Barker's Circle: a 1930s BAA lunar observing group

Richard McKim

It is well known that the 'Headley Group' of planetary observers flourished between the two World Wars, but almost nothing has been written about a lunar and planetary observing 'Circle' within the BAA that operated during the 1930s. Started by Robert Barker, its members included L. F. Ball, B. Burrell, R. E. Diggles, E. F. Emley, W. E. Fox, H. Simmons, C. F. O. Smith and H. E. Wooldridge. Arising in 1934 through the demise of the astronomical columns in *English Mechanic*, the Circle exchanged its own astronomical circulars and published many papers in the BAA *Journal*, accounting for much of the activity of the Association's Lunar Section. The chance survival of many of the Circle's records has enabled this paper to be written.

The 1930s amateur lunar and planetary scene

In the early 1930s the BAA had a number of active planetary Sections.[1] Veteran lunarian Walter Goodacre had directed the Lunar Section since 1896, and was still observing from Bournemouth. Goodacre published several excellent BAA Lunar Section *Memoirs*. The intervals between them were rather long,[2] but lunar notes and other papers often appeared in the *Journal*. The Mercury & Venus Section was likewise headed by veteran Scottish observer Henry McEwen,[3] and he contributed regularly.

The Mars Section had a very low profile: its Director of the previous decade, Dr W. H. Steavenson, was a first-rate observer but conspicuously failed to analyse the observations submitted to him. The appointment of Dr R. L. Waterfield in 1932 had given hope for better things. The Rev T. E. R. Phillips had for many years been very active with the Jupiter Section, perhaps the most successful of all these Sections, publishing regular accounts in the *Journal* and *Memoirs*. Phillips had a major observatory at Headley, Surrey, and his main collaborators were B. M. Peek and F. J. Hargreaves. The Saturn Section was sporadically active.

In summary, the 1930s BAA lunar and planetary Sections were not uniformly good at reporting members' work. *Memoirs* generally appeared many years after the observations and there was not enough money to publish many halftone plates of illustrations in each volume of the *Journal*. Isolated observers, if they could not attend meetings and see current work projected upon the screen, would be starved of current planetary information. Even those who joined the BAA would not necessarily see results in print for some time, and sadly, in the case of some Sections, never.

There were few local astronomical societies, apart from those that served large cities, such as those in Glasgow (the latter a local Branch of the BAA), Hull, Leeds, Liverpool and Manchester (another ex-Branch) and Newcastle upon Tyne.

English Mechanic & World of Science

There was, however, one periodical to which many amateurs had recourse. For many years, the popular weekly newspaper *English Mechanic*[4] reached a wide audience; its columns carried astronomical news, letters, tips for telescope makers and telescopic drawings by amateurs. It seems that it fulfilled the same need for topicality as would *The Astronomer* magazine, from 1964 onwards. Therefore, many BAA members were subscribers to a long-enduring periodical that many contributors affectionately referred to as 'Ours'.

Early in 1934 the Editor of *English Mechanic* decided not to accept further observational material. He wrote to H. E. Wooldridge,[5] declining his recent contribution: 'Owing to the very great pressure on our editorial columns, and to the fact that the interest in astronomy has shown a marked falling off during the past year or so, it has been decided to drop this feature of 'English Mechanics' and to concentrate more upon matters of practical interest to readers. We are sorry, therefore, that it will not be possible to accept for publication letters dealing with observational

Figure 1. Robert Barker in 1935. (From Wooldridge's papers.)

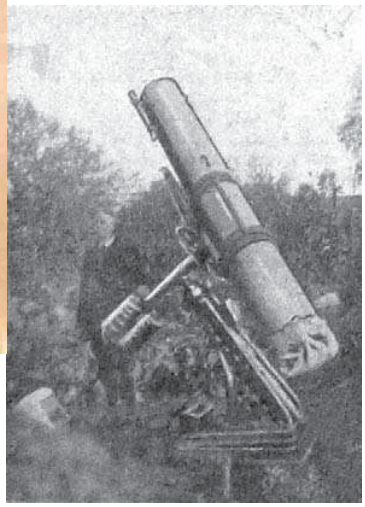


Figure 2. Barker's telescope, reproduced from a very small photo published in *English Mechanic*, 1926.[20]

Figure 3. Ben Burrell in the RAS Library in London. (1950s)

matters on astronomy, although occasionally we hope to publish constructional items relating to telescopes and similar apparatus.'

This doubtless came as a shock, and in due course the RAS cancelled its subscription.[6] A new magazine with a glossy cover called *Practical Mechanic* had produced strong recent competition, but it would not cater for astronomers. Nor would the ever-popular *Meccano* magazine.[7] 'I've cancelled my order for the journal,' wrote W. E. Fox to Wooldridge[8] 'as they have cut us out'.

There had been an attempt to start a popular UK astronomical magazine in 1930 (*The Amateur Astronomer*, edited by P. E. Emerton–Brown of West Ealing), but it folded after only one issue. Unless they could face the challenge of writing a finished piece for the BAA *Journal*, or contribute to a journal published outside of the UK, amateur astronomers were deprived of a convenient place to publish their data. Consequently, in those dark days immediately following the great Depression of 1929–1933, a small group of amateurs sought to fill the void by forming their own observing Circle. On 1934 March 10, Robert Barker wrote to Leslie Ball: 'I suggest *circular correspondence* between (alphabetically) Ball, Barker, Burrell, Diggles, Emley and (perhaps) Wilkins' and went on to discuss his plan in more detail. Barker said that he had also written to Burrell and Diggles, so probably Emley had already accepted the plan. Now let us properly introduce the *Dramatis Personae*.

The new lunar and planetary Circle and its members

The Circle was often referred to as Mr Barker's Circle, and its final list of members comprised Leslie Francis Ball (1911–1992, Figure 4),[9] a BAA member from 1932; Robert Barker himself (1873–1966, Figures 1 & 2),[10] a member since 1924; Ben Burrell (1903–1983, Figures 3 & 5)[11] who joined in 1932; Robert Edward Diggles (who joined in 1931); Edward Frederick Emley (1917–1980),[12] who joined in 1933; William Edwin Fox (1898–1988, Figure 6),[13] who joined in 1935; Hugh Simmons (1891–1952), who joined in 1922; Charles F. O. Smith (*d.* 1949, Figure 7)[14] and Harry Ewart Wooldridge (1913–2006, Figure 8), who had been a member since 1934.[15] So all were BAA members; indeed, Ball, Burrell, Emley and Wooldridge had all joined through Barker's influence. And most, if not all, of these observers had been regularly contributing to 'Ours' for several years, so were already acquainted with each other.

A full address list[16] is as follows:

L. F. Ball, FRAS, 'Auriga', 27 Parkbrook Road, Northenden, Cheshire.

Robert Barker, FRAS, 'Brendon,' 168 Crossbrook Street, Cheshunt, Herts.

R. E. Diggles, BSc, FRAS, 'Colwyn', Ash Grove, Bucknall, Stoke-on-Trent. (The 1937 January BAA *List of Members* also gives a term-time address: The High School, Henley, Stoke-on-Trent, Staffs.)

E. F. Emley, 'Westworth', 18 Alderley Road, Low Fell, Gateshead, Northumberland.

W. E. Fox, 49 Milner Street, Newark, Notts.

H. Simmons, 'Solaris', Edlesborough, Dunstable, Beds.

Chas. F. O. Smith, 22 Inverleith Gardens, Edinburgh.

H. E. Wooldridge, 'Lyndhurst', Stoke Road, Aston Fields, Bromsgrove, Worcs.

Ben Burrell himself lived in Doncaster: in the 1930s, his address was 93 Woodhouse Road. Some of the others listed became 'FRAS' later.

Later Dr Samuel Morris Green (1922–1944)[17] seems to have joined the Circle. Dr Hugh Percy Wilkins (1896–1960)[18] was not accepted into the Circle in the beginning, and joined it only in 1946, in its brief post-War revival, though in reality Wilkins worked independently of it in mapping the Moon.

Surviving letters show that many members of the Circle were already in touch by letter by 1932. Formal records began in 1934. Barker's plan was very quickly put into operation. Each member would issue handwritten illustrated circulars from time to time, to be passed between them in alphabetical order, and each would duly receive comments written upon them from the others. At an early stage Diggles (a schoolteacher from Stoke-on-Trent) volunteered to act as 'drudge' with any calculations needed, and Emley offered to be the Circle's 'librarian'.

Burrell and Emley sought to preserve incoming circulars by hand-copying them into hardback notebooks: all these copybooks still exist. Burrell's four copybooks (468 pages) cover the period from 1934 April till 1938 December with a gap for the War, and then run from 1946 May till 1948 May. Emley's two notebooks span the period 1934 April until 1937 November: the second book has blank pages at the end and latterly shows evidence of haste. Ball mixed the circulars and notes and photographs from observers in with his personal observations (and wartime astronomical diary) in several notebooks; these confirm the period of operation of the Circle logged by Burrell. Members also kept their original circular sheets once returned to them.

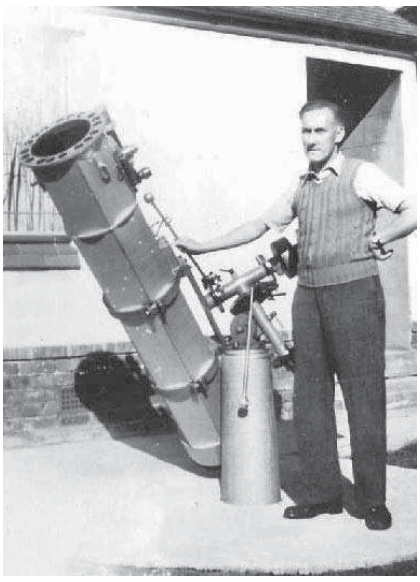


Figure 4. Leslie Ball in 1949 with his 25cm reflector.

No photocopying was possible in the 'thirties, though later Burrell did have access to blueprint and photographic facilities at his place of work, and made good use of them for complicated diagrams or charts, or artistic drawings.

Figure 5. Burrell observing with his 22cm reflector from his home in Doncaster. (1930s)

Mutual cooperation

Many of these individuals were practical men, and some had an engineering background. All had been subscribers to 'Ours'. We know that Burrell started out as a railway porter, becoming a railway fitter, and later was an industrial photographer for British Railways. Later he made all his own glass slides to project during astronomical talks, and many of them were skilfully coloured by hand. Fox was an engineer who during WW2 worked on silent pumps for submarines, though he had been unemployed during the great Depression just before joining the Circle.

Burrell and Wooldridge both had access to machine tools, and Wooldridge often made finely finished telescope parts for others. He made adaptors to convert Barker's RAS-thread eyepieces to push-fit, to the latter's delight, plus a fine spherometer for the mirror-maker Jos (Joseph) Slater. Wooldridge also had a long correspondence with the lunar observer Henry Tompkins (1871–1957). Professionally, Wooldridge worked on DC generators and later was foreman engineer in a drop-forging company.

Ball's career lay in the Civil Service, and Diggles was a school teacher. Simmons worked at Whipsnade Park Zoo (opened in 1931 and located in Dunstable), rising to the post of Superintendent in 1946, and retiring early on account of ill-health in the following year.

Barker was very much the elder statesman of the Circle. As a composer of church music, he was also music critic for the *Morning Post* and the *Manchester Guardian*. He had been active since the early 1920s, and was a source of much kindly help and inspiration to fellow amateurs, encouraging the young recruit. He befriended and helped the young Patrick Moore[10] when Moore joined the BAA in 1934; Richard Baum has a vivid memory of a single meeting with Barker in 1947. Barker attended most BAA meetings. Ball and Wooldridge preserved many letters from him.

Figure 6. Bill Fox with his 75mm refractor in 1934. (From Wooldridge's papers.)

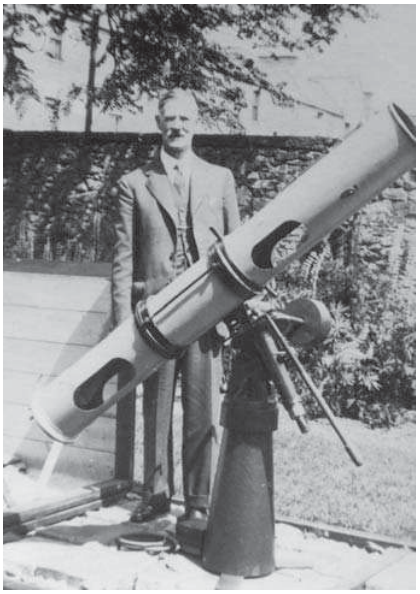


Figure 7. C. F. O. Smith in 1936 with his 16cm reflector. (From Ball's notebook.)

Barker gave advice about eyepieces, where to buy a good mirror, books and lunar charts, *etc*. Often he obtained books for friends at low prices, and sometimes generously presented them to them. Typically, he writes to Wooldridge on 1934 December 15: 'Here is one of Lowell's rare books – it would cost 21/- at Foyle's (*if* they had a copy) – the old shark at our local shop marked it 8/6, and I got it for you at 3/6.'[19] Years later the writer acquired a copy of Walter Goodacre's *The Moon* from the estate of the late W. E. Fox, and into it had been slipped a note: 'Sent by request of Mr. Barker from W. Goodacre'. Doubtless it was another gift.

Telescopes

Most of the telescopes used were typical for the epoch. Fox in those days used a 7.5cm refractor (Figure 6) but later acquired a 15cm reflector by Browning. Later still he would borrow a 25cm reflector from the BAA. Simmons used refractors around 10cm aperture for his solar work. Ball started with a 16cm Calver reflector, and Wooldridge also began with an aperture of 16cm (Figure 8), though he would graduate to a 25cm aperture later. Ball purchased a 25cm mirror from Slater in 1935 and built the rest of the telescope himself. Diggles used an 18cm refractor, and Emley a 16cm reflector whose mirror was made by With. Burrell started with a 7.5cm refractor, and by the early 1930s was employing a 22cm reflector, also with a mirror by With (Figure 5); he would later make a 25cm reflector. At one time Burrell also owned a 16cm Calver which had previously been used by Arthur P. Norton in compiling his classic star atlas, according to a 1953 letter from the latter.

Figure 8. H. E. Wooldridge observing with his 16cm reflector, 1934 July. (From Wooldridge's papers.)

Barker owned the largest instrument of the group, a 32cm (12.6-inch) Calver reflector (Figure 2), which he had purchased direct from the legendary George Calver. The mounting was so heavy that on one occasion the whole instrument subsided into a hidden cavity in the lawn. Barker also had an excellent clock

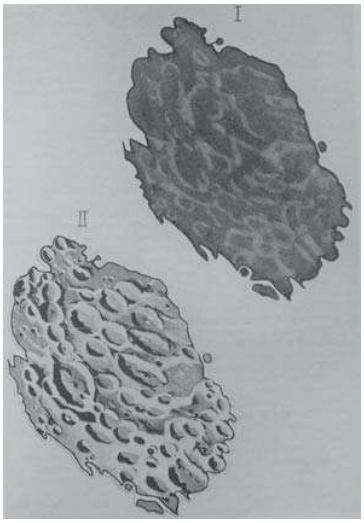


Figure 9. C. F. O. Smith's historical 'reconstruction' of the cratering record of Mare Crisium.[24] Drawing I is a chart of the 'ghost rings' that can be observed under a high Sun; II is a reconstruction of the likely cratering record.

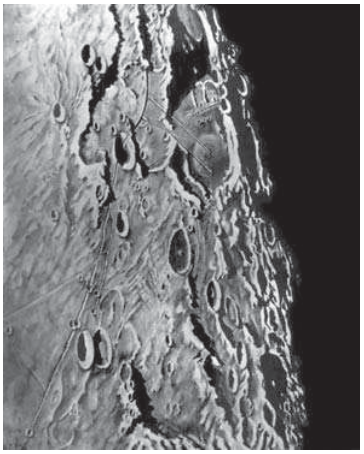


Figure 10. Lunar drawing by L. F. Ball. From a photograph of an original of the Sirsalis Cleft, published in the *Journal*.[28]

drive and covered the instrument with tarpaulins when not in use.[20] Burrell's homemade 22cm reflector was featured on a short news clip from Pathé News in 1939,[21] as it was then the largest instrument in the Doncaster area. Smith used a 16cm Newtonian (Figure 7) but later obtained a 15cm Wray refractor which he housed in a T-shaped run-off shed which was illustrated in the *Journal*.[22]

Projects, influences and publications

In the 1930s there was still a lot of original lunar work that could be done: one member of the Circle would circulate a chart of a lunar crater, such as Newton or Schickard, or some feature near the less well-mapped limb areas,[23] and the others would copy the chart and add to it at succeeding lunations. Amongst themselves they also circulated drawings of Venus, Mars, Jupiter and Saturn, and photos of the Sun, Moon or bright comets. Simmons mostly contributed sunspot or solar prominence drawings.

Often a member of the group would submit a finished paper for publication in the BAA *Journal*. Smith was most interested in the origins of lunar features. He wrote about ghost craters on the Mare Crisium in a novel, pseudo-archaeological fashion (Figure 9)[24] and sought observational evidence for Wargentin-type formations with raised lava floors,[25,26] whereas Leslie Ball[27] and Barker[28] concentrated upon discovering new lunar domes and, above all, clefts.

Apart from their mutual circulars, members of the Circle carried on an extensive correspondence with outside figures. Barker had corresponded with Percival Lowell, W. H. Pickering and other famous personalities: Pickering's ideas about possible 'lunar vegetation'[29] exerted a powerful influence upon Barker, even if Goodacre was of the opinion that changing illumination would sufficiently explain the observed changes. In this connection Barker also had the odd idea that the radial dark bands of Aristarchus had developed further during the 20th century.[30]

The group produced a large number of good papers for the *Journal* over a period of several years. Barker listed in one circular, with some pride, those papers published during the BAA's 1933–'34 session:

L. F. Ball, 'The lunar crater Darwin'[31]
R. Barker, 'Notes on Saturn in 1933'[32]
E. F. Emley, 'The lunar region west of Vendelinus'[33]
R. E. Diggles, 'A lunar libration position chart'[34]
R. Barker, 'Venus at W. elongation'[35]
L. F. Ball, 'Recent lunar observations'[36]
E. F. Emley, 'The northern dark area in the lunar crater Schickard'[37]

Barker noted that he was asked at each BAA meeting: 'Are you, or your friends, giving an *interesting* paper, – you know, something I can understand?'[38] And L. F. Ball's fine lunar drawings were always greeted with applause when projected upon the screen:[38] see Figures 10–12 for some examples. Ball later described something of his artistic technique in a chapter of Patrick Moore's *Practical Amateur Astronomy*[39] and gave further tips in one edition of the BAA Lunar Section's guidebook.[40] Ball's drawings also illustrate early editions of some of Moore's other books.[41]

The Circle, Walter Goodacre and T. L. MacDonald

Walter Goodacre (1856–1938; Figure 13),[42] Lunar Section Director since 1896, was not a member of the Circle, but he was impressed by its cooperative work, which was normally collated and forwarded to him by Barker. When Goodacre could not be present at a BAA meeting he might ask Barker to deputise, and to read a paper by one of the Circle's members. Ewen Whitaker recalled to me a post-War occasion when Barker was speaking at the BAA, 'with gusto in his rather high-pitched voice'.

It seems that around 1931 Goodacre was thinking – perhaps already for the second time – about a successor. Once he apparently had

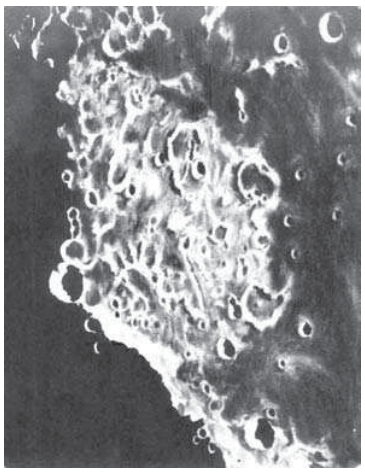


Figure 11. Lunar drawing by L. F. Ball. From a photo of an original of the complex area of Palus Somnii. 1946 Dec 12, 01:00UT, 25cm refl., ×180.

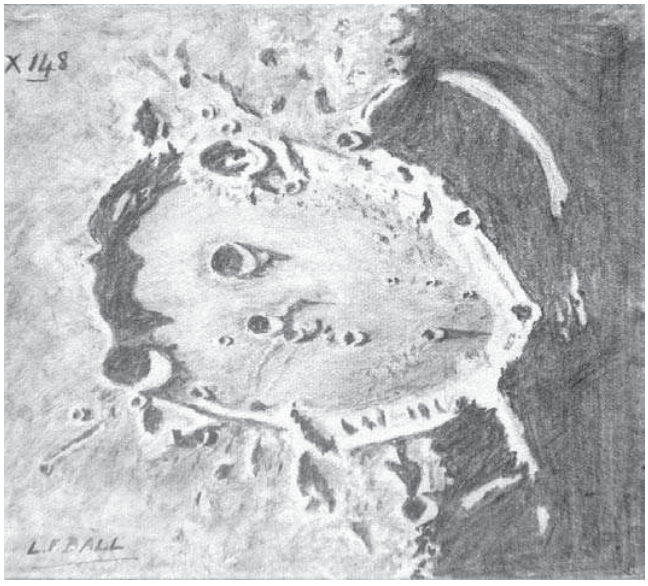


Figure 12. Lunar drawing by L. F. Ball. A very early pencil drawing of Clavius. 1931 Feb 26, 20:00UT, 7.5cm OG, ×148.

Figure 13. Walter Goodacre: BAA Presidential portrait.[42]

Figure 14. T. L. MacDonald as Mayor of Carlisle in 1961–'62. (Courtesy Mr A.Wiseman and Carlisle City Council.) A very small picture of him was also published in *Hermes* (1968).

wanted Barker to succeed him in office, but Barker himself[43] persuaded Goodacre to continue, the latter agreeing on the condition that Barker would assist him informally. Barker helped Goodacre with the latter's famous Moon book. By the time Goodacre did resign in 1937 Barker was out of favour with the Council (for reasons we shall see later) and so Goodacre nominated L. F. Ball to succeed him. However, through illness Goodacre missed a crucial Council meeting at which Thomas Logie MacDonald (1901–1973) was appointed Director. 'Mac' (or 'TLM'; Figure 14)[44] had a superb historical and mathematical knowledge; he was au fait with all the lunar research of his day and often published excellent thought-provoking articles in the *Journal* and *English Mechanic*. Furthermore, he was a past President of the BAA West of Scotland Branch, but unlike Barker and his Circle, was not first and foremost a practical observer. (MacDonald's four-part statistical study of lunar craters is still highly regarded by LPOD [Lunar Picture of the Day] website master Chuck Wood.[45])

Barker did not approve of the appointment, and wanted the Circle to protest. However, they would not do so, and Ball's letter files reveal that both Emley and Smith knew MacDonald personally and thought highly of him, even though both would gladly have worked under Ball. MacDonald was quick to publicly praise Barker's recent paper on suspected lunar changes.[46]

Although an excellent writer, 'Mac' tended not to return papers sent to him. It is true he was deliberately accumulating material for a Section *Memoir* in the early years of the War, but Wilkins and Wooldridge experienced trouble in having materials returned (the latter needing to get the BAA President to intervene), and he was notorious for not answering letters. But 'Mac' cannot be entirely blamed for the lower activity of the Lunar Section during WW2: circumstances conspired against him.

1935: the 'Martian rebellion'

One earlier event proved a temporary setback for the fortunes of the Circle: the affair of the 1935 aphelic opposition of Mars (opposition date: April 6). R. L. Waterfield, then Section Director, quickly produced a BAA apparition report,[47] which (amazingly) appeared in print by late July of the same year. The Circle's members contributed: Ball, Barker, Burrell, Fox and Wooldridge had made some 80 drawings, but all were influenced by Barker, who was a great admirer of Percival Lowell and who drew Mars and Venus much the way Lowell did. Unfortunately, Barker's collaborators had not seen any recent Mars work apart from that published in *English Mechanic* which (as it happened) was mostly of the 'canal school' type; moreover, none except Barker himself had enjoyed more than one apparition of study with a really adequate aperture.

Barker's 1935 Mars summary chart (Figure 15)[47] was crisscrossed with fine geometrical canals. Given that the former Director E.–M. Antoniadi had dealt a deadly blow to the canal theory as long ago as 1909,[48] Waterfield would not accept the Circle's stylised portrayals, though he did publish Barker's map alongside another summarising the combined results of the Section, drawn by Phillips

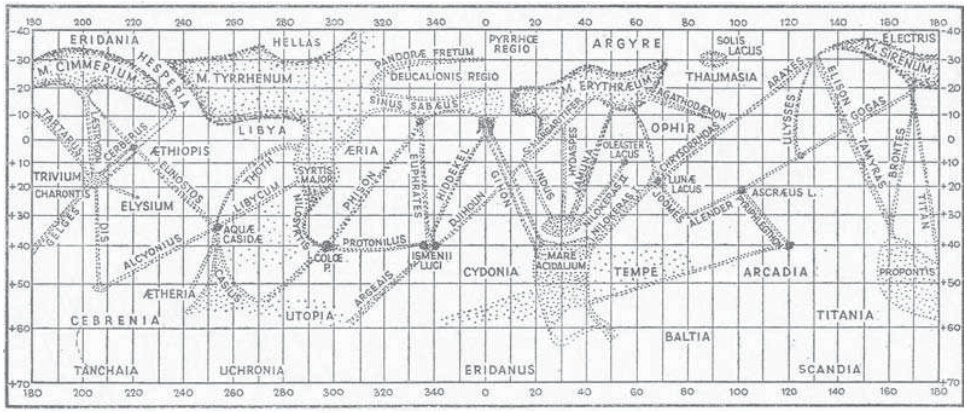


Figure 15. Barker's map of Mars in 1935, showing many fine canals. This clearer, redrawn version is reproduced from Moore's *Guide to the Planets* (1955).[41]

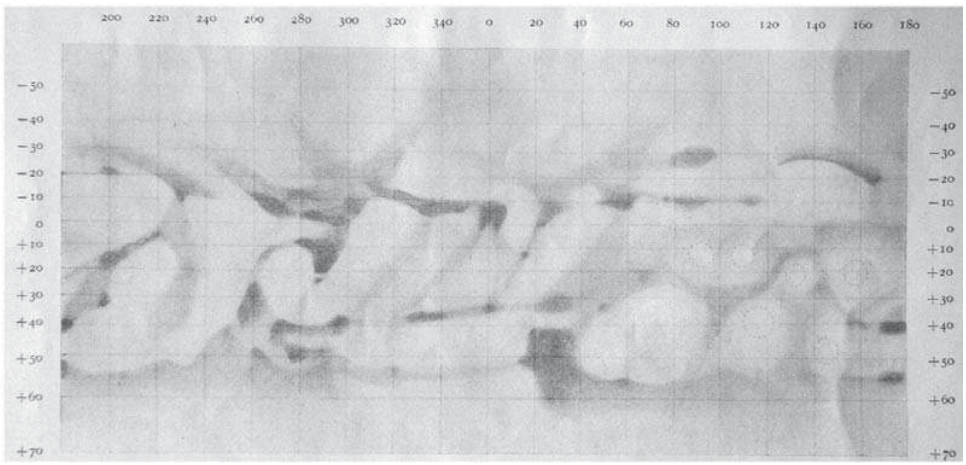


Figure 16. The BAA Mars Section chart for 1935.[47]

in the soft-pencil style of the 'Headley Group' of observers which included Waterfield himself (Figure 16), and another in similar vein by Antoniadi himself. It was a jarring comparison. To Waterfield, Antoniadi wrote privately:[49] 'He [Barker] admires Lowell blindly', which unfortunately was only too true. The 1935 drawings of the planet by L. F. Ball were also crossed with fine lines.[50]

To Barker, who contributed observations to the Section over several decades,[51] the mode of publication of his chart was ironic: it was probably reproduced, he wrote in a circular to his friends on August 16, 'as a horrible example and solemn warning' for the uninitiated. In his copperplate hand he penned a strong letter to Waterfield immediately upon receipt of the offending issue of the *Journal*. His letter, preserved in the Mars Section archives, went straight to the point and began: 'You hit with a straight left'.[52] The other Circle members sent the Director a joint letter. Waterfield sent a suitably mild reply to each. Of the other contributors to the Section, R. E. Pressman and the veteran E. A. L. Attkins[53] were said by Barker to have been supportive of the Circle's standpoint, but their drawings do not really confirm this supposition.

In fact Waterfield had genuinely valued the Circle's observations of the 'difficult' side of the planet, and was less concerned with errors in the portrayal of the minor markings: 'like seeing a horse when there is actually a donkey', he had written in the *Journal*.[47] Barker was allowed to speak about his 1935 Mars work at the Ordinary Meeting of 1936 January, and a long discussion followed in which the other speakers supported Antoniadi's viewpoint.[54] The damage was done: Barker turned against the Director, and his next observations were sent for publication abroad.[55]

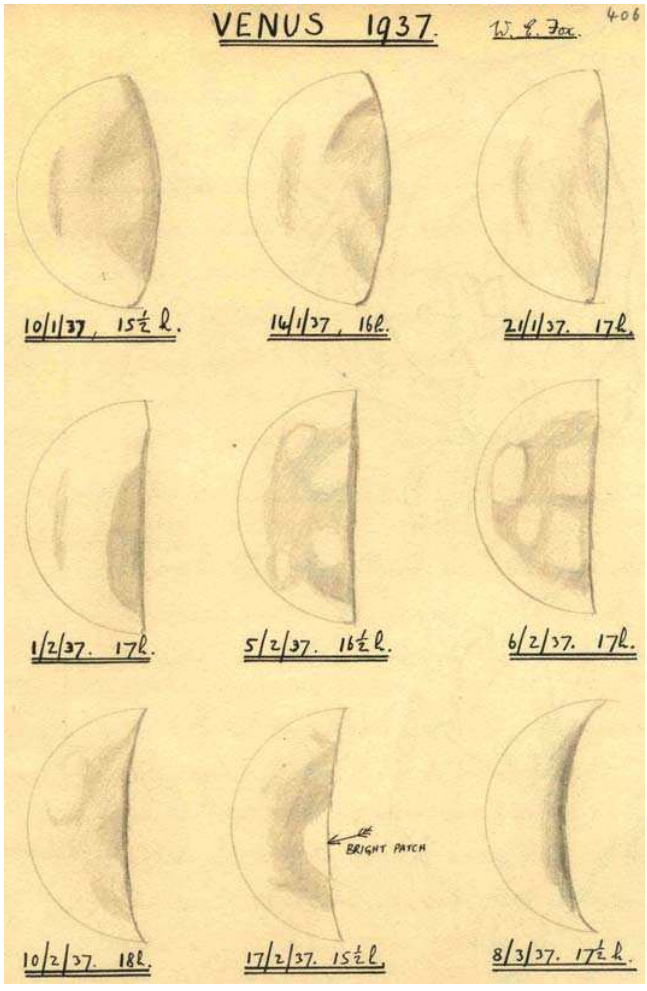


Figure 17. Venus at the evening elongation of 1937 by W. E. Fox. (From Burrell's copybook.)

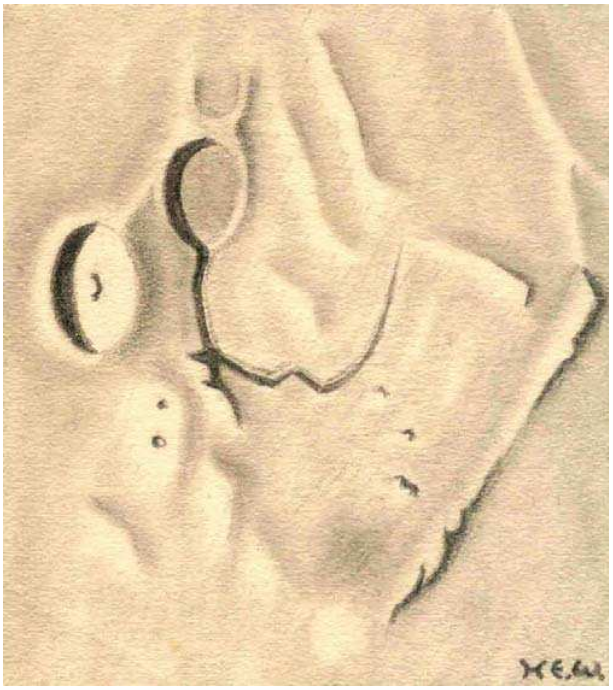


Figure 18. Aristarchus, Herodotus and Schroeter's Valley drawn by H. E. Wooldridge, 1934 Jan 27, 22:00UT, 16cm refl., ×77.

In 1939 Barker tried again and submitted a paper to the BAA about his recent observations of Mars. The Secretaries told him it was to be held over for publication in the Section *Memoir*, a publication which, predictably, would never appear. But he was told he could speak about the planet at the November Ordinary Meeting. Having cycled all the way to London from Cheshunt, 'with slides in pocket', he was not allowed any time on the platform.[56] It was the last straw, as he related the details to Wooldridge. He resigned from the BAA, but rejoined in 1946 after Waterfield (and MacDonald) had been succeeded.

Some other members of the Circle had continued to supply drawings to Waterfield, but the heat was taken out of any further debate by the planet's poor position for British observers in 1937 and 1939 and then, inevitably, by the Second World War. One wonders if most of the Circle's members were entirely behind Barker? In this respect, Ball was perhaps his strongest supporter.

Other studies by the group, 1934–1939

Members of the Circle also studied Venus. Barker's somewhat Lowellian drawings featured in short papers he wrote for the *Journal*,[35,57,58] but the other members of the Circle were more soft-pencil in their approach. However, Barker did succeed in resolving individual cloud structures, as have certain later observers. In the first of his papers[57] he wrote: 'I obtained transitory glimpses of the Venusian disc parcelled into a chequerwork of tiny areas... impossible to record.' Henry McEwen, in passing Barker's paper for the *Journal* wrote to him that his drawings resembled those published by Jarry–Desloges,[59] and that the key thing with the Venusian markings was 'not to take sides'. The Circle's notebooks also allow us to recover copies of drawings which would have been submitted to

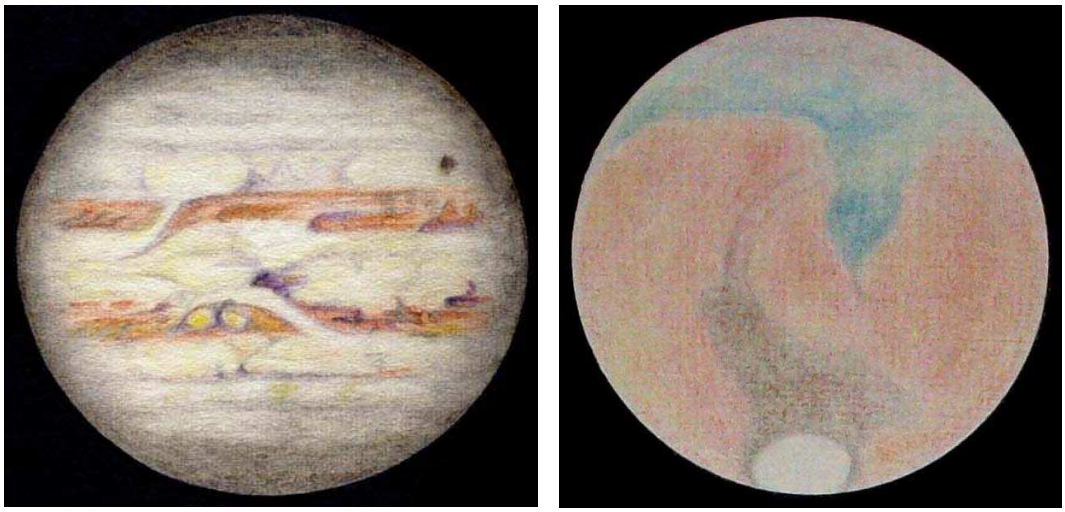


Figure 19. Colour planetary drawings by L. F. Ball. *Left:* Jupiter, 1935 May 22, 24:00UT, 25cm refl., ×324. ω_1= 354°, ω_2= 35°. *(From Ball's logbook.) Right:* Mars, 1950 Mar 29, 20:00UT, 25cm refl., ×262. *(BAA Mars Section Archives.)*

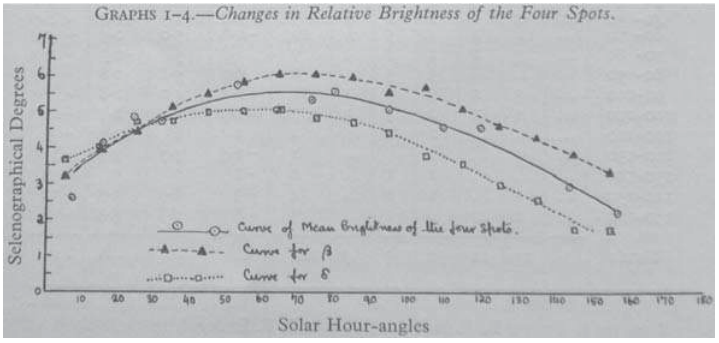
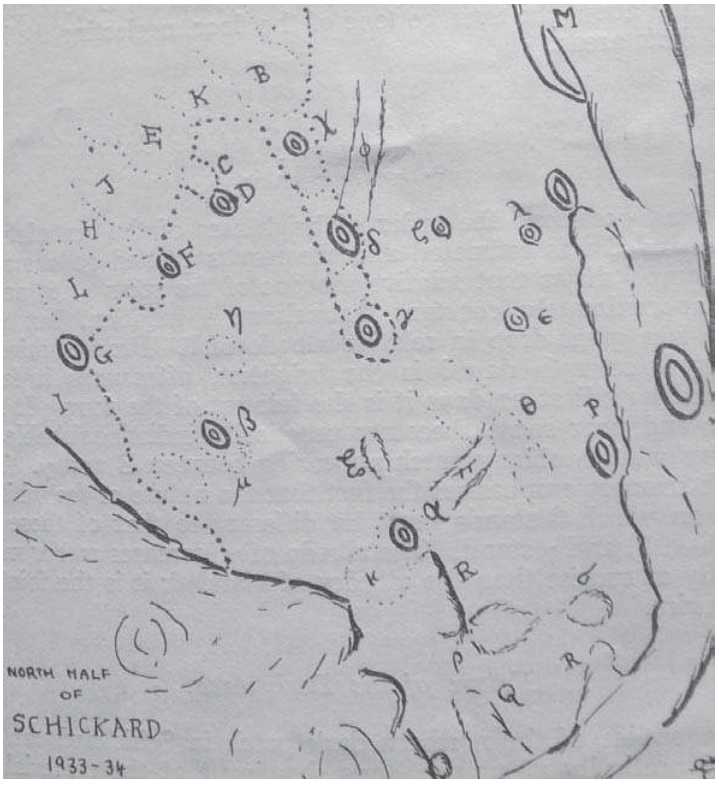


Figure 20. E. F. Emley's lightcurves for light spots in the lunar crater Schickard, demonstrating their periodic variation with the progress of a lunation.[63] A key map *(below)* from an earlier paper is included.[37]



the Mercury & Venus Section, and later lost,[3] such as a series by Fox in 1937 (Figure 17).[60]

H. E. Wooldridge was also a superb artist. His sketch of Aristarchus and Herodotus (Figure 18), found loose in what had once been Fox's copy of Goodacre's *The Moon*,[61] is given here. His daughter Erica Gaize adds: 'My father also kept his drawings from school and in the late 1930s he did some very good oil paintings, copied from biscuit tins or books.'[62] Wooldridge's sketches were included in papers by other members of the Circle in the *Journal* and *Memoirs*. He was also active in the Jupiter Section. Ball observed Jupiter occasionally and was delighted with the performance of his new 25cm mirror. He would make many coloured planetary drawings: see Figure 19.

E. F. Emley's paper entitled: 'Periodic changes in brightness of four light spots in the lunar crater Schickard',[63] was a first-class effort, and was a continuation of an earlier paper.[37] He showed by analysis of the intensity estimates by himself and five other members of the Circle that these patches – although curious in appearance to the observer – varied systematically in brightness during each lunation. Figure 20 shows a key map and his graphs: there was no evidence for any irregular change. The Circle's work on the lunar limb regions was exemplified in another study by Emley, this time concerning the Mare Smythii (Figure 21),[64] which again presented the results of cooperative work.

Burrell and Fox gave attention in 1936 to the edgewise rings of Saturn, and both observers continued to make several very artistic drawings of the planet (Figures 22–23). Barker was able to observe shadow transits of Dione, though even with his

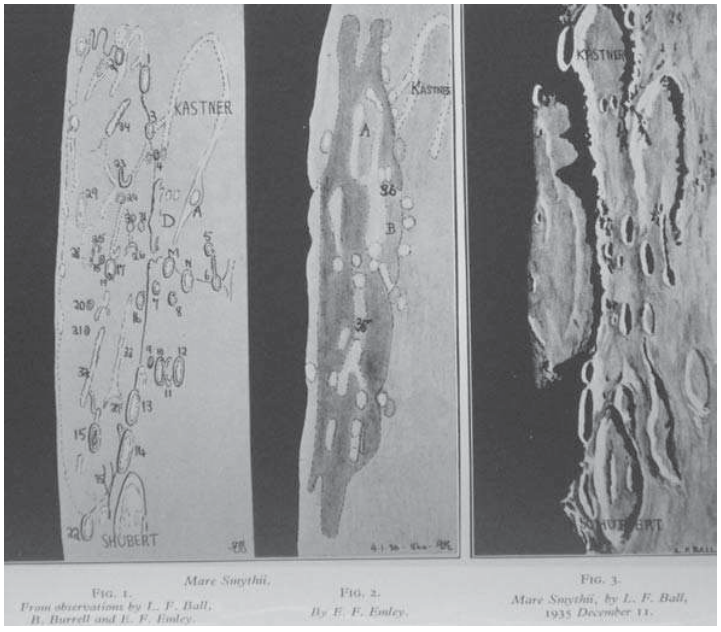


Figure 21. Mare Smythii illustrations in a paper by Emley.[64]

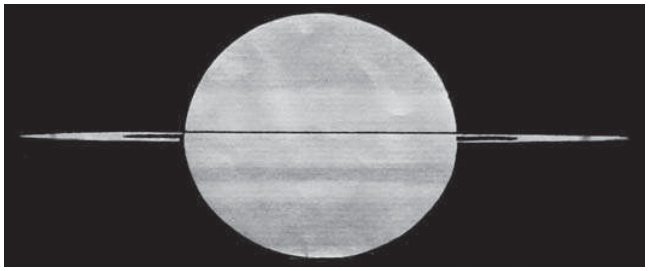


Figure 22. Drawings of Saturn by B. Burrell. **(A)** The nearly edgewise rings on 1936 Aug 27, 22:30UT, 22cm refl., ×240–400.

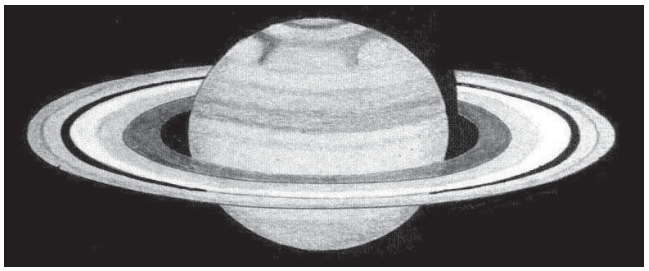


Figure 22. (B) Unusual activity in Saturn's South South Temperate Zone, 1948 Mar 27, 20:10UT, 16cm refl., ×288. *(B. Burrell.)*

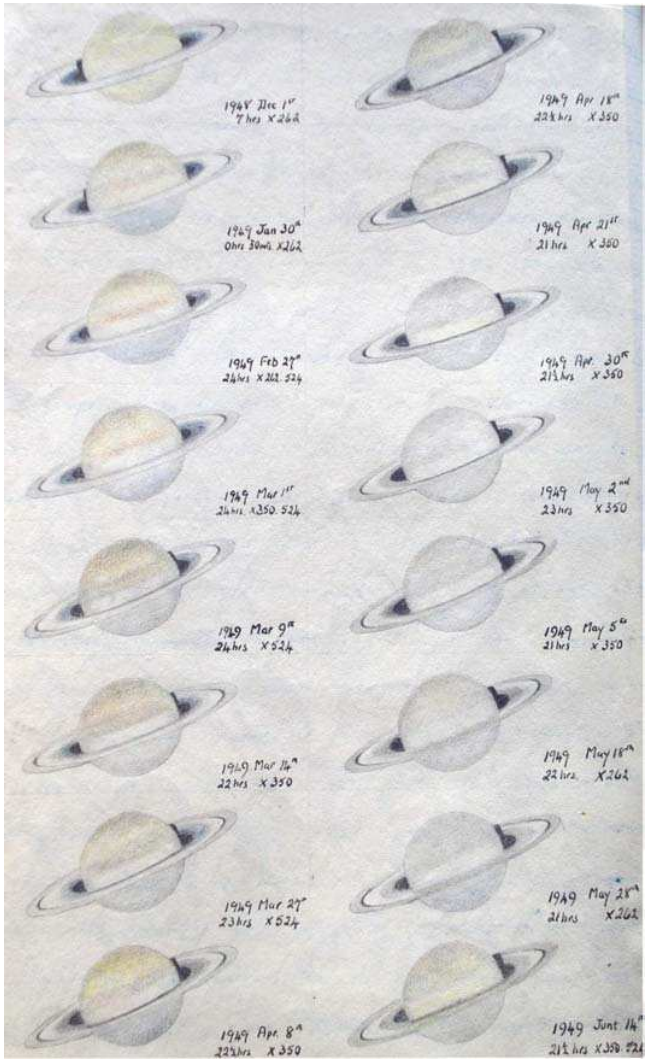


Figure 23. A series of Saturn drawings during 1948–'49 by L. F. Ball. Note the general yellowish tint of the S. hemisphere compared with the bluish tint to the north of the rings.

large reflector they were difficult to detect.[65]

In 1938 November Burrell took the first successful colour photographs of a total lunar eclipse, on Agfacolor film: although described in the *Journal*,[66] one can be reproduced in colour only now (Figure 24). We also give two drawings of the same eclipse made by Ball (Figure 25). Burrell also obtained good black and white series of the lunar eclipses of 1939 (Figure 26), 1949 and 1950. Later, Burrell would deliver a well-received talk about his photographic work concerning the 1949 April total lunar eclipse at that year's BAA Exhibition Meeting.

Figure 24. The 1938 Nov 7 total lunar eclipse photographed in colour by B. Burrell. A 3-minute guided exposure at the prime focus of a 7.5cm OG at f/16, taken on Agfacolor film, copied from the original.

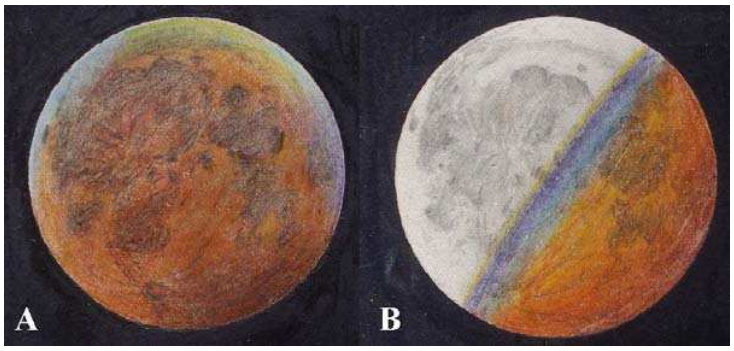


Figure 25. Drawings of the 1938 Nov 7 total lunar eclipse by L. F. Ball with ×8 binoculars. View (A) *(left)* was drawn for mid-eclipse at 22:30UT, and (B) was sketched at 23:30 UT. Note the coloured fringe to the umbral shadow in (B).

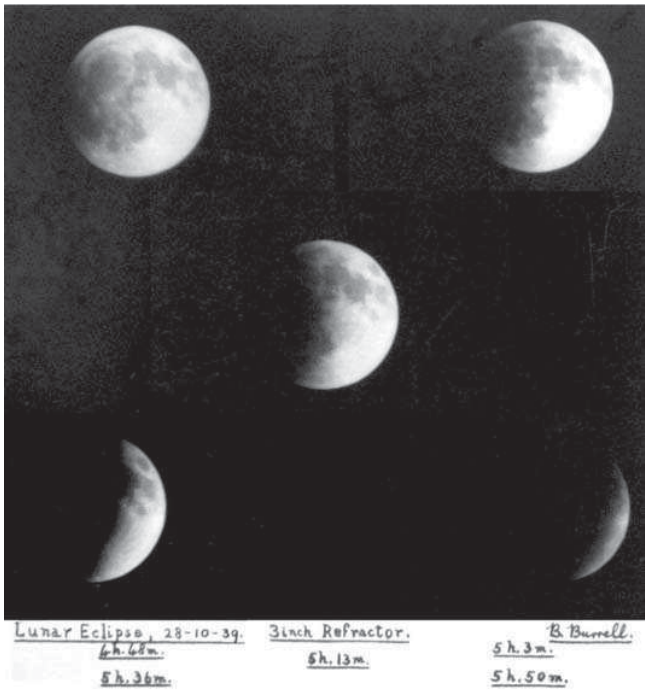


Figure 26. B. Burrell's sequence of photographs of the 1939 Oct 28 lunar eclipse.

Figure 27. The great auroral display of 1947 Apr 17, photographed by B. Burrell.[68]

Recognition

Let us interrupt the story with the outbreak of the Second World War in 1939, and jump ahead to show the recognition some members of the Circle would later achieve.

As already noted, Leslie Ball[9] did a lot of book illustrations. He did not apparently contribute to BAA Sections after the 1950s, but was still observing until 1990.[67] When the lunar crater Endymion B was called 'L. F. Ball' by Wilkins and Moore, the IAU did not accept the name. Informal names given to craters by Wilkins for

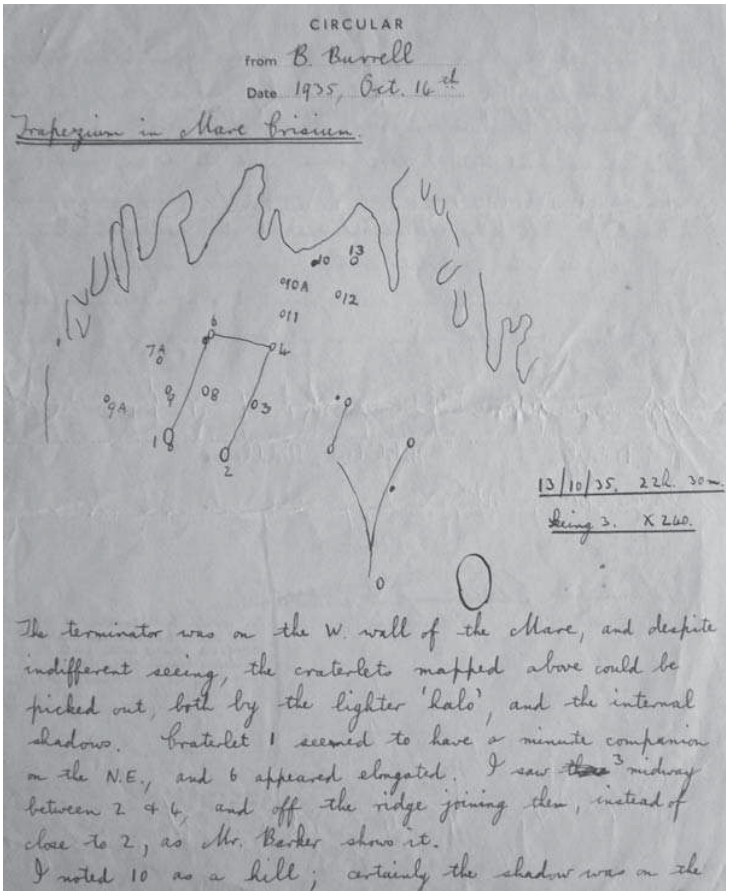


Figure 29. *Above:* 'Barker's quadrangle' (*aka* Trapezium) in southern Mare Crisium,[73] as drawn by Burrell in one of his early Circulars. *Right:* The reverse side with observers' comments.

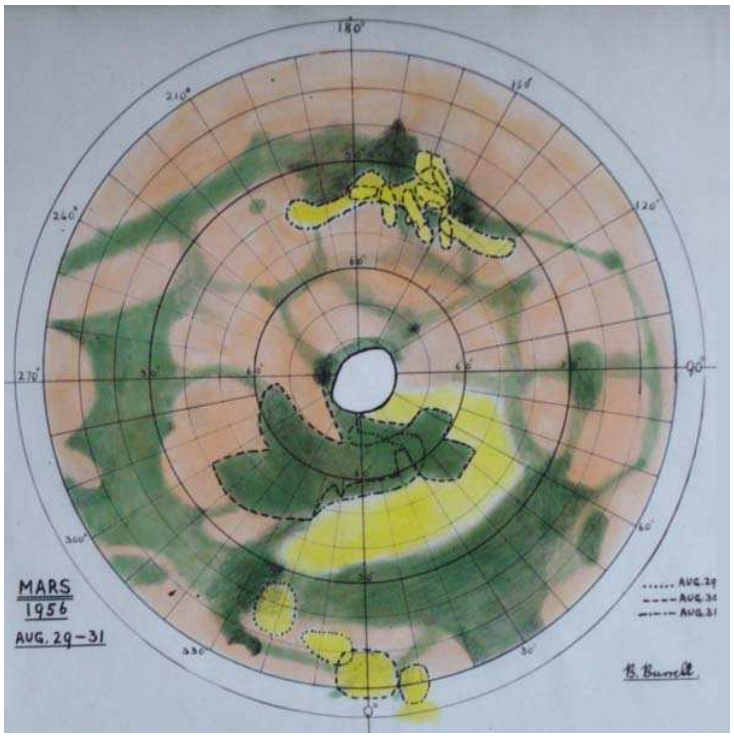
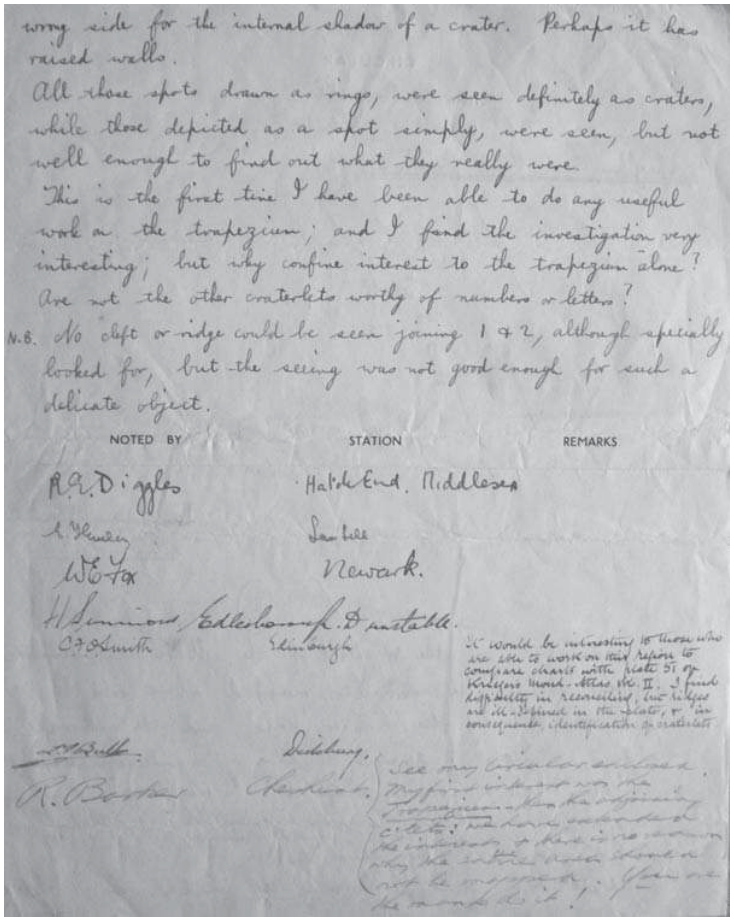


Figure 28. Burrell's maps of the initial stages of the 1956 planet-encircling martian dust storm. *(BAA Mars Section Archives.)* A different projection was used in the 1956 Mars Section Report.[69]

Barker, Burrell, Emley, Green and Smith suffered the same fate, although Wilkins himself did have a crater officially named after him. Ball produced illustrations for astronomical film strips, and for television series. He would act as a technical assistant for the film adaptation of the Arthur C. Clarke novel *2001 – A Space Odyssey*, where he advised about the backgrounds for the Jupiter scenes.



Apart from Ben Burrell's lunar drawings and mapping work, his photographs of the aurorae, particularly the great display of 1947 (which he published in the *Journal* and of which we print an example in Figure 27),[68] were highly praised. He also did good work on the bright comets of the 1950s. Burrell[11] was E. H. Collinson's Assistant Director in the Mars Section for two decades, and gave him considerable technical assistance in (for example) mapping the early stages of the 1956 planet-encircling dust storm (Figure 28).[69] As President of Leeds Astronomical Society he had the pleasure – in 1952 July – of chairing an evening meeting of the RAS!

Edward Emley was by profession a research and development metallurgist, who after working in Manchester ultimately rose to become chief metallurgist with the British Aluminium Company in Gerrards Cross. In addition to his valued lunar papers which we have already cited, he wrote books and articles on mineralogy and metallurgy.[70] Tragically he died in a climbing accident on the Isle of Skye on 1980 August 19, leaving a widow and two sons. Climbing had been a longstanding hobby.

Bill Fox[13] would go on to direct the BAA Jupiter Section for over 30 years, and publish many accounts of its work. He worked with (and later succeeded) Dr A. F. O'D. Alexander[71] in the 1950s to try to locate a visible source upon the planet for the then newly-discovered jovian radio emission. The result, though negative, was valuable. He independently discovered a revival of the planet's S. Equatorial Belt in 1971, during a visit to Kuiper's Lunar & Planetary Institute in Arizona. He was the only one of the Circle to become BAA President. Bill also started the BAA Horncastle residential weekends, and helped to found the Nottingham Astronomical Society, of which he was also President in 1954. Bill was also the only member of the Circle known personally to me.[72]

Of all the Circle's members we know the least about Hugh Simmons, but it's quite likely that as he was known to the young Horace Dall, he got Dall interested in viewing the Sun in hydrogen alpha light.

Robert Barker, as we implied earlier, found professional acclaim as a music critic. The informal name, 'Barker's Quadrangle', perpetuates the 1930 discovery by Robert Barker of a curious trapezoidal arrangement of craters and objects in the south of Mare Crisium (Figure 29).[10] Even today this occasionally excites observers' curiosity.[73] Barker answered many letters about telescopes and lunar and planetary observation, and his tireless encouragement and promotion of others will remain a testament to him.

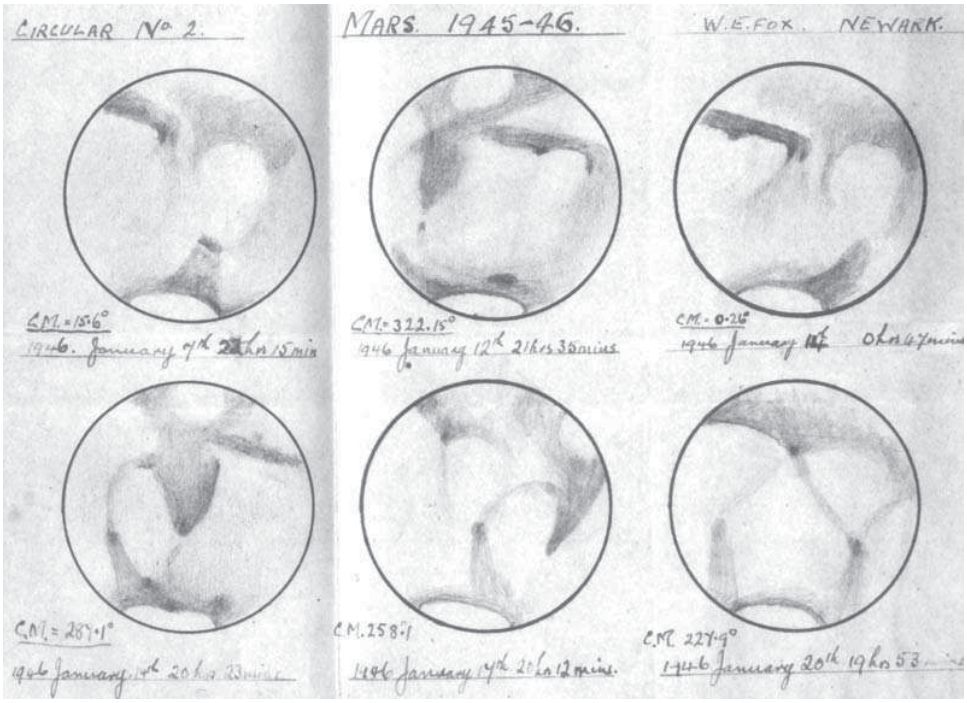


Figure 31. Fox's drawings of Mars in 1946 January. (From Burrell's copybook.)

The 1940s and the end of the Circle

The cooperative activity of the Circle had actually ended in 1938 with the death of Goodacre, after nearly five very productive years. This was quickly followed by Barker's resignation from the BAA in 1939 and then the outbreak of the War. If for a time there were fewer lunar papers printed by the Association, it was partly because some papers intended for the *Journal* had been held back by MacDonald for inclusion in a planned Section *Memoir*. Several of the Circle's observers were able to continue individual astronomical work throughout the War, though Barker was obliged to stop for some time due to air raids: shrapnel rather than bombs was his main problem.[55] L. F. Ball was drafted overseas for Army service during much of the War. Burrell was able to observe the 1941 and 1943–'44 apparitions of Mars, but could give little time to further lunar work.

Figure 30. An original drawing of Darwin on 1938 Jan 28, 21:40UT, by veteran lunar observer C. F. O. Smith, 16cm refl., ×240. (Pasted into one of Ball's logbooks.)

Within the BAA Sections there was also change. Waterfield joined the Royal Army Medical Corps and was drafted overseas, and his successor as Director of the Mars Section was veteran planetary and variable star observer, P. M. Ryves. Also volunteering for the RAMC, Dr S. M. Green was tragically killed on his first day of active service during the Normandy landings in 1944.

In 1946 Ball was demobbed, and Barker rejoined the BAA and suggested the Circle be re-formed. Burrell was then actively assisting the new Director of the Mars Section by analysing that group's work, nearly a full-time hobby in itself. Wooldridge got married in 1940. In 1946 he began to lose peripheral vision in his right eye, and although the trouble got no worse till about his 90th year, it may have made him stop observing. As we have seen,

Barker was the elder statesman of the group, and by 1948 he was 75 years old, though he would continue to observe and publish papers till as late as 1957, when a serious cycling accident led to his selling his beloved Calver. But there was yet another reason why the post-War activity of the group would never reach its earlier heights.

By 1946 H. P. Wilkins had revitalised the BAA Lunar Section (though he needed to be persuaded by Barker to do so). Ball, Barker and Smith joined the Section's Advisory Committee. Wilkins circulated portfolios of contributors' drawings and notes to Section members. He produced a few issues of a typed Circular, *The Selenographical News*, during 1947–'49, after which the Section was ready for something better.

In 1950 an illustrated quarterly Section magazine simply called *The Moon* began,[74] initially under the editorship of D. W. G. ('Dai') Arthur, and later Frank H. Thornton. Wilkins also produced two *Memoirs* containing numerous plates, line drawings and charts, which again included much of the work of the Circle, and finely reproduced drawings by Ball. Given that lunar work was always the major interest of the Circle's members it may be that they felt that the newly dynamic BAA Lunar Section filled their needs. Indeed, Barker suggested as much in a letter to Ball. Emley was still writing for *The Moon* in the 1950s; his subscription continued into the '60s, but by then he was no longer a member of the Section.

Another important publication that did much to publicise amateur lunar work after WW2 was *The Strolling Astronomer*, or more formally the *Journal of the Association of Lunar & Planetary Observers*, edited in the USA by American amateur (and BAA member) Walter H. Haas from 1947 onwards.[75] Wilkins cooperated extensively with the new organisation as well as other groups in Germany and Spain.

Burrell's Circle copybooks recommenced in 1946 July. Individual members of the Circle who were still active remained much in evidence. In particular, C. F. O. Smith wrote several excellent papers. His 'Jupiter in retrospect'[76] was a study of all the past BAA Jupiter Section *Memoirs*, from which he concluded that the two equatorial belts can both be disturbed simultaneously on occasion, giving the lie to the popular idea that they become active alternately. He found that greater activity tended to lead to a reddening of the belts. Smith[77] also suggested that it would be profitable to keep watch on the lunar night side for lunar meteors, anticipating successful CCD work in this area in very recent decades. But just as he was becoming highly active in retirement, Smith died in 1949; the first member of the original Circle to pass away. Like the other members, he had been a talented artist: one example of his original drawings will have to suffice (Figure 30).

Both Burrell and Fox (Figure 31) produced accounts of their 1946 Mars observations, and Burrell made comprehensive charts of his work for circulation. Ball made an energetic start and circulated some fine lunar drawings made in late 1946, but somewhere they were lost in the post. Although Burrell had made photographic copies, Ball was discouraged by the loss, and also by the relative inactivity of some other Circle members. He published only one more paper in the BAA *Journal*,[78] but remained an active Lunar Section member throughout the 1950s. He had begun to do more Deep Sky work, too, from the darker skies of his new post-War home in Wales. Diggles, Simmons and Wooldridge all left the BAA after the late 1940s.

After 1946 December, Burrell's copybook for the group's circulars would contain just two more pages of entries, for 1947 February and 1948 May. Following a circular on the subject of variable power eyepieces by Barker, the record simply closed with many blank leaves remaining. The post-War revival had been as ephemeral as the appearance of the bright comet drawn by Ball in 1957, which perhaps makes a suitable closing illustration (Figure 32). Ball in a logbook entry for 1948 confessed that the Circle had 'fizzled out', citing as the main reason the better communications in some BAA groups by means of Section circulars. The Circle existed no longer, but its members carried on.

Conclusion

The 1930s Circle can be seen as a stop-gap between the ending of the astronomical columns in *English Mechanic* and the rise of several post-War periodicals. Today, its very existence is almost unknown, having been alluded to only in Ball's obituary,[9] so I have described it in some detail to give its members the credit they are due for having stimulated and carried on lunar observing during the difficult years of the early 1930s. This paper was also written to draw attention to the existence of the rich source material that the Circle's records provide (see 'Note on source materials', below): these will now be held within the Lunar Section and/or in the BAA archives.

Compared with the pre-War shortage of astronomical information, today there are many local societies and popular magazines. And finally the internet has allowed the immediate 'publication' and sharing of observations: an ultimate kind of Circle, which had come into general use at the same time that Ball (the youngest member of the Circle) died. The original Circle of eight members was as large as the speed of the Royal Mail would permit. It could never have been larger and still remain an efficient means of communication. Ball often told his friend Brian Gordon–States that the Circle succeeded simply because 'we were all kindred spirits'. In this age of electronic images and instant communication, let us take a moment to salute the members of the Circle for their sterling lunar and planetary work of over half a century ago.

Acknowledgments

I thank Michael Palmer, Archivist & Deputy Librarian for the Zoological Society of London, for information about the career of H. Simmons. Pamela Martin, Mayoral & Civic Officer for Carlisle City Council arranged for T. L. Macdonald's portrait as mayor of the city to be copied. Miriam Burrell, Erica Gaize and Brian Gordon–States are thanked for passing on to the Association archival materials relating to B. Burrell, H. E. Wooldridge and L. F. Ball respectively. A small collection of letters from the Circle to W. E. Fox was supplied by Dr John Rogers.

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Note on source materials

The original materials used to write this paper were as follows. First, in 1981, the executors of Dr E. F. Emley presented several of his library books and his two MS notebooks of the Circle to the Association. When I made the first catalogue of the BAA Archives at Burlington House in

the same year, these notebooks were included. Although of much interest, in the absence of correspondence they did not tell a complete tale. Some 26 years later, Erica Gaize, the daughter of H. E. Wooldridge, presented a collection of some 200 of his private letters to the BAA. In particular, this set contains many from Barker.

In 2008, Miriam Burrell – one of Ben Burrell's daughters – presented his collection of archive material to the BAA. This included several letters from some other members of the Circle, plus four MS notebooks of copied circulated material, plus a set of all his personal circulars. The receipt of Burrell's records made it possible to compile this paper.

Finally, in 2011, as the paper was being completed, Brian Gordon–States kindly presented to the BAA all the personal records of observations and extensive correspondence of L. F. Ball which he had saved after his friend's death. Their perusal enabled me to finish the task to my satisfaction.

The writer would be interested to hear of any original material concerning other members of the Circle which may still exist in private hands.

Dedication

While the proofs of this paper were being corrected, the sad news arrived of the death of Sir Patrick Moore. Had Patrick been born a decade earlier there is no doubt that he too would have been a leading member of Barker's Circle. In recalling the work of that lunar observing group, it seems entirely appropriate to dedicate this paper to Patrick's memory.

Figure 32. Comet Arend–Roland on 1957 Apr 27, 22:00UT, drawn by L. F. Ball.

Notes and references

1 H. L. Kelly *(ed.), Mem. Brit. Astron. Assoc.*, **36**(2) (1948)
2 The last four of the Lunar Section's 11 *Memoirs* came out in 1921 [*Mem. Brit. Astron. Assoc.*, **23**(4)], 1936 [*ibid.*, **32**(2)], 1947 [*ibid.*, **36**(1)] and 1950 [*ibid.*, **36**(3)].
3 R. J. McKim, 'Henry McEwen of Glasgow: a forgotten astronomer?' *J. Brit. Astron. Assoc.*, **115**, 13–24 & 87–97 (2005)
4 *English Mechanic* was first published on 1865 Mar 31 as *The English Mechanic*. Its title for many years was *English Mechanics & World of Science*; in 1926 it incorporated *Amateur Mechanic & Work and World of Science* and the title changed to *English & Amateur Mechanics* beginning again at volume 1. A CD-ROM set of the 1865–1926 serial is available (see **http://www.englishmechanic.com**/).
5 Letter from the Editor *(anon.)* to H. E. Wooldridge, 1934 Feb 20
6 The RAS library possesses unbound copies for 1934 up till Sep 14; however, the serial continued as there exists a later reply from its editor to Wooldridge upon another matter, and the writer has seen copies elsewhere as late as 1940 Dec.
7 *Meccano* magazine had been created in 1916 by Meccano's inventor, the legendary Frank Hornby (1863–1936). The magazine's editor during 1921–1935 was the Leeds-based BAA member, writer and polymath Ellison Hawks (1889–1971).
8 W. E. Fox to H. E. Wooldridge, 1934 Jun 3
9 Obituary notice for L. F. Ball by B. F. L. Gordon–States, *J. Brit. Astron. Assoc.*, **103**, 87 (1993)
10 Obituary notice for R. Barker by P. Moore, *ibid.*, **77**, 147–148 (1967). Robert Barker left an unpublished typescript for a short book about the Moon (from which the latest reference cited dates it to *circa* 1938), entitled *Great scenes on the Moon*, a copy of which was discovered among Leslie Ball's papers. Ball had provided Barker with illustrations. The rest of the Circle's members were acknowledged.
11 Obituary notices for B. Burrell by W. E. Fox, *ibid.*, **94**, 173 (1984); R. J. McKim, *The Inner Planets Newsletter*, **10**, 1984, p 1
12 No obituary for Emley appeared in either the BAA *Journal*, or the publications of the Royal Institute of Chemistry of which he was a Fellow.
13 Obituary notice for W. E. Fox by J. H. Rogers & R. J. McKim, *J. Brit. Astron. Assoc.*, **98,** 314 (1988)
14 C. F. O. Smith had joined the BAA as early as 1897 but resigned early in the 20th century, rejoining in 1931.
15 H. E. Wooldridge was known as 'Ewart' to his family and friends.
16 This list comes from Burrell's records.
17 Dr S. M. Green was a BAA member from 1937, and lived in Prescot, Lancs.
18 Obituary notice for H. P. Wilkins by P. A. Moore, *J. Brit. Astron. Assoc.*, **70**, 237–238 (1960). Wilkins joined the BAA in 1918, stayed for a few years and rejoined in 1936; he lived in Llanelly, Wales and later at Bexleyheath, Kent. Starting as an engineer by profession he later became a civil servant.
19 Many years ago Foyle's of Charing Cross Road, London, had a good second-hand section as well as selling new books.
20 Figure 3 was copied from *English Mechanic*, 1926 Dec 24.
21 Pathé News clips are now available on the internet, and Burrell's was first shown on 1939 May 11 under the title 'Up and doing'. H. P. Wilkins was the subject of a post-War news film.
22 C. F. O. Smith, *J. Brit. Astron. Assoc.*, **48**, 73–75 (1937)
23 As a typical example witness the study of Sven Hedin by S. M. Green, published posthumously in *Mem. Brit. Astron. Assoc.*, **36**(3) (1950).
24 C. F. O. Smith, 'Markings on the Lunar 'Seas', *J. Brit. Astron. Assoc.*, **46**, 94–95 (1936)
25 C. F. O. Smith, *ibid.*, **43**, 199–201 (1933)
26 C. F. O. Smith, *ibid.*, **45**, 241–242 (1935)
27 L. F. Ball, 'The Dopplemeyer Cleft', *ibid.*, **42**, 299–301 (1932)
28 R. Barker, 'The Sirsalis Cleft and District', *ibid.*, **47**, 257–260 (1937)
29 W. H. Pickering (1858–1938) published six papers about the changes in Eratosthenes in the (now defunct) American magazine *Popular Astronomy*, and in his 1903 book, *The Moon*. Joseph Ashbrook [*Sky & Telesc.*, **26**, 335–336 (1963)] aptly summed him up: 'His scientific legacy includes several elaborate mares' nests originating from some never-corrected misunderstandings, yet buttressed by long series of observations.'
30 R. Barker's ideas about lunar changes were much opposed by Steavenson and others at BAA meetings when they were put forward: see *J. Brit. Astron. Assoc.*, **58**, 86–88 & 99–101 (1948), and **59**, 174–175 & 181–182 (1949).

31 L. F. Ball, *J. Brit. Astron. Assoc.*, **44**, 75–80 (1933)
32 R. Barker, *ibid.*, **44**, 74–75 (1933)
33 E. F. Emley, *ibid.*, **44**, 141–144 (1934)
34 R. E. Diggles, *ibid.*, **44**, 144–145 (1934)
35 R. Barker, *ibid.*, **44**, 302–303 (1934)
36 L. F. Ball, *ibid.*, **44**, 303–307 (1934)
37 E. F. Emley, *ibid.*, **44**, 308–311 (1934)
38 Circular to the Circle from R. Barker, 1934 Jun 22, quoted from Emley's records.
39 P. Moore *(ed.)*, *Practical Amateur Astronomy*, Lutterworth Press, 1963
40 BAA *Guide to Observing the Moon*, Enslow, 1986. This (the unstated 4th edition) contains a drawing of Clavius by Ball made as late as 1982. Ball's formal notebooks end, however, in the late 1950s.
41 Fine coloured examples can be seen, for instance, in early editions of Patrick Moore's *Observer's Book of Astronomy* (revealing the observer's stepwise technique) and *Guide to the Planets* (Eyre & Spottiswoode,1955). See also Moore's *Guide to the Moon*, Eyre & Spottiswoode, 1953, and *Survey of the Moon*, Eyre & Spottiswoode, 1963.
42 Obituary notice by R. Barker, *J. Brit. Astron. Assoc.*, **49**, 38–40 (1938)
43 R. Barker to H. E. Wooldridge, 1939 November 26
44 T. L. MacDonald's effects included material hoarded from his predecessors (including a copybook of Goodacre's) and not passed on to Wilkins: these have ended up at the Lunar & Planetary Institute in Houston (according to Chuck Woods' LPOD website). The late P. M. E. Erwood, a dealer in rare and second-hand astronomy books, told me in 1980 that he had bought and sold Mac's private library: there was a huge amount of it. 'Mac' also once served as Mayor of Carlisle, 1961–'62. It seems that for a long time he was in possession of Emley's second copybook, for there is a letter attached to the inside front cover dated 1966 Oct 14 apologising for keeping it so long in his 'ancient store'. Barker had died recently and MacDonald bore no grudge, adding: 'His controversies can be forgotten and his sincere interest remembered.'
45 T. L. MacDonald, *J. Brit. Astron. Assoc.*, **41**, 172–183 (1931), 228–239, 288–290, 367–379 (1932) & **42**, 291–294 (1932). C. Wood writes of MacDonald: 'I was impressed with his quantitative analyses of crater geometry – he was the direct predecessor to Baldwin's classic work that demonstrated the impact origin of lunar craters.' (C. Wood to R. J. McKim, private communication, 2004 September 30.)
46 R. Barker, 'Physical changes on the Moon', *J. Brit. Astron. Assoc.*, **48**, 347–351 (1938)
47 R. L. Waterfield, *ibid.*, **45**, 347–360 (1935)
48 R. J. McKim, 'The Life and Times of E. M. Antoniadi', *ibid.*, **103**, 164–170 & **103**, 219–227 (1993)
49 Quoted by McKim, *op. cit.* (ref.48)
50 Ball contributed Mars drawings to the BAA only occasionally (in 1935 and 1950), but his later work was much more natural.
51 Barker contributed to the Mars Section at every opposition from 1924 to 1935, and in 1948–'52 and 1956. His style did not vary with time.
52 R. Barker to R. L. Waterfield, 1935 October 7, BAA Mars Section Archives.
53 R. J. McKim, 'Mars at its nearest: E. A. L. Attkins on Madeira, 1924', *J. Brit. Astron. Assoc.*, **113**(4), 196–200 (2003)
54 R. Barker, *ibid.*, **46**, 136–137 (1936)
55 Barker published his own 1937–'39–'41 Mars observations in papers contributed to *Popular Astronomy*. He alludes to WW2 and its effects in some of his lunar and planetary papers in that serial.
56 Even in old age, Barker remained a keen cyclist, and it was only a near-fatal accident with a van that curtailed this activity. He had competed professionally in the sport in his youth.[10]
57 R. Barker, *J. Brit. Astron. Assoc.*, **42**, 216–217 (1932)
58 R. Barker, *ibid.*, **43**, 159 (1933)
59 Wealthy French amateur René Jarry–Desloges published a ten-volume series of observations (1907–1941) conducted at his private observatories, entitled *Observations des Surfaces Planétaires*. His main observer, G. Fournier, often portrayed Venus with broad, streaky markings.
60 As reproduced here, Fox's Venus drawings are the faithful copies drawn by Burrell in his copybook.
61 Walter Goodacre, *The Moon*, Pardy & Son, Bournemouth, 1931
62 E. Gaize to R. J. McKim, private communication, 2007 Aug 31
63 E. F. Emley, *J. Brit. Astron. Assoc.*, **48**, 76–79 (1937)
64 E. F. Emley, 'The Lunar Mare Smythii', *ibid.*, **47**, 151–152 (1937)
65 R. Barker, 'Saturn's Satellites in 1936', *ibid.*, **47**, 152–153 (1937)
66 B. Burrell, *ibid.*, **49**, 153–154 (1939)
67 I never met nor corresponded with Leslie Ball, but was surprised and delighted to hear from Brian Gordon–States that Leslie had liked my own drawing style which he'd seen in the BAA *Journal*. In fact Leslie's planetary drawings in the *Observer's Book of Astronomy*[41] were some of the first I ever saw, and his style certainly influenced me.
68 B. Burrell, 'Photographs of the Great Aurora, 17th April 1947', *J. Brit. Astron. Assoc.*, **57**, 205–207 (1947)
69 A monochrome version of one of these charts appeared in E. H. Collinson's Section Report, 'Mars in 1956', *ibid.*, **68**, 142–147 (1958).
70 Gleaned from private communications from R. Garfinkle, based upon information supplied to him by the Royal Society of Chemistry.
71 R. J. McKim, 'Dr A. F. O'D. Alexander', BAA Lunar Section *Circular*, **31**(5), 74 (1995)
72 Throughout the 1980s Bill Fox and I often travelled home from BAA meetings on the same train. Even in his late 80s, Bill was always sprightly in handling the London Underground stairs and escalators between Piccadilly Circus and King's Cross.
73 R. Barker, 'Goldschmidt and Mare Crisium Craterlets', *J. Brit. Astron. Assoc.*, **45**, 124–126 (1935); BAA Lunar Section *Circular*, **48**(5), 9–10 (2011)
74 *The Moon* would continue until it was replaced by a cheaper monthly bulletin in 1966 (which continues to this day). However, *The Moon* was resurrected in 2011 to replace its 1982–2010 successor which had been aptly titled *The New Moon*.
75 The ALPO grew from an informal group of American amateurs who had already published planetary work cooperatively with Haas, and with whom Barker had worked during WW2. The ALPO was organised upon the BAA's sectional plan.
76 C. F. O. Smith, *J. Brit. Astron. Assoc.*, **57**, 37–39 (1946)
77 C. F. O. Smith, 'Things do happen on the Moon', *ibid.*, **57**, 237 (1947)
78 L .F. Ball, 'Plinius', *ibid.*, **57**, 180 (1947)

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