent the rest of his career in Cambridge.

Newton
In Cambridge, Hoskin supervised doctoral student D. T. Whiteside, working in seventeenth-century mathematics. Whiteside lost interest in his thesis after it was approved, so Hoskin saw the work through the press. Hoskin actively supported Whiteside's edition of Newton's mathematical papers, raised funding from Trinity College, the Sloan Foundation and the Leverhulme Trust, and acted as assistant for the first six volumes of the work from 1967.
Whiteside then proposed a publishing project of the first magnitude, a multi-volume edition of Newton's mathematical papers. Cambridge University Press agreed to take the project on, but only with Hoskin's involvement, in the research, the practicalities and the funding. The resultant eight huge volumes took fourteen years to appear, and the project is one of the great works in the field. Whiteside was a genius of unique ability, but Hoskin ever after believed that his own career had suffered from the distraction.
Meanwhile, history and philosophy of science was expanding in the University and they were formalised into the department of today. This allowed Hoskin to concentrate on a field where his mathematics was an asset and his ignorance of science less a disadvantage - namely astronomy before astrophysics. He specialised in the Herschel family, on writing eight books.

In 1969, a London publisher asked Hoskin whether there was an area of history of science not yet catered for, and this led to the founding of the Journal for the History of Astronomy, which Hoskin was to edit for 45 years.

St Edmund's and Churchill Colleges
In 1965, Hoskin became a Fellow at St Edmund's House, newly established as a small, experimental community for graduates. For four years, he served as Vice-Master and Tutor, and later was influential in paving the way for St Edmund's to become a full College of the University.
In 1969, Hoskins was invited by Churchill College, Cambridge to join the Fellowship and plan and oversee the construction of an archives centre to house the papers of Sir Winston Churchill and his contemporaries. The building was opened in 1973 by the Duke of Edinburgh and has become a major centre for historical research.

Greek General Assembly of the International Astronomical Union
In 1982, the triennial General Assembly of the International Astronomical Union was held in Patras, Greece, and Hoskin was asked to speak at one of the three Invited Discourses - on ancient Greek astronomy. The event left a lasting impression on Hoskin, who found himself under the stars addressing the astronomers of the world, who were seated around him on the stone benches of an ancient Roman theatre, two millennia old.

British Archaeoastronomy
The early years of JHA coincided with a period of intense interest in the possibility of there having been a true science of astronomy in Britain in prehistoric times. A leading figure in this was Alexander Thom, an Oxford engineer, expert in measuring sites. Hoskin collaborated with him, and some twenty JHA papers by Thom were ghost-written by Hoskin.
In 1981, as President of Commission 41 of the IAU organising a conference, Hoskin chose to hold an

archaeoastronomy meeting in Oxford, conveniently near to Stonehenge. Regular 'Oxford' meetings have been taking place ever since, and the International Society for Archaeoastronomy and Astronomy in Culture exists to manage them.

Hoskin often visited the Balearic Islands for holidays. He encountered Bronze Age burials there and spoke with local archaeologists. He was later invited to survey two mainland sites with numerous Neolithic dolmens. One site consisted of 'beehive' tombs, built with large numbers of small stones. Surprisingly, Hoskin found that almost all the tombs faced within the range of sunrise.

The second site, by contrast, consisted of megalithic tombs, built with small numbers of large stones, yet the custom of orientation was identical. A dozen years of investigatory fieldwork took Hoskin from Ireland to France, Spain, Portugal, and throughout the Mediterranean and north Africa. This resulted in *Tombs, Temples and Their Orientations* (2001, 2020), which looks at some 3000 tombs.

Antequera and Associated Honours

The authorities at the Antequera in southern Spain enlisted Hoskin's help to apply for World Heritage Status for the three enormous dolmens there. He used his expertise to argue that one dolme was probably unique, in facing a mountain rather than something in the sky.

World Heritage Status was granted, and Hoskin given many honours for his part in the resulting economic prosperity of the region.

Later Life

Hoskin took early retirement in 1988, allowing him leisure for archaeological fieldwork—and for becoming a vice-president of the SHA. In later life, he relished the return to the history of astronomy, contributing into his eighties.

He died peacefully at home in Cambridge on 5 December 2021. He was predeceased, by his wife Jane, with whom he had five children.

Photograph courtesy of David Sellers.

For awards and major publications, as well as Hoskin's self-written obituary, which forms the basis for this summary, see the website www.michaelhoskin.com

2022 AGM and AUTUMN CONFERENCE

This will be on **Sat 22 Oct 2022** at 10 am – 5 pm

at the Birmingham & Midland Institute, 9 Margaret St, Birmingham, B3 3BS.

Speakers include:

David Brand *The planet Vulcan: the twists & turns in our understanding of the heliocentric Solar System*

Daniel Belteki *The winter of raw computers: the history of the lunar and planetary reductions of the ROG*

Christopher Taylor *The Astronomers & the Birth of Atomic Physics*

Mike Leggett *Star Colours and Edward Iszatt Essam*

Allan Chapman *TBC*

Lines from *Locksley Hall*

by Alfred, Lord Tennyson

Many a night from yonder ivied casement, ere I went to rest,
Did I look on great Orion sloping slowly to the West
Many a night I saw the Pleiads, rising thro' the mellow shade,
Glitter like a swarm of fire-flies tangled in a silver braid.
Here about the beach I wander'd, nourishing a youth sublime
With the fairy tales of science, and the long result of Time;
When the centuries behind me like a fruitful land reposed:
When I clung to all the present from the promise that it closed:
When I dipt into the future far as human eye could see;
Saw the Vision of the world, and all the wonder that would be.

The poem was published in 1842 and is a dramatic monologue of unrequited love. In this extract, the speaker (a soldier) reflects on a time earlier in his life when he gazed in wonder at the stars and considered the future.

Anniversary Quiz Answers: 1. Brockhurst Observatory, East Grinstead 2. Dr Emily Winderburn 3. It was deliberately crashed into Jupiter to avoid Europa 4. *Spirit, Opportunity* (NASA), *Mars Express* (ESA) 5. Sir George Biddell Airy 6. The Antikythera Mechanism 7. *Sputnik 1* 8. Erik Brahe 9. Lady Margaret Huggins 10. Samples from the surface of an asteroid 11. Townsend Observatory 12. The World 13. Jeremiah Horrocks 14. Pluto (thanks to the New Horizons spacecraft) 15. Edinburgh, at the university's Kings Buildings campus 16. *Oumuamua*, from beyond the Solar System 17. The first 'image' of a black hole 18. The *Nebra Sky Disc* 19. The special canopy deployed to enable the landing of the *Perseverance* probe on Mars was made in Tiverton 20. William and Caroline Herschel, in Bath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