



British Astronomical Association



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Founded in 1890

BAA Solar Section Newsletter

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Sunspot data 2023 July

Day	g	R
1	6	102
2	6	111
3	6	114
4	6	98
5	6	91
6	7	107
7	8	120
8	9	126
9	9	137
10	9	143
11	10	150
12	10	151
13	7	107
14	7	108
15	6	97
16	8	119
17	7	114
18	8	129
19	7	130
20	7	130
21	7	112
22	7	117
23	8	109
24	7	106
25	7	101
26	8	115
27	8	118
28	8	129
29	9	142
30	9	138
31	8	135

Images for the web should be sent to Peter Meadows: peter@petermeadows.com and copied to me. All digital images must be in "JPEG" format with the same orientation as naked eye orientation. Include initials, date and time in the file name. Keep each image file to less than 1Mb.

On-line Reporting:

<https://britastro.org/solarwl>

<https://britastro.org/solarha>

Observers:

D Arditti, London	R Johnson, Surrey
M J Armstrong, Kendal	S L Karl, Aberdeen
A Atterbury, Leicestershire	D Keep, Lincoln
C Bailey	K Kilburn, Staffordshire
R Battaiola, Milan, Italy	M Kinder, Cheshire
M Boschat, Canada	P Lawrence, Leicestershire
C F Bowron, South Yorks	L Macdonald, Berkshire
A Bowyer, Epsom Downs	R Mackenzie, Kent
S Brown, Leicestershire	P Meadows, Essex
E Bryant, North Devon	A Mengus, France
M Buck, Bristol	H Meyerdieks, Germany
L Cambon, France	B Mitchell, Norwich
G Clarke, Australia	L Morrone, Italy
E Colombo, Italy	M Nicholls, Sheffield
J Cook, Wolverhampton	P Norman, Worcester
P Curtin, USA	G Palmer, Wales
S Dawes	Polish Solar Obs Soc
A Devey, Spain	C Potter, Orkney
R Dryden, Oxon	R Samworth, Leicestershire
F Dubois, Belgium	J D Shanklin, Cambridge
T Emmett, Cambs	J Shears, Cheshire
T Figiel, Poland	D Smith, Essex
M Giuntoli, Italy	L Smith, Angus
D Glover, Essex	N Spencer, York
S Green, Lancs	T Tanti, Malta
K Hall, Warrington	D Teske, Mississippi, USA
B Halls, W Sussex	N Tonkin, Cornwall
K Hay, Canada	P Tosi, France
A W Heath, Nottingham	S Ove Thimm, Denmark
R Heard, Suffolk	P Urbanski, Poland
R Hill, Arizona, USA	G Vargas, Bolivia
J Janssens, Belgium	F Ventura, Malta
M Jenkins, Cambridge	D Vidican, Romania
S Jenner, Kent	S Viney, Cheshire
A Johnston, Denbighshire	J Warell, Sweden

Monthly Means

MDFg:	7.95	(47 observers)
MDFNg	3.71	(39 observers)
MDFSg	4.43	(39 observers)
Mean R:	129.31	(45 observers)

The Sun in White Light – July

Activity in July mirrored that seen in June. There was a slight rise in the Relative Sunspot number (R) maintaining the upward trend for the third consecutive month. The Q number was also slightly higher for the third consecutive month reflecting an increase in the quality of sunspot group configuration. Sunspots were numerous throughout the month with forty-one groups receiving a Boulder number. The largest/most complex groups are reported below.

AR3354 N17°/165° survived on the disc from the previous month, now in the NW quadrant. The group had a dramatic appearance being type Fkc consisting of several irregular penumbral sunspots, the largest being the follower which had an area of 1260 millionths. The following day, the overall appearance of the group was similar although the shape of individual sunspots had changed. However, on the 3rd, as the group approached the limb surrounded by noticeable bright faculae, the middle penumbral sunspots had merged to give a single elongated penumbral sunspot. Overall, the group appeared as three penumbral sunspots approaching the NW limb accompanied by a few sporadic pores. As the group rotated over the limb, only a single Hsx type sunspot remained close to the limb on the 5th.

AR3359 S19°/070° appeared on the 1st not far from the SE limb as a faint Bxo sunspot group which strengthened the following day into a compact Dao group with an area of 230 millionths. It was of a similar configuration during the next few days including the 7th when it was just passed the central meridian (CM). The following day, it was showing signs of decay with the two penumbral sunspots reducing and was seen as a sole Axx sunspot on the 9th.

AR3361 N23°/038° formed not far from the NE limb on the 4th from a patch of faculae seen near the limb on the 3rd. By the 5th the group had strengthened to type Cao with a small penumbral leader. The group continued to grow, developing a penumbral follower by the 7th. The following day the group was over the CM consisting of an asymmetrical leader and follower, type Dao. Over the coming days as the group progressed across the NW quadrant, there were changes particularly in the follower region and the penumbral leader became symmetrical by the 10th. As the group approached the limb, the followers faded and the leader reached the limb on the 14th.

AR3363 S20°/346° was reported on the 6th, just over the SE limb as a large Hkx sunspot. The following day it was further onto the disc when it could be seen that it was an isolated large penumbral sunspot with an area of 1050 millionths. The umbra was elongated and sported a light bridge between the larger leading umbral area and a smaller follower on the 9th. There was also a small retinue of pores forming around the outer edges of the sunspot. The group reached the CM on the 12th with the light bridge clearly seen. The group progressed into the SW quadrant accompanied by sporadic pores. On the 16th the group was still described as “impressive” with the light bridge across the umbra still persisting. A small penumbral sunspot was also forming immediately south of the main penumbral area. The group reached the SW limb on the 18th.

AR3372 (a & b) N25°/274° & N26°/262° rotated over the NE limb on the 11th as a large penumbral sunspot. The following day, more sizeable sunspots could be seen with faculae in-between. A large penumbral sunspot followed the leader over the NE limb the group being type Eko. The east-west length of the group was estimated at 510,000 km on the 15th. Over the next few days, the penumbral follower changed shape becoming highly irregular and showing signs of breaking up as the group crossed into the NW quadrant on the 18th. In the coming days, any intervening pores faded and the group not only lengthened to type F, but the leader and follower drifted apart more than 10° of longitude, defining each component as a separate sunspot group under BAA rules. Hence the designation of AR3372a for the leader and AR3372b for the follower (the group received only a single Boulder number). On the 20th the leader was a large Hkx sunspot with an area of 370 millionths before reducing to type Hax when close to the limb on the 23rd. The follower, comprised of a few small penumbral sunspots with an area of 230 millionths before decaying into a Bxo sunspot group on the 23rd.

AR3373 N09°/246° rotated over the NE limb on the 14th type Dao. The group matured over coming days with a large irregular penumbral sunspot forming mid group on the 17th. Over the next two days, this configuration changed to produce a large asymmetrical follower, and another large asymmetrical sunspot preceding it with pores and a small penumbral sunspot further west leading the group. On the 20th the group was type Ekc and had an area estimated as 710 millionths on the 21st. Again, the largest sunspot was the follower with smaller penumbral sunspots in the middle and leading positions. By the 23rd the group had reduced to type Eac with an area of 390 millionths and the group continued to decay as it approached the NW limb. The group was last seen on the 26th, close to the limb as a single Hsx sunspot.

AR3376 N24°/228° formed in the NE quadrant not far from the limb on the 16th and was notable as the group displayed reversed polarity for Cycle 25. The group was fairly insignificant until the 18th when it underwent an outburst in activity and developed into a Dso type group consisting of two penumbral sunspots aligned north/south with a few pores between. Over the next few days, the southern sunspot grew, the dual umbra coalescing into a single penumbral sunspot by the 21st. As the southern sunspot matured, the northern sunspot decayed and faded altogether by the 22nd. The group looked to be fading but on the 24th, small sunspots developed to the east and south of the penumbral sunspot. The following day, the group underwent rapid growth again and was type Dai on the 25th. The group was last reported on the 26th, nearing the NW limb consisting of three small penumbral sunspots in close formation.

AR3377 S08°/199° rotated over the SE limb on the 18th as a bi-polar Dso group with a dumbbell type appearance. The group changed very little as it progressed across the disc, measuring 360 millionths in area on the 21st and reaching the CM on the 23rd. As the group crossed the SW quadrant, the follower seemed to catch up with the leader and formed a close compact group by the 26th. The group was last seen on the 29th close to the limb, with the appearance of a single Hax sunspot with possibly fore-shortening being responsible for this view.

AR3379 N16°/169° rotated over the NE limb on the 19th type Dso. Several followers could be seen on the following day and the group was type Eac with an area of 470 millionths on the 21st. The group was type Fho on the 22nd, the largest penumbral sunspot being the leader with several smaller followers extending eastward. These followers started to fade on the following days giving the group a sparse and extended configuration. On the 26th SWPC renamed two of the followers AR3382 and AR3383. By the 28th only the original AR3379 remained being a single Hsx type sunspot. This remained case until the end of the month when the group reached the NW limb on the 31st.

AR3380 S11°/123° rounded the SE limb on the 23rd as a single Hsx sunspot. A few pores accompanied the penumbral sunspot over the coming days and on the 28th and 29th these smaller sunspots multiplied, primarily to the northern edge of the group. On the 30th, some of these smaller spots began to grow and by the 31st the group was type Dkc with the northern area now comprising of a large extended asymmetrical penumbral sunspot with the smaller twin umbra sunspot to its south.

AR3386 N12°/091° was seen over the NE limb on the 26th comprising of two small faint sunspots. The group grew rapidly overnight and sported a penumbral leader and smaller penumbral follower with a few pores between. There was rapid development again overnight with the follower extending into a large irregular penumbral sunspot, type Dki. This follower sunspot broke up on the 29th changing the designation to Dac with an area of 360 millionths. The largest sunspot was now the penumbral leader which became more elongated on the 30th. The group crossed the CM on the 31st type Eki.

26 observers reported a Quality number of **Q = 25.55** for July.

The Sun in H-alpha

Prominences

16 observers reported a prominence MDF of **7.54** for July.

On the 3rd a curved pillar prominence was reported on the SE limb and a faint but quite long pillar was on the NW limb. This latter feature had a detached plasma cloud to the northern edge.

A small flame type prominence was on the NW limb on the 5th which lengthened to a thin pyramid shape on the 6th and persisted through to the 8th.

An arc type prominence was on the E limb on the 9th before consolidating into a flame type prominence on the 10th. The feature then rotated on to the disc

On the 13th an arch prominence rising to about 50,000 km was on the NE limb and a spray type prominence was reported on the NW limb.

A cloud of plasma was seen reaching about 120,000 km in height on the E limb on the 15th. Also, a flat arch prominence on the SE limb, about 50,000 km in length and 20,000 km high. A forked prominence was also seen rising to about 40,000 km on the NE limb.

An active prominence was observed on the W limb on the 17th in the proximity of AR3363; various changes in shape were noted.

A large tree type prominence was reported on the NW limb on the 19th and a detached prominence was seen of the W limb on the 21st.

On the 22nd a long, extended prominence hearth was seen on the NE limb consisting of at least six elements. A smaller prominence was further south with a detached element at the tip. The extended prominence hearth endured in various shapes through to the 24th.

A hedgerow prominence graced the S limb on the 26th and a moderately sized prominence was also seen on the NW limb with part of the prominence detached.
 A spray prominence was reported on the SE limb on the 29th and a hedgerow prominence was on the NW limb extending for about 120,000 km and 15,000 km in height.
 On the 30th, an inclined pillar prominence was reported on the NW limb with a length of about 80,000 km.

Bi-Polar Magnetic Regions, Filaments & Plage

15 observers reported a filament MDF of **10.19** and 12 observers reported a plage MDF of **6.89** for July.

At the start of the month, a long dark filament underscored AR3359, measuring about 200,000 km long on the 1st. Over the coming days, the filament faded in strength and turned to a more north/south configuration to precede the group. It had dissolved by the 6th.

On the 6th and 7th, a bright plage area was seen in association with AR3363, following the sunspot, with the Chromosphere taking on a whirlpool-like appearance around the group. Plage remained with AR3363 throughout its passage. A filament was seen in association with the sunspot to its southern side, also throughout its passage. The filament had a distinctive forked shape on the 9th and 10th.

A curved north/south aligned filament appeared over the NE limb on the 10th which eventually preceded AR3372 which rotated over the limb on the 12th. The filament persisted throughout its passage across the disc, darkening on the 18th before fading on the disc after the 19th near the NW limb.

A very large bi-polar magnetic region (BMR) was seen to be associated with AR3372 on the 15th, and was extending westwards. Its east/west length was about 510,000 km and about half that north/south. An equally interesting BMR was associated with AR3371 in the SE quadrant with a small dark filament on its northern edge.

A dark curved filament appeared in the NE quadrant not far from the limb on the 20th and persisted through to the 22nd. An even larger and darker curved filament appeared over the NE limb on the 25th preceding AR3386 near its lower extent. The filament was of a dramatic appearance over the next few days but was absent on the 29th. On the 26th another dark north/south aligned filament was close to the SW limb and a fine fila-prom graced the SE limb.

CaK

Two large areas of CaK emission developed around sunspot groups AR3372 and AR3379. The former was within a long-lasting and large area of CaK from the 15th to the 23rd. The second was within a very large area of emission from when it was first seen on the 20th, just over the NE limb, to the end of the month as it approached the NW limb.

CaK MDF **8.63** (19 days) observer Brian Mitchell.

Polar Faculae

Jan Janssens reported a polar faculae MDF of North 0.20 and South 0.40 (5 days).

Flares

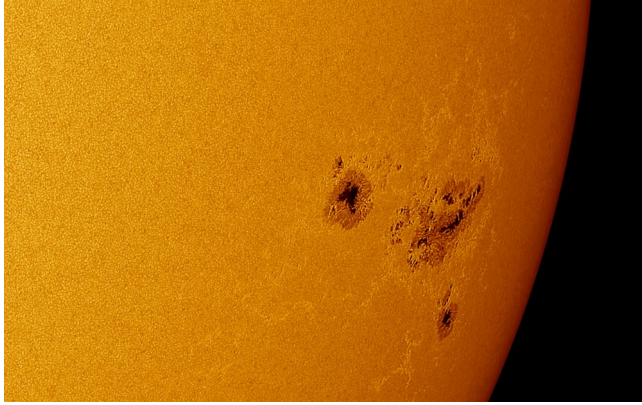
Numerous flares were reported by Section members. M class flares were reported as follows:
 Brian Halls 12th – large surge prominence and flare developed within a follower sunspot of AR3372 at 0845 UT (subsequently rated M6.8).

Andrew Johnston 11th – M1 flare AR3372 near NE limb, 16.10 UT and 15th M3 flare AR3363 0740 – 0750 UT.

Andy Devey 16th – M1 flare 0844 UT AR3363 and M2 flare SE quadrant, 31st 0911 UT.

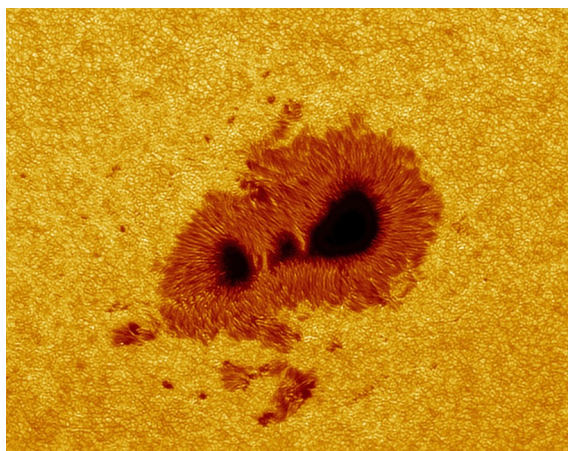
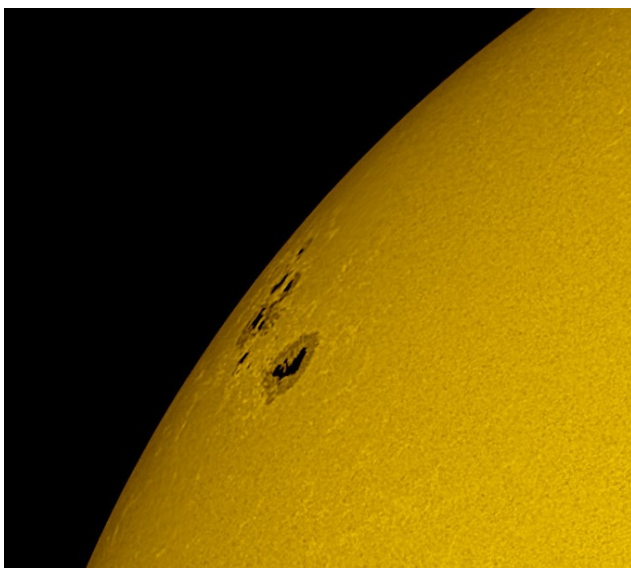
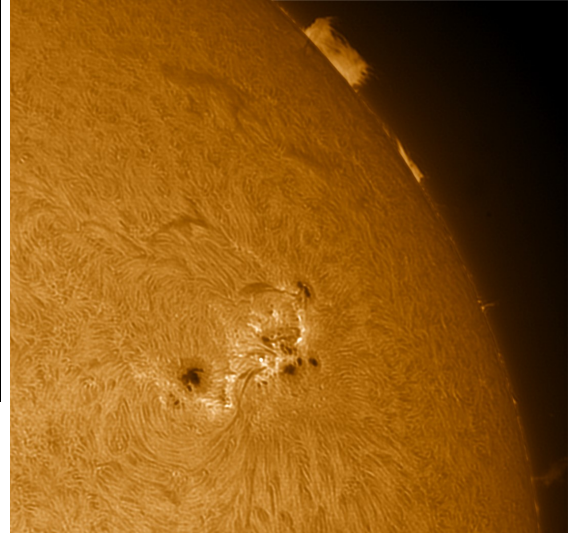
MAGNETOMETER REPORT 2023 JULY

DATE	DURATION (UT)		ACTIVITY	
6/7	21:45	07:00	Disturbed	
7/8	18:00	02:30	Disturbed	
14/15	03:00	01:30	Disturbed	Solid-state magnetometer, Uncalibrated
16/17	21:15	02:00	Disturbed	
17	05:00	09:00	Disturbed	
17/18	19:00	04:00	Disturbed	John Cook
21/22	22:00	01:30	Disturbed	
25/26	20:30	11:30	Disturbed	



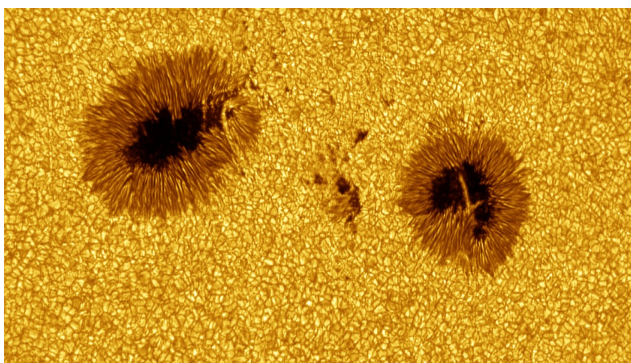
Above: Image in white light of AR3354 nearing the W limb 20230703—Gary Palmer.

Right: Also AR3354 imaged by Dave Smith in H-alpha on 20230702 at 0626 UT.



Left: AR3372 rounding the NE limb on 20230712 at 0842 imaged by Brian Halls

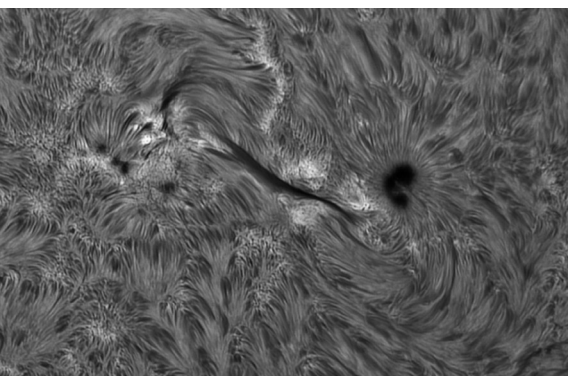
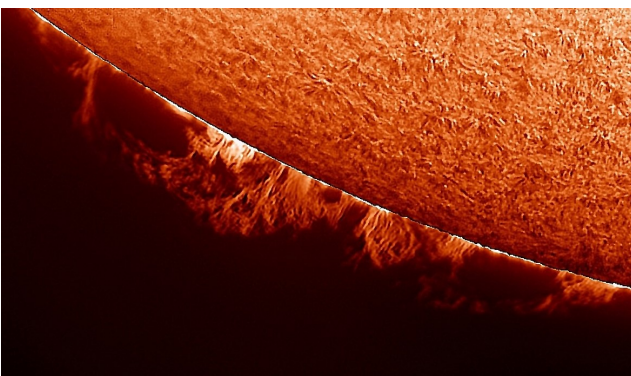
Above: Ella Bryant captures AR3363 mid disc on 20230712 at 1310 UT



Left: AR3373 imaged by Luigi Morrone 20230721 at 0846 UT C14 Edge HD

Below Left: A fine prominence hearth on the SE limb on 20230707 imaged at 0956 UT by Carl Bowron, 120 mm OG.

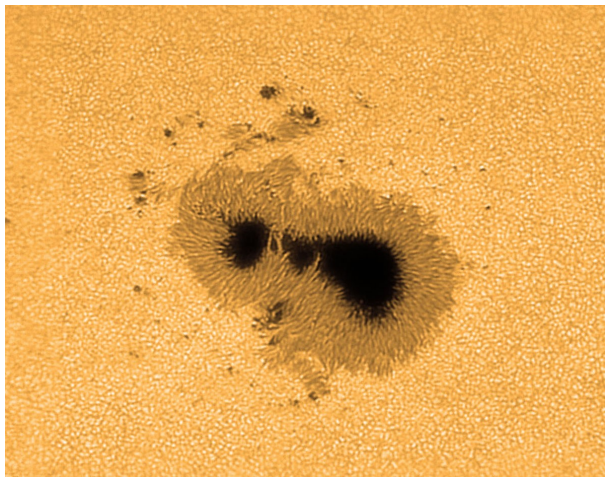
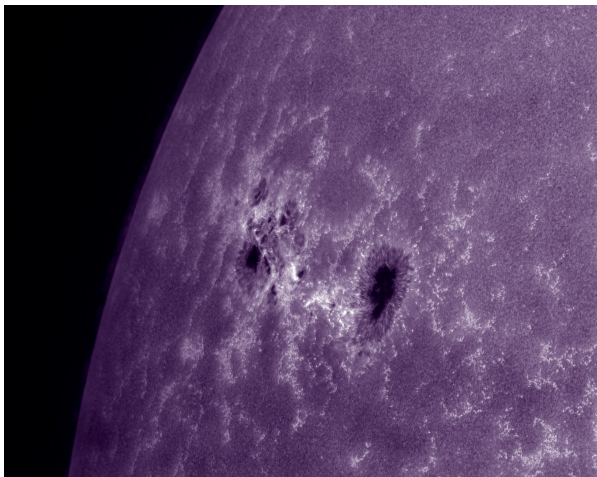
Below: H-alpha image by Stuart Green of AR3372 and filament 20230720 at 1156 UT



Section News

I am very sad to inform you that long-term member and contributor to the Section, Jorgen Kartin, passed away in late July. Jorgen was based in Denmark and has regularly contributed to the Section for over 20 years. You will doubtless recall his regular polar faculae counts printed in the monthly solar report. I have sent our sincere condolences to his family.

Simon Brown is planning to go the USA in April 2024 for the solar eclipse. Simon has booked at large house outside Austin, Texas and plans to view the eclipse from Fredericksburg with 4 mins and 39 seconds of totality. There is one spare room available for rent through Simon at a cost of £285 for 5 nights. If anyone is interested in taking up Simon's offer please let me know and I will pass on your details for Simon to get in touch. Roger Samworth has suggested a new challenge for observers/imagers. Members used to regularly report on the Wilson effect displayed by sunspots entering or rotating off the disc. Such reports have declined in recent years although I doubt the spots displaying the effect have! Therefore there will be a Section challenge for members to report, draw or image sunspots displaying the Wilson effect from 1st September 2023 through to 31st December 2023. Let's get a fine collection of drawings/images of these spectacular sunspots and get the best posted on the Section webpages and maybe even in the Journal.



Above Left: AR3372 imaged in Calcium K-line by Ella Bryant 20230713 at 1244 UT

Above Right: AR3363 imaged on 20230712 at 0909 UT by Simon Dawes using Meade 127mm Refractor and Altair Astro GPCAMII camera.

