'The People look at the great comet of 1264'. Taken from the Italian Nuova Cronica, a 14th century history of Florence created in a year by year linear format by the banker, Giovanni Villani. (Wikimedia Commons)

THE COMET'S TALE

Comet Section – British Astronomical Association

Journal – Number 39 2020 July
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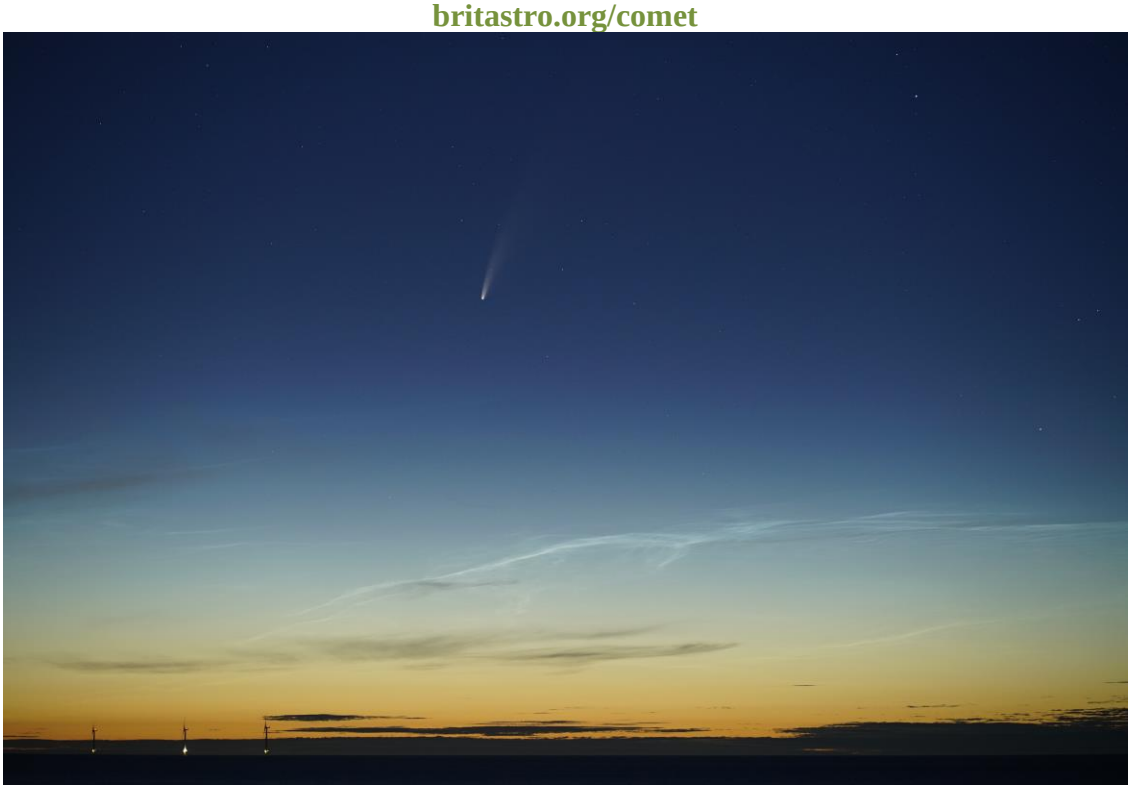

C/2020 F3 (NEOWISE) 2020 July 12 David Swan, Tynemouth

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1 From the Director – Nick James

I hope you enjoy reading this issue of the Comet's Tale. There is plenty of varied material and you should find something that will interest you. Very many thanks to Janice McClean for editing it and to Denis Buczynski for soliciting contributions. The fact that it is rather later than usual is solely down to your Director. I started writing this editorial in early May but the good weather, both day and night, has distracted me from sitting at the keyboard. Apologies are due to Janice and to the other contributors for this excessive delay. I will try to do better in the future!

I can't believe that a year has whizzed by since the last Newsletter. We are certainly living in interesting times. A large part of the world is in lockdown as a response to the COVID-19 pandemic and many of us have been subject to restrictions that we would have found difficult to believe only a few months ago. I hope that you are all keeping well and managing to cope in these difficult times.

I tend to travel frequently for work and also for personal reasons, so I have spent much more time at home than usual over the last 14 weeks. This has coincided with exceptionally good weather in my part of the UK and the presence of three interesting comets in the northern circumpolar skies. There is more about them below. The lockdown has also had a huge impact on commercial air transport and, one of the advantages for astronomers, is the lack of aircraft contrails and the general improvement in transparency. On the flip side we are seeing more and more Starlink satellites in orbit and several observers have reported trails on their comet images.

One other aspect of the lockdown is that most of us will now be familiar with video conferencing using tools such as Zoom and Webex. I have been working from home on most days and so have used the latter to keep in touch with my team and our customers. Usually we work with video off but sometimes someone will enable their camera and it is interesting to see the various places that people are working.

These tools have become important in our hobby as well. Local societies are holding their meetings virtually and this seems to work very well. The BAA is running a very popular series of Wednesday evening webinars which have covered a wide range of topics. I was privileged to deliver the first one which described the prospects for C/2019 Y4 (ATLAS). This looked as if it could be a nice comet in the May evening twilight.

At about the time of the Webinar the comet started to fade and we were able to observe its fragmentation during April and final demise in May. A description of its final few weeks was published in the June BAA Journal and it is available online at https://britastro.org/journal_item/22450. The quality of observations received during this period was an excellent example of how modern technology and image processing is expanding the horizons of comet observers.

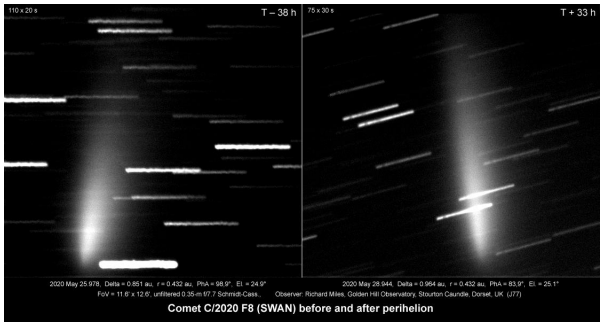
My most recent BAA webinar looked at the fantastic archive that we have in the Comet

Section. We have a few records going back to the late 1930s when Crommelin was director but the main bulk of material starts in Merton's time from the mid 40s onwards. Up to the mid 90s observation reports and much correspondence were paper based and when I took over from Jonathan Shanklin I collected 17 boxes of material. We have started to go through and scan this material and the ultimate aim is to index it and put it online but that is a huge task and won't be done for some considerable time. In the meantime, some of the material is already online here at britastro.org/node/19388.

Recently I came across a set of letters from the famous American comet photographer Alan McClure (see Denis's article in Tale No. 37) dated from the late 1950s and early 1960s. At this time McClure was one of the most accomplished comet photographers in the world and it is fascinating to read about what he was doing in these contemporary letters. You can find them online https://britastro.org/node/22680.

Recordings of all of the BAA's weekly webinars are available to everyone via the BAA's YouTube channel here: https://www.youtube.com/user/britishastronomical. The BAA has also opened up its complete meetings video archive to everyone so there is plenty to watch if you need some astronomical inspiration (britastro.org/video/17601).

The disintegration of C/2019 Y4 made me somewhat reluctant to make any more predictions about comets and, luckily, we didn't say too much about C/2020 F8 (SWAN). This was a lovely comet for southern observers when it was below the horizon from the UK but, by the time it appeared above our horizon, low in the morning sky in mid-May, it was a shadow of its former self having broken up as it approached perihelion. Unfortunately, in some forums these two "disappointments" led to some negative comments on comet astronomy in general. For me, both comets, while not bright, were interesting in their own way. C/2019 Y4 was probably the most fascinating comet I have observed. Each night it looked different and you never knew what to expect as the evening sky darkened.



Amateurs obtained amazing, high-resolution images of a very faint object which are an important record of a rare event. C/2020 F8 was never spectacular from here but trying to track it down low in the morning sky was one of those exciting challenges that make comet observing so much fun. Comets are never boring.

While we had all of the excitement over C/2019 Y4 and C/2020 F8 our old friend C/2017 T2 (PanSTARRS) continued to impress. This comet has been around for ages. It has been circumpolar since the beginning of the year and will be around through the summer. It is past perihelion now and is fading but for a time it was the brightest comet in the northern sky, being around 9th magnitude in early June. It also shows some complex features in the inner coma and it is definitely worth your time.

Neils Bohr (and others) are reputed to have said "It is difficult to make predictions, especially about the future". This applies particularly to predictions of comet magnitudes and so I was reluctant to make any however, after C/2019 Y4 and C/2020 F8, it was third time lucky with C/2020 F3 (NEOWISE). This was discovered in March and, like 2020 F8 and

2019 Y4, it is a small object with a close (<0.3 au) perihelion. Observations by Michael Mattiazzo prior to perihelion showed that it was healthy and had a nice tail. The comet really performed when it became visible to northern observers post perihelion and, as I write this, it is between 1st and 2nd magnitude with a lovely tail (see our cover picture from David Swan). It is certainly the best comet I have seen since C/2006 P1 (McNaught) in early 2007. Keep an eye on the BAA web pages to see the latest images of this comet. I'll be writing a summary for the October BAA Journal.

It is much fainter but don't forget that 29P/Schwassmann-Wachmann will be a good object to observe as the nights lengthen after mid-summer. It is well placed and moving north of the equator and will be at opposition in November. Observations during the last season showed multiple outbursts and Richard Miles is keen to continue this campaign.

As always, the Section recommends submitting your total magnitude estimates via the COBS website (cobs.si/). This site is a fantastic resource but make sure that you are registered as a BAA observer. This allows us to download your ICQ format observations at the end of each month for our records and for use in the magnitude analyses carried out by Jonathan Shanklin. COBS is also the best place to go to get some idea of the performance of current comets but don't let this bias your observations in any way. The BAA and other organisations imported all of their historical ICQ data into COBS when it was set up and so it is the best source of data on historical observations too.

Our image archive britastro.org/cometobs/ continues to grow thanks to Denis Buczynski's hard work curating it. The Section now has around 34,000 comet images online from a wide range of observers around the world. At some point I would like to enhance the archive to make it much easier for users to search for particular objects, observers and dates and, possibly, link it to the COBS database so that we have a wider view of the performance of particular comets.

We have a new mailing list that we hope will keep members in touch. The old mailing list which was run from the BAA server had started to become very unreliable so we have moved to an external list hosting company called Simplelists. You can subscribe to the list by going to britastro.org/node/21866. Note that, while attachments are enabled on the list, please only post images if they show something new or unusual. Routine comet images should be sent to cometobs@britastro.org as of now.

The summer is always a challenging time for comet observers at UK latitudes since we don't get much darkness but let's hope for good weather through the summer and then as the nights lengthen into the autumn. There are always lots of interesting comets to observe and I look forward to receiving your observations.

Nick James Section Director

2 The Discovery of Comet C/2020 F8 SWAN Michael Mattiazzo

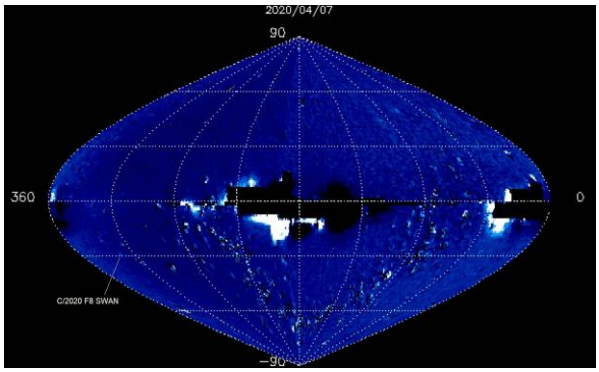
I work in the pathology industry which, to the surprise of many, had a significant downturn in workload during the COVID crisis in April 2020. As a result, I took the opportunity to take some time off work, where lockdown gave me the opportunity to concentrate on my astronomy hobby.

I discovered comet SWAN by searching publicly available data on a SOHO website. SWAN (Solar Wind Anisotropies) instrument, is an ultraviolet camera on board the Solar and Heliospheric Observer (SOHO) spacecraft. SOHO has been in operation since 1996 and its primary purpose is to study the Sun but as a side benefit, SWAN is great at detecting comets as they shine brightly in UV due to the sublimation of water ice when near the Sun, via the Ultraviolet Lyman Alpha emission line of ionised Hydrogen.

On 2020 April 9, I downloaded the latest SWAN comet tracker animation map at http://swan.projet.latmos.ipsl.fr/ and noticed a steadily brightening, moving object that did not correspond with any known comet. There were 5 other known comets detectable in the data. The new comet was also detectable as early as March 26th but very faint.

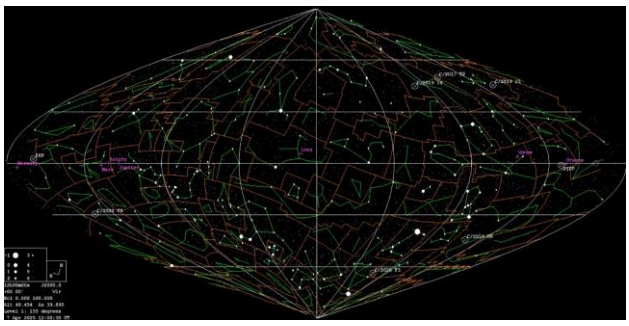
It takes plenty of patience and experience when looking at the data because there are many false positives due to its low resolution and background sources, especially in the milky way region. Comets are more likely to be found approaching

the Sun. Once you think you have found a possible candidate, then the second challenge is to actually find the comet in the sky. SWAN data is usually posted at least 3 days behind schedule, so you need to predict where the comet may currently be in the sky.



April 7th image indicating position of C/2020 F8 SWAN.

The SWAN data is also presented in ecliptic coordinates which don't make a lot of sense to astronomers, but it is easy to convert to equatorial coordinates by using a planetarium software, such as Guide 9.



Guide 9 representation of the SWAN comet tracker map

You can see that on April 7, the comet was situated in Grus, and trekking towards Pisces Austrinus. Once you have a search area, it is best to use a camera and telephoto lens to photograph a wide area of sky. The more area you cover, the better your chances of detecting it. Normally I use a Canon 60da and 200mm telephoto lens.

I had poor weather prospects in this situation, so instead requested help from the comet community via a comets-mailing list. An amateur from the Czech Republic, Martin Masek, was able to use a remote telescope in Argentina to confirm the comet. Once detected and measured, the positions of the comet are then posted onto the Possible Comet Confirmation Page (PCCP) for immediate follow up by astronomers around the globe. Remote telescopes have become especially useful tools for this purpose. Within 24hrs, I was able to follow up with further astrometry from Swan Hill, Victoria as well as Paul Camilleri situated in WA. After a few days of astrometric data, a reasonable orbit was able to be established which indicated that:

- Comet was closest to the Earth on 2020 May 12 at 0.55AU
- Comet was closest to the Sun on 2020 May 27 at 0.43AU

These conditions were favourable for a bright comet, potentially visible to the naked eye, but maximum brightness was very uncertain at this point as the comet was possibly in outburst at the time of discovery.

Comets are quite unpredictable as we learnt with comet ATLAS C/2019 Y4 which was expected to reach naked eye visibility in May 2020 but broke apart as it approached the Sun. Comet C/2020 F8 SWAN brightened rapidly during April and seemed to experience a brightness surge at the end of that month. By early May, comet SWAN was faintly visible to the unaided eye, if you knew where to look. The faint ion tail was also quite impressive in photos, spanning over 10 degrees in length, although quite faint visually. It was expected to brighten further as it approached the Earth and the Sun but had other ideas. One unusual feature on display was the flattened appearance of the head of the coma. This is often seen in comets that later go on to disintegrate; a sign that the nucleus is very elongated in shape and quite small, more prone to breaking up. By mid-May the comet shone around 5th magnitude, where the brightness had

stagnated, just in time for northern hemisphere observers, who do not seem to have much luck with seeing bright comets these days! By the time the comet was visible from the north at perihelion in late May 2020, the prediction had come to fruition with the comet disintegrating into a dust cloud.

This is my 8th discovery credit for SWAN comets since 2004 and I so check the data on most days. SWAN is credited for 17 comets as well as recoveries of several others, most recently 58P Jackson-Neujmin in early April 2020, which had not been seen since 1996 and missed 2 returns. I had a role in confirming 58P form the ground using my camera and telephoto lens. What a busy week that was!

Comet SWAN is not named after me as I did not use my own equipment, as per IAU naming guidelines. My interest in comets was sparked by the arrival of comet the Halley in 1986. Then in 1987, a comet by the name of Bradfield became visible in small scopes. I had the privilege of meeting Bill Bradfield after attending an Astronomical Society of South Australia (ASSA) meeting in 1995, after his comet discovery of that year. Overall, he managed to visually discover a total of 18 comets as an amateur between 1972 and 2004. That will never likely be repeated given to-day's technology. He was very keen to pass on his knowledge and experience to me. Bill was a life member of the ASSA and was inducted into the ASSA Hall of Fame in 2013. He is best described as a gentleman, scholar and a mentor.

I had taken up comet hunting in 1997 when I moved to Wallaroo, South Australia where my greatest success was making an independent visual discovery of comet C/2000 W1 Utsunomiya-Jones but was 24hrs too late and missed the cut.

In 2002, SWAN became a threat to the visual comet hunter when a couple of Japanese amateurs picked up C/2002 O6 and SWAN data was then becoming publicly available on the internet as a comet tracker map. After that time, I concentrated on SWAN hunting and have since achieved discovery credit for C/2004 H6, C/2004 V13, C/2005 P3, P/2005 T4, C/2006 M4, C/2015 C2, C/2015 P3, and C/2020 F8.

2020f8_20200502_mmatti

Michael Mattiazzo

Follow me on southern comets Facebook page where I post regular updates of my recent comet observations or [southern comets homepage](http://www.members.westnet.com.au/mmatti/sc.htm), updated less frequently, but has a terrific record of my comet observations since 1996 as well as finder charts available for the brighter comets.
http://www.members.westnet.com.au/mmatti/sc.htm

3 Comet Swift-Tuttle: The Elusive Giant Neil Norman

Comet 109P/Swift-Tuttle imaged by Gerald Rhemann

What we know about 109P/Swift-Tuttle?

Every August our skies are filled with one of the most reliable meteor showers of the year, the Perseids. Virtually everyone knows of it and because of its perfect yearly timing of mid-August, meteor parties can be held after a long leisurely BBQ. But how many can claim to have seen the parent comet of this superb celestial firework display, comet 109P/Swift-Tuttle?

Our story begins with Ignatius Kegler / 戴進賢 / Jinxian Dai (11 May 1680-30 March 1746) a French Missionary in Peking, China. He was observing the pre-dawn skies on the morning of July 2, 1737, when he discovered a comet in the constellation

of Aries. At the time of discovery, it was a magnitude three object and Kegler, with his telescope, described it as tailless and "larger than Jupiter." The following day he observed it again and noted it had moved 2 degrees in the south-southwestern direction of the sky. His last observation came on the next day (4th), as a combination of moonlight interference and bad weather stopped further observations. The last recorded observation was made on the 14th of July and the comet was then lost.

Nothing more of the object was ever published and our story fast forwards to the night of July 16th,1862, when Lewis Swift of New York, was observing the constellation of Camelopardalis with his 11.4-cm refractor.

Lewis Swift – 1820 – 1913 American Astronomer who discovered 13 comets and 1248 previously uncatalogued nebulae

He came across the distinctive fuzziness of a comet glowing dimly at magnitude 7.5. He didn't report it at first as he thought it was a comet previously discovered a couple of weeks earlier. Three nights later though, Horace Parnell Tuttle was observing from Harvard Observatory and discovered the comet also.

Horace Parnell Tuttle 1837 – 1923 American Astronomer and American Civil War Veteran

By the end of July, the comet had brightened to magnitude 5.5 and displayed a tail 1 degree in length. This greatly improved, and by late August/early September, the comet was magnitude 2 with a tail 30 degrees in length. The comet continued moving southwards in the sky and was lost by late October. Astronomers began upon the task of determining the orbital period and came to a value of around 119 years.

Move forward to 1981, and an eager search began to recover the comet of 1862, but by the year end nothing had been found that resembled the comet they were looking for, and so it was believed to have been missed.

Then Dr Brian Marsden of the Minor Planet Center looked upon the case and drew a

link between the comets of 1737 and 1862 meaning the period was in the order of 130 years and a return should be expected around 1992.

As imaged by Martin Mobberley

Brian Marsden 1937 - 2010 Director of Minor Planet Center for 28 years and recipient of the BAA Merlin Medal in 1965

On September 26th,1992 Tsuruhiko Kiuchi discovered a comet that after calculations was identified as comet 109P/Swift-Tuttle.

Tsuruhiko Kiuchi B 1954 Japanese Comet hunter

The comet eventually reached its brightest in mid-November at magnitude 5 and sporting a 7-degree tail.

Nature of the Beast.

Comet Swift-Tuttle is the parent of the Perseid meteor shower, an association that was first noted by Italian astronomer, Giovanni Schiaparelli in 1866. The shower was first recorded as early as AD36. This shower is active between July 17 and August 24th each year and remains as delightful to observe to-day.

This tells us two things about the parent;

1. it returns on a very regular basis and
2. it must be an active/large comet.

Point number 1 is certainly true. The orbit over the last 2,000 years has varied between 124 and 136 years and is in an orbital resonance with Jupiter of 1:11, or in other words, for every eleven orbits around the Sun Jupiter makes, Comet Swift-Tuttle orbits once. The comet has been in this relatively stable orbit for thousands of years and will remain so for tens of thousands of years to come.

Factor 2 now seems true also. The nucleus is estimated to be ~26 km in diameter, the third largest cometary nucleus known after 29P/Schwassmann-Wachmann and C/1995 O1 (Hale-Bopp), which are both estimated to have been 50-60 km in diameter. Various studies of the 1992 return showed that Swift-Tuttle had a rotation period of around 67 hours and that the highly active areas observed in 1862 were very much behaving the same way in 1992.

As imaged by Nick James

The comet has one more rather scary trick up its sleeve; it has the ability to impact Earth at some point . It has a MOID value or Minimum Orbital Intersection Distance of 0.000892 AU, or just over 130,000 km. This is a dangerously close figure given that non-gravitational forces (the jets released from the comet-much like rocket boosters on a spaceship) can guide it off course very easily.

The comet also follows a retrograde orbit, that is an orbital direction around the Sun opposite to the way of the planets. This means that when the comet is in the Earth's vicinity, it is travelling at almost 75 km/s. Needless to say, an impact from a 26 km object travelling at this speed would result in major problems for the planet. It must be remembered that the asteroid/comet that wiped out the dinosaurs 65 million years ago was just 6km in diameter.

The Elusive Interloper.

We have three recorded returns of 109P/Swift-Tuttle above and two of these three were observed in detail, so why is this so when compared to 1P/Halley, a comet with very much similar orbital characteristics as 109P/ ? Both comets have nodes that are placed on the Earth's orbit around the Sun, with 109P/ actually having its perihelion just inside the orbit of Earth so more observations of 109P/ should, in theory, have been recorded-especially as the absolute magnitude of 109P/ is 4.5 and 1P/ is 5.5 respectively.

With all the information we have, we can determine for certain that the comet has made at least sixteen perihelion passes in the past 2,000 years, and the list of perihelion dates are as follows

-68 BC	August 27.
59 AD	May 18.
188	July 10.
316	Oct 27.
441	Nov 3.
569	Mar 1.
698	Sep 6.
826	Apr 20.
950	Apr 20.
1079	Sep 17.
1212	Nov 5.
1348	May 2.
1479	Oct 18.
1610	Feb 6.
1737	June 15.
1862	Aug 23.
1992	Dec 11

Notes. . indicates appeared before discovery. . indicates not observed . . indicates Discovery. . indicates appeared.

For 109P/ to have been discovered before the age of the telescope (1604), it would have needed to be naked eye obviously and it attained a magnitude of around 3 - 4. It is a relatively diffuse object having made

numerous returns to perihelion before and thus releasing copious amounts of volatile materials. With this in mind, we can now determine how close the comet came to Earth and the apparent magnitude it would have attained.

The orbit determines that a perihelion date in January is highly unfavourable with the comet to Earth distance then being 2 au making the comet very faint. This basically rules out and explains the missing 1610 apparition. Conversely, if the comet approaches perihelion in July/August it is highly favourable as the comet is very close to the node of Earth's orbit (remember this is the prime time of the Perseid meteor interaction).

The following table gives the details of 109P/ Swift-Tuttle's perigee (q) date, days +/- from perihelion, closest approach to Earth, date and distance and magnitude it should have been as seen from Earth.

YEAR	Q	DAYS +/-	CLOSEST	APPROACH	MAGNITUDE
			Date	Distance (AU)	
68 BC	27/8	-4	23/8	0.62	3.4
59	17/5	+36	23/6	0.45	3.5
188	10/7	-15	25/7	0.12	0
316	27/10	-26	1/10	1.05	5
441	3/11	-29	5/10	1.08	5.5
569	01/03	+73	13/5	1.29	6
698	6/9	-5	1/9	0.65	3.5
826	19/4	+41	9/6	0.81	5
950	19/4	+42	10/6	0.82	5
1079	17/9	-8	9/9	0.73	4.5
1212	6/11	-28	9/10	1.08	5.5
1348	02/05	+46	17/6	0.71	4.5
1479	18/10	-19	29/9	0.94	4
1610	6/2	-57	7/12/1609	1.36	6
1737	15/6	+34	19/7	0.37	3
1862	23/8	+7	30/8	0.34	2
1992	11/12	-34	7/11	1.16	5
2126	12/7	+24	05/08	0.15	0.1
2261	10/8	+14	24/8	0.14	0
2392	16/9	+1	17/9	0.50	3

With this closer inspection we can determine which apparitions could not have been seen under any circumstance of that particular epoch . Only 4 of the 13 pre-telescopic era apparitions could have been seen with any certainty, which is odd because the returns of 59AD and 698 AD should have been detected easily. We can only say that because these returns were right on the limit of naked-eye visibility, the comet may have underperformed perhaps? Maybe bad weather hindered observations also?

As imaged by Joe Young

The first telescopic era return was unfavourable with the comet arriving at perihelion some eight weeks before perihelion and not coming any closer than 1.36 au to the Earth. It now appears though that after 1610, we enter a 'purple patch', with the years of 1737, 1862, 1992, 2126, 2261 and 2392 all being very favourable indeed.

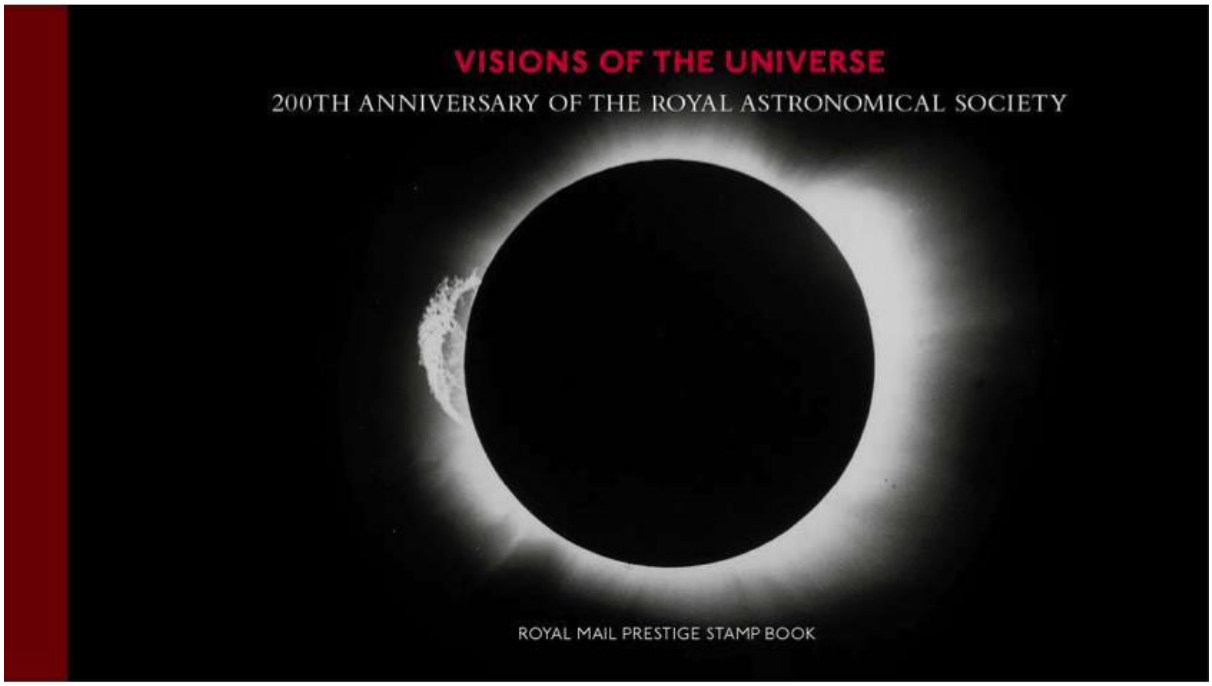
In conclusion, we can say that 109P/Swift-Tuttle is a monster comet with a very serious potential to one day impact Earth. It seems that it has been outshone (no pun intended) by comet Halley because Halley happened to be in the right place at the right time more often.

The next apparition in 106 years' time will see it remain a naked-eye comet from July 10th till August 20th. Maybe a manned mission will be ready and waiting for this dangerous object who knows? But until then, we can look up to the sky in late July until late August and see the dust from 109P/Swift-Tuttle burning up in our atmosphere.

Neil Norman. FRAS.

4 Comets and Philately

Katrin Raynor-Evans



Seeing Saturn through the telescope when I was a teenager, its rings clearly visible, is an image that has always stuck in my mind. At that time, in the late 1990's, I was lucky enough to see some fantastic astronomical events including comet Hale-Bopp C/1995 O1 and the solar eclipse of 1999. Some of my most cherished memories involve standing outside and looking up and Hale-Bopp slowly gliding across the sky for months on end will be something that I will never forget.

Astronomy and space have long been commemorated on stamps and other philatelic material such as first day covers, Post Office Headquarter Cards and prestige stamp booklets (see above). Comets stamps and covers are no exception and their appearance throughout history in our night and daytime skies have often been celebrated through philately. From Herschel to Halley, I present below just a few examples of these wonderful philatelic pieces.

Caroline Herschel

I could not omit Caroline Herschel from an article about comets and stamps. She is one of the greatest female comet hunters in history famed for discovering comet 35P/Herschel–Rigollet and she achieved so much in her 97 years. Sister of William, she

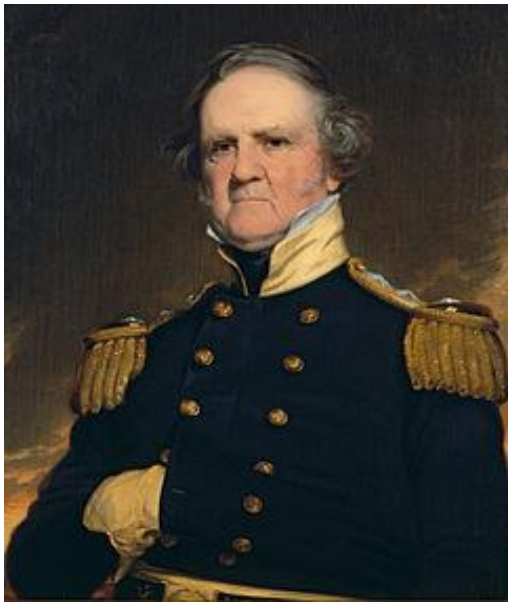
assisted him in astronomical works and over the course of her career was awarded the Gold Medal from the Royal Astronomical Society and was elected an honorary member of the Royal Irish Academy in 1838.

There aren't many stamps commemorating Caroline and her work, but one which sticks in my mind for the wrong reasons, is a stamp issued by Redonda in 1986 commemorating the return of Halley's comet. The stamps illustrate a portrait of Caroline and a member of the crew from the Apollo 16 mission in the background carrying out lunar experiments. I am not sure of the significance of the Apollo mission here or why Caroline and the mission relates to the return of Halley's comet, but I certainly have not forgotten the stamp.

Great Comet of 1861 C/1861 J1

Comet Tebbutt was discovered on May 13th, 1861 in New South Wales, Australia. It is one of the eight greatest comets of the 19th century and was visible to the naked eye for 3 months. The comet had a magnitude between 0 and -2 due to forward scattering and could cast a shadow on the ground.

An interesting rare piece of philatelic history from the American Civil War, dating back to 1861 is a postal cover with an illustration of comet Tebbutt. The head of the comet depicts General Winfield Scott,



General Winfield Scott 1786 - 1866 US Army

an American military commander. This cover is from fellow American philatelist, Richard Jakiel's personal collection and shows General Scott's face as the 'head' of the comet. There are some other fascinating American issues including Abraham Lincoln depicted as the Great Comet, with a tail of red white and blue streaking behind. This first day cover can fetch thousands of dollars at auction.

Comet Kohoutek C/1973 E1

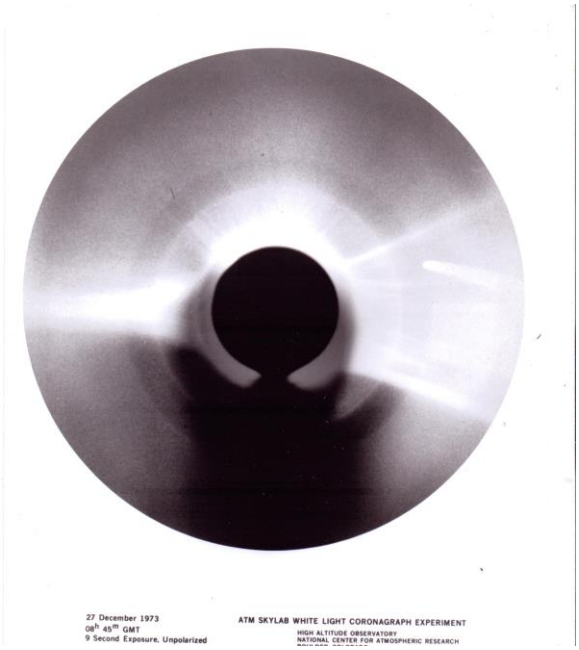
Comet Kohoutek is perhaps best remembered as the comet that never was. Thanks to the media, the long period comet was hyped to be the comet of the century but unfortunately, it was not to be. Discovered in 1973 by Luboš Kohoutek, a Czech astronomer, the naked eye comet partially disintegrated upon its approach to the Sun hence it was not as bright as expected. It will make its next approach to Earth in 75,000 years.

There are plenty of covers available marking the occasion but no stamps to my knowledge. A friend in the US sent me a home-made cover which celebrates the closest approach of the comet to Earth and is signed by Kohoutek himself. A stamp of Copernicus, famous 15th century

astronomer is affixed to the cover and it has been date stamped on the 15th January 1974, the date of the comet's closest approach to Earth.

NASA launched Skylab in the 1970's and operated between 1973 and 1974. It was America's first space station. The crew of Skylab 4 were tasked with observing comet Kohoutek using the on-board solar observatory. There is just a sprinkling of stamps available of Skylab. The Ivory Coast commemorated the Skylab 4 mission in 1986 when Halley returned to our skies and the stamp, from a set of 4, depicts Skylab and Kohoutek

Whilst not a stamp of Kohoutek, I am lucky enough to have in my collection a photograph from Skylab's white light coronagraph experiment which shows the comet taken on the 27th December 1973 170 million km from Earth.



Comet Halley 1P/Halley

Named after the famous astronomer Edmond Halley, it is perhaps the most famous short period comet in history due to its return period of 76 years. Some of us may even see it twice in our lifetimes. The comet has been recorded as far back as 240BC in China and was embroidered onto the world-famous Bayeux Tapestry. The appearance of Halley's comet in 1985 was celebrated globally on stamps and here in the UK, the Royal Mail issued a fantastic set of four stamps in 1986 which were illustrated by the famous cartoonist, Ralph Steadman. The stamps are colourful and imaginative.

They depict a rather disgruntled but comical looking Halley; an image of two comets to represent seeing it twice in a

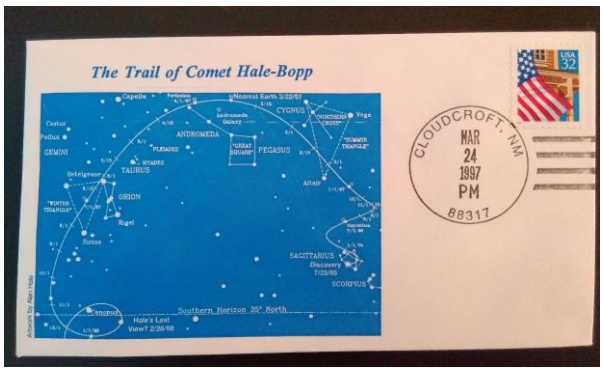
lifetime; Giotto and the comet orbiting the Sun. Designs printed on the first day covers (the cache) include images of the orbit of the comet, a portrait of Halley and Giotto. The UK issued special hand stamps to accompany the commemoration including a postmark at Islington, the birthplace of Halley and the British Interplanetary Society.

Hale-Bopp C/1995 O1

I have just recently interviewed Alan Hale for the *Sky at Night* and the *Society for Popular Astronomy*. It is 25 years this July since Hale-Bopp was discovered, and I remember looking at it for months when I was in my late teens. I am sure readers will be aware of *Ice and Stone 2020* http://earthriseinstitute.org/is20home.html Alan's fantastic educational website promoting and informing us all of comets past and present.

Moving across our skies for approximately 18 months, Hale-Bopp was the most observed comet of the 20th century. Discovered independently by Alan Hale and Thomas Bopp in the United States on the 23rd July 1995, the comet passed perihelion on the 1st April 1997, and shone bright at magnitude of -1. Even in light polluted towns and cities, it was visible to the naked eye.

On the 1st April 1997, the Dominican Republic issued a set of stamps depicting the comet positioned against a tropical pink and yellow sky with its two tails of gas and dust clearly illustrated. Ten years later in 2007, Republic of Equatorial Guinea issued a set of miniature-sheets to celebrate the 10-year anniversary of Hale-Bopp. Colourful and informative, the miniature-sheets depict Alan Hale and Thomas Bopp set against various backgrounds including images of the comet and an illustration of Charles Messier, a nod to one of the greatest comet hunters in history.

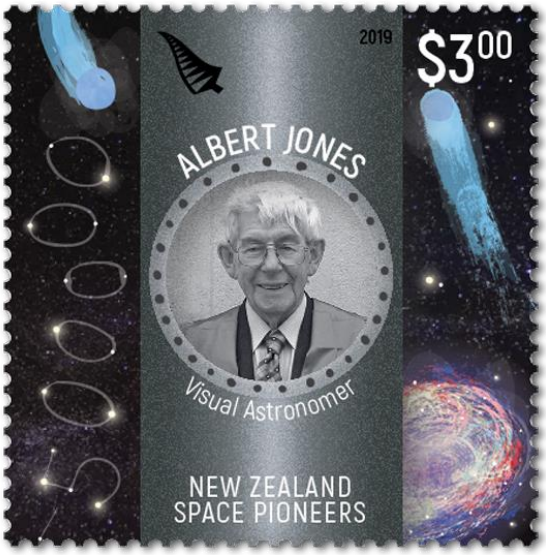


Some stamp collectors even made their own covers to celebrate the comet and had

them hand stamped at Cloudcroft, New Mexico where Alan Hale first made the discovery. This is from my collection and was sent to me by an ex-NASA engineer, who specialises in making his own covers.

New Zealand Space Pioneers

On the 1st May 2019, the New Zealand Post issued a set of five stamps commemorating famous New Zealanders and their contributions to science and astronomy. One of the stamps features Albert Jones, OBE who was a prolific comet hunter. He discovered two comets in his lifetime; comet Jones C/1946 P1 in 1946 and comet Utsunomiya-Jones C/2000 W1 in 2000.



The se-tenant stamps (a set of stamps that adjoin each other) are cleverly thought out and all 5 stamps, when adjoined forms a rocket ship. The stamp celebrating Albert Jones depicts a black and white photograph of him with colourful drawings of comets bordering his image and the number 500,000 on the left-hand side, a commemoration of the number of observations that he made over his lifetime. As a special and touching addition to the stamp set, they were sprinkled with dust from a meteorite making this a unique and wonderful addition to any stamp collection.

The next comet stamps?

The northern hemisphere is long overdue a beautiful naked eye comet and there was a lot of excitement about comet ATLAS C/2019 Y4 in our sky. I was so hoping that the comet would become a celestial moment that would go down in history and be commemorated on stamps. However, we should not be disappointed and comets aside, we have a lot to look forward to in the coming months…the launch of the James Webb telescope, the manned crews of SpaceX Dragon 2 and Perseverance, the next Mars rover. I hope and have everything crossed that some of these special achievements will be celebrated on stamps

Katrin Raynor-Evans

About the author:
Katrin Raynor-Evans is a Fellow of the Royal Astronomical Society and Royal Geographical Society. She is a member of the European Astronomical Society, American Philatelic Society and Astro Space Stamp Society. She writes articles and interviews for popular astronomy magazines including the BBC Sky at Night and is the Features Editor for the Society for Popular Astronomy's magazine, Popular Astronomy. She has been commissioned to write articles for Stanley Gibbon's magazine, Gibbons Stamp Monthly and Astronomy Magazine. Minor Planet 446500 Katrinraynor was recently named after her.

5 The Fascination of Comets - A Personal Story Stefan Beck

I began comet observing as a teenager, whilst awaiting the famous Comet Halley in 1986. Unfortunately, I missed it and several more, before I eventually saw my first comet through my small 13cm Newtonian telescope. Inspired through the comet images of Michael Jäger, which I had seen printed in my home German Astronomy magazine, "Sterne+ Weltraum", I started into the field of astronomical photography and tried to image comets as well.

In the early years I imaged comets and made visual estimations of the brightness, diameter of the coma, value of DC, and sent the results to our German Comet Section, “VdS Fachgruppe-Kometen" literally Comet Group. With every step in upgrading my telescope from the 13cm Newtonian to a larger 8" Newtonian and a 5.5" Celestron Schmidt camera I gradually stopped using visual estimations. When I began getting into digital imaging I stopped watching comets through my telescope. Only very bright ones received a short visual view from me. But recently I felt the desire to observe the comets again not only with electronic eyes. So, I made small steps back into visual observations of the brighter comets.

As I retrace my journey back to visual comet observing I want to tell you something about the other things I do about comets. First of all, I have maintained the image gallery of the VdS Fachgruppe-Kometen since 2004. In the very first days of the image gallery, we used the webspace of Maik Meyer, then the head of the German Comet Section. By 2006 the image gallery was switched to the

webserver of the German "Vereinigung der Sternfreunde" (VdS), literally the Association of Star Friends, and which is still maintained there. All the data is stored in a SQL-Database. I have taken the role of the database administrator and most things are done automatically on my small Linux server at home. Only the publication needs to be done manually with the help of a web-browser.

In 2011 I introduced an online upload form that makes the work much more straight-forward, easier for the imagers and for myself. In 2017 I introduced a database search to find images of a specific comet or an observer. Almost everything is automated, except actually putting the images/sketches/videos online. This is just for security reasons and to publish correct data because the format of the data is not given. Due to the free format, there is no need for membership of the website. The aim is to have a place with lots of images taken by general community of comet imagers from around the world without the need to be a 'member' as such, ensuring that those lost after posting on for example Instagram or Facebook have place for safekeeping and access to all interested persons.

The image gallery is open to everybody in the world. In June 2018 I contacted Carl Hergenrother from the ALPO (Association of Lunar and Planetary Observers) to retrieve past comet images for publication. Every comet imager is invited to upload their images to the gallery, especially historic images are welcome. Please contact me if you want to upload old images.

In 2009 I started a project called "All Comet Observers of the World", because there are lots of mailing lists for communications, but I always wanted to know what people look like and where they are while reading their emails. Many observers have already joined the project and can be found with the two webpages that contain the name, data and images. The observers can be listed by name or by country. There is also a Google map to locate the observers. Please contact me if you want to submit items to the project.

Since 2010 I have been working on another project that was started by the Spanish comet observer Juan José González Suárez. It is now called "Comet Discoverers & Comet Discoveries by Amateurs". Originally written in Spanish I translated it with Google Translate into English and now it provides information and images about the discoveries and the stories behind the discoveries of comets found by amateurs. All discoveries from 1978 until now are described but also the death of a discoverer (amateur or professional) is notified.

Stefan Beck

My homepage http://www.cometchaser.de/
VdS Fachgruppe Kometen gallery: http://fg-kometen.vdsastro.de/bildere.htm
VdS Fachgruppe Kometen upload form: http://fg-kometen.vdsastro.de/pix/test/up2_e.php
Project "All Cometobservers of the world":
https://www.cometchaser.de/observers/cometobservers.html and
https://www.cometchaser.de/observers/map.html
Project "Comet discoverers & Comet discoveries by amateurs" ->
https://www.cometchaser.de/discoverystories/Comet-discoverers.html
Original website Comet discoveries http://www.perihelio.org/descubri.htm

6 Comet Observing in Australia - Chris Wyatt

Comet C2006P1_McNaught_InMoonlight_Jan2007 C Wyatt

Comets have always been a part of my interest since I saw Halley's Comet 1/P in 1986. I was 7. I remember using my father's binoculars to view this fuzzy patch in the sky, with a short tail. I remember seeing the majesty of the Milky Way and stars littering the dark sky. I was hooked then and there. I was living in Western Sydney near the foot of the Blue Mountains at the time.

In 1996 I saw comet Hyakutake C/1996 B2 as another fuzzy blob from light polluted skies, I saw Hale-Bopp C/1995 O1 via my 60mm refractor. Near home was the University of Western Sydney and they had just built an observatory a short walk away. I used to help out at public viewing events where I pointed the telescope to objects of interest, I left the talking to the Uni guys.

In 2002 I moved to the small town of Walcha in country NSW, about 450 km North of Sydney by road.

Gorge Country Walcha, Northern Tablelands, NSW, Australia

It was here that I got blown away by really dark skies. I purchased a 10" f/5 Dobsonian that year and a couple of years later a second hand 8" SCT which I used for Astrophotography, mainly with a film camera, to photograph comets C/2001 Q4

NEAT and C/2002 T7 LINEAR, I also used the C8 to observe and photograph the Transit of Venus.

Then in 2006 I joined the Comets-ML Yahoo group, and a few months later read about the discovery of C/2006 P1 McNaught. I followed the emails with interest until late December 2006 when things started to get interesting. Early 2007 I witnessed the BEST comet I have EVER seen! I was totally blown away by its size and shape and just generally the imposing view of this Great Comet. I remember seeing reports of how bright this comet got, -5! How did they work that out?

Comet C2006P1_McNaught_20th Jan 2007_CWyatt

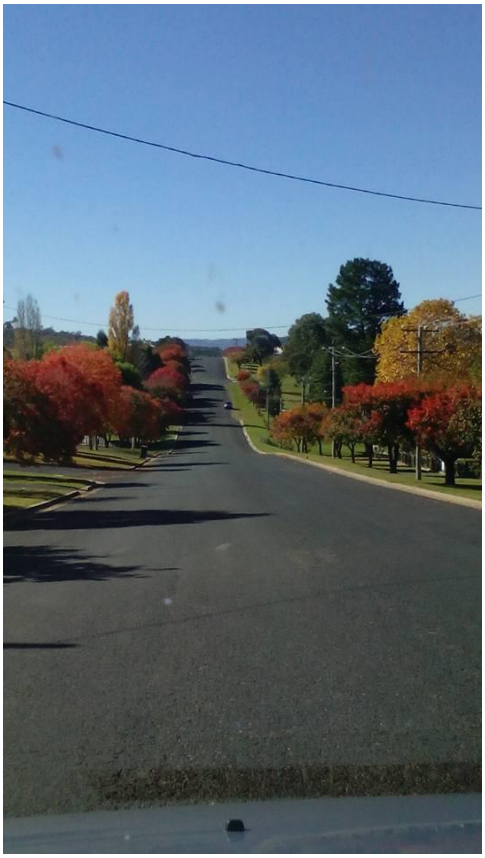
I investigated and started reading about comet observing and making measurements. My local Astronomy club, the University of New England and Northern Tablelands Astronomical Society, had no experienced observers there to talk to, and I quickly discovered that I was very isolated, even on the online fora's observers were scarce. I kept searching and found the Astronomical Society of Victoria's Comet Section and made good contact with Con Stoitsis who encouraged me to have a go.

I had no-one to teach me first hand on how to make the measurements so I taught myself. There was a lot of initial doubts about whether I was making them properly and reporting them correctly. I first started jotting down my measurements in a little note book. The biggest challenge was finding comparison stars. The planetarium program I had at the time did not use the recommended comparison star sources, so I had to make do with what I had available.

Then along came the outburst of 17P/ Holmes. Another fantastically bright and yet intriguing comet, it was amazing! I attempted to make observations of this comet but was very 'green' and had a go without much success as it turned out as I left out a few key notes, all part of the learning curve. In 2008 I followed 8P/

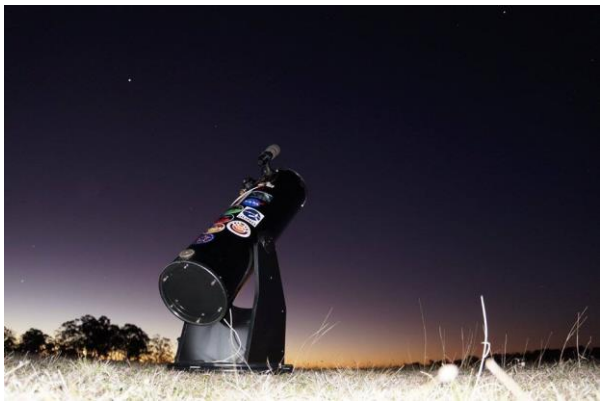
Tuttle and C/2007 N3 LULIN with interest and made many observations of these and other comets. I started to build in confidence and also purchased some better eyepieces.

During Easter 2008 I attended the National Australian Convention of Amateur Astronomers in Penrith in Western Sydney, my old home ground, in the hope of finding someone or something to help me along with my comet observing. Arne Henden was there to talk about the AAVSO and contributing to Variable Star Observing. I soon realised that by starting my own variable star observing programme I could use the processes of magnitude interpolation and apply it to my comet observing even though they were a little different, but it could be mastered, plus I would be contributing to the AAVSO database as well.



Hill Street in the Autumn Walcha

At that same conference I also reconnected with Occultation observing, which I had dabbled in during the early 1990's in my backyard and my 60mm refractor, watching and timing stars disappearing behind the Moon. The whole convention just amazed me at how backyard observing, naked eye or otherwise, through various avenues can help contribute to Astronomy Science. This awakened me and inspired me to do something with my observations rather than just take pretty pictures of the night sky.



The Dark Skies of Walcha

Very soon I found some encouraging help from various observers in the Comets-ML community who were giving me bits of advice to help refine my techniques. I eventually purchased a copy of the Guide 9.0 (Project Pluto) Planetarium Program which has been my staple program ever since. Its flexibility for comet observing is tremendous with plug-in comparison star selection files helping no end. Most comets I observe are fainter than 12th magnitude, so dark skies are essential, which I am fortunate to have access to right out my backdoor, however, being a visual observer means I can be flexible as my equipment loading is small and batteries are pretty much non-existent other than those I require for dew control. I like to stay mobile so I can run from the clouds when they arrive.

The equipment I use for comet observing consists of a pair of 7x50 and 11x70 binoculars and I use these on comets that are around 5th mag to 9th magnitude. From

then on, I use my 10-inch f/5 Dobsonian, which has been my main scope for comet observing since 2008. Using 32mm Plössl and 15mm Plössl I obtain magnifications of x39 and x83, occasionally in conjunction with a x2 Barlow I can get up to x166 magnification. I can usually get down to 14th mag comets depending on their compactness and dust content. Faint gassy, or diffuse comets are a little harder to detect.

In the past couple of years, I decided to improve the contrast by flocking the tube, installing a Crayford focuser and fitting dew heaters to my secondary and finder-scope. The Crayford focuser stops image shift and also helps speed up my de-focussing methods; it was a good move.

In 2018 I found the need to go one step up from my 10" dob to grab some fainter comets in the 15th mag region, give or take, but also to grab those faint 14th mag ones which the 10" can't resolve easily. Without ever having built a telescope in my life I designed and constructed my own 16" f/4.5 dob of the Obsession design with my own little modifications and a few 'happy ending' mistakes along the way.

16inch Dobsonian homemade

I didn't want a tracking mount and I didn't want any power-hungry dew heaters drawing in excess of 2A, which I managed to achieve. I also did not want to build a scope that I could not transport and handle myself, no ladders required either. For me the 16" f/4.5 is perfect.

I also purchased a new suite of 2" eyepieces. I use a 31mm Type V Nagler, a 17mm Type IV Nagler, a recently-purchased a 10mm Ethos, and a 7mm De-Lite, giving me magnifications of x59, x108, x183 and x261 respectively, which increases my field of view and therefore more drift time since it's not tracking.

16 inch and the Milky Way

When it comes to my observing process I print off a suite of charts of different target comets. The good news is that to mimic the view through the eyepiece I only have to turn my chart upside-down to obtain that same view. Using Guide 9.0 I have concentric circle overlays which I made for my 10" dob fields to help reference the scale view of consecutive charts.

My comparison stars are already circled and magnitudes marked due to the clever design of the plug-in files I obtain online, but they are only available for known comets of current interest, which is most of the time. In the case of comets which undergo outbursts or newly discovered I use UCAC-4 plug-in, which I enable and manually mark on my printed chart the

stars which have found the right colour index.

Usually I try to keep the comparison star (B-V) value between 0.2 and 0.8; for gassy comets; one can have a slightly bluer cast and for dusty comets a slightly redder cast can be used as these are guidelines only. For comets brighter than 10.5 magnitude I use Tycho-2 comparison stars provided the colour index is within the guideline values. Comets fainter than 10.5 I use the APASS or ASAS-3 sources. The UCAC-4 V-magnitudes are sourced from the APASS catalogue.

Once out in the field it's a matter of locating the field by star-hopping and settle down using a magnification that resolves the coma well. Sometimes I use a 'Comet Filter' as a diagnostic to determine if a comet is gas or dust dominant. This filter applied between the eye and the eyepiece will enhance the view of a gas dominant comet and dim or block out a dust dominant comet. 29P/Schwassmann-Wachmann for instance, when in outburst, just about disappears using this filter indicating its dust dominance.

To measure a comet you need to know at least 3 things.

1. The Total Integrated Magnitude, known as "m1"
2. The Coma diameter
3. The Degree of Condensation

First point I make through the eyepiece is the Degree of Condensation or D.C., this is a graduated indicator of the brightness profile across the coma. If the coma appears diffuse with no "central condensation" it is given a DC of 0 to 2 depending on the degree of diffuseness. If the coma displays a definite condensation or brightening at its centre, separate from the outer coma, it is given a DC of 3.

The DC values increase depending on the compactness of that central condensation. If the centre is star-like and there is an appreciable outer coma visible then a DC of 6 is given. Building on that if the bright centre of the coma appears star-like and the outer coma is somewhat diminished in comparison, it is given a value of between 6 and 8. If the coma is star-like or disc-like with no outer coma visible it is given its highest designation of 9. The DC value is the ingredient needed to determine the magnitude estimation method you will use to derive your m1 value (Magnitude).

The magnitude estimation methods are like a sliding scale of a single extrafocal, or defocussing, method. But before you can do that you need to take notice of the coma diameter, perpendicular to any tail if present. While I am taking note of the diameter in my mind I want to record that diameter on paper.

When I first started I used the drift-timing method, whereby using an eyepiece fitted with a reticle you would time the crossing of the coma across a reticle line placed perpendicular to the motion of the drifting background stars. I took 10 timings, in seconds, using a stopwatch. Averaging the times I would apply a formula which is also dependent on the declination of the Comet to arrive at a coma diameter value. Unfortunately I couldn't find a low power eyepiece that utilised a reticle, so I made my own reticle using a piece of very thin fishing line stretched and glued across the field stop.

These days I note the separation of pairs of stars in the eyepiece field that are the same or close to the observed coma diameter, I then note this on the chart and later I will use a measuring tool in the planetarium program to determine the diameter. The diameter I am looking for is the extremity of the coma edge that is visible, not imagined. This is achieved using averted vision; it takes some practice but it becomes second nature after a while, and being careful not to incorporate any faint tail which might be present.

Some of the challenges I have encountered during my experience observing comets revolved around the lack of bright comparison stars, such as I experienced with C/2011 L4 PanSTARRS, especially since it was low on the horizon, in twilight and around 1st magnitude. It happened to appear in a region of sky devoid of suitable bright comparison stars, and it set late in the evening twilight. This is where I had to apply atmospheric extinction corrections using a table supplied from ICQ literature.

The idea is not to apply the corrections to the comet itself but rather to apply the corrections to the comparison stars, to achieve a corrected magnitude depending on their altitude above or below the altitude of the comet. In effect this is bringing the stars to the same altitude as the comet and comparing them. It is always best to pick comparison stars at or near the altitude of the observed comet so that extinction corrections need not be applied. Another interesting development was with large comae on comets, like 252P/ LINEAR in 2016.

Once the coma reaches a large diameter you will be required to reduce your magnification to allow you to see the entire coma. For 10' diameters I try not to use anything higher than x20 or lower than x12. 252P/LINEAR achieved a coma size of 54' by my reckoning in early April 2016. I wanted to use something around x3 magnification. Upon consultation with a friend of mine I used a 15mm eyepiece in conjunction with a 50mm f/1.8 camera lens which gave me a magnification of x3.3. The reason to use this combination was to be able to see the entire coma well and also that due to the large coma diameter the back-focus required to compare the fuzzy coma with an out of focus star was much easier than attempting this with a binocular with limited back-focus, and it also suppressed the interference from faint background stars by not being able to resolve them in the field. The only technical issue was alignment of the optics, with a little practice it became easier but despite this it worked well. Using a magnification above this would mean that the outer coma would not be rendered visible and a fainter magnitude would be the result. A magnification too low would mean the coma would not be comfortably viewed.

Naked eye estimates are fraught with their own issues, especially on very diffuse comets like 252P. More compact comets like C/2011 L4 PanSTARRS were also difficult but the coma being small it wasn't too bad on the eye. Using the Morris or Modified-Out Method it took some practice to get it right. By defocussing the coma by

crossing my eyes to the extent that the coma was of an even brightness I had to turn to my comparison star holding this position with my eyes. The lack of bright comparison stars in the vicinity meant I had to locate a star first and memorise where it was in relation to the comet, then looking at the comet and performing the art of defocussing I would turn back to the star and adjust my eyes again to the comets memorised appearance in diameter and surface brightness.

Time was critical as the comet was setting rapidly and there came a point in the observation where the comet would be too low, the sky still darkening and the time spent fuzzing about with your eyes, taking notes, writing down your estimates and trying them again with the background sky gradient changing all the time……there had to be a balance somewhere.

Some of the brightness estimates seemed a little conservative, upon applying the atmospheric extinction tables I used at the time, based on the ICQ recommendations, the comet brightness mathematically seemed a little too optimistic. Somewhere along the way I took some images using a DSLR on a tripod. It was more difficult than I had anticipated, but it was fun too!

My enjoyment of comet observing peaks at bright naked eye comets, but then there are also the ones that surprise us in the outbursting comets. I also like comets that show inner coma structure, like spines. These are dust features that usually indicate fragmenting of the nucleus or parts of the nucleus, such as I saw in the outburst of 15P/ Finlay, and even the spine in the head of C/2011 W3 Lovejoy, that sungrazer that surprised us all, written off by experts pre-perihelion.

I love the changing nature of comets from dust to gas dominance or vice-versa. C/2012 S1 ISON was a very interesting one to witness. I also love seeing ion tails and dust tails, changing all the time, night to night.

Dec 2011 W3 Lovejoy CWyatt 241211B75pc

Comets also surprise us in that they can link the past to the present, they answer questions asked long ago. During the apparition of C/2006 P1 McNaught the dust tail was just able to be observed poking out from the horizon in the Northern Hemisphere, the striated rays brought back memories of the drawings of 'de Cheseaux's' comet C/1743 X1. Now it can be explained! The outburst of 17P/Holmes in late 2007, its appearance and size was almost picture perfect to the images taken of the comet when first discovered in 1892, it was like a time-machine, and as it so happened, almost in the same region of sky as it appeared over 125 years previously. WOW!

All comets are unique, they take on different appearances viewed from different perspectives, I enjoy newly discovered comets and tracking them down, I love sharing experiences with other observers. I also love the seemingly borderless comet observing community world-wide and how it connects us all, knowing that we are all playing our small part in building our knowledge on these small and yet fascinating bodies.

The little town I reside in called Walcha (pronounced Wol-Ka, population: 1400, shire area: 6,267 km^2) is about 1050m above sea level, with many of my observing sites scattered around the district. When I first moved here I found the weather hard to predict, you can have 4 seasons in one day here. Most of my observing sites are not far off the tar. Much of the time I use my 4wd to cart the scope(s) and it is handy to have when you need to go off-road to find a safe place from which to observe.

Drought Gorge

I like to stay mobile as the clouds can appear from nowhere. Sometimes on a clear blue sapphire sky day there is no indication of any clouds, but then just on dusk a little gentle Easterly breeze shuffles through, and by 11pm the town is covered by low cloud. About 25kms West of me is a little town called Woolbrook, and it is just off the Walcha plateau so all I have to do is drive 20 mins west and I get perfect crystal-clear sky. It has taken a few years to know when and where to go if cloud or fog come along…..maybe that's why the region is called "New England"?

Sometimes I get a nice clear sky in the evening, then wake up in the morning to dense fog, so now I travel east, which takes me to 1200m above sea level and out of the thick fog. I'd be driving along, go up a little rise and bingo! Clear Sky! And it stays like this all morning. Walcha is also renowned for its frosty mornings, but to me this means clear sky.

Mornings are difficult to contend with when -10° C frosts come around, for my fingers and toes feel like cold steel, but when there is a bright comet on offer I don't let it bother me too much. Most of the time the frosts are mild at -5° C. The skies are quite clean and clear, and at one of my sites I have managed to get 22.10 with the Sky Quality Meter (SQM), but on average the skies about 1km out of town give me 21.7-21.9 mag-$arcsec^2$, so light pollution is minimal.

Frosty 10 Inch

As I write this I am approaching 2300 observations and 190 individual comets visually observed. I am always anticipating the next bright one, I have been lucky enough to witness two absolute stunning ones and I am sure there will be a few more to come and I certainly won't give up comet observing any time soon.

I find observing at the eyepiece is quite rewarding, you really get to know your scope well, and the sky as well as the environment around you. I love sketching comets if I am patient enough; it really teaches you to 'see' and not just look at an object, my drawing skills are average but it is improving as time goes on and I am gathering quite a collection. I am glad that I kept my old sketches of Jupiter and the S-L 9 Shoemaker -Levy impact scars back in 1994. I quickly jotted them down while making my turn on one of my astronomy club's telescopes during a public viewing evening. At the time I never gave it much thought but these days it puts me in the place I was at that time and the memory is brought back to life.

Meeting Warwick Holmes

I like the ease of enjoying a view while contributing data and seeing these wonderful patches of light that not many people have the fortune to see or ever see again. One thing that I learnt is that comets are all unique, they all behave differently, and they should be enjoyed no matter how dim or boring the majority might seem.

Another thing I love about this hobby is the pro-am collaborations in which you might become involved in anticipation of a bright comet like C/2012 S1 ISON, which turned out to be a rollercoaster of a ride, as well as the involvement during the encounter between comet C/2013 A1 Siding Spring and Mars in 2014, and also during that time the spectacular ESA Rosetta Mission to comet 67P/ Churyumov-Gerasimenko. I was even fortunate enough to have a chance meeting with Warwick Holmes who happened to be passing through Walcha. Warwick is an Australian Avionics Engineer who worked for ESA and helped design and build the Rosetta spacecraft and Philae lander. It was an absolute honour to meet him. It was a pleasure to be involved in such a wonderful and important science venture, the people I communicated with along the way has been nothing short of phenomenal. I can't wait for the next one.

Chris Wyatt
Walcha, NSW Australia

Comet Observers of the Past – Histories Contributions and Achievements

Director's Note - This section introduces historical perspectives on comet discoveries, their role in general society and in politics. I hope you enjoy it and also feel free to contribute.

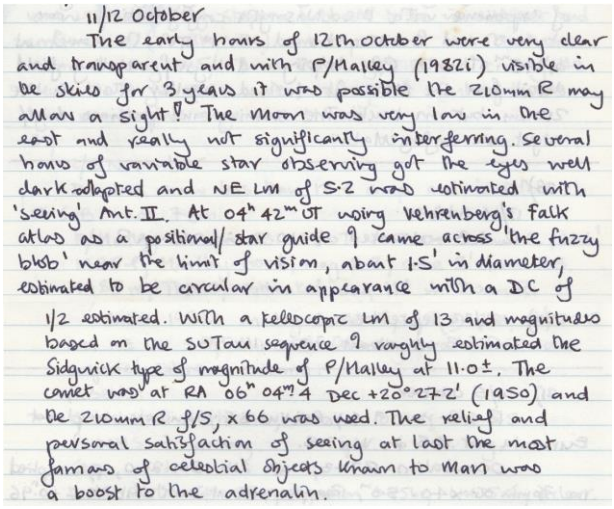
7 Melvyn Taylor's Observations of Comet 1P/Halley (1982i) Alex Pratt

Melvyn Taylor (1947 – 2017) observed more than 60 comets from his back garden in Wakefield, West Yorkshire. He was one of the BAA's most active visual observers and his main instruments were binoculars, a trusty Bedford Astronomical Supplies alt-azimuth 3-inch refractor and for fainter objects he used an alt-az BAS 212mm reflector. He didn't simply 'look' at celestial objects; he carefully studied them and extracted much useful information from his observations.

Melvyn Taylor with his binoculars and refractor used for visual observations and magnitude estimates of the comet.

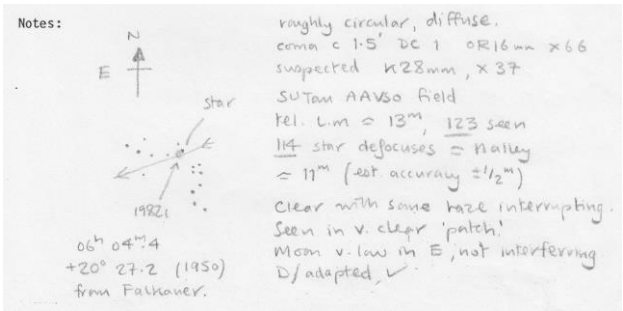
It was with great anticipation that he looked forward to the return of Halley's comet in 1985-1986, so, as well as participating in the observing programmes of the BAA and *The Astronomer* magazine he joined the International Halley Watch (IHW). His Halley archive includes the following booklets:
Comet Halley 1985-1986 and how to find it – John Lewis and Don Miles
The Comet Halley Handbook – An Observers Guide (IHW) – Donald K. Yeomans
IHW Amateur Observer's Manual for Scientific Comet Studies – Stephen J. Edberg
IHW Amateur Observer's Bulletins – Stephen J. Edberg
Halley's Comet – The 1986 Apparition – BAA Memoir

His eager searches for this famous comet were rewarded in the autumn of 1985, as he recorded in his diary:



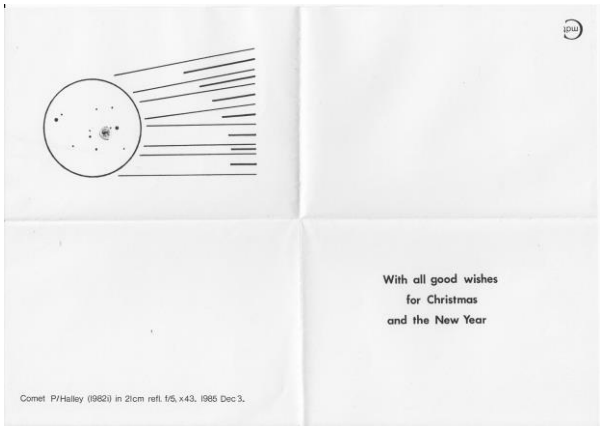
11/12 October
The early hours of 12th October were very clear and transparent and with P/Halley (1982i) visible in the skies for 3 years it was possible the 210mm R may allow a sight? The Moon was very low in the east and really not significantly interferring. Several hours of variable star observing got the eyes well dark-adapted and NE Lm of 5.2 was estimated with 'seeing' Ant. II. At 04h 42m UT using Rehrenberg's Falk atlas as a positional/ star guide I came across 'the fuzzy blob' near the limit of vision, about 1.5' in diameter, estimated to be circular in appearance with a DC of 1/2 estimated. With a telescopic Lm of 13 and magnitudes based on the SuTam sequence I roughly estimated the Sidgwick type of magnitude of P/Halley at 11.0±. The comet was at RA 06h 04m.4 Dec +20° 27.2' (1950) and the 210mm R f/5, x66 was used. The relief and personal satisfaction of seeing at last the most famous of celestial objects known to Man was a boost to the adrenalin.

His first sighting of the comet, on 1985 October 12.

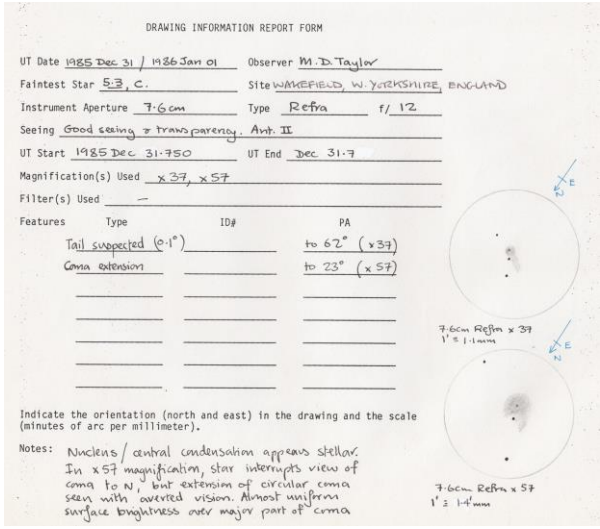


Notes:
roughly circular, diffuse.
coma c 1.5' DC 1 OR16mm x66
suspected N28mm, x37
SuTam AAVso field
Tel. Lim = 13m, 123 seen
114 star defocuses = Halley
= 11m (est. accuracy ±½m)
Clear with some haze interrupting.
Seen in v. clear 'patch'.
Moon v. low in E, not interferring
D/adapted
N
E
star
1982i
06h 04m.4
+20° 27.2 (1950)
from Falkauer.

In addition to observing the comet at every opportunity as it progressed through the winter constellations, Melvyn also took part in the visual and photographic monitoring of the Orionid meteors, the debris from Halley's earlier returns. The euphoria over a successful observing campaign led to him acquiring various Halley memorabilia and he produced his own Halley Christmas card for 1985.

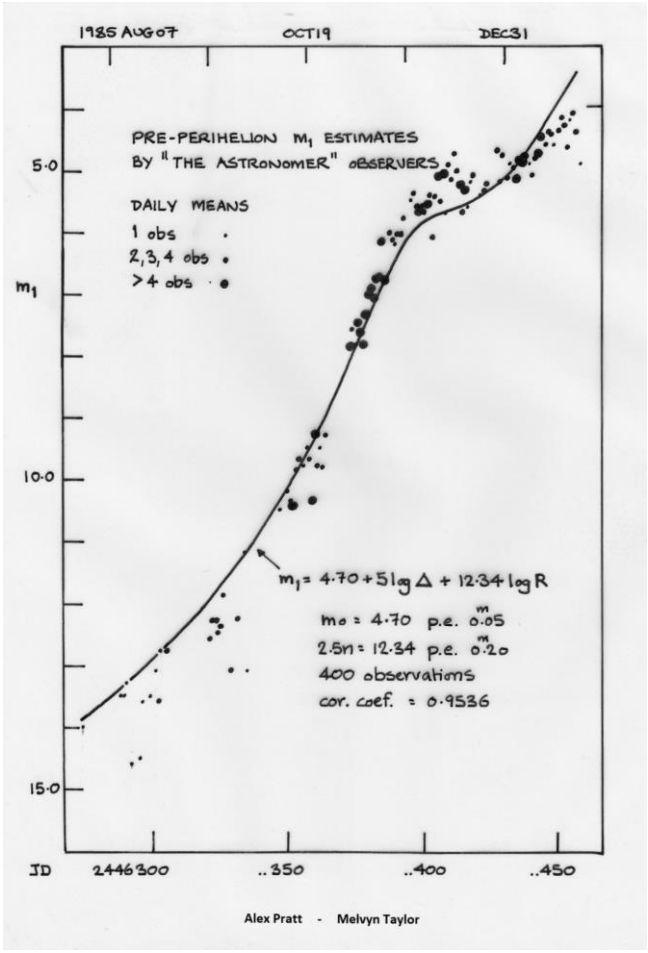


Melvyn's Halley Christmas card



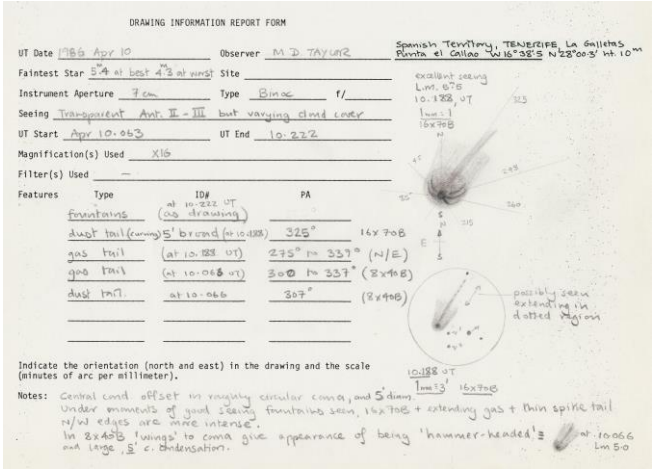
His drawings and description of the comet on 1985 December 31.

On 1986 Jan 25 I joined him on Ilkley Moor, crunching through the snow in -60°C temperatures to catch a binocular sighting of the comet in the evening twilight before it reached perihelion. Melvyn and I collated all data submitted to *The Astronomer* to estimate its pre-perihelion magnitude formula.



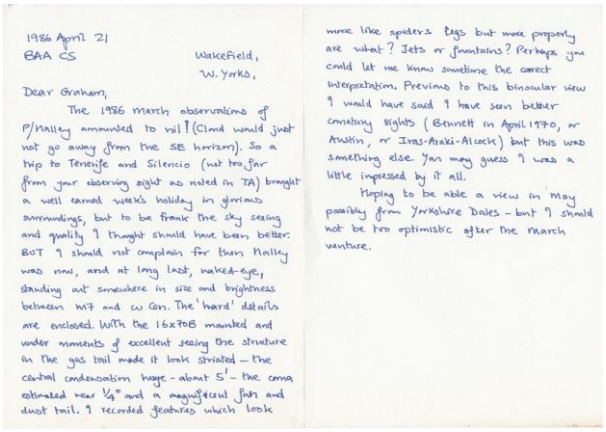
Halley's pre-perihelion magnitude formula derived from The Astronomer observations

His next observations were from much warmer climes, on the island of Tenerife, during 1986 April 6 to 10.



Melvyn's observations from Tenerife on 1986 April 10. A fine example of the contributions from this skilled observer

He described his impressions of the comet in a letter to Graham Keitch:



1986 April 21
BAA CS
Wakefield,
W. Yorks.

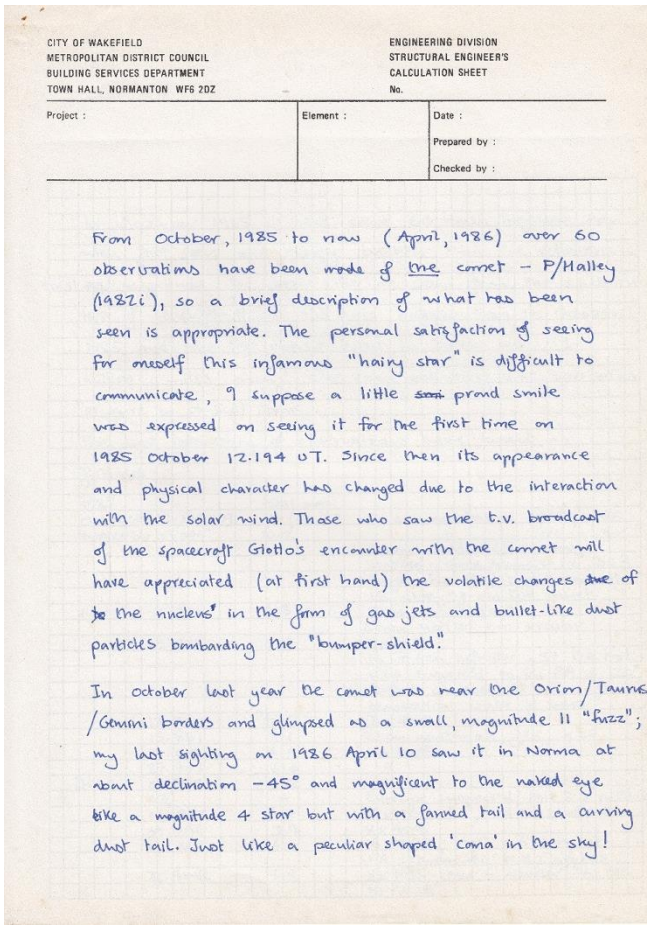
Dear Graham,

The 1986 March observations of P/Halley amounted to nil! (Cloud would just not go away from the SE horizon). So a trip to Tenerife and Silencio (not too far from your observing sight as noted in JA) brought a well earned week's holiday in glorious surroundings, but to be frank the sky seeing and quality I thought should have been better. BUT I should not complain for then Halley was now, and at long last, naked-eye, standing out somewhere in size and brightness between m7 and m8 Gen. The 'hard' details are enclosed. With the 16x70B mounted and under moments of excellent seeing the structure in the gas tail made it look striated – the central condensation huge - about 5' – the coma estimated near ½° and a magnificent fan and dust tail. I recorded features which look more like spiders legs but more properly are what? Jets or fountains? Perhaps you could let me know sometime the correct interpretation. Previous to this binocular view I would have said I have seen better cometary sights (Bennett in April 1970, or Austin, or Iras-Araki-Alcock) but this was something else. You may guess I was a little impressed by it all.

Hoping to be able a view in May possibly from Yorkshire Dales - but I should not be too optimistic after the march venture.

Letter to Graham Keitch, Comet Section Visual Observations Co-ordinator

and summarised his most interesting observations:



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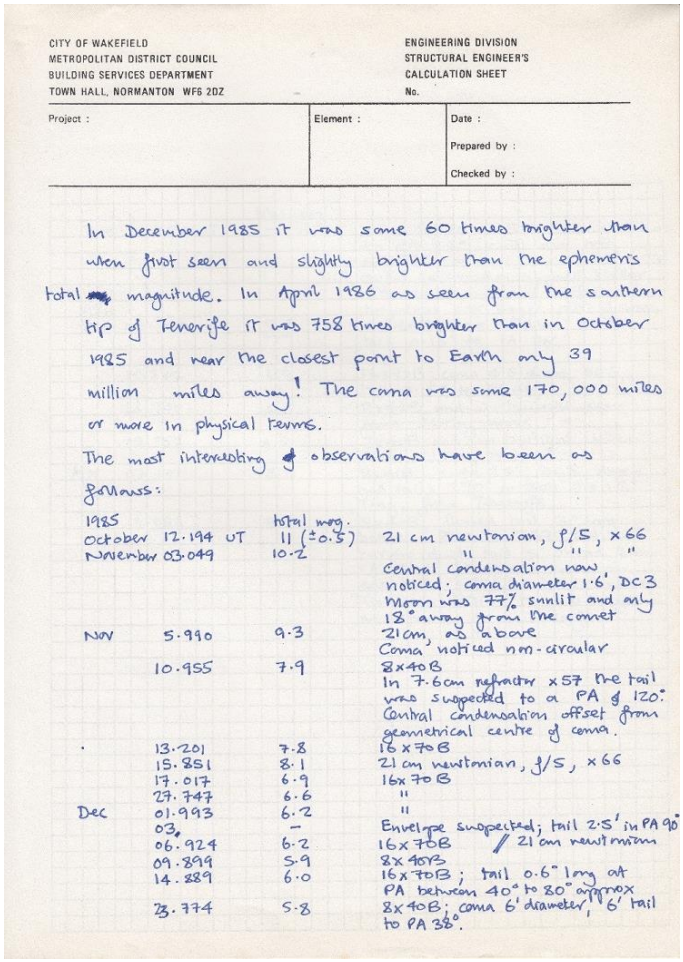
From October, 1985 to now (April, 1986) over 60 observations have been made of the comet – P/Halley (1982i), so a brief description of what has been seen is appropriate. The personal satisfaction of seeing for oneself this infamous "hairy star" is difficult to communicate, I suppose a little ~~sent~~ proud smile was expressed on seeing it for the first time on 1985 October 12.194 UT. Since then its appearance and physical character has changed due to the interaction with the solar wind. Those who saw the t.v. broadcast of the spacecraft Giotto's encounter with the comet will have appreciated (at first hand) the volatile changes due of to the nucleus' in the form of gas jets and bullet-like dust particles bombarding the "bumper-shield."

In October last year the comet was near the Orion/Taurus /Gemini borders and glimpsed as a small, magnitude 11 "fuzz"; my last sighting on 1986 April 10 saw it in Norma at about declination −45° and magnificent to the naked eye like a magnitude 4 star but with a fanned tail and a curving dust tail. Just like a peculiar shaped 'coma' in the sky!



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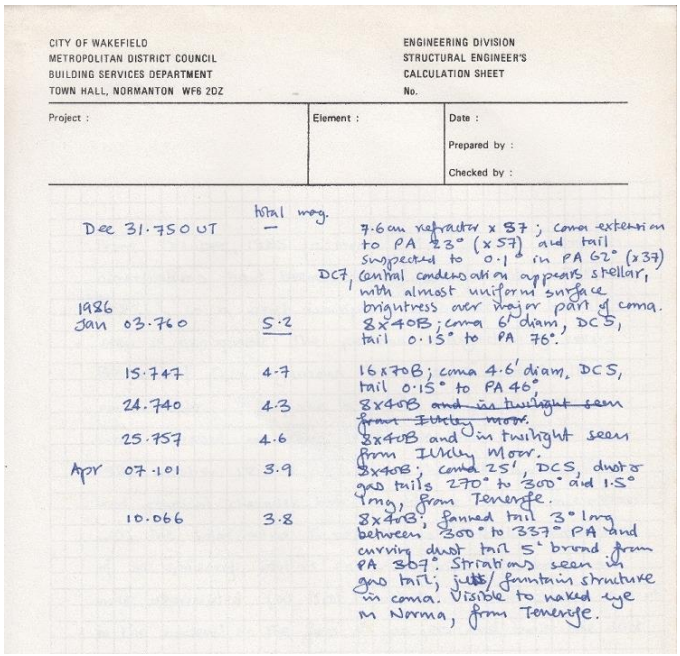
In December 1985 it was some 60 times brighter than when first seen and slightly brighter than the ephemeris total ~~mag~~ magnitude. In April 1986 as seen from the southern tip of Tenerife it was 758 times brighter than in October 1985 and near the closest point to Earth only 39 million miles away! The coma was some 170,000 miles or more in physical terms.

The most interesting observations have been as follows:

		total mag.	
1985			
October	12.194 UT	11 (±0.5)	21 cm newtonian, f/5, x66
November	03.049	10.2	" " "
			Central condensation now noticed; coma diameter 1.6', DC3 Moon was 77% sunlit and only 18° away from the comet
Nov	5.990	9.3	21cm, as above Coma noticed non-circular
	10.955	7.9	8x40B In 7.6cm refractor x57 the tail was suspected to a PA of 120° Central condensation offset from geometrical centre of coma.
	13.201	7.8	16x70B
	15.851	8.1	21cm newtonian, f/5, x66
	17.017	6.9	16x70B
	27.747	6.6	"
Dec	01.993	6.2	"
	03.	–	Envelope suspected; tail 2.5' in PA 90°
	06.924	6.2	16x70B // 21cm newtonian
	09.899	5.9	8x40B
	14.889	6.0	16x70B; tail 0.6° long at PA between 40° to 80° approx
	23.774	5.8	8x40B; coma 6' diameter, 6' tail to PA 38°.



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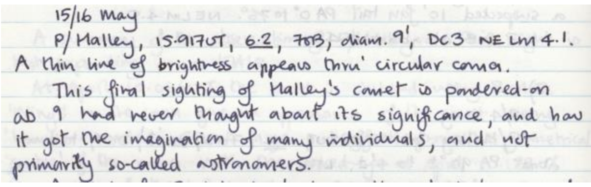
		total mag.	
Dec	31.750 UT	–	7.6cm refractor x57; coma extension to PA 43° (x57) and tail suspected to 0.1° in PA 62° (x37)
		DC7,	Central condensation appears stellar, with almost uniform surface brightness over major part of coma.
1986			
Jan	03.760	5.2	8x40B; coma 6' diam, DC5, tail 0.15° to PA 76°.
	15.747	4.7	16x70B; coma 4.6' diam, DC5, tail 0.15° to PA 46°
	24.740	4.3	8x40B ~~and in twilight seen from Ilkley Moor.~~
	25.757	4.6	8x40B and in twilight seen from Ilkley Moor.
Apr	07.101	3.9	8x40B; coma 25', DC5, dust & gas tails 270° to 300° and 1.5° long, from Tenerife.
	10.066	3.8	8x40B, fanned tail 3° long between 300° to 337° PA and curving dust tail 5° broad from PA 309°. Striations seen in gas tail; jets/fountain structure in coma. Visible to naked eye in Norma, from Tenerife.

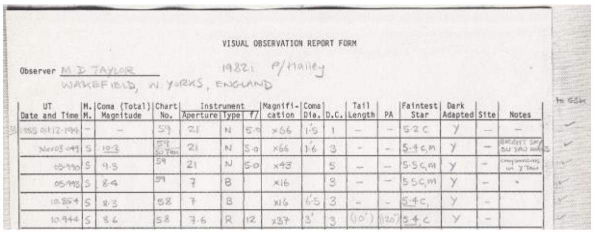
Personal highlights of the comet's apparition and his most interesting observations

He continued to observe 1P/Halley from Wakefield until his last sighting of it on 1986 May 15.


15/16 May
P/Halley, 15.917UT, 6.2, 7oB, diam. 9', DC3 NE LM 4.1.
A thin line of brightness appears thru' circular coma.
This final sighting of Halley's comet is pondered-on as I had never thought about its significance, and how it got the imagination of many individuals, and not primarily so-called astronomers.

Melvyn's last observation of Halley, on 1986 May 15

Melvyn's drawings of the comet have been scanned and uploaded to the Comet Section's image archive. He submitted his visual magnitude estimates to various bodies but none of them are listed in COBS.


VISUAL OBSERVATION REPORT FORM

Observer M D TAYLOR — 1982i P/Halley
WAKEFIELD, W. YORKS, ENGLAND

UT Date and Time	M. M.	Coma (Total) Magnitude	Chart No.	Instrument Aperture	Type	f/	Magnification	Coma Dia.	D.C.	Tail Length	PA	Faintest Star	Dark Adapted	Site	Notes
[illegible]	–	–	59	21	N	5.0	x66	1.5'	1	–	–	5.2C	Y	–	–
Nov03.049	S	10.3	59 SU Tau	21	N	5.0	x66	1.6'	3	–	–	5.4c,m	Y	–	[illegible]
05.990	S	9.3	59	21	N	5.0	x43		5	–	–	5.5c,m	Y	–	[illegible]
05.993	S	8.4	59	7	B		x16		3	–	–	5.5c,m	Y	–	
10.854	S	8.3	58	7	B		x16	6.5'	3	–	–	5.4c,	Y	–	
10.944	S	8.6	58	7.6	R	12	x37	3'	3	(10')	(120°)	5.4c	Y	–	

Extract from one of his visual observation report forms

He took a few static tripod-mounted shots of the comet, so a search through his numerous slide boxes should uncover them.

Alex Pratt

8 Comet Medal of The Astronomical Society of the Pacific Denis Buczynski

The ASP Comet Medal front and rear

The history of astronomy is crowded with comet medals and awards given by various countries, organisations and sometimes Royalty. These medals and awards were mainly given for discoveries of new comets. Some of these helped the recipients and spurred them on to further discoveries. Others were able to advance their careers and reputations with the scientific recognition associated with the awards, and to others the awards were a needy supplement to their income.

When we look back at the history of comet medals and awards some famous names come to the fore. One surprising name may be that of William Herschel whose discovery of Uranus in 1781 was at first thought to be comet and although it soon became recognised as a major planet of our Solar system the discovery did eventually earn Herschel an annual stipend of £200 from King George III. Another early recipient of reward from his comet discoveries was Charles Messier who gained national recognition when Napoleon himself, in 1806, presented him with France's Cross of the Legion of Honour. In 1831 the King of Denmark Fredrick VI offered a comet medal to any person who was the first to discover a telescopic comet.

One of the winners of this medal in 1847 was the American female astronomer Maria Mitchell whose comet discovery (though somewhat complicated and contentious at the time) propelled her to national fame. An article about her life appeared in Comet's Tale issue 37 2018 May by Janice McClean

The King of Denmarks comet medal won by Maria Mitchell

Another of the very early awards offered was by Joseph Jérôme Lefrançois de Lalande who offered a reward of 600 francs to the person who made the first comet discovery of the 19th Century. This

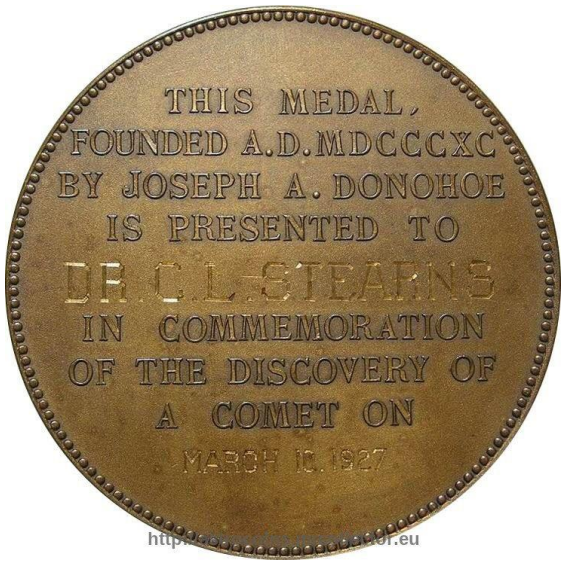
prize went to Jean Louis Pons who went on to be a prolific discoverer of comets.

The Imperial Academy of Sciences in Vienna offered gold medals for comet discoveries for at least three years from 1870. In 1881 in the USA, the tycoon Hulbert Warner began a comet medal award including a $200 prize and a gold medal. The award was administered and adjudicated by Lewis Swift, himself a successful comet discoverer who was in charge of Warner's private observatory. Two of the main recipients of this award and prize money were William Brooks and the famous observer Edward Emerson Barnard. By the late 1880's Warner was close to bankruptcy and the comet awards were halted. These were the main comet awards made in the 18th and 19th Centuries.

The Donohoe Comet Medal - front

For comet awards made in the 20th Century we must look at the Donohoe awards made by The Astronomical Society of the Pacific.

The Donohoe awards were instigated by the ASP in 1889 after the wealthy industrialist, Joseph Donohoe, donated $500 for a medal to be awarded to the discoverer of each new comet. The first medal was given to William Brooks in 1890 and the last to Rudolph Minkowski in 1950. The award was given over 250 times before ceasing in 1950. Many famous astronomers were presented with this medal with names ranging from Edwin Holmes to Edwin Hubble. The Donohoe Comet Medal award was the longest lasting of the comet awards and it is to be seen if the current Edgar Wilson award (administered by the Smithsonian Astrophysical Observatory since its inception in 1999) will endure more than the 60 years of the ASP Donohoe medal and award.



The Donohoe Comet Medal- reverse

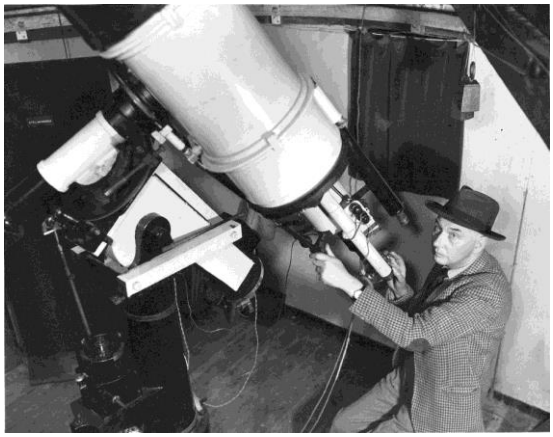
The shortest-lived comet award was the reactivation of the Donohoe award given by the ASP from 1969 to 1974 and was awarded on only 5 occasions. It was called The Comet Medal (1969–1974). After 1974 the Comet Medal was discontinued. It is the proposal behind this award, the main proponent of its instigation within

the ASP and the five individuals (and their achievements) who received this award that this article now concentrates.

During the 1960's one of the leading figures in the ASP was the comet scientist and observer Elizabeth Roemer, whose life and career I outlined in a previous issue of this magazine. She was board member of the ASP and wrote the Monthly Comet notes for the Society. In these monthly notes she described comet discoveries and observations of known comets that were current. She was in regular communication with comet observers across the world, including the leading amateurs or "non-professionals" as she preferred to call them.

It was Elizabeth Roemer's appreciation of the valuable work that these amateurs undertook that prompted her to propose to the ASP Board that the Donohoe award be reactivated in a slightly different form; that the ASP should award a new comet medal. In 1968 the ASP Board voted to create a new comet medal to be awarded once yearly to recognize "an outstanding nonprofessional astronomer" for "past contributions to the study of comets." With her wide-ranging contacts and up to date knowledge of the contributions that leading amateurs had made in her field of cometary research and observation she was ideally suited to proposing recipients for this new medal.

The first award of the new medal was made by the ASP in 1969, with the announcement that the medal was to be presented to Dr Reginald Lawson Waterfield of the United Kingdom. Unfortunately, there was a typo in the spelling of his name when the announcement was made. Waterfield was an active comet observer and one of a very small number of comet photographers in the UK who was involved in the astrometric measurement of comet positions.



Reggie Waterfield taken at his observatory at Silwood near Ascot, UK in the late 1950s

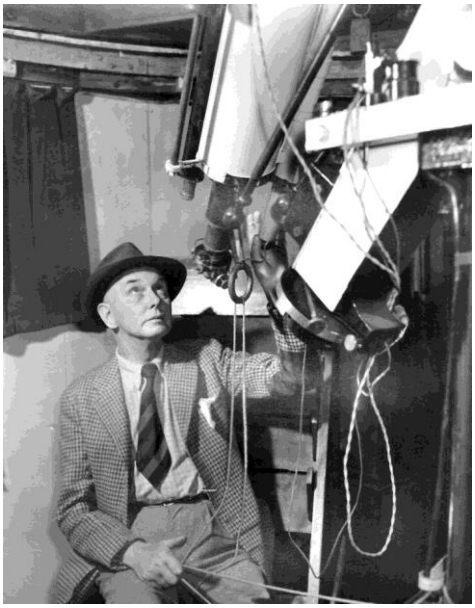
This procedure was a very involved one in the 1950's and required much time and concentration to produce results that were accurate enough for the use in orbit determination. Waterfield began his observing career as a boy in 1910 when he was 10 years old. He observed the 1910 apparition of 1P/Halley and the Daylight comet C/1910A1 of the same year.

One of his first recorded comet observations were of Comet Delevan C/1913Y1, a comet that reached naked eye visibility with a magnitude +3 and had a tail 2 degrees long. He successfully attempted to photograph this comet using a small camera which sat on top of a small refractor and was hand guided.

He became a member of the British Astronomical Association in 1914 and here he became friends with older more experienced astronomers such as Dr W.H. Stevenson and his mentor Rev T.E.R.Phillips. He would observe with them frequently and enjoy weekend long stays at the Four Marks Observatory where he learned his skills. He eventually became a President of the BAA, following these same observing colleagues in that post.

In the 1930's he established his own observatory in the grounds of the Headley Rectory Observatory (where Phillips had an extensive facility) and installed a 6-inch Cooke refractor that had been left to him in the will of an Industrialist, whom Waterfield had befriended when he was at school at Cheltenham. He added to the original equipment a specialist wide-field photographic comet camera, a 6-inch f/4.5 Cooke/Taylor triplet lens. With this camera and telescope he set about his life's work of photographically recording comets for astrometry as well as for coma and tail morphology.

At that time the BAA Comet Section had a very active group of comet orbit calculators under the direction of J.G.Porter (an astronomer at the RGO), so Waterfield's comet positions were easily absorbed into the Section's programmes. The war years in the 1940's disrupted all the work and Waterfield, being a medical doctor who specialised in blood disorders spent his time serving the war effort in the medical units. After the war ended his mentor Phillips died and his personal observatory was moved to another site near Ascot.



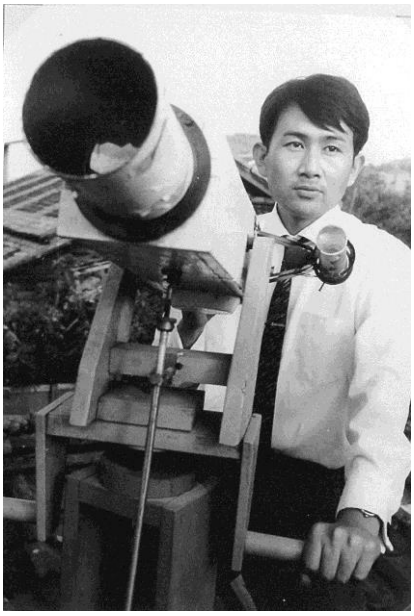
Reggie Waterfield at the eyepiece, Silwood

Around this time Waterfield contracted Polio and was ill for a long time with recuperation periods spent in Switzerland. He was able to return to his comet observing even though he was now paralyzed in his lower body and became confined to a wheelchair for the rest of his life. He was able to photograph the two bright comets of the late 1950's C/1956R1 Arend-Roland and C/1957P1 Mrkos. The photographs he took of these comets were exceptional and many were used by professional astronomers when the analyses of tail structures in these comets were made. He communicated with the astronomers across the world and he was well known and popular, attending international conferences and IAU conventions.

His most active and productive period was 1950's-1970's and his personal friendship with Dr Brian Marsden of the Minor Planet Center encouraged him to continue even though his condition made it very difficult. His popularity amongst amateurs in the UK meant that he was able to call on a variety of observing colleagues to assist with comet photography. The award of the ASP Comet Medal came alongside other awards from the Royal Astronomical Society and the BAA.

He continued observing until 1986 and was able to record observations of 1P/ Halley for the second time in his life and I was proud to have been able to personally assist him at that time. The ASP medal was a well- deserved recognition of a life spent observing comets.

The second award of the Comet Medal made in 1970 was to a man who was probably the world's most well- known and revered discoverer and comet observer, Tsutomu Seki of Japan.



Tsutomu Seki of Japan, mid 1960s.

He began comet hunting in 1950 and went on to discover 6 new comets and recover 28 periodic comets between 1961 and 1995. His discoveries were all made visually, firstly with a small 9cm refractor and then with large 12cm binoculars. His recoveries were made photographically and more recently with CCD imaging using the large reflectors at Geisei Observatory. Geisei Observatory is situated in the village of Geisei in Kochi Prefecture.

Tsutomu Seki Comet Seeker taken in Japan in the mid 1960s.

The main telescope at Geisei Observatory was donated in 1980 by the late Mr Seizo Goto, the then president of Goto Optical Mfg. Co. Mr. Goto was born in Kochi and donated the instrument for research and education for Kochi residents. The telescope is used for measuring the positions of comets, discovery of asteroids as well as detection of faint periodic comets.

He was inspired to search for comets after reading an account of the discovery and apparition of Comet 45P Honda-Mrkos-Padjusakova in 1948. After more than 10 years of searching he discovered his first comet in 1961, and a year later another comet was found. This one was named C/1962C1 Seki-Lines and became a bright object when it was close to perihelion. Although the elongation from the Sun was small some observers saw the comet with the naked eye at -1 magnitude displaying a 2-degree tail. Seki's most famous discovery came in 1965 when he discovered, jointly, with a fellow countryman Kaoru Ikeya one of the brightest comets ever seen. The sun-grazer C/1965S1 Ikeya-Seki was a stunningly bright object with experienced comet observers estimating that the comet was as bright at magnitude -10 at perihelion.

This comet cemented Seki's reputation as an exceptional comet hunter. The discovery was hailed across the world and the comet was one of the most studied comets prior to the space age. Seki was also the first amateur to photographically record the reappearance of 1P/Halley at its 1986 apparition. His last comet discovery was in 1970 and since then he has concentrated on astrometry and recovery with the large reflector at Geisei.

He is still actively observing comets, as his excellent website reports, and his latest observations are in March 2020. He received awards and recognition from

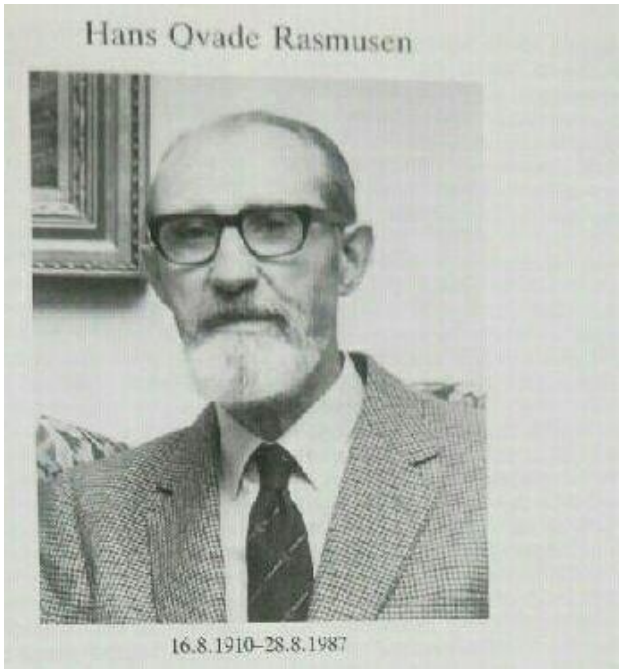
around the world, including from his own country Japan and his own region of Kochi, from France and also the ASP Comet Medal. Tsutomu Seki was a truly deserving recipient of this award.

The third award was made in 1971 to a man that was mostly unknown to the majority of comet observers around the world as he was not an active observer. Hans Qvade Rasmusen, a native of Denmark was a comet orbit calculator. He was self- taught and never worked for any Institution. His nomination for the Comet Medal is copied here:

"*The Astronomical Society of the Pacific Comet Medal, established to recognize outstanding contributions of a nonprofessional astronomer in the study of comets, has been awarded for 1971 to Mr. Hans Q. Rasmusen of Vaerslevgaard, Denmark. Mr. Rasmusen, a Danish estate owner, has worked diligently since the mid-1980s on problems of celestial mechanics with particular application to computations of orbits of periodic comets.*

Through the years Mr. Rasmusen has collaborated with various members of the staff of the Copenhagen Observatory, including Elis Stromgren, Julie Vinter Hansen, and Jens P.Möller. A recent letter from Dr. Anders Reiz, currently Director at Copenhagen, states, however that Mr. Rasmusen,.. "has never been associated with the astronomical institute and has never received financial remuneration of any kind in connection with his astronomical work." Of particular interest was the information that Mr. Rasmusen, after obtaining the exemption necessary because of the fact that he had not had formal academic training, successfully defended his doctoral dissertation (work on the motion of P/Olbers 1815-1887-1956) and was awarded a degree.
In addition to the long-continued work on P/Olbers, Rasmusen has worked since the mid-1930s on studies of the motion of P/Schwassmann-Wachmann 2, and since the early 1950s in collaboration with Miss Vinter Hansen, on P/Comas Solá. He has also carried out investigations of use to others in furthering computations of comet orbits, including tables of the coordinates of Uranus and Neptune 1800-1908 and tables of functions and elaboration of methods useful in calculations of perturbations in rectangular coordinates. His work has always been of the highest standard; on a par with that of the most qualified professionals."

He was born in Korsør . He completed his realeksamen at SorøAkademi in 1928, interestingly enough with a maths mark of around D. Later he went to agricultural school. In 1932 he surprised professor Elis Strömgren of Copenhagen Observatory with a perfect comet orbit solution, which propelled Rasmussen's scientific career. Elis Strömgren used him from 1932 to 1936 as an analyst.



Hans Ovade Rasmusen taken in Denmark in the late 1980s.

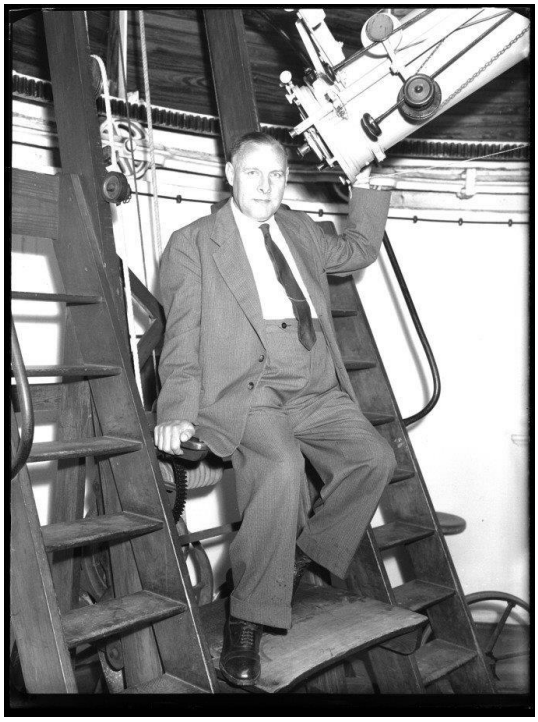
His main work was on comet Olbers. Rasmusen published 12 works before 1940. In his fifty-year long career overall,

he published over 20 papers in a variety of professional publications. Rasmusen achieved a great insight into the methods of, and problems with, predicting the movement of comets. His mathematical skills were undoubtedly excellent, and he found great joy in numbers and calculations. He was, rightly so, very proud of his consistently low error rate, following his ability to find and correct any errors promptly. The driving force behind it all was of course the joy of following, step by step, the grand act of the solar bodies' movements.

In his last publication in Videnskabernes Selskab in 1979, Rasmusen details the paths for the comets Halley and Olbers until their reappearances in, respectively, 1986 and 2024. This is a detailed piece of work. His quiet work, out of the spotlight of observing and discovery is an example of how important and intertwined the different aspects of cometary research are. The ASP Comet Medal award recognised this and Hans Qvade Rasmusen was uniquely qualified to be a recipient.

In 1972 the Comet Medal was awarded to one of the leading comet observers of the mid- 20th Century, Max Beyer. A resident of Hamburg in Germany all his life, he became associated with the Hamburg Observatory at Bergedorf and used the observatory instruments there for 30 or more years. He was invited to join the staff of the observatory but chose to remain an amateur and a school teacher. He was eventually awarded an Honorary Doctorate in 1951 by Hamburg University.

In 1930 he discovered a comet C/1930 E1 whilst taking long exposure plates for variable star charting purposes. His care and diligence in confirming his own discovery before announcing it was an example of the exacting standards he imposed on himself.



Max Beyer in Hamburg, Germany 1960s.

His comet observations were very numerous and his own list of comets observed started with the great January comet of 1910 and ends with another great comet C/1975 V1 West. He is amongst the top 10 comet observers as counted by the number of observations in the ICQ database. What was most notable about his visual comet magnitude estimates was that he measured each one of his chosen reference stars using a visual wedge photometer calibrated against the North Polar Sequence prior to making the reduction. This amounts to a huge amount of work but it ensured that the internal accuracy and reliability of the estimates were assured.

An article in the JBAA in 2004 regarding the history of Hamburg Observatory recounts the life, achievements and recognition of Max Beyer. This states, "A notable episode in professional–amateur collaboration at Bergedorf was the astonishing case of Max Beyer (1894–1982)". Born in Hamburg, Beyer developed a lifelong passion for astronomy at a young age, and kept in touch with the

professionals at Bergedorf whilst he worked as a teacher. Kasimir Graf (the Director) seems to have appreciated the role amateurs might play in astronomy, and invited Beyer to informal monthly meetings at the observatory in the 1920s.

Beyer had access to various telescopes of his own and of his acquaintances and in 1950, at Graf's persuasion, published his own star atlas, the Beyer–Graf Star Atlas. In 1960, Beyer moved to quarters close to the observatory, so as to be near the professional community, and the observatory let him have use of the 26cm equatorial, his favourite instrument. This was the beginning of an astonishing period of observation for Beyer, who specialised in comet and variable star observations, and he published many valuable papers in Astronomische Nachrichten. Beyer observed at Bergedorf with the equatorial from 1946–1977.

As an amateur his contributions were very considerable, and included a new method of determining comet magnitudes (Beyer's method, or 'Extrafocal-Extinction'). Graf's early inspirations undoubtedly played a role in the thoroughness of Beyer's work and in 1972 the Astronomical Society of the Pacific awarded him their Comet Medal. His observing work at Bergedorf ended in 1977 after an accident left him unable to walk without crutches, an event which must have caused the utmost disappointment.

His enthusiasm for observing can be glimpsed by his mention in some of the annual reports of the observatory; for example, in 1968 Beyer made 2764 observations over 127 nights with the equatorial. This one piece of collaboration was unique, and professional-amateur collaborations never revived after Beyer, because observational activities in Bergedorf decreased generally.

Max Beyer was born in 1894 and served in the military in both the World wars and his life ended in 1982. He was an astronomical observer without equal and his published work is a testament to his dedication. A worthier recipient of the Comet Medal award could not be imagined.

In 1973 the last of the Comet Medals was awarded. This was given to a man whose observing career was only half completed, he lived and observed for another 40 years, his most productive and significant years lay ahead of him at the time of this award. He was Albert Jones of New Zealand born in 1920. Albert Jones was first and foremost a variable star observer who in his long observing career amassed more than 500,000 visual variable star magnitude estimates and along came National and International recognition in the forms of awards, medals and academic degrees.

Albert Jones at his observatory in New Zealand in the 1970s.

He was only one of two Comet Medal recipients to have also received the ASP Donohoe medal. He was also an assiduous and prolific comet observer, whose magnitude estimates were of high quality and internal accuracy. Living in the Southern Hemisphere meant that many comets which were inaccessible to other observers were recorded by him.

He began his observing career as a teenager living in Timaru, a port town in the southern Canterbury region of New Zealand. By his late teens he had fashioned his first telescope from a spectacle lens and a home-made cardboard tube. He was observing variable stars and comets with a second hand 5-inch long focus reflector and then with a 5-inch refractor.

In 1945 he joined the Comet Section of the Astronomical Society of New Zealand and submitted magnitude estimates of comets that were visible in his refractor. It was with the refractor that he found his first comet, almost by accident. He had been following a comet search programme and during the period up to 1952 he made recovery observations of some periodic comets.

However, he was more intent on observing variable stars. One morning, August 7 1946, he pointed his telescope low down near the horizon to observe the variable U Puppis when he spotted a faint object that turned out to be a discovery, his discovery of a new comet. It was later designated Comet Jones 1946V1. It was an interesting comet, it was never bright being around 9th magnitude but it was suspected of having an unusual orbit.

In 1952 he joined the BAA Comet Section and served as Assistant Director and was awarded the BAA Merlin Medal in 1968 for his work in establishing accurate comet magnitudes. He submitted comet observations and magnitude estimates to the BAA from 1951 to 2008; over 1000 in total. He went on to discover a second comet in 2000 on Nov 25, repeating the practice that found him his first, by spotting a fuzzy object in the same field of view as a variable star in the pre-dawn sky, this time T Apodis.

Albert Jones and his astronomy medals taken in New Zealand in the 1990s.

He was using a 78mm f/8 refractor. It turned out that this comet had been first seen by a Japanese observer Syogo Utsunomiya a few days earlier but had become lost due to its rapid southerly motion. Jones's discovery was an independent discovery and the comet was named Comet Utsunomiya-Jones W1. Thus, Jones became the oldest person to discover a comet at the age of 80 and he became the person with the longest period between comet discoveries 1946-2000!

More important was his discovery of a Supernova in 1987. In the words of his wife Carolyn, "he has found only one supernova but it was a GOOD one". This was of course the bright naked eye Supernova in the Large Magellenic Cloud 1987a. It all went to show what a great astronomical observer Albert Jones was. He was the last person to receive the ASP Comet Medal, but how fitting it was that it should be him.

Denis Buczynski Comet Section - Secretary

Acknowledgements and credits:

Thanks to Joycelin Craig Director, Membership & Communications Astronomical Society of the Pacific for searching the ASP archives for information about the Comet Medal
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Thanks to Hakon Dahle for copying the obituary of Q.H.Rasmusen.
Thanks to Jon Shanklin for providing me with information related to Albert Jones BAA comet observations.
In this article I have relied heavily on websites, articles and obituaries published in the Astronomical literature some of which I list here:
http://www.comet-web.net/~tsutomu-seki/

Title: A short history of Hamburg Observatory
Authors: Anderson, S. R. & Engels, D.
Journal: Journal of the British Astronomical Association, vol.114, no.2, p.78-87

Hans Qvade Rasmusen, 16.8.1910 - 28.8.1987. Møller, O. Astronomisk Tidsskrift, Årg. 21, Nr. 2, p. 69 – 71 Pub Date 1988 Bibcode: 1988ATi....21...69M

Rodney Austin's biography of Albert Jones given at the RASNZ 1994 conference

9 "Donati's Comet" C/1858 L1 by William Turner of Oxford

Richard Miles

Wikimedia Commons

In the autumn of 2018, I was in London for the BAA Annual General Meeting and over the lunch-break I popped into an exhibition of "British Watercolours" at the Royal Academy next door. There were 25 smallish paintings on display, all loaned from the Paul Mellon Collection's *Yale Centre for British Art*. One painting caught my attention big-time! A striking picture of Donati's Comet painted in 1858.

The representation of the comet seemed very true to life in my opinion so when I read the caption alongside it, I was dismayed to see that the curator (Gillian Forrester) had made an inaccurate judgement of the artist's skill. William Turner (not the more well-known JMW Turner) had painted it in the evening of October 5th when the comet was virtually at its brightest. He gave it the title, "*Near Oxford—Half-past 7 o'clock, p.m., Oct. 5, 1858".*

The caption to the painting at the Royal Academy stated that, "the watercolour is not an accurate representation of the comet as it would have appeared on that night", quoting from '*Cosmos: The Art and Science of the Universe*' by Olson and Pasachoff, 1998, pp. 232-33. The caption went on to say that "On 5 October the comet was ... passing over the huge and very bright star Arcturus at 7:11 pm, with its twin secondary plasma tails visible, but neither the star nor its tails are depicted in Turner's watercolour."

Standing in front of the painting, I recognised some familiar stars in the

constellation of Boötes and could see that Arcturus would have been immersed in the comet's tail. So looking more closely I was amazed to see that the artist had indeed included a representation of Arcturus just behind the head of the comet, which the curator had failed to spot! What a travesty, I thought, and looked around expecting to see some official person that I could complain to about it. No such person could be seen so I strode back to Burlington House to join the imminent BAA Council meeting.

I still have a vivid memory of Arcturus peeping out from that canvas and until recently I thought nothing more of it – until now, that is. I subscribe to the Bristol Astronomical Society webgroup and with most folk in lock-down, there has been a lot more dialogue passing to and forth via that particular medium of late. The subject of Donati's Comet of 1858 came up and one message appended an image of William Turner's painting. Most amateur comet observers are aware of its existence, as I had been, but few will be aware of the hasty judgement on the artist's credentials and his supposed failure to include both the star Arcturus, or its ion tails in his watercolour. In this article, I hope to resurrect the artist's reputation a little by researching the matter in more detail. Here's what I found out:

First I am aware that most artists worth their salt do not usually want to create a photographic representation of what they see before them, such as would be recorded by a camera, without any artistic licence applied. I believe this is what Turner has done in this work of art. He clearly wanted to depict the appearance of the comet as seen by the eye soon after sunset, whilst it was framed in a blue sky against a colourful and interesting landscape near Oxford. Unusually, he included the exact time of the rendition in the painting's title. Why was that, I thought?

With modern-day access to a precise ephemeris of the comet's position, I interrogated the marvellous website maintained by the Jet Propulsion Laboratory, Pasadena, CA, namely JPL's *HORIZONS Web-Interface*. This facility has the most accurate and detailed information on solar-system bodies and it was easy enough to select Comet C/1858 L1 (Donati) as the target body and observatory code 996 (Radcliffe Observatory, Oxford) as the observer location. I discovered that at the quoted time of 7.30pm GMT (British Summer Time was a 20th century invention so there's no ambiguity in the quoted time), Arcturus was indeed where it is shown in the watercolour, some 1/3° north of the pseudonucleus.

In the accompanying chart generated using Bill Gray's GUIDE software, you can see where the comet would have been located at that time. I have stretched the contrast in the inset to show the star embedded near the head of the comet – in reality, its presence on the canvas was more evident when looking at the original.

That evening, the sun set very shortly after 5.30pm so that by 7.30pm, twilight had just finished and the sun was 18° below the horizon with the comet in a truly dark sky. Turner must have decided to show the comet as it had appeared in a blue sky

alongside the local landscape as he saw it about 6.15-6.30pm that evening. Since the ion tails would have been of a bluish colour and relatively faint, they would not have been visible earlier and so the artist was indeed showing the comet true to life. Only the position of Arcturus is off slightly as the star would have been further to the left of centre. So I beg to differ as far as the sentiment goes that "the watercolour is not an accurate representation of the comet as it would have appeared on that night".

Richard Miles
Director Asteroids & Remote Planets Section

Refs.

Yale Centre for British Art, Paul Mellon Collection, Accession Number: B1975.4.1767
https://collections.britishart.yale.edu/vufind/Record/1666046

William Turner of Oxford 1859 Donati's Comet.jpg, Wikimedia Commons:
https://commons.wikimedia.org/wiki/File:William_Turner_of_Oxford_1859_Donati%27s_Comet.jpg

Editor's Whimsey

10 Maria Margaretha Winckelmann — Janice McClean

Maria Margaretha Kirch, née Winckelmann 25th February 1670 – 29th December 1720

2020 is the 300th anniversary of the death of Maria Margaretha Kirch née Winckelmann, noted in history as the first woman to discover a comet. 2020 is also the BAA year of promoting women in astronomy, something that we have not been too robust around, so after delivering a talk about the Forgotten Stars of Comets at our Comet Section meet in York last year, I felt I should exercise my editor's privilege and remind us all of this one particular star.

Looking back over the centuries it is often assumed that women were automatically excluded from participation in the scientific revolution of early modern Europe, but in fact powerful trends encouraged their involvement. Aristocratic women did participate in the learned discourse of the Renaissance court and dominated the informal salons that proliferated in seventeenth-century Paris. In Germany, women of the artisan class pursued research in fields such as astronomy and entomology. These and other women fought to renegotiate gender boundaries within the newly established scientific academies in order to secure their place among the men of science.

But, for women, the promises of the Enlightenment were not always to be fulfilled. Scientific and social upheavals could also leave women on the side-lines and also brought about what is referred to as the "scientific revolution in views of sexual difference." That revolution gained support from another quarter—the scientific understanding of biological sex and sexual temperament (what we today call gender). Illustrations of female skeletons of the ideal woman, with small skulls and large pelvises, portrayed female nature as a virtue in the private realm of hearth and home, but as a handicap in the world of science.

At the same time, seventeenth- and eighteenth-century women witnessed the erosion of their own spheres of influence. Midwifery and medical cookery were gradually subsumed into the newly professionalised medical sciences. *Scientia*, the ancient female personification of science, lost ground to a newer image of the male researcher, efficient and solitary, a development that reflected a deeper intellectual shift. By the late eighteenth century, a self-reinforcing system had emerged that rendered invisible the inequalities women suffered.

So why is this 'first woman' significant in those times? Born on 25th February 1670 Maria Winckelmann became one of the most famous astronomers of the period due to her writings on the conjunction of the sun with Saturn, Venus and Jupiter. Rather than this bringing her great acknowledgment, a comfortable retirement and a prominent place in history, the jealousies of her colleagues led to her poverty and disappointment in her senior years.

In those days it was very much a matter of chance if as a female child you learnt to read never mind enjoy any kind of broad education. In this case luck was on her side in two ways. She was born in Pantizsch near Leipzig, Electorate of Saxony. And born into a Lutheran family; her father believed that all children should have a good education, and so he ensured she received one. Luck was not all on her side because both her parents died when she was 13 but by then she was being educated by Christoph Arnold, who lived nearby.

Christoph Arnold 1650 – 1695 German Amateur Astronomer Discovered the Great Comet C/1686 R1 of 1686

(He was also a comet observer and had spotted the great comet of 1686, 8 days before Hevelius). She became his unofficial apprentice and later his assistant, living with his family. Luck then took another turn, and I leave it up to your own experience if you consider this good or bad…she then met a by then, famous German mathematician and astronomer, Gottfried Kirch, a mere 30 years her senior.

They married in 1692, subsequently having four children all of whom also became interested and worked in astronomy.

She moved with Gottfried to Berlin in 1700 on his appointment as Astronomer Royal. She then became widely known as the 'Kirchin', a feminine version of their family name. She continued in the female footsteps of Maria Cunitz, Elizabeth Hevelius and Maria Clara Eimmart, all active astronomers in their own right in the 17th century.

Maria and Gottfried worked as equals although she would only ever be acknowledged as his 'assistant'. They produced calendars, almanacs and ephemerides, and recorded weather information. In fact as their children grew

up they also became involved in meteorological observations.

Verbesserter Januarius. Jenner.

Sonnab.	1 Neu Jahr.	♑	☾ 7.39 Nachlaß
1.	Chr. Flucht in	Egy	pten. Matth. 2.
Sonntag	2 nach N. Je.	♑	der Kälte.
Montag	3 Enoch	♌	windicht und
Dienstag	4 Loth	♌	nicht allzubeff-
Mitwoch	5 Simeon	♐	tige Kälte.
Donnerst.	6 H. 3. König.	♐	☿ wird früh
Freytag	7 Isidorus	♐	sichtbar.
Sonnab.	8 Erhardus	♐	☌ ♂ Unstet.
2.	Jesus 12, Ja	hr a	lt, Luc. 2.
Sonntag	9 Epiph.	♑	☉ ☾, ☿ ♀ Frost
Montag	10 Paul Einf.	♒	und Schnee.
Dienstag	11 Hyginius	♒	Frost und
Mitwoch	12 Reinhold	♒	Schnee / oder
Donnerst.	13 Hilarius	♓	nur Regen.
Freytag	14 Felix	♓	Regen oder
Sonnab.	15 Maurus	♓	Schnee.
3.	Hochzeit zu C	ana	. Joh. 2.

Tages-Länge	☉ Aufgang	☉ Untergang.
5 7 ſt. 36 m.	8 U. 12 m.	3 U. 48 m.
10 7 44	8 8	3 52
15 7 58	8 1	3 59

1 -15 January of the Chur-Brandenburgischer Calendar for 1701

They produced the first calendar of a series, 'Verbesserter Kur Brandenburgischer Kalender für das Jahr Christi 1701'. Friedrich III, Elector of Hanover, had decreed a monopoly on the production of calendars and the income from this was to help fund the Berlin Academy of Sciences which Friedrich had founded.

Seat of the Academy of the Berlin Academy of Sciences

Maria was a dedicated observer and notetaker, and observed almost every evening starting at about 9pm. On 21st April 1702 her observations led her to discover the so called "Comet of 1702". C/1702 H1. Whilst the comet's discovery is *still* attributed to her husband, his own notes state,
"*Early in the morning (about 0200) the sky was clear and starry. Some nights before, I had observed a variable star and my wife (as I slept) wanted to find and see it for herself. In so doing she found a comet in the sky. At which time she woke me and I found that it was indeed a comet…I was surprised that I had not seen it the night before*".

There were three independent discoveries of this comet. Francesco Bianchini and Giacomo Filippo Marialdi recorded it from Rome on April 20th 1702. In their observations they stated that it was a short distance above the horizon and said to resemble a "nebulous star". Then it was seen by Maria Kirch, and finally it was recorded about two hours later by Philippe de la Hire in Paris on April 24th. The last observation was by the two Italians again on 5th May 1702.

It has been noted as the 10th closest comet to the Earth at 0.0437 AU. Nicola-Louis de Lacaille, the French Abbé and astronomer, subsequently computed the parabolic orbit. Originally it was designated the Kirch Comet and even when Gottfried finally confessed 8 years later, that it was his wife's discovery the name was never changed nor the official attribution to him. . There is no doubt about her discovery as her original report of the sighting of the comet, was published in the 1930s, by F.H Weiss who had her original report in his private possession.

Maria did publish observations under her own name, but she wrote in German. Latin was the language used for scientific discoveries in the Holy Roman Empire (in

the Acta Eruditorum, Germany's only scientific journal at the time) at this time so her articles did not appear there. She published her observations of the aurora borealis in 1707and in 1709 of the upcoming conjunctions with the Sun, Saturn and Venus which occurred 1712, in her own name, and a well-received pamphlet in which she predicted a new comet in 1711, which failed to materialise. She was only the second woman astronomer to be published in the Empire since Maria Cunitz. She was awarded the Gold Medal by the Royal Academy of Sciences in Berlin in 1709. Aged 40

Despite being so well known and respected, once her husband died she was consistently refused the Directorship of the Academy that she and her husband had established.

Gottfried Wilhelm von Leibniz 1646 – 1716

She had the support of the President of the Berlin Academy of Sciences, Gottfried von Leibniz, but that was not enough. She had been continuing the production of the calendars during her husband's last illness but the other academy members were adamant that a woman's lead would be an embarrassment to the Academy.

"*That she be employed in an official capacity to work on the calendar or to continue with observations simply will not do. Already during her husband's lifetime the society was burdened with ridicule because its calendar was prepared by a woman. If she were now to be kept on in such a capacity, mouths would gape even wider*" (secretary of the Academy, J. Jablonksi"

It was also argued that giving the job to a woman, although other qualified candidates were very scarce, would set a precedent. Heaven forbid. She was allowed to remain in the tied property for another 6 months, given 40 thalers for her husband's notebooks and later the academy presented her with the gold medal as mentioned above.

She wrote, "*Now I go through a severe desert, and because the ..water is scarce..the taste is bitter*.

She had four children to raise alone, no home and no income, her husband having left little money to provide for them.

Johann Heinrich Hoffmann, a less experienced astronomer was appointed to her late husband's post of Astronomer Royal. During his tenure he was twice censured for poor work. Maria had to move and took work in 1712 in von Krosigk's observatory, a family friend, and she published a further paper in her own name predicting a new comet.

This turned out to be the highpoint of her career because she was now denominated 'master' astronomer and actually had two students to assist her. After Krosigk's death she worked as a mathematician in Danzig, and later Winckelmann and her son Christfried took over Hevelius's observatory in Danzig. She was offered work for the Russian Tsar, Peter the Great, but she preferred to remain in Germany.

Later that year Hoffmann's death led to her son becoming an observer at the

Academy's Observatory and thus Astronomer Royal with his mother and sisters, Christine and Margaretha as assistants. Alas her high profile caused much jealousy and annoyance. She was ordered to, "*retire to the background and leave the talking to... her son*". Thus being forced to leave, she largely abandoned her professional astronomical career although it is said she continued to work and observe privately.

She died of a fever in December 1720.

Maria Winckelmann was surprisingly not such an exceptional woman for her time. In fact between 1650 and 1720 more than 14% of German astronomers were women. The craft traditions of women in apprenticeships did foster some into the secrets of trades, but the exclusion of women from universities for centuries, and a new trend of so called 'professionalism' underlined this exclusion of women scientists from the more intellectual world. Women could learn through apprenticeships but not become journeymen and thus could not travel and learn from master to master. Maria's story is typical of many women in her era; the importance of an open-minded father who educates her (and a mother who excused her from domestic duties) and as in Maria's case upon the death of her parents a kind of adoption by Christoph Arnold. Then unable to attend a university the next step was to marry a man recognised in the field of interest. But the new professionalism would not allow a woman to retain her husband's position in which she was a partner, to see out his contract, as the Guilds had done. The traditions that had once secured that under the guild system were now no longer applicable for women in science in new institutions.

Janice McClean - Editor

Ref:

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Erik Gregersen: Encyclopaedia Britannica
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My special thanks to Frau Ulla Wickmann for her extensive and infinitely patient enquiries to the German National Library.

15 Comet Section Contacts

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Picture Gallery
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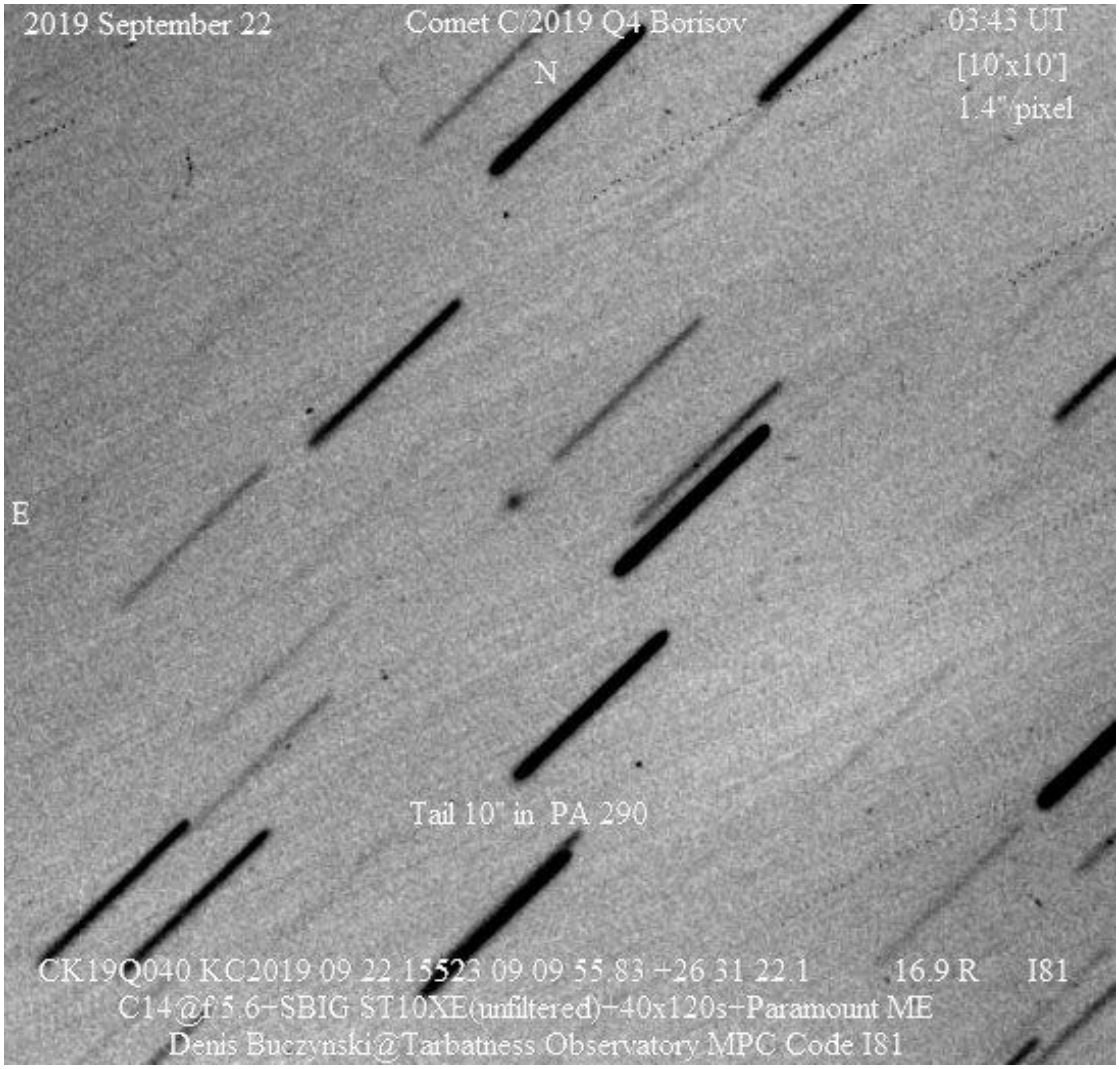
2i Images/ Borisov

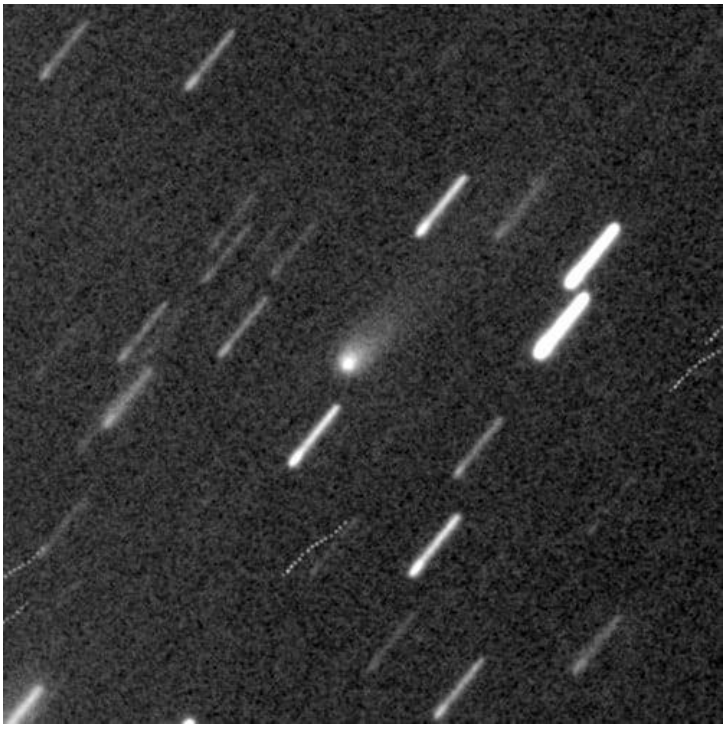
This comet was discovered by Gennadiy Borisov an amateur astronomer on 2019 August 30 and this comet turned out to be one of the most significant cometary objects ever discovered as it was found that it was an interstellar comet. The images shown here cover the period 2019 September to 2019 December when the comet was observed to have developed a short tail

Denis Buczynski 2019 September 22 C/2019 Q4 Borisov



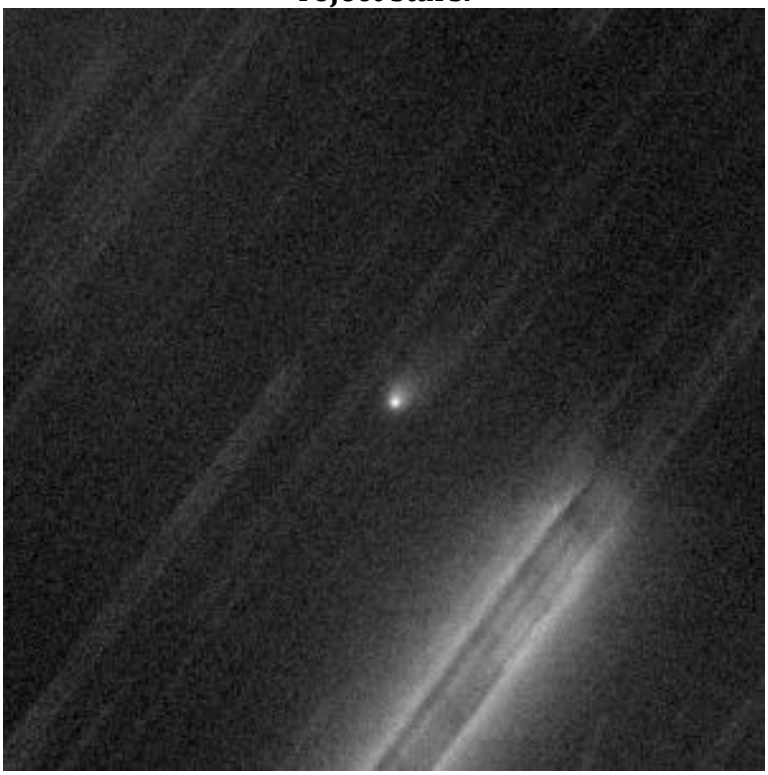
https://britastro.org/cometobs/2i/2019q4_20190922_dgb.html

François Kugel 2I (Borisov) On 2019 Oct 26 04h28 UT TEL 0.4-m f/2.8 reflector + CCD Atik460ex 15x90s



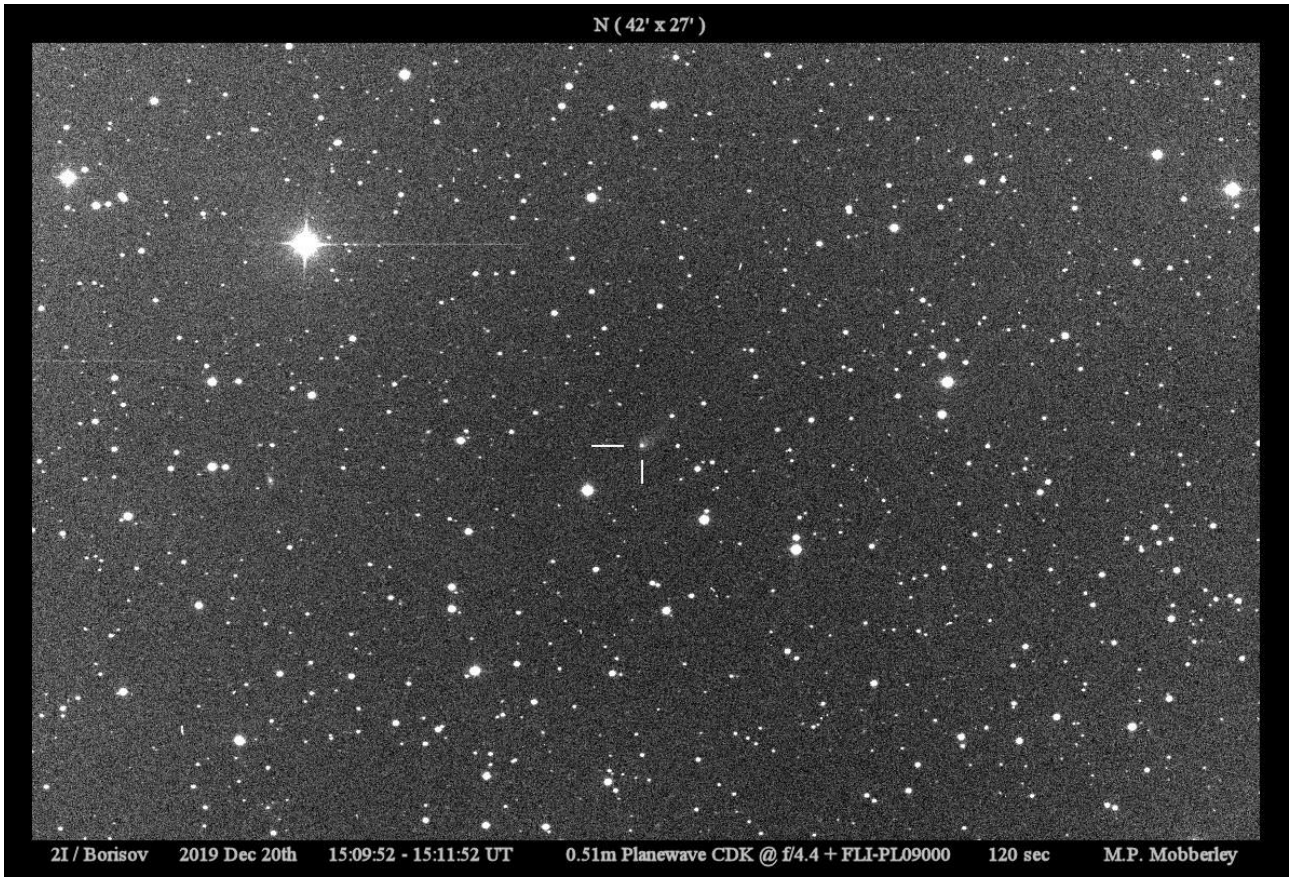
https://britastro.org/cometobs/2i/2i_20191026_fkugel.html

Nick Haig 2I/Borisov 0327 to 0555 5/11/19. Unfiltered, 12" Newtonian, ASI1600MMC@-20, 2hrs10min total exposure, Southampton UK 7.2' square crop, 1.44"/pix. Tail visible to maybe 40". Mix of average and kappa-sig stacks to partially reject stars.



https://britastro.org/cometobs/2i/2i_20191106_nhaig.html

Martin Mobberley 2i 20191220 1511



https://britastro.org/cometobs/2i/2i_20191220_1511_mpm.html

C/2019 Y1 ATLAS

This comet was discovered by the ATLAS search telescope on Hawaii on 2019 December 16 and is a long period comet whose perihelion occurred on 2020 March 15. The comet appears to be the 4th member of a group of comets that have split from Comet C/1998 A1 Liller. The images shown here cover the period during 2020 April when the comet was at it brightest.

Martin Smith 2019y1 20200421 0257 mjsmith

https://britastro.org/cometobs/2019y1/2019y1_20200421_0257_mjsmith.html

Nick James 2019y1 20200425 2126

Object: C_2019_Y1__ATLAS_, Observer: Nick James
Mid time: 2020-04-25 21:26:58, Span: 1998s, Exposure: 30x60s
Telescope: C11 Edge HD, Camera: Finger Lakes 1.211 Version N
Scale: 1.29 "/pix, FoV 33.0x22.0 arcmin, PA: -1.0 deg, ZP: 25.70 mag

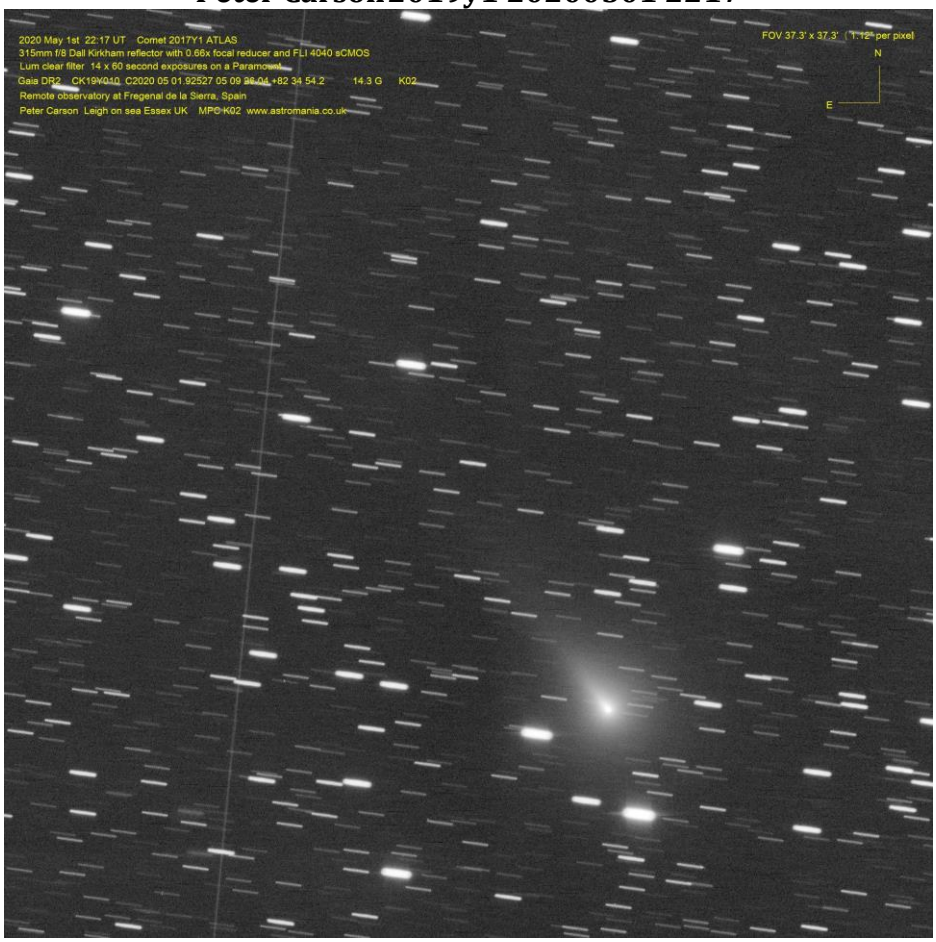
permID	provID	trkSub	artSat	modelstn	obsTime	ra	dec	rmsRA	rmsDec	astCat	mag	rmsMag	band	photCat	photAp	logSNR	seeing	exp	rmsFitNStars	notes	remarks
	C/2019 Y1			CCD1970	2020-04-25T21:21:57Z	31.62674	+77.20882	0.17	0.13	Gaia2	12.7	0.04	G	Gaia2	11.0	2.32	2.7	60	0.21	173	
	C/2019 Y1			CCD1970	2020-04-25T21:43:07Z	31.68500	+77.22674	0.16	0.12	Gaia2	12.7	0.04	G	Gaia2	11.0	2.34	2.6	60	0.19	170	

https://britastro.org/cometobs/2019y1/2019y1_20200425_2126_ndj.html

Pierre Girard 2019y1 20200426

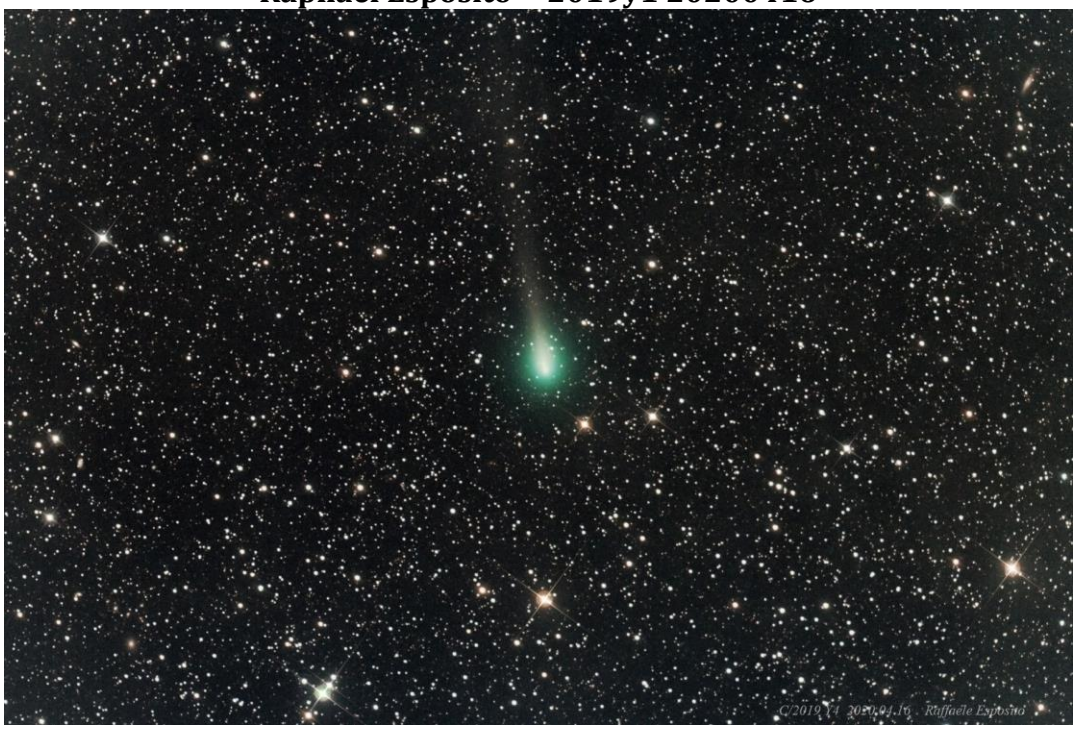
https://britastro.org/cometobs/2019y1/2019y1_20200426_pgirard.html

Peter Carson 2019y1 20200501 2217



https://britastro.org/cometobs/2019y1/2019y1_20200501_2217_pcarson.html

Raphael Esposito 2019y1 20200416

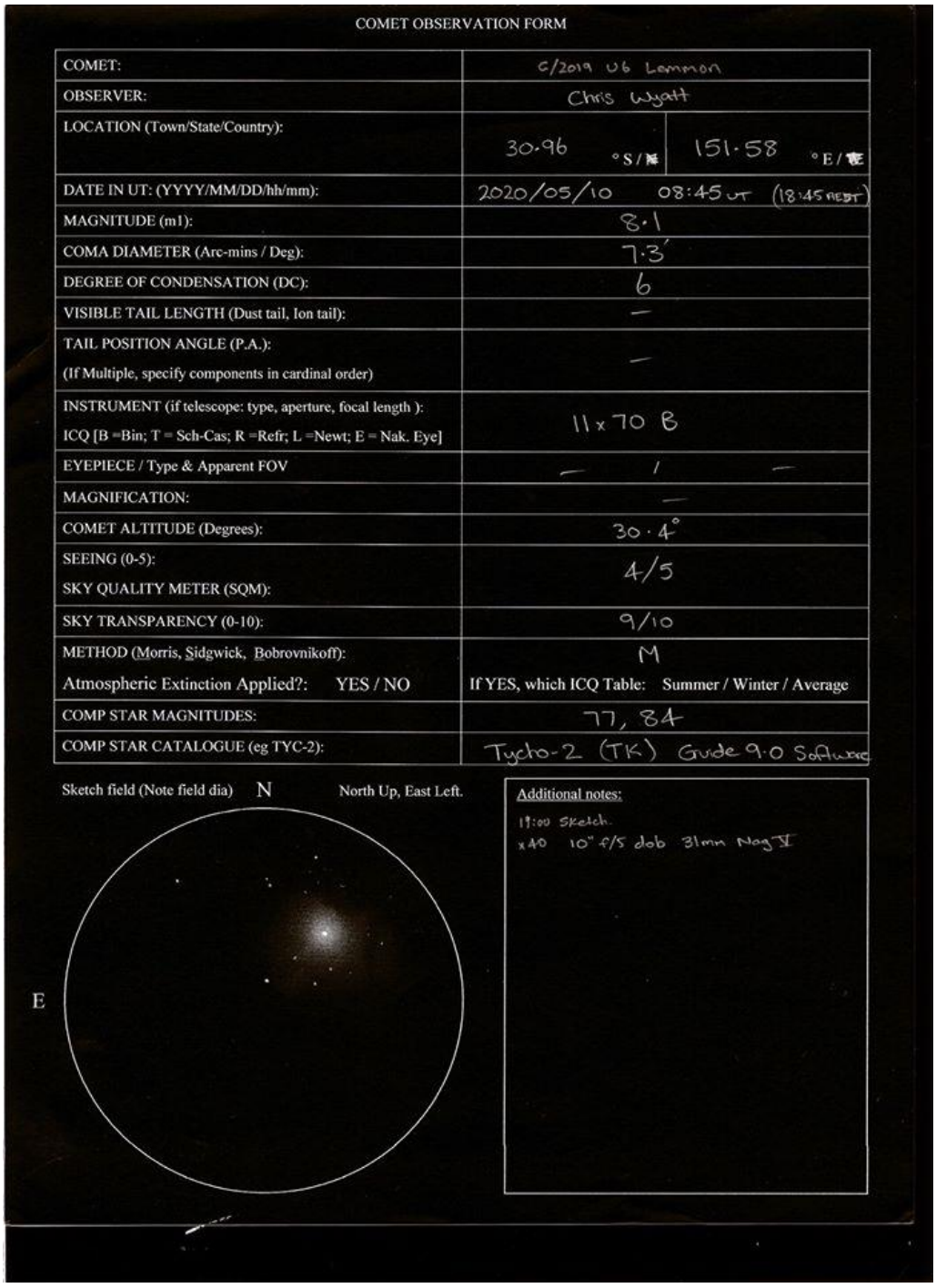


https://britastro.org/cometobs/2019y1/2019y1_20200416_resposito.html

C/2019 U6 Lemmon

This comet was discovered on 2019 October 31 with the 1.5m telescope on Mount Lemmon in Arizona. It was then a very faint 20th magnitude object. The images shown here are ones made exclusively in the Southern Hemisphere during 2020 May when the comet had brightened and was showing a strong ion tail and a round coma

Chris Wyatt 2019u6 20200510



COMET OBSERVATION FORM

COMET:	C/2019 U6 Lemmon
OBSERVER:	Chris Wyatt
LOCATION (Town/State/Country):	30.96 °S/N 151.58 °E/W
DATE IN UT: (YYYY/MM/DD/hh/mm):	2020/05/10 08:45 UT (18:45 AEST)
MAGNITUDE (m1):	8.1
COMA DIAMETER (Arc-mins / Deg):	7.3′
DEGREE OF CONDENSATION (DC):	6
VISIBLE TAIL LENGTH (Dust tail, Ion tail):	—
TAIL POSITION ANGLE (P.A.): (If Multiple, specify components in cardinal order)	—
INSTRUMENT (if telescope: type, aperture, focal length): ICQ [B =Bin; T = Sch-Cas; R =Refr; L =Newt; E = Nak. Eye]	11x70 B
EYEPIECE / Type & Apparent FOV	— / —
MAGNIFICATION:	—
COMET ALTITUDE (Degrees):	30.4°
SEEING (0-5): SKY QUALITY METER (SQM):	4/5
SKY TRANSPARENCY (0-10):	9/10
METHOD (Morris, Sidgwick, Bobrovnikoff):	M
Atmospheric Extinction Applied?: YES / NO	If YES, which ICQ Table: Summer / Winter / Average
COMP STAR MAGNITUDES:	77, 84
COMP STAR CATALOGUE (eg TYC-2):	Tycho-2 (TK) Guide 9.0 Software

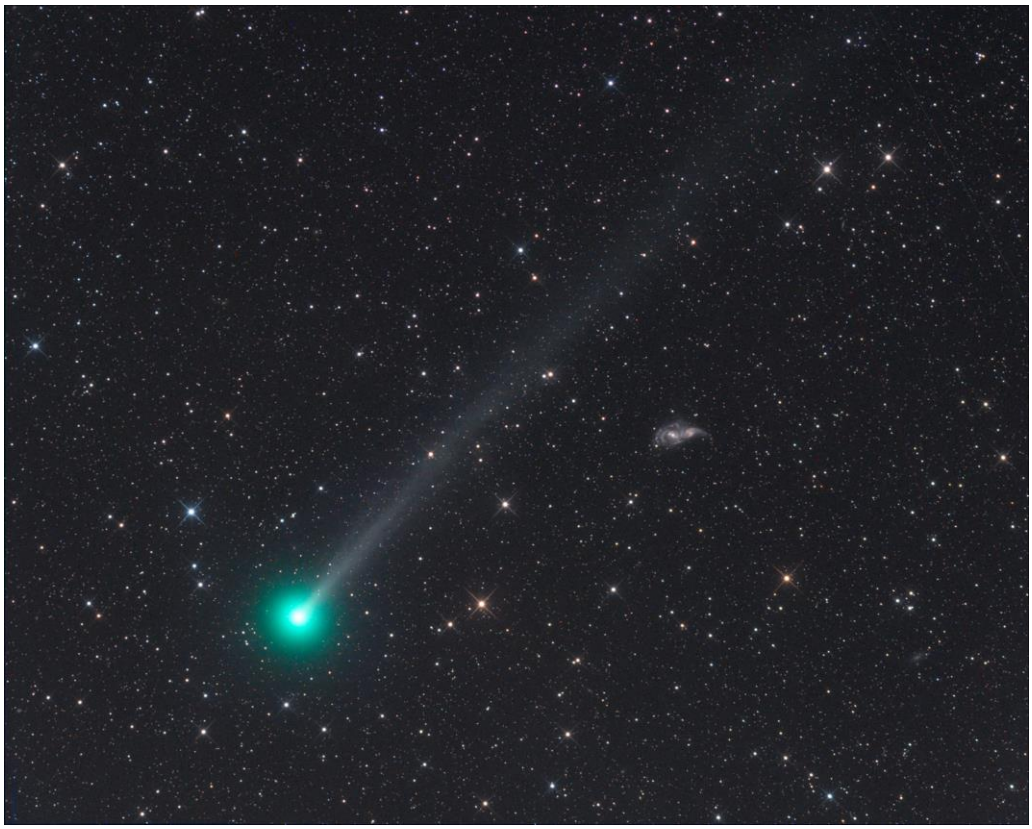
Sketch field (Note field dia) N North Up, East Left.

E

Additional notes:
19:00 Sketch.
x40 10" f/5 dob 31mm Nag V

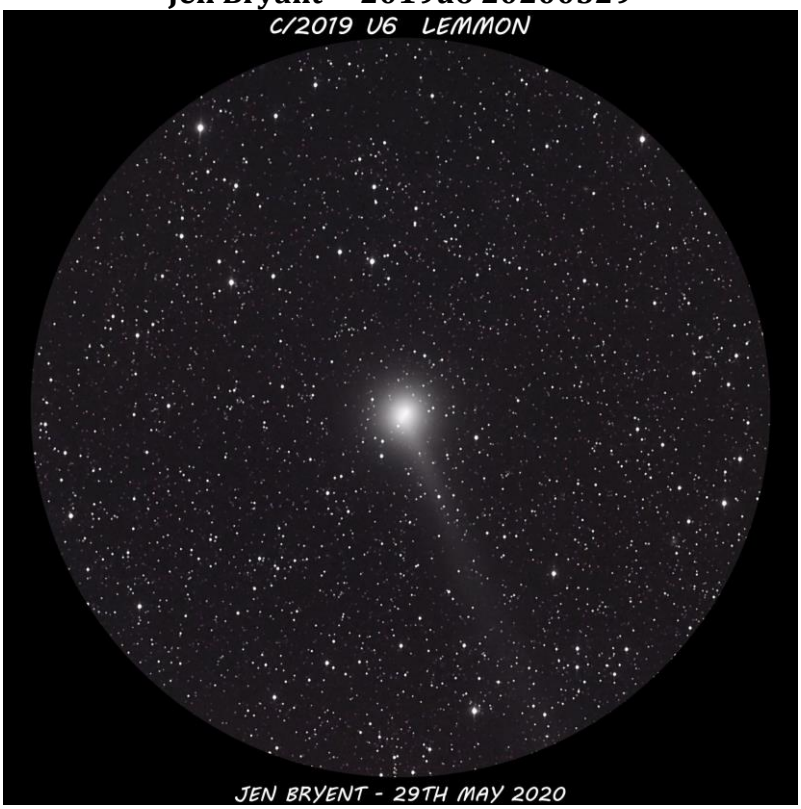
https://britastro.org/cometobs/2019u6/2019u6_20200510_cwyatt.html

Gerald Rhemann 2019u6 20200520



https://britastro.org/cometobs/2019u6/2019u6_20200520_grhemann.html

Jen Bryant 2019u6 20200529



https://britastro.org/cometobs/2019u6/2019u6_20200529_jbryent.html

Michael Mattiazzo 2019u6 20200529

https://britastro.org/cometobs/2019u6/2019u6_20200529_mmattiazzo.html

C/2020 F8 SWAN

This comet was discovered on the SWAN camera images on the SOHO spacecraft by amateur astronomer Michael Mattiazzo on 2020 March 25. As it became visible in the Southern Hemisphere skies it was seen to have developed a long ion tail which is well seen in the images shown here. The comet entered the Northern Hemisphere skies but faded very quickly and ended appearing only a faint elongated cloud of dust. The dramatic fade is seen here in these images covering the period 2020 April-May.

Ian Sharp 2020f8 20200416 1850 ids

https://britastro.org/cometobs/2020f8/2020f8_20200416_1850_ids.html

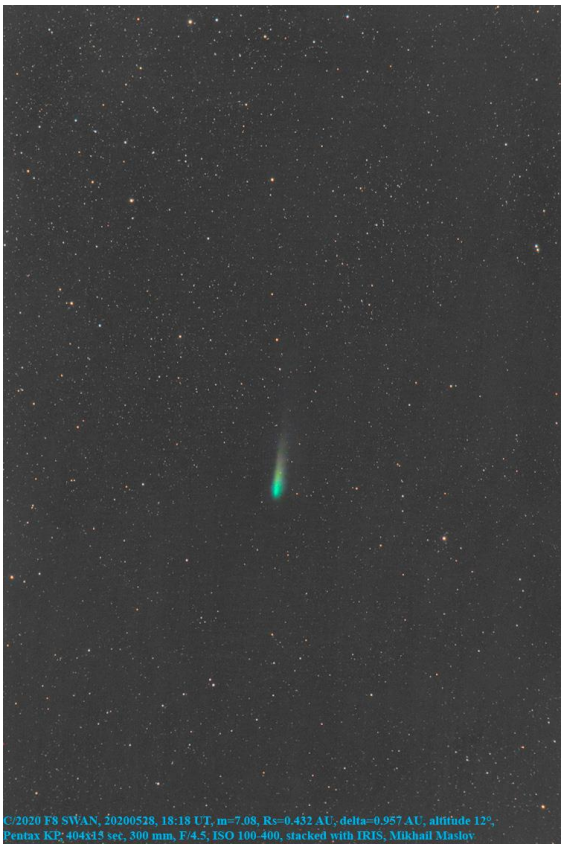
Damian Peach 2020f8 20200502

https://britastro.org/cometobs/2020f8/2020f8_20200502_dpeach.html

Norbert Mrozek 2020f8 20200518

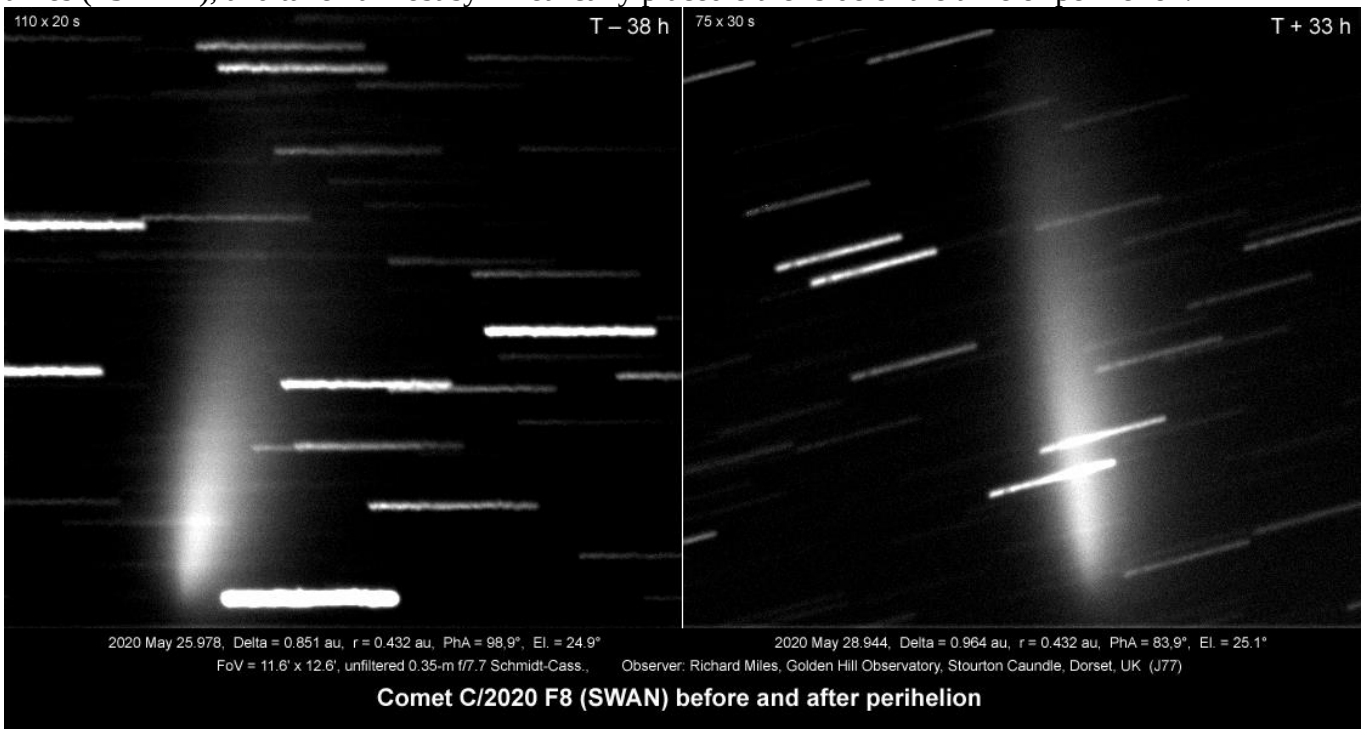
https://britastro.org/cometobs/2020f8/2020f8_20200518_nmrozek.html

Mikhail Maslov 2020f8 20200528 1818



https://britastro.org/cometobs/2020f8/2020f8_20200528_1818_mmaslov.html

Richard Miles 2020f8 20200528 images taken 3 days apart, using similar total exposure times (~37 min), and taken almost symmetrically placed either side of the time of perihelion.



https://britastro.org/cometobs/2020f8/2020f8_20200528_rmiles.html

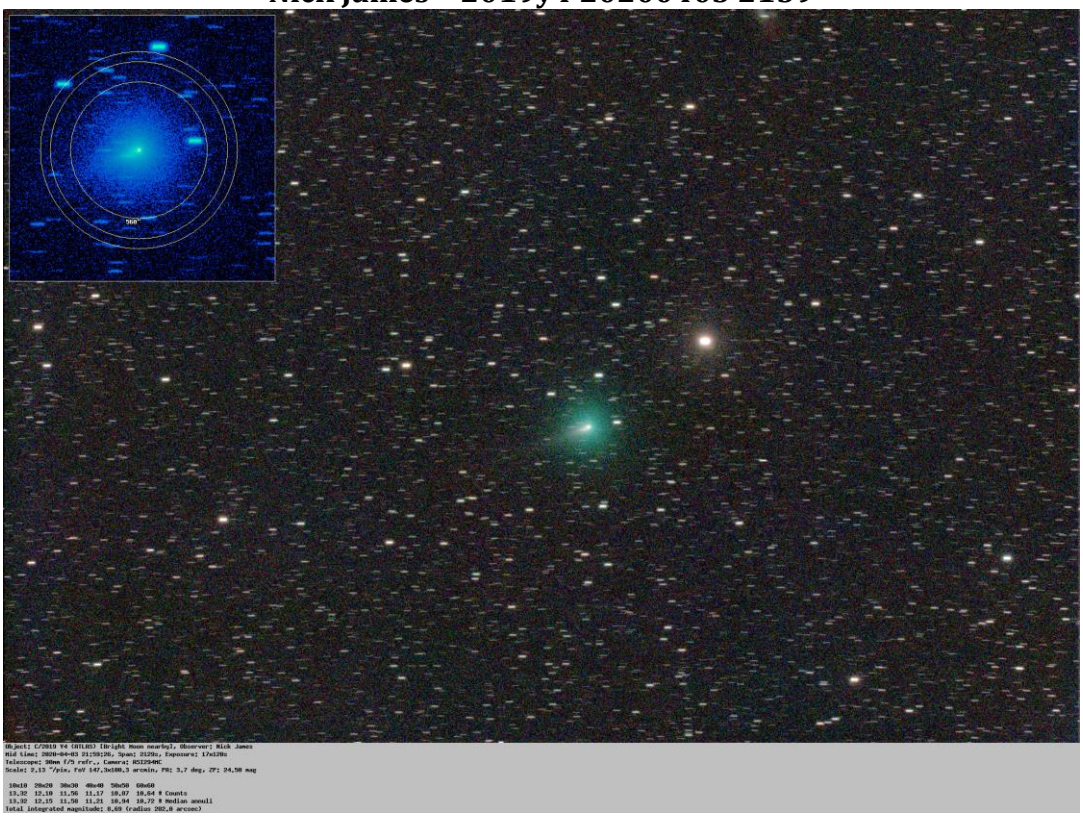
C/2019 Y4 ATLAS

This comet was discovered on 2019 December 28 by the ATLAS survey telescope as a faint 19th magnitude object. In 2020 February the comet began to brighten rapidly and continued to do so until fragmentation of the comet began to be reported by many observers. The images shown here cover the period 2020 March -May whilst this fragmentation event occurred.

Ian Sharp 2019y4 20200322 0530

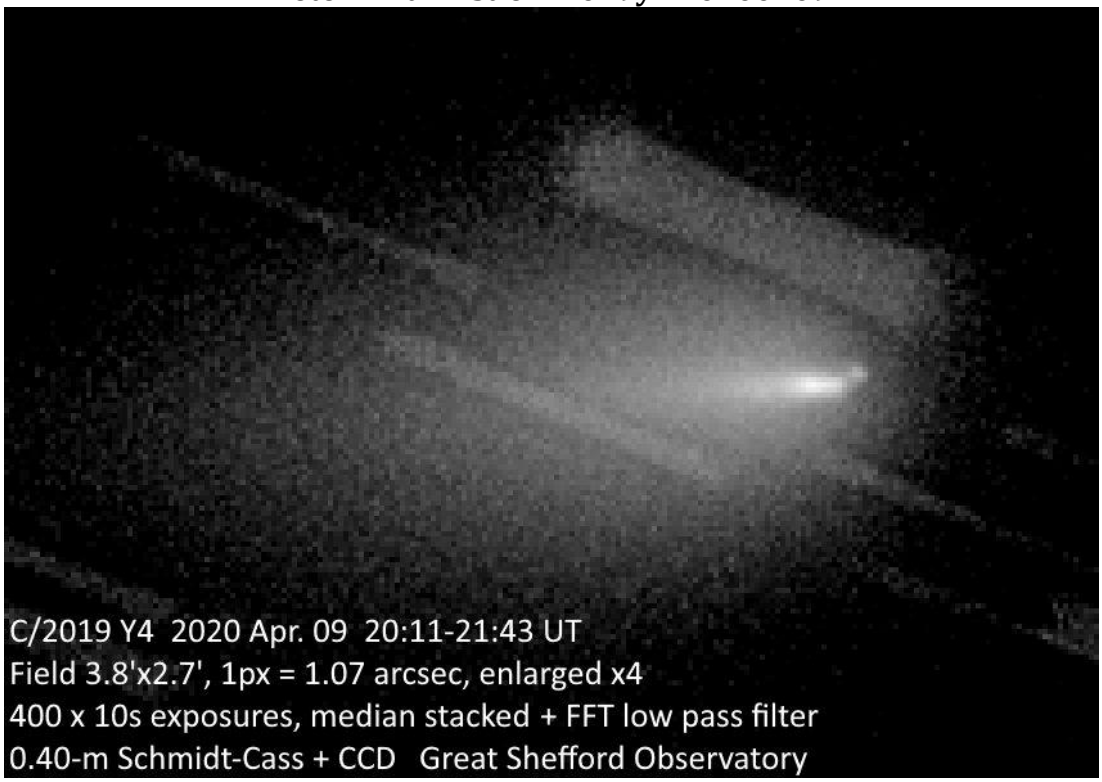
https://britastro.org/cometobs/2019y4/2019y4_20200322_0530_ids.html

Nick James 2019y4 20200403 2159



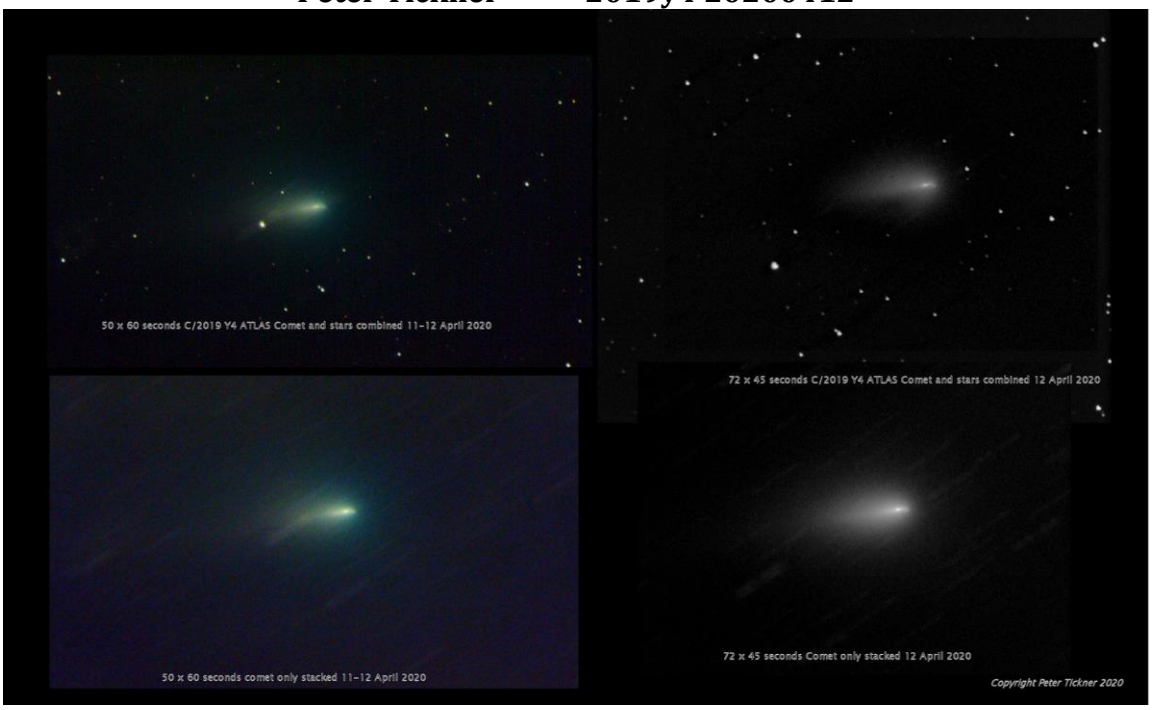
https://britastro.org/cometobs/2019y4/2019y4_20200403_2159_ndj.html

Peter Birtwhistle 2019y4 20200409



https://britastro.org/cometobs/2019y4/2019y4_20200409_pbirtwhistle.html

Peter Tickner 2019y4 20200412



https://britastro.org/cometobs/2019y4/2019y4_20200412_ptickner.html

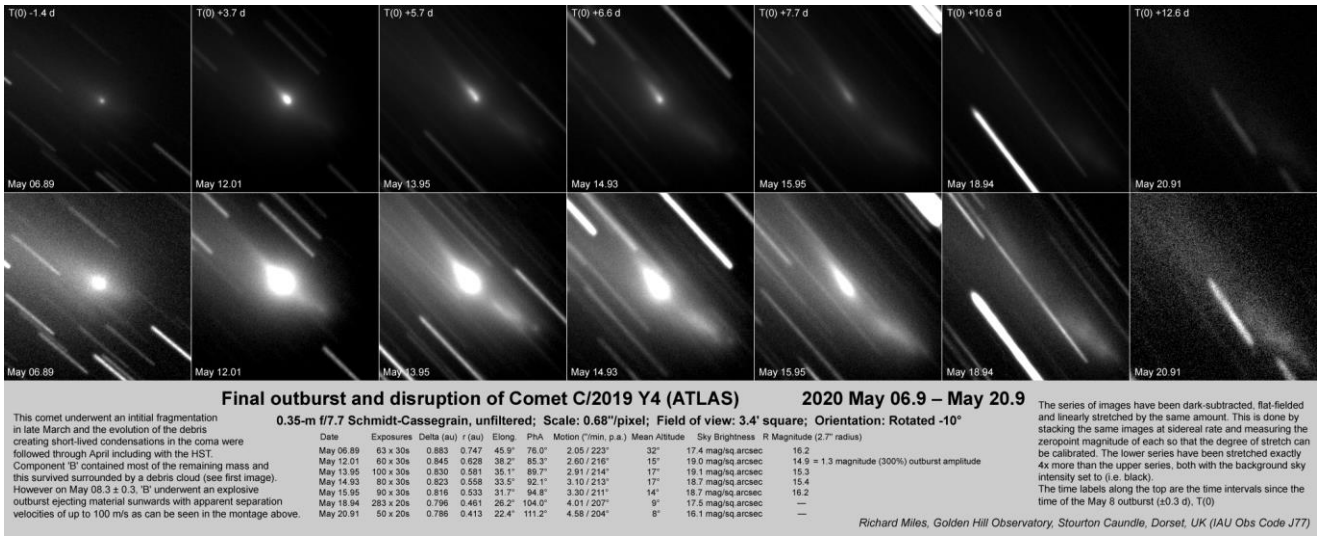
Richard Sargent 2019y4 20200416 2101

https://britastro.org/cometobs/2019y4/2019y4_20200416_2101_rsargent.html

Michael Jaeger 2019y4 20200518

https://britastro.org/cometobs/2019y4/2019y4_20200518_mjaeger.html

Richard Miles 2019y4 20200520 A montage of the last two weeks of the comet's life



https://britastro.org/cometobs/2019y4/2019y4_20200520_rmiles.html