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ISSUE NO. 71 JANUARY 2017 WWW.AAVSO.ORG

AAVSO Newsletter

SINCE 1911...

The AAVSO is an international non-profit organization of variable star observers whose mission is: to observe and analyze variable stars; to collect and archive observations for worldwide access; and to forge strong collaborations and mentoring between amateurs and professionals that promote both scientific research and education on variable sources.

FROM THE DIRECTOR'S DESK

STELLA KAFKA



Friends—In November 2016, the 105th Annual Meeting of the AAVSO took place at the Marriott Boston/Burlington. The meeting revolved around “the AAVSO in the Era of Big Surveys,” with representatives from Kepler/K2, KELT, TESS, Evryscope, J-Plus, and LSST

giving talks about their projects, and scientists from Caltech, the University of Washington, the Harvard-Smithsonian Center for Astrophysics, and Texas A&M discussing the AAVSO observer’s contribution complementing big telescope spectroscopy. The highlight of our meeting was a live panel discussion with all those scientists and our members, aiming at providing feedback on how all we—citizen scientists, professional and non-professional astronomers—will better work together to produce the best science possible. For those who attended in-person or remotely, I hope that the discussion provided ideas for your future observing programs, and that your interactions with key scientists gave you an insight into how those projects work and how you will be able to participate and contribute. I know that panel members left with a better understanding of how to better communicate with our observers, what they need from our community, and what the role of the AAVSO is, and they are excited (and overwhelmed) to discuss future avenues of collaboration.

You can listen to a recording of the discussion at

<https://www.aavso.org/content/2016-annual-meeting-panel-discussion>

It also became clear that this discussion was necessary for us to understand how we can all work together. Gone are the days when our observers were simply submitting data to our database with no knowledge or understanding of how those light curves were used. Now observers opt for feedback and a deeper understanding on the objects observed, and the AAVSO is looking for ways of directly communicating with scientists who lead various projects, and as a community, we want to share the excitement of discovery alongside those who analyze our data. In the era of “big data,” we are contributors, collaborators, and co-authors as we all learn together about the variable sky. And the AAVSO’s role is becoming more critical as we move forward. We already see an increased request for targets through our campaigns and alerts. We already see more and more younger scientists including the AAVSO in their discussions for ground-based follow-up of their targets, trusting AAVSO observers for their light curve needs. We understand that we need to ensure that our observers are well trained to become even more skillful in acquiring their data. We move towards high precision CCD photometry for exoplanets, and we cherish visual, DSLR, and PEP observing to follow up targets in the bright sky. (Actually, the AAVSO is uniquely covering bright targets, whereas all ground-based

PRESIDENT'S MESSAGE

KRISTINE LARSEN



2017 is upon us, and with it my last 11 months of service as your president. The past year has been a breathless rush, attending both the Spring and Fall meetings, joining Director Stella Kafka in representing the organization at the AAS meeting in Florida, recruiting members and observers at

Stellafane in August, and attending to the far less glamorous business of attending to the nuts and bolts of taking care of this historic and unique program collaboration. The past year has certainly been a whirlwind (we have a new Exoplanet section, a new light curve generator, updates to the website, thousands more stars in VSX, and so on), and I expect exciting new opportunities to come, not the least of which being the total solar eclipse in August!

Last January, in my inaugural address, I made a challenge to the membership to complete the Astronomical League’s Binocular Variable Program. The need for eye surgery last Fall slowed me down, but now that I can actually use both eyes when I look through binoculars, I look forward to completing my last dozen observations before Valentine’s Day

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DIRECTOR'S MESSAGE CONTINUED...

surveys saturate in stars brighter than 8th mag.) In the era where every survey will produce “thousands of alerts a day,” we work closely with the professional astronomical community to ensure that the targets we end up following are the ones of active interest to researchers. We make sure that your work is relevant and of excellent quality—in fact, we are expected to ensure that submitted data are of high quality. Our database already is providing a continuous record of the behavior of the most popular (and surprising) variable stars in the night sky through our visual observations, and we aspire to continue our long record of observing those targets.

One not-so-surprising result from the Annual Meeting is that we need to have more such discussions. We need to educate each other about our observing needs and observing capabilities, interests, and needs. We need to make sure that, as a community, we move forward together. The challenge of surveys will be to deal with a large volume of data, and produce accurate catalogues of objects all over the night sky. Astronomy is pushing its data handling limits, and astronomers are bracing for an influx of information. Most of those surveys aim at resolving the nature of dark matter, discovering earth-like exoplanets, and studying distant galaxies. Variable objects are a side-product, but a very important one for all of us. At this point, the AAVSO's role is, more than ever, critical for the progress of science. No photometric survey is perfect, and the scientists involved in those hope that their survey's deficiencies in cadence, coverage, and/or color will be covered by AAVSO observers. We will not disappoint. In 2017, with your support

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and with the guidance of our council, the AAVSO will continue its work towards “enabling anyone, anywhere to participate in scientific discovery through variable star astronomy.”

Have a strong, healthy new year. And, as always, clear skies! ★

Ed. note: the Spanish language version of Stella's message can be found on page 10.

PRESIDENT'S MESSAGE CONTINUED...

and moving on to start the full AL Variable Star Observing Program. Of course, you are all invited to join me on that journey as well. But this January I want to pose a different type of challenge to you, one that anyone can take part in.

Again, among my favorite responsibilities of this office is to attend the Spring and Fall meetings (as if I wouldn't have done that anyway!). I hope I get the opportunity to speak with you in person at the Spring 2017 joint meeting with SAS in California or the Fall 2017 meeting in Tennessee. Each meeting is an opportunity to meet with members and observers, and it is always a pleasure to see old friends and make new ones. But each year I can't help but notice that the assembled group of variable star enthusiasts is, on average, obviously one year older. Of course, in some regards this certainly beats the alternative (either myself or any of you being unable to attend), but as we look toward the future of the AAVSO we need to address an issue that is facing many astronomical organizations—the graying (and general lack of diversity in) the membership of our organizations. Many have debated this phenomenon, and it is not my intention to retread those discussions here. My intention is to act—to commit to bringing new, fresh, young, diverse, enthusiastic faces to our meetings in 2017.

This is where each of you can play a vital role, if you are willing. Here are four simple steps you can take, depending on your situation and time and resource constraints:

- 1) Take a personal role in introducing someone new to the joys of variable star observing. You can do this through your local astronomy club, high school, or college. Take part in star parties, give a talk, offer to act as a mentor. If you are able, join the AAVSO Mentor Program.
- 2) How many of us are unabashed telescope hoarders?

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

DIRECTOR	Stella Kafka
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Michael Joner	William Stein

NEWSLETTER

EDITOR	Elizabeth O. Waagen
PRODUCTION EDITOR	Michael Saladyga

The *AAVSO Newsletter* is published in January, April, July, and October. Items of general interest to be considered for the *Newsletter* should be sent to eowaagen@aavso.org. Photos in this issue courtesy of Richard Berry, Rodney Howe, Roger Kolman, and David Levy.

Membership in the AAVSO is open to anyone who is interested in variable stars and in contributing to the support of valuable research. Members include professional astronomers, amateur astronomers, researchers, educators, students, and those who love variable star astronomy.

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www.aavso.org

(Sheepishly raises hand.) If you have a beginner telescope that you have no use for, why not donate it to your local astronomy club, high school, or university, along with a commitment to demonstrate its proper set-up and usage? Of course, while you are doing your demonstration, take the opportunity to explain how to do a variable star observation. If you have a CCD camera that is not exactly up to your current needs, consider donating it as a “first instrument” to someone who has a telescope but lacks the resources to buy a new camera of their own. Again, contact nearby astronomical organizations if you don't know of someone who could give your well-loved hand-me-down a good home. Perhaps you might also consider purchasing access to the AAVSO CCD school streaming videos for your old CCD's proud new owner. This brings me to my third suggestion—

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PRESIDENT'S MESSAGE CONTINUED...

3) Buy a supporting membership for a young person under 21 years of age. It only costs \$37.50 to give a young person the opportunity to be a member of our organization for a full year. You could provide that vital spark that gets them hooked on long-term membership. If you don't have a particular young person in mind, ask your local astronomy club or university if they have a student who has demonstrated particular interest in variable stars. Perhaps you can make an arrangement with a local high school or college to fund one associate membership each year to the student who shows the most promise in astronomy (or whatever criteria you agree upon). Make a special commitment to support young women and students from under-represented groups.

4) If you are a faculty member, get your undergraduate students involved in genuine lab experiences in astronomy working with AAVSO data and/or observing variable stars. If you don't have a separate astronomy lab, take one lecture period a semester and introduce your students to the joys of safe solar observing. If your students have the opportunity to work on research projects, direct them towards variable stars. Student projects (whether completed or in progress) are encouraged for presentation at the Spring and Fall meetings. Work with your students to write up their projects for publication in *JAAVSO*. A peer reviewed journal article certainly adds weight to

their resume or graduate school application. The point is to get them involved with the AAVSO on a more personal level. Take advantage of the fact that faculty can register students for AAVSO meetings under the family member rate, as well as the Student Meeting Scholarship Fund, which funds meeting registrations for up to 10 students per annual meeting. Donations to this fund are, of course, always welcomed!

The first line of the AAVSO Council Policies and Procedures manual states "It is the obligation of each Council member to leave the AAVSO better than they found it." I take this commitment very seriously, as do my fellow council members. But we can't do it alone. Don't we all want to leave the organization more vibrant, scientifically relevant, and financially secure than we found it (after hopefully decades of membership)? Who will take my seat in the audience at the Fall 2017 annual meeting? Now is the time to plant those seeds and recruit the next generation of variable star enthusiasts. Can I count on your support in this important endeavor to secure the future of our organization? I look forward to discussing this further with you on the AAVSO Forums.

Until we speak again, I wish you all clear skies, good health, and a successful and exciting 2017! ★

Ed. note: the Spanish language version of Kris's message can be found on page 10.

AAVSO SPRING MEETING

The AAVSO's 106th Spring Meeting will be held June 15–17, 2017, in Ontario, California. This will be an AAVSO-SAS joint meeting (SAS is the Society for Astronomical Sciences). It's sure to be an exciting and informative meeting, with many very experienced speakers discussing observing techniques, equipment, and observing programs.

Further information about the meeting and accommodations will be announced on the AAVSO website.

A NOTE FROM THE EDITOR OF JAAVSO

JOHN R. PERCY, EDITOR, *JAAVSO*
DEPARTMENT OF ASTRONOMY, UNIVERSITY OF TORONTO



John Percy

Check out the recently-published Vol. 44, No. 2 issue of *JAAVSO*! It includes an especially rich mix of articles. These include two review articles: one on how your observations (and others) of pulsating stars enable astronomers to detect and measure their evolution, and one on variable star astronomy with the *Kepler* satellite,

including why there is a continuing role for AAVSO observers in the age of *Kepler*. There is a variety of articles on education, history, data, and astronomical techniques, a slightly-offbeat editorial from me, and many articles on variable star research, including research done with your observations.

As usual, there is one of those by me and an undergraduate student. Emily Deibert is a remarkable young woman who is completing a specialist program in Astronomy and Physics, a major program in English (!), and a minor program in Mathematics. All of her marks in her 35 courses are A, and 23 of them are A+—quite remarkable in a highly-ranked university like mine (University of Toronto). I'm happy that your observations (of pulsating red giants in this case) have helped her develop her research skills, as well as contribute to science.

As usual, I thank all the authors for going to the effort of doing their work and preparing their articles, the anonymous voluntary referees who carefully review the articles, and the dedicated *JAAVSO* HQ staff—especially Mike Saladyga and Elizabeth Waagen. ★

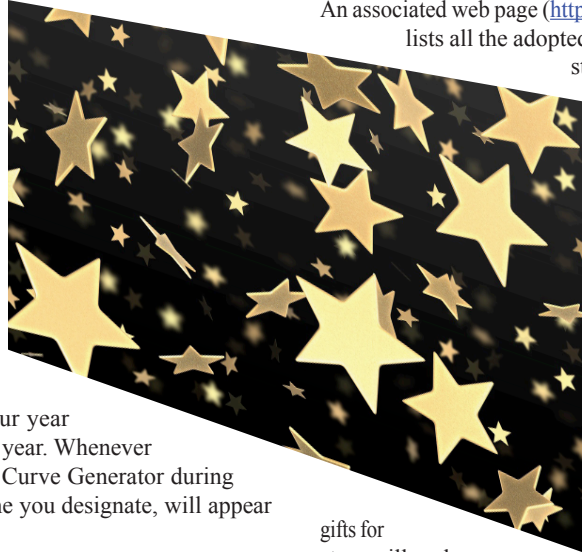
THE ANNUAL ADOPT A VARIABLE STAR PROGRAM (AAVSP)

The Annual Adopt a Variable Star Program (AAVSP) is a fundraising program designed to encourage small donations to the AAVSO from a large number of donors each year. The concept is very simple and has been used by other non-profits to raise money for children, animals, and other good causes. In our program you can “adopt” any variable star listed in VSX for one year, for a donation to the AAVSO of \$30.00 US (tax-deductible in the US).

When you adopt a star for a year you will receive a star chart of that variable star and a certificate showing either your name or the name of the person you specify on it. Also, at the end of your year you will receive a light curve of your star for that year. Whenever a light curve of your star is created on the Light Curve Generator during your year, your name as an “adopter”, or the name you designate, will appear above the light curve.

There is no limit to the number of variable stars a person can adopt (at \$30.00 per star). There is also no limit to the number of people who can adopt a specific variable star.

We have created a simple web form (<https://www.aavso.org/apps/adopt-a-star/>) that will handle the adoptions and donations.



An associated web page (<https://www.aavso.org/apps/adopt-a-star/adopted-stars/>) lists all the adopted stars and the donors who have adopted them. The stars will be listed alphabetically by constellation. Stars with no GCVS designation will be listed at the end of the list in alphanumerical order.

To be perfectly clear, you are not buying a star, you are not becoming the owner of anything pertaining to that star (except bragging rights), we are not naming it after you or your cat or your dog—you are simply donating to the AAVSO in the name(s) of your favorite variable star(s).

Adopt a variable star as a gift to yourself! Adopt a variable star in celebration of a birthday, anniversary, wedding, graduation, promotion, retirement or other milestone! Just think, for those of you who perpetually procrastinate buying Holiday your friends and loved ones, AAVSP adopted excellent last-minute stocking stuffers, New

gifts for stars will make Year’s gifts, etc.

We hope you will enjoy this fun new way of supporting the AAVSO mission and will come up with your own ideas how this can be used.

Adopt A Variable Star Now! ★

SCIENCE SUMMARY: AAVSO IN PRINT

**ELIZABETH O. WAAGEN (WEO),
AAVSO SENIOR TECHNICAL ASSISTANT**

AAVSO data are constantly being used by researchers around the world in presentations and publications.

In the past, we have listed in the *Newsletter* the publications appearing during the previous quarter on the arXiv.org server that used AAVSO data or resources and/or acknowledged the AAVSO. This listing has also appeared on the AAVSO website.

As of issue Number 69, we are not listing the publications but instead giving a summary of the numbers of publications from arXiv that used different AAVSO resources. The listing of publications still appears on the AAVSO website at <https://www.aavso.org/aavso-print>. The articles are categorized by AAVSO resource used.

From 2016 September 27 through 2017 January 5, the arXiv.org preprint server included the following numbers of publications:

- Publications using the AAVSO International Database (AID): 39
- Publications using the AAVSO Photometric All-Sky Survey (APASS): 21
- Publications using the International Variable Star Index (VSX): 6
- Publications using other AAVSO resources:
 - AAVSO Alert* and/or *Special Notices*: 1
 - AAVSO Data analysis software (TS): 1
 - AAVSO member(s) among authors: 4

Note: Many variable star publications include AAVSO members/observers among their authors in addition to the ones indicated here. The number here refers to publications on non-variable star subjects.

We thank these researchers for including the AAVSO and its resources in their work, and for acknowledging the AAVSO in their publication. We urge all those writing for publication to include the word “AAVSO” in their list of keywords. ★

105TH ANNUAL MEETING OF THE AAVSO



AAVSO Director Stella Kafka

The theme of the AAVSO 105th Annual Meeting was “The AAVSO in the era of the large surveys”. A key event at the meeting was the panel discussion on the role of the AAVSO in the era of the large surveys. The six panel members (all associated with the large surveys) and the other meeting attendees had an excellent discussion, with much good dialogue and many insightful questions and answers going in both directions.

It was exciting and very encouraging to see that the AAVSO will have an ongoing vital role in following up on observing the countless targets and in mining and analyzing the data that will come from these surveys. There will be more for AAVSO’ers to do than ever before, and all methods of observing – visual, CCD, DSLR, PEP – will be needed and valued. In addition to the survey targets work, the longterm monitoring of AAVSO Legacy stars and other known variables will continue to be crucial for present and future research. The future is very bright!

The panel discussion was recorded and may be viewed by clicking

<https://www.aavso.org/content/2016-annual-meeting-panel-discussion#overlay-context>



105th Annual Meeting of the AAVSO at Burlington, Massachusetts, November 10–12, 2016

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Ed Los and Barbara Harris



(Back row, l-r) David Ciardi, Alessandro Ederoclitte, Meredith Rawls, Dennis Conti; (front row) Joey Rodriguez, Linda Schmidtbreick, Stella Kafka, Sanaea Cooper Rose



Charles Alcock



Joey Rodriguez



AAVSO President Kristine Larsen



Mike Joner



Gerry Samolyk and Neil Simmons

Complete meeting minutes, lists of awards, and papers presented are published in the AAVSO Annual Report

ACCOLADES AT THE ANNUAL MEETING

Among the awards presented at the AAVSO 105th Annual meeting were the Merit Award—the AAVSO’s highest honor—and the William Tyler Olcott Distinguished Service Award for the promotion of variable star observing and the AAVSO. Ken Menzies received the Merit Award and Donn Starkey the Olcott Award.



Ken Menzies, AAVSO Merit Award recipient, with AAVSO President Kristine Larsen and Director Stella Kafka

The 47th AAVSO Merit Award was presented “to **Kenneth T. Menzies**, for his devoted service to the AAVSO as a meticulous and prolific observer, contributing more than 250,000 CCD observations; his outstanding commitment to improving the quality of all AAVSO data through mentoring new observers; his financial and intellectual contributions to the VPHOT Software team; and his thoughtful instruction of

multiple VPHOT CHOICE courses. Kenneth has been an active member of the TG/TA Transformation team and the AAVSONet Task Force, a volunteer image inspector in AAVSONet, and a patient, thoughtful and ever-present resource on many forums, especially the VPHOT forum.”

The 13th William Tyler Olcott Distinguished Service Award was presented “to **Donn R. Starkey** for his enthusiastic commitment to educating and mentoring both the current and next generation of variable star observers, and assuring the future success of the AAVSO through his forward-thinking service on Council, lending his considerable business acumen to the Investment and Budget Committees, and serving as a tireless advocate for the observation of variable stars.”



Donn Starkey, Olcott Award recipient, with AAVSO President Kristine Larsen

Special AAVSO Awards were presented to four attendees for their volunteer contributions: **Dennis Conti** for his work with the Exoplanet section and database and observer training; **George Silvis** for his work on the Eggen Cards project; **Francis Hemsher** for his work on the new AAVSO light curve generator; **Patrick Wils** for his work with VSX and Application Programming Interfaces for AAVSO software.

Observer Awards for solar and variable star observing were presented to those observers in attendance who had reached various milestones by the end of fiscal 2015–2016. **Solar awards** to non-attending observers have been sent to them; the announcement and distribution of variable star observing awards will be made at the Spring meeting, the usual time for these awards.

Digitizer Awards were announced for **Bruno Billiaert**, **Terry Moon**, and **Stuart Morris** for their work in digitizing historical published variable star data and/or historical solar data.

A **Staff Recognition award** was presented (virtually) to **Sebastián Otero** recognizing his 5 years of service on VSX.

Recognition awards were announced for 100 participants in the AAVSO’s Nova Search program from 1972 through 2016 (the program was discontinued in 2010 but some observers are still contributing observations), and for 22 participants in the Eggen Cards project to catalogue the over 108,000 data and information cards of astronomer Olin Eggen. Those participants present received their awards; others were sent them by mail.

The *AAVSO Annual Report* for 2015–2016 will contain complete lists of award recipients and texts of citations. Also, these lists will be posted in the Honors and Awards section of the AAVSO website (under People). Regarding the Nova Search program participants, if you see your name on the list but have not received a certificate, it is likely because we do not have contact information for you. Please contact us (aavso@aavso.org) so we may send you your certificate.

Congratulations to all award recipients! Thank you for your dedication to and many efforts on behalf of variable star observing and the AAVSO—we are very grateful to you. ★

SOME MEMORIES OF LESLIE PELTIER

DAVID H. LEVY (LVY), VAIL, ARIZONA

More than half a century ago, in 1965, Mrs. Lancey, my grade 11 English teacher, assigned our class to read a book and submit a book report. It was an odd assignment for a senior high school class at the time. I had just borrowed a new book from the library of our astronomy club, the Montreal Centre of the Royal Astronomical Society of Canada, on the recommendation of Isabel Williamson. It was the first edition of *Starlight Nights: The Adventures of a Star Gazer*, written by Leslie Peltier, one of the premier amateur astronomers in the world at the time. Mrs. Lancey gave me permission to review that book.

I owe a lot to *Starlight Nights*. From the time I began reading it, with the words "There is a chill in the autumn air" I could not put it down, and completed it just two days later. *Starlight Nights* was directly responsible for my joining the AAVSO in 1966 and I've been a member and contributor ever since. I have visited Leslie at his Delphos, Ohio home twice, in 1974 and 1979, and have written about him, also twice, when I had a column in *Sky & Telescope* magazine.

I wrote Leslie at the end of 1966 and his response began a long period of correspondence that culminated in my first meeting with him in 1974, followed by a second one in 1979 a few months before he passed away. One conversation I remember was that he was trying to recover from an attack of shingles. Almost like a child, he asked me, "Does it ever go away?" I assured him that it did and that he would recover. He did, but he passed away from heart failure in May.

One of the most powerful memories of Leslie concerns my Father, who was even more an avid reader than I am. I told him that there are many astronomy books that tell you how to observe the night sky (I have written several of them). *Starlight Nights* is the book that tells you why.

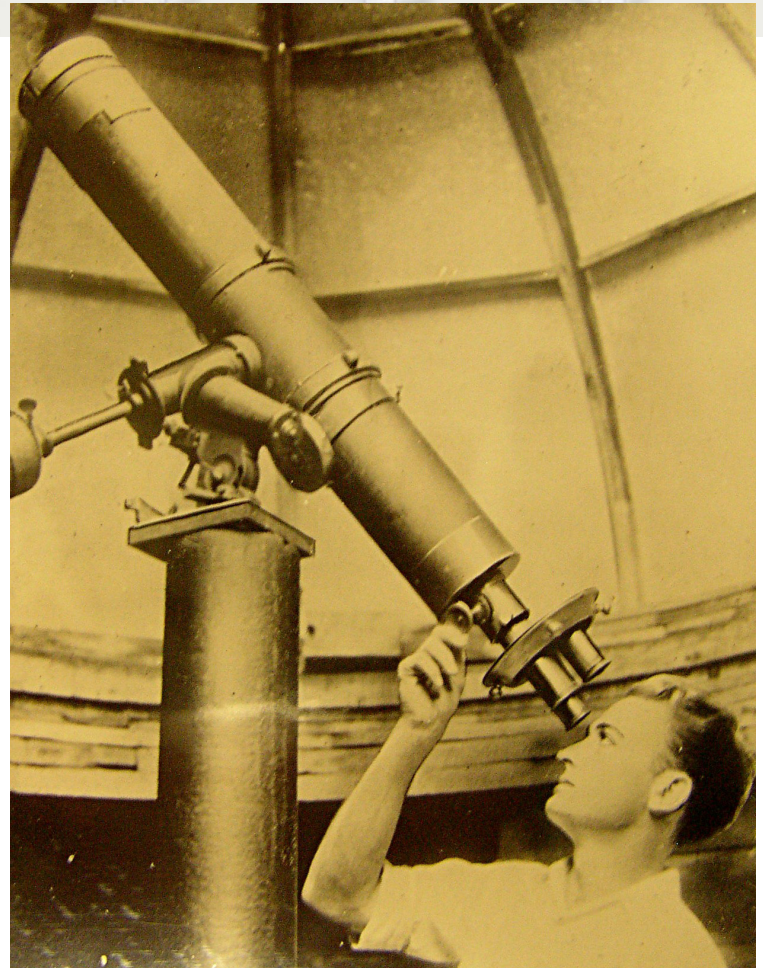
When Leslie died in the spring of 1980, he left a record of some 132,000 observations of variable stars. He also discovered twelve comets, listed here. The first designation on each line represents the comet designation that would have been familiar to Peltier; the designations after the equal signs are the ones in use today.

1925k = C/1925 V1	Peltier-Wilk	November 13, 1925
1930a = C/1930 D1	Peltier-Schwassmann-Wachmann	February 20, 1930
1932k = C/1932 P1	Peltier-Whipple	August 8, 1932
1933a = C/1933D1	Peltier	February 16, 1933
1936a = C/1936 K1	Peltier	May 15, 1936
1937c = C/1937 D1	Wilk	February 27, 1937

Leslie found this comet a few hours after Antonin Wilk of Cracow, Poland, discovered it. The comet was announced in Europe as Comet Wilk.

1939a = C/1939 B1	Kozik-Peltier	January 19, 1939
1943b = C/1943R1	Daimaca	September 19, 1943

Leslie found this comet 16 days after its original discovery by Daimaca of Bucharest, Romania., but at the time he was unaware of Daimaca's effort because of communication delays caused by World War II. Because no other observer in the United States ever saw this comet, his independent discovery was crucial in determining this comet's orbit.



Leslie Peltier and his "comet seeker" telescope at the Peltier observatory in Delphos, Ohio (note his pie-plate eyepiece turret invention)

1944a = C/1943 W1	van Gent-Peltier-Daimaca	December 17, 1943
1945f = C/1945 W1	Friend-Peltier	November 24, 1945
1952d = C/1952 M1	Peltier	June 20, 1952
1954d = C/1954 M2	Kresak-Peltier	June 19, 1954

Recently I have had contact with amateur astronomer Vinny Strosnider. He has done considerable research on Leslie Peltier, and has prepared a set of documents devoted to this inspiring amateur astronomer, and has compiled them in an e-book titled *Return to Starlight Nights*. They offer a view of the great observer from a perspective I didn't see back in the 1960s, when Leslie was still alive and submitting his monthly observations to the AAVSO. They offer a view of Leslie that might be more appropriate to today's population than it was to mine.

Accompanying is a portion of what Mr. Strosnider has done; the complete e-book (~24 Megabytes) may be downloaded at:

<http://jarnac.jarnac.org/>

The excerpt here is nominally about Leslie's merry-go-round observatory but it offers much more than that, a look into the ideas and concepts of a man who really appreciated the magic of the night sky. May his work and joy inspire many more generations to love the night sky. ★

BOOK EXCERPTS BEGIN ON NEXT PAGE

LESLIE PELTIER CONTINUED...

The Adventure of the "Merry Go Round"

History Adventures with Leslie Peltier
and Vinny Strosnider



...the "world famous" Merry Go Round observatory

Sitting among an array of world class observatories and telescopes, behind a very tall fence, sits an unassuming little six-foot by six-foot wooden building that could be mistaken for a garden shed. With its square shape, sheet metal roof and white painted exterior, this little garden shed is in fact the world's most famous homemade observatory. And still being used today.

Made famous by the Ohio farm boy and amateur astronomer Leslie Peltier in his autobiography ...Starlight Nights.

John Bryan State Park Observatory
Operated by the Miami Valley Astronomical Society, Dayton Ohio

Built out of necessity, this little twirling box has garnered the attention of professional academia as well as curious onlookers for decades. From its conception, it was built out of a need for portability.

...in the beginning

After living on a farm with his parents for twenty something years, Leslie began noticing a girl that lived on the edge of town. As the story goes in Starlight Nights, a nod turned into a wave, then a honk of the Model-T horn, and finally a face to face with the girl he would marry.



Being ten years older, Leslie had to wait for his bride to be -to finish college. During his time on the farm, Leslie and his dad had built an observatory out in the middle of the adjoining corn field next to the farm house. By the time Leslie was thirty-six years old he was nationally known for his discovery of comets and stars using this observatory.

Once Leslie and Dottie were married in 1933, Leslie left the home of his parents.

Doratha Nilhiser meets Leslie Peltier

The Adventure of the "Merry Go Round"

...its moving time again

In 1948 Dottie Peltier came across the home of her dreams, "Brookhaven." Surrounded by acres of yard, with a 100-acre stone quarry at the rear of the property, Leslie began plotting where he would mark the permanent home for the Merry Go Round observatory. Here the rotating box would rest from 1948 until 1992.



Brookhaven to the left, the concrete pad for the Merry Go Round observatory at the far right as it looks today

After a few comet discoveries, many articles in the national newspapers and being labeled the "world's most famous amateur astronomer" in the 1930s, Leslie received many visitors of notable academia. People would come from other parts of the country to visit with Leslie and his observatories.

Leslie's first attempt at having a backyard observatory was in 1920. The "open air desk" built for the 4-inch Moge refractor.

In 1921 the "Cow Pasture" observatory was built, first hosting the 4-inch Moge and then the 6-inch Fitz.



The Cow Pasture observatory from 1921 to 1939



In 1937 the "Merry Go Round" observatory was constructed with the 6-inch Fitz "Comet Seeker" refractor in mind.

And in 1959, a gift, presented to Leslie from the Miami University of Oxford, Ohio. A 12 inch Clark-Lohmann refractor complete with observatory dome and transit room.

Of the many visitors over a sixty-four-year vigil, one far off visitor wrote about the small town stargazer and his merry go round.



The 12 inch Clark observatory 1959 to 1994

The Adventure of the "Merry Go Round"

...it's moving time

Moving across the road into his grandfather's farm house which was now owned by his uncle, Leslie and Dottie settled into married life with Leslie still using the Cow Pasture observatory. After a few years, Leslie's uncle Ralph and his wife sent news to Leslie that they would be returning home. It was now time for them to get ready to move again. Running out of family farm houses to live in, they needed to look for a rental house in the town close by.

In the beginning months of 1937, Leslie had been working as a draftsman for a company in town that built children's toy furniture.

Still wanting to continue stargazing wherever he lived, he needed to come up with a solution for housing his 6-inch Fitz Comet Seeker.



1933 Leslie and Dottie's Wedding
Courtesy of the Delphos Canal Museum



1936 Courtesy of the Delphos Canal Museum

Once Leslie began using the newly built observatory, he found that he could observe variable stars with lightning speed. His cow pasture observatory needed manual rotation of the dome and scope for each section of the night sky observed. This took much time. However, this new contraption "super charged" his observing schedule.

As the observing chart at the right demonstrates, Leslie was able to make one hundred and fifty-nine variable star observations in one night with the Merry Go Round.

From 1937 to 1940 the Merry Go Round observatory was used at a rental house located on the pathway of the Miami and Erie canal. His seventh comet was discovered here in 1939.



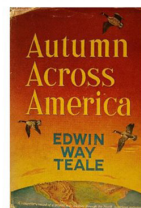
In 1940 they had to move, yet again, into another rental house. From here three more comets were discovered in 1943, 1944 and 1945.

The second rental house. 1940 to 1948 This is the back yard where Leslie discovered 3 comets using the Merry Go Round observatory



The Adventure of the "Merry Go Round"

...a far off visitor



One memorable visitor was Edwin Way Teale. The man who encouraged Leslie to write Starlight Nights. This famous author from the 1940s, 50s and 60s, twice visiting from Connecticut with his wife, wrote of the famous Leslie Peltier and his comet seeking Merry Go Round observatory...

After he left the farm and moved to Delphos, where he is designer for a furniture factory, Peltier built his second observatory in his back yard. It is even smaller and more economical than the first. We walked out to it, a simple white box about six feet square, resting on a concrete foundation at the edge of a dahlia garden next to a patch of late sweet corn. The sheet metal of its flat roof was below the level of my eyes. This observatory, in which Peltier has discovered five of his comets, was made mainly from odds and ends. Its total cost was fifteen dollars -less than the amount paid for the original spyglass telescope.

He swung open the door. On hot summer nights it is held ajar by the pressure of a down-bent portion of the edge of the metal roof; in winter weather it is kept shut by means of a simple hook and eye. Everything about the observatory is unpretentious, often improvised The "dew shield" at the end of the telescope is merely a sheet of corrugated cardboard held loosely around the barrel by a strand of wire. It can be slipped out of the way when the telescope is lowered into the box observatory and the opening in the roof is closed to make the interior watertight.

I peered inside. Just within the door one half of the front seat of a junkyard automobile had been mounted behind the eyepiece of the telescope. I eased myself into this seat and looked around the crowded interior. The counterweights on the telescope were pieces of lead from a discarded battery. Just in front of my knees there rose a steering wheel salvaged from another junked automobile. I turned it and the whole box of the observatory began rotating on small flanged wheels that followed the circle of a single rail mounted on the concrete foundation. Above my right hand a disk of wood carried a knob at its edge. Winding this disk elevated or depressed the end of the telescope. Elbow-high on my right, a shelf held a loose-leaf book of star maps and jottings on the backs of envelopes beneath a ten-watt photographic safelight in a crook-necked lamp. This faint illumination is all that is needed for making notes, and it does not affect Peltier's eyes sufficiently to upset his judgment of the comparative brilliance of distant stars. I slid out of the seat and walked back to the house. That evening, as soon as it became dark, we planned to return to this telescope that had brought first intelligence to the world of existence of nearly a dozen comets.

Through it we would watch autumn stars. At Delphos the evening came at last. And while twilight deepened into darkness we lingered over the chicken, hot biscuits, the muskmelon, the peach cobbler, the long train into darkness of a Midwestern feast Mrs. Peltier had prepared. We listened to recollections of a time, when Peltier just married, made a living collecting rocks in the southwest for the Ward's Natural History Establishment of Rochester, New York.

1950s Leslie Peltier and his Merry Go Round observatory
Photo taken by Edwin Way Teale during a visit to Delphos, Ohio



BOOK EXCERPTS CONTINUED ON NEXT PAGE

LESLIE PELTIER CONTINUED...

The Adventure of the "Merry Go Round"

It was after eight o'clock when we finally started for the observatory. At that moment the great disappointment of the trip enveloped us. Ever since the storm at Cape May the skies had been clear. For half a month afterwards the nights were cloudless and brilliant with stars. On this one evening of all those many evenings, dense overcast had spread across the sky, sheeting it from horizon to horizon, making invisible every planet, blanketing every star. It was a long time before I could accept the reality of this fact. Endlessly I turned the steering wheel that revolved the observatory. Endlessly I wound the wooden disc that raised and lowered the telescope. I was like a pilot caught above fog, seeking a hole which to escape. Everything was uniform blankness. Only once the telescope recorded light—a sudden glow of brilliant red like some rare heavenly body. It was the ruby warning lamp at the top of the radio tower.



At length I gave up. The look-forward-to experience was not for us. We had, however, met a man of lasting interest and that was worth traveling far to find; we had made friends in Delphos. But the stars and planets still moved invisible behind their veil of overcast when we bade the Peltiers good-bye that night.

Edwin Way Teale—nature writer, inside his famous hand built "Brush File" writing room, located on his property in Hampton, Connecticut. Here the birds would visit while Teale wrote his stories.



Edwin Way Teale at home

...the AAVSO

Many of the visitors to Leslie's world would also be fellow variable stargazers from the American Association of Variable Star Observers. Established in 1911 the AAVSO is comprised of amateur astronomers using their resources to help professional astronomy monitor variable star activity by recording the magnitude activity of these stars on a regular basis. Monthly reports are recorded and sent to the AAVSO headquarters.

Literally hundreds of people visited Leslie and at least one of his observatories over the years. Neighbors, Boy Scouts, Sunday Schools, Garden Clubs, Observatory Directors, and AAVSO members.



The Adventure of the "Merry Go Round"

The Adventure of the "Merry Go Round"

...the unsung hero

The story of the Merry Go Round observatory cannot be told without also remembering the sacrifice of someone who had the forethought to rescue Leslie's last remaining observatory.

After Leslie's passing in 1980, Dottie at age 70 and living alone, was left with an immense house and estate to take care of. Not wanting to get rid of anything important to Leslie, but also unable to take care of the constant maintenance these wooden observatories required.



...Dayton Daily News June 16, 1993—paraphrased

Starlight nights on a New Mexico mountaintop turned U. S. Airforce Major Roger J. Hoffman into the man who would restore a famous amateur astronomer's homemade observatory.

Major Hoffman began his research after reading Peltier's Starlight Nights. Wanting to visit the author he drove to Delphos, Ohio. Knocking on the door with no one answering, he searched out a neighbor. Learning of Peltier's death from the neighbor, Major Hoffman inquired about the observatories. Learning that they were still on the property, he investigated. It was discovered that after Ten years of non-use and weather decay, these observatories were beyond repair or restoration.

Major Hoffman says the Merry Go Round observatory is historically unique. The first of its kind. Gaining permission from Mrs. Peltier and volunteering the Miami Valley Astronomical Society, Major Hoffman relocated the observatory to his home and began teardown and new reconstruction in 1992.

One year and fourteen-hundred dollars later, the Merry Go Round observatory was reconstructed and relocated to John Bryan State Park in 1993, where it remains, to this day, still in use by the Miami Valley Astronomical Society. A second restoration of the wood structure was accomplished by the Society in 2007. Leslie's telescopes are safe with the Peltier family. Thank you Roger.

Most of the original interior metal parts of the Merry Go Round were used in the 1992 reconstruction. Model-T steering wheel, Model-T seat frame, metal counterweight arm, truck wheels and hand disc. Photos from the 2007 restoration



The Adventure of the "Merry Go Round"

MAJ. ROGER HOFFMAN SITS IN OBSERVATORY AS VISITOR LOOKS ON

Restoration in the stars

Beavercreek man fixes observatory

By Jim Babcock
DAYTON DAILY NEWS

Starlight nights on a New Mexico mountaintop turned U.S. Air Force Maj. Roger J. Hoffman into the man who would restore a famous amateur astronomer's homemade observatory.

Hoffman, a Wisconsin native now living in Beavercreek, says one thing led to another after the awesome beauty of the Los Alamos, N.M., sky reawakened his stargazer soul.

His reawakening between 1987 and '89 has caused him to build his own 12-inch telescope and erect a backyard observatory to house the instrument. But he ranks that as less impressive than the just-completed restoration project.

The object of Hoffman's satisfaction is a 6-foot square rotating observatory built 45 years ago by Leslie C. Peltier of Delphos.

Peltier was an amateur astronomer who became famous internationally for his astronomical observations and discoveries. He died in 1980 at age 80.

"Essentially what we did, through restoring and refurbishing, we re-created it," Hoffman said before he and the Miami Valley Astronomical Society devoted last weekend to giving the little observatory its first public showing.

Hoffman, who is attached to the Air Force Reserve Officer

when he and his brother bought a 3-inch Edmund Scientific telescope. He only "dabbled" back then, mostly looking at the moon, a few larger planets, he said. But the larger planets, he said, had the most interest in science. He majored in physics at the University of Wisconsin and then began his Air Force career.

His first encounter with the Dayton area was in the late 1970s while he was earning a master's degree in laser physics at Wright State University.

His interest in astronomy was rekindled while he was assigned to the Los Alamos National Laboratory as a laser research physicist.

He built his 12-inch observatory while at Los Alamos, then built his own 12-foot square observatory at home in 1989.

He explains why he named his observatory the "Merry Go Round."

"I guess I woke up on the night and just popped into my head," he said. "The M-G-R represents the first initials of my wife and daughter and second daughter, Love's name."

"The only trouble was it did not have a name that started with L."

STARLIGHT NIGHTS ON A NEW MEXICO MOUNTAINTOP TURNED U.S. AIR FORCE MAJ. ROGER J. HOFFMAN INTO THE MAN WHO WOULD RESTORE A FAMOUS AMATEUR ASTRONOMER'S HOMEMADE OBSERVATORY.

Stars

CENTRALIZED FROM A
Training Corps at Wright-Patterson Air Force Base, has assuredly respected Peltier's work more than 120,000 variable star observations and a dozen comet lines and a dozen comet lines and a dozen comet lines.

A brief account written by Hoffman notes that Peltier was so highly regarded that in 1984 the Harvard College Observatory purchased him to be the "most distinguished non-professional astronomer."

Hoffman began his research about three years ago after reading Peltier's 1987 autobiography, Starlight Nights—the Adventure of a Stargazer.

He said the book made him want to meet Peltier, so he drove to Delphos with that intent.

He learned from a neighbor that Peltier had died, but decided to visit the estate anyway to admire the equipment and observatories he had read about.

"It was kind of a shock," he said, "seeing the condition of the two observatories and the equipment—extremely bad condition—I remember I was almost to the point of having tears in my eyes."

So, I embarked on my research.

His effort led to an association with Richard Lynch, a Rhode Island amateur astronomer who is a friend of Peltier's widow.

Lynch suggested in 1991 that it would be nice to restore the small observatory to which Peltier made life of his comet discoveries.

Hoffman said the small building, which Peltier called the "Merry Go Round Observatory," is historically unique because it was the first of its kind.

Original plans called for Lynch's astronomy club, Skywatchers Inc., to sponsor the restoration and then move the observatory to a new location in Vermont. But another plan diverted the club's interest and Lynch was left seeking a new sponsor.

"So I volunteered our local group," Hoffman said. "The understanding was we would do it and simply keep the observatory in Dayton, which is a lot closer to Delphos than he was anyway."

The project began on July 14, 1992, when Hoffman and some fellow Miami Valley Astronomical Society members loaded the date and transported it to Hoffman's backyard.

Hoffman said he and other club members spent several months on the research that Peltier had started the restoration shortly after Christmas.

"I've provided most of the labor and I haven't asked for money yet," he said. "I've got at least \$1,200 in it at this point, mostly to the chagrin of my wife."

Hoffman said he determined from his research that Peltier had rebuilt the observatory at least once. He decided to duplicate the original structure, which was wood clad with a small window in each side.

The finished product contains the original child's merry go round track assembly that the observatory relies on, the original track wheels, steering wheel assembly, metal counterweight arm, truck wheels and hand disc.

"I volunteered our local group," Hoffman said. "The understanding was we would do it and simply keep the observatory in Dayton, which is a lot closer to Delphos than he was anyway."

Workers move Maj. Roger Hoffman's Peltier Observatory into the Museum of Natural History

when he and his brother bought a 3-inch Edmund Scientific telescope. He only "dabbled" back then, mostly looking at the moon, a few larger planets, he said. But the larger planets, he said, had the most interest in science. He majored in physics at the University of Wisconsin and then began his Air Force career.

His first encounter with the Dayton area was in the late 1970s while he was earning a master's degree in laser physics at Wright State University.

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"The only trouble was it did not have a name that started with L."

TALKING ABOUT THE AAVSO

Events

AAVSO members, observers, and friends have given or will be giving presentations about the AAVSO and variable stars at the following venues:

September 29-October 2, 2016—**Chris Stephan** (SET, Newton Ohio), was an invited speaker and a vendor at Michigan's largest star party, the Great Lakes Star Gaze (<http://www.greatlakesstargaze.com/>). Chris spoke on "The AAVSO and Visual Variable Star Observing".

October 1, 2016—**Stella Kafka** (KKS, Cambridge, Massachusetts) gave the presentation "Variable Stars and their Stories" at the Connecticut Star Party, Goshen, Connecticut.

October 6, 2016—**Gary Poyner** (PYG, Birmingham, England) spoke on "Historic Novae" at the Rugby Astronomical Society, Worcestershire, England.

October 20, 2016—**Stella Kafka** spoke on "The AAVSO as a resource for research" at the University of Florida.

October 24, 2016—**John O'Neill** (ONJ, Topsfield, Massachusetts, and Rush, Ireland) repeated his talk entitled "Where have all the (Bright) Novae Gone?" to the Irish Astronomical Society (members and public) at Ely House in Dublin, Ireland.

November 11, 2016—**Tom Calderwood** (CTOA, Bend, Oregon) gave a talk for the general public entitled "Arlington Touches the Stars: Peter Schwamb and the Mt. Wilson Observatories", at the Old Schwamb Mill, 17 Mill Lane, Arlington, Massachusetts. His talk told the story of fabricating the mount for the 100-inch Hooker telescope. This newsletter editor (EOW) was in attendance and reports it was a fascinating talk and was very well received.

November 17, 2016—**Eric Dose** (DERA, Topeka, Kansas) presented an "Introduction to Variable Stars" to the Northeast Kansas Amateur Astronomers' League, Topeka, Kansas. The talk and discussion covered amateur variable star photometry as well as opportunities and web tools made available by the AAVSO.

January 13, 2017—**Simone Santini** (SSIM, Prato, Italy) will give a talk for a general public astronomy course entitled "Variable stars" (Le Stelle Variabili, in Italian) at the Associazione Astronomica "Quasar" c/o Centro di Scienze Naturali, Via di Galceti 74, 59100, Prato, Italy. Topics covered will be general information about variable stars, star evolution and the role of amateur astronomers and related organizations (including AAVSO).

John Percy (Toronto, Ontario, Canada) had an unusually varied autumn of astronomy outreach, including: presentations to pre-service Physics and Chemistry teachers on how astronomy can be used to enrich their curriculum; "Amazing Universe" presentations to a well-established later-life-learners organization (audience of 150) and a brand new one (audience of 230); a talk on "Archaeoastronomy" at two branches of the Toronto Public Libraries (TPL); a talk in another TPL branch on "Common Misconceptions about the Universe: From Everyday Life to the Big Bang"; a presentation on "Toronto's Astronomical Heritage" to the University of Toronto's alumni association; and, on the next day, an astronomical walking tour on the same topic to the same group. There were two variable-star-related presentations: "The Birth, Life, and Bizarre Deaths of Stars" to a grade 12 Earth and Space Science class on November 28, and one on "Variable Stars: Action in the Sky!" to the University of Toronto Astronomy and Space Exploration Society on October 20.

Dennis Conti (CDEC, Annapolis, Maryland), Chair, AAVSO's Exoplanet Section, conducted a number of outreach sessions to further advance the practice of exoplanet observations by amateur astronomers. On October 1, 2016, Dennis was dinner speaker at AstroAssembly 2016, the annual meeting sponsored by the Rhode Island Skyscrapers Astronomical Society. Dennis also conducted a workshop on Exoplanet Observing Techniques during the meeting (on September 30). In addition, Dennis conducted a two-day workshop in San Diego, California, (October 29-30, 2016) on exoplanet observing as part of the Boyce Research Initiatives and Educational Foundation (B.R.I.E.F.) series of forums.

Thank you, speakers!

We know many of you are involved in outreach related to the AAVSO and variable stars - let us help you spread the word! Send us information about your event (upcoming or past) for inclusion in the April 2017 AAVSO Newsletter (submission deadline March 15, 2017). Many thanks for your education and outreach efforts on behalf of the AAVSO and variable star observing! ★

Ed. note: following are the Spanish language texts of the Director's and President's messages.

MENSAJE DEL DIRECTOR STELLA KAFKA

Amigos—En Noviembre de 2016 en el Mariott Boston/Burlington, tuvo lugar el 105º Encuentro Anual de AAVSO. El mismo se centró en “el rol de la AAVSO en la Era de los Grandes Relevamientos del cielo”, con representantes de Kepler/K2, KELT, TESS, Evryscope, J-Plus y LSST, quienes dieron charlas acerca de sus proyectos, y científicos de Caltech, la Universidad de Washington, el Harvard-Smithsonian Center for Astrophysics y Texas A&M debatiendo sobre la contribución del observador de AAVSO complementando la espectroscopia con grandes telescopios. Lo más destacado de nuestro encuentro fue un panel de discusión en vivo con todos esos científicos y nuestros miembros, con el fin de proveer un ida y vuelta acerca de cómo todos nosotros – científicos ciudadanos, astrónomos profesionales y no profesionales – trabajaremos mejor juntos para producir la mejor ciencia posible. Para los que estuvieron presentes en vivo o remotamente, espero que la discusión haya generado ideas para sus futuros programas de observación y que la interacción con científicos importantes les haya dado un panorama acerca de cómo esos proyectos funcionan y cómo ustedes podrán ser capaces de participar y contribuir. Sé que los miembros del panel se fueron con un mayor entendimiento de cómo comunicarse mejor con nuestros observadores, lo que necesitan de nuestra comunidad y de cuál es el rol de la AAVSO y están muy entusiasmados con discutir futuras formas de colaboración. (Pueden escuchar una grabación de la discusión en

<https://www.aavso.org/content/2016-annual-meeting-panel-discussion>.)

También se hizo evidente que la discusión era necesaria para que entendiéramos cómo podemos trabajar todos juntos. Quedaron atrás los días en que nuestros observadores solamente enviaban sus datos a nuestra base de datos sin saber o entender cómo se usaban esas curvas. Ahora los observadores prefieren tener información y un entendimiento más profundo de los objetos observados y la AAVSO está buscando formas de comunicarse directamente con los científicos que lideran varios proyectos y, como una comunidad, queremos compartir lo excitante del descubrimiento junto a aquellos que analizan nuestros datos. En la era de los “grandes datos”, somos contribuyentes, colaboradores y co-autores, mientras aprendemos todos juntos sobre el cielo variable. Y el rol de la AAVSO se está volviendo cada vez más importante a medida que seguimos adelante.

Ya vemos cómo crece el número de pedidos de observación de objetos a través de nuestras campañas y alertas. Ya vemos más y más científicos jóvenes incluir a la AAVSO en sus discusiones para obtener seguimiento desde tierra de sus objetivos, confiando a los observadores de AAVSO sus necesidades de curvas de luz. Entendemos que necesitamos asegurarnos de que nuestros observadores estén bien entrenados para volverse aún más hábiles en adquirir sus datos. Vamos camino a la fotometría CCD de alta precisión para exoplanetas y atesoramos la observación visual, de DSLR y fotoeléctrica para seguir objetos del cielo brillante. (En realidad, la AAVSO es la única en cubrir objetos brillantes, ya que todos los relevamientos terrestres saturan con estrellas más brillantes que la 8va. magnitud). En la era donde cada relevamiento producirá “miles de alertas por día”, trabajamos codo a codo con la comunidad profesional para asegurarnos de que los objetos que terminemos observando sean aquellos de gran interés para los investigadores. Nos aseguramos de que ese trabajo sea relevante y de una calidad excelente – de hecho, se supone que debemos asegurar que los datos que se envían sean de alta calidad. Nuestra base de datos ya provee de un registro continuo del comportamiento de las estrellas variables más populares (y sorprendentes) del cielo a través de nuestras observaciones visuales y aspiramos a que ese registro a largo plazo de esos objetos continúe.

Un resultado no tan sorprendente del Encuentro Anual es que necesitamos tener más de estas discusiones. Necesitamos educarnos los unos a los otros acerca de nuestras necesidades y capacidades observacionales, intereses y requerimientos. Necesitamos asegurarnos de que, como comunidad, nos movemos hacia adelante juntos. El desafío de los relevamientos será lidiar con un volumen inmenso de datos y producir catálogos precisos de objetos de todo el cielo nocturno. La astronomía está ampliando sus límites en cuanto al manejo de datos y los astrónomos están preparándose para un gran flujo de información. La mayoría de esos relevamientos tienen como objetivo resolver la naturaleza de la materia oscura, descubrir exoplanetas de tipo terrestre y estudiar galaxias distantes. Los objetos variables son un producto secundario, pero uno muy importante para todos nosotros. En este punto, el rol de la AAVSO es, más que nunca, indispensable para el progreso de la ciencia. Ningún relevamiento fotométrico es perfecto y los científicos que participan en ellos esperan que las deficiencias de sus proyectos en cuanto a cadencia, cobertura y/o color, sean resueltas por los observadores de AAVSO. No vamos a decepcionarlos. En 2017, con su apoyo y con la guía de nuestro Consejo, la AAVSO continuará su trabajo para “posibilitar

que todos, donde quiera que sea, participen del descubrimiento científico a través de la astronomía de estrellas variables.”

Que tengan un gran Año Nuevo y con mucha salud. Y, como siempre, ¡cielos claros! ★

MENSAJE DEL PRESIDENTE KRISTINE LARSEN

2017 está con nosotros y, con él, mis últimos 11 meses de servicio como su presidenta. El año pasado ha sido una carrera sin aliento, asistiendo a las reuniones de primavera y otoño, uniéndome a la directora Stella Kafka para representar a la organización en la reunión de la AAS en Florida, reclutando miembros y observadores en Stellafane en agosto y atendiendo los asuntos mucho menos glamorosos de los intrínquilos de cuidar de esta histórica y única colaboración profesional-aficionados. El año pasado ha sido ciertamente un torbellino (tenemos una nueva sección de Exoplanetas, un nuevo generador de curva de luz, actualizaciones del sitio web, miles de estrellas más en VSX y mucho más) y espero nuevas oportunidades emocionantes, no menos importante, entre ellas, ¡el eclipse solar total en agosto!

En enero pasado, en mi discurso inaugural, hice un desafío a los miembros para completar el Programa de Variables para Binoculares de la Astronomical League (AL). La necesidad de cirugía ocular el otoño pasado me frenó, pero ahora que realmente puedo usar ambos ojos cuando miro a través de binoculares, espero completar mis últimas docenas de observaciones antes del Día de San Valentín y seguir adelante para comenzar el Programa completo de Observación de Estrellas Variables de la AL. Por supuesto, todos ustedes están invitados a unirse a mí en esta aventura. Pero este mes de enero quiero plantearle un tipo diferente de desafío, uno en el cual todos pueden participar.

Una vez más, entre mis responsabilidades favoritas de este cargo es asistir a las reuniones de primavera y otoño (¡como si no lo hubiese hecho de todos modos!). Espero tener la oportunidad de hablar con usted en persona en la reunión conjunta de primavera de 2017 con la SAS, en California, o en la reunión de otoño de 2017, en Tennessee. Cada reunión es una oportunidad para reunirse con miembros y observadores y siempre es un placer ver a viejos amigos y hacer nuevos. Pero cada año no puedo dejar de notar que el grupo reunido de entusiastas de estrellas variables es, en promedio, obviamente un año más viejo. Por supuesto, en algunos aspectos, esto ciertamente supera la alternativa (ya sea yo o cualquiera de ustedes

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MENSAJE DEL PRESIDENTE CONTINUED

que no pueda asistir), pero al mirar hacia el futuro de la AAVSO necesitamos abordar un tema que se enfrenta a muchas organizaciones astronómicas: el ponernos canosos y la falta general de diversidad en la membresía de nuestras organizaciones. Muchos han debatido este fenómeno y no es mi intención relanzar esta discusión aquí. Mi intención es actuar, comprometernos a traer caras nuevas, frescas, jóvenes, diversas, entusiastas a nuestras reuniones en 2017.

Aquí es donde cada uno de ustedes puede desempeñar un papel vital, si es que están dispuestos. Aquí les presento cuatro pasos sencillos que puede seguir, dependiendo de su situación y limitaciones de tiempo y recursos:

1) Tome un papel personal en entusiasmar a alguien nuevo a el gozo de la observación de estrellas variables. Puede hacerlo a través de su club de astronomía local, escuela secundaria o universidad. Participar en fiestas de estrellas (star parties), dar una charla, ofrecerse para actuar como mentor. Si te sientes capaz, únete al Programa de Mentores de AAVSO.

2) ¿Cuántos de nosotros somos flagrantemente acaparadores de telescopios? (Vergonzosamente levante su mano) Si tiene un telescopio para principiantes que no utiliza, ¿por qué no donarlo a su club de astronomía, escuela secundaria o universidad, junto con el compromiso de demostrar su configuración y uso adecuados? Por supuesto, mientras usted está haciendo su demostración, aproveche la oportunidad para explicar cómo hacer una observación de estrellas variables. Si usted tiene una cámara CCD que no está exactamente a la altura de sus necesidades actuales, considere donarla como un “primer instrumento” a alguien que tiene un telescopio, pero carece de los recursos

para comprar una nueva cámara propia. Una vez más, comuníquese con organizaciones astronómicas cercanas si no conoce a alguien que podría darle a su bien amada “de segunda mano” un buen hogar. Tal vez usted también podría considerar la compra de un acceso a los videos de la escuela de CCD de AAVSO para el nuevo orgulloso propietario de su vieja CCD. Esto me lleva a mi tercera sugerencia...

3) Comprar una membresía de apoyo para un joven menor de 21 años de edad. Sólo cuesta \$ 37,50 dar a un joven la oportunidad de ser miembro de nuestra organización por un año completo. Usted podría proporcionar esa chispa vital que consiga engancharlo en calidad de miembro a largo plazo. Si usted no tiene una persona joven en particular en mente, pregunte a su club de astronomía local o la universidad si tienen un estudiante que ha demostrado un interés particular en estrellas variables. Tal vez usted puede hacer un acuerdo con una escuela secundaria local o universidad para financiar una membresía asociada cada año para el estudiante que muestra la mayor promesa en astronomía (o cualquier criterio que acuerde). Hacer un compromiso especial para apoyar a las mujeres jóvenes y estudiantes de grupos menos representados.

4) Si usted es un docente universitario, haga que sus estudiantes de grado participen en verdaderas experiencias de laboratorio en astronomía trabajando con datos de AAVSO y/u observando estrellas variables. Si usted no tiene un laboratorio de astronomía por separado, tome un período de lección de un semestre e introduzca a sus estudiantes al disfrute de la observación solar segura. Si sus estudiantes tienen la oportunidad de trabajar en proyectos de investigación, oriéntelos a las estrellas variables. Los proyectos de los estudiantes (ya sea completados o en curso) son bienvenidos para ser presentados

en las reuniones de primavera y otoño. Trabaje con sus estudiantes para escribir sus proyectos para su publicación en el *JAASO*. Un artículo de revista revisado por pares sin duda añade peso a su curriculum vitae o aplicación a un posgrado. El punto es conseguir que participen de AAVSO en un nivel más personal. Aproveche el hecho de que la facultad puede inscribir a los estudiantes para las reuniones de AAVSO bajo la tarifa de miembros de la familia, así como el Fondo de Becas de Participación de Estudiantes en la Reunión, que financia registros de reuniones para hasta 10 estudiantes por reunión anual. ¡Las donaciones a este fondo son, por supuesto, siempre bienvenidas!

La primera línea del Manual de Políticas y Procedimientos del Consejo de la AAVSO establece: “Es la obligación de cada miembro del Consejo dejar a AAVSO mejor de lo que la encontró”. Tomo este compromiso muy en serio, al igual que mis compañeros miembros del Consejo. Pero no podemos hacerlo solos. ¿No es que todos queremos dejar a la organización más vibrante, científicamente relevante y financieramente segura de lo que la encontramos (después de años de membresía)? ¿Quién ocupará mi lugar en la audiencia en la reunión anual de otoño de 2057? Ahora es el momento de plantar esas semillas y reclutar a la próxima generación de entusiastas de las estrellas variables. ¿Puedo contar con su apoyo en este importante esfuerzo para asegurar el futuro de nuestra organización? Espero con interés discutir esto con ustedes en los foros de AAVSO.

Hasta que volvamos a hablar, les deseo a todos ¡cielos despejados, buena salud y un exitoso y emocionante 2017! ★

A NOTE ON THE TRANSLATIONS

We are grateful to Sebastián Otero and Jaime García for providing, respectively, the Spanish language versions of the Director's and President's messages. We hope that readers of the *Newsletter* will enjoy this feature.

IN MEMORIAM

MEMBERS, OBSERVERS, COLLEAGUES,
AND FRIENDS OF THE AAVSO



Gerd-Lutz Schott

GERD-LUTZ SCHOTT (SLZ, Wesel, Germany) died August 2, 2016, at the age of 71. Gerd-Lutz contributed 500 variable star observations (mostly of S Per and SS Cyg) made between August 1967 and December 1998 to the AAVSO International Database. Gerd-Lutz was a

solar observer of sunspots and eclipses, a cometwatcher, and a serious astrophotographer, particularly of the sun, comets, and deep sky objects. He contributed sunspot observations to the AAVSO for many years (AAVSO solar observer code SCGL), and received AAVSO Solar Observer Awards (Sunspots) at the 1,500-, 2,500-, 3,000-, and 3,500-day levels, most recently in 2015. Gerd-Lutz was an active member of the Weseler Astronomischen Arbeitsgemeinschaft (WAAG). He was also a dedicated birdwatcher and nature photographer. Some of his astronomy and nature photographs may be seen online, and similar videos made by him may be seen on YouTube. We extend our sincere condolences to Gerd-Lutz's family and friends.



Allen Heasley

ALLEN S. HEASLEY (HY, Aurora, Colorado), died January 2, 2017, at the age of 87. Allen, an AAVSO member since 1964, contributed 2,614 visual variable star observations made between August 1964 and August 2005 to the AAVSO International Database.

An avid amateur astronomer since boyhood, Allen remained active throughout his service in the U.S. Marine Corps during the Korean War, and during his career as a sales executive in the steel industry.

Allen had been a very active and dedicated member of the Mahoning Valley Astronomical Society (MVAS) since 1948. Over the years, his duties in the MVAS included serving as president, treasurer, observatory director, newsletter editor, and member of the 16-inch building committee. In 1992, the MVAS bestowed Allen with Honorary Membership status in the Society.

MVAS Secretary Phil Plante writes: "In 1962 the MVAS embarked on a project to put their member-constructed 16-inch Classical Cassegrain in an observatory. Allen was instrumental in obtaining two 14 ft. diameter steel rings that the observatory dome would ride on. These rings were fabricated to within 1/4 inch out of perfectly round by Van Huffel Steel, his employer at that time. The dome was also hand built by MVAS club members using aluminum sheeting and a 'thousand' rivets. The dome is still in use today.

"With the success of the observatory it was decided it should be of use to the science of astronomy. After exploring various programs of research easily available to amateur astronomers, Allen convinced the membership that variable star observing for the AAVSO was the way to go. He then directed the

MVAS Variable Star Program from 1964 to 1985. In all, fifteen members participated during that time. By 2016 over 54,000 observations have been submitted to the AAVSO by MVAS members. Allen's own variable star observations reported to the AAVSO totaled 2,614 estimates. Allen's wife, Bette Heasley (HYB), submitted 43 estimates.

"Allen had a close friendship with George Diedrich (DHG), who was at the time president of both the AAVSO and the Ohio Turnpike Astronomers Association (OTAA). This friendship provided a source of guidance and support for developing the successful MVAS variable star program. In the early 1970s, the MVAS tried photoelectric photometry using the 16-inch Cassegrain with the guidance of [future AAVSO president] Art Stokes (SAJ), the regional expert on PEP observations.

"Allen and other members were good friends with renowned observers Leslie Peltier (P) and Carolyn Hurlless (HR). He often told stories of how he and Carolyn would observe faint cataclysmic variables with the 16-inch Cassegrain...

"On their return to Ohio in 2004, Allen and Bette attended many public star parties hosted by the MVAS, sometimes setting up his telescope to provide views for attendees. These star parties took place at local parks and sometimes at Youngstown State University. When it came time to work at the Observatory, Allen helped with painting or clean-up chores. He was always supportive of the MVAS and AAVSO. Allen was a mentor and friend to us all. For this writer, he was a guiding light in MVAS affairs for many years. With Allen's encouragement I started variable star observations in 1991, finally joining the AAVSO in 1997.... Allen and Bette [who died in 2015] will be forever missed and loved by all of us in the MVAS."

The AAVSO is grateful for dedicated and loyal members and observers like Allen. We extend our deepest sympathies to his family and many friends.

USING THE SSP-4 PHOTOMETER TO COLLECT SOLAR INFRARED DATA FOR THE J AND H BANDS

RODNEY H. HOWE (HRHA, AAVSO SOLAR SECTION COORDINATOR)

Abstract Early work of stellar astronomers (Johnson 1962) established the nomenclature for the infrared wavelength bands in the 1000 to 5000 nm range known as J, H, K, L, and M. This study uses the AAVSO SSP-4 photometer to collect solar data in the J and H bands, where the central wavelengths of these bands are roughly 1300 nm for the J band and 1600 nm for the H band. The continuum radiation from the sun is formed at the deepest level in the sun, around 40 km from the surface at 1600 nm (H band), and then the spectral continuum begins as the height increases with increasing wavelength in the infrared spectrum (Penn 2008). From data collected here the H band has slightly larger values than the J band, however, there are distinct crossovers on different days of observing. The telescope used is a 60-mm LUNT, a blocking factor of 12 with a tilt-etalon filter (<https://luntsolarsystems.com/product/l560tds/>), which can be adjusted to look at ‘white light’, and in that configuration the SSP-4 photometer captures the sun’s disc centered in the SSP-4 eyepiece (1 inch focal length ~ 25.4 mm).

Introduction The Orion equatorial mount has an Astro-view Right Ascension motor, which tracks the sun, and for an average data capture session of about 10 minutes, it is quite stable. Capturing data in the early morning is best as the weight of the SSP-4 helps the little RA motor, rather than in the afternoon when the balance would be against the direction of the Earth’s rotation.

Some photos of the setup on the deck in the early morning sun. The telescope is lined up to the sun with a ‘sun finder’.

Methods Figure 1 is a screen of SSP-4 software display, where you can see a capture of the recordings for the J and H band daily averages. The computer is not far from the SSP-4 so that once the scope is tracking the sun it’s just a matter of changing the filters for about 10 to 12 two-second data recordings per band, and doing it 5 or 6 times a session. A daily session may take 10 minutes.

Figure 2 shows six weeks of readings in the J and H band, notice how close these data are to each other and that they cross over one another on different

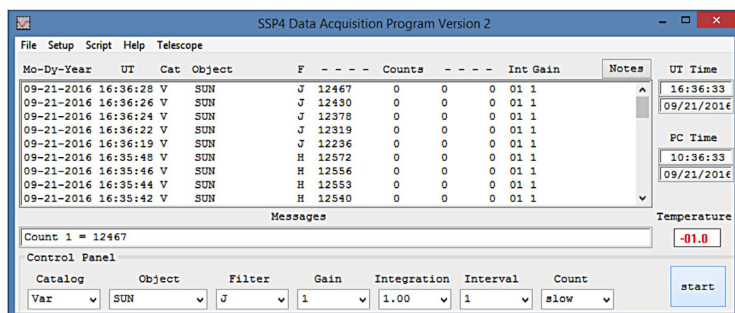


Figure 1. SSP-4 software display screen



The author with his equipment

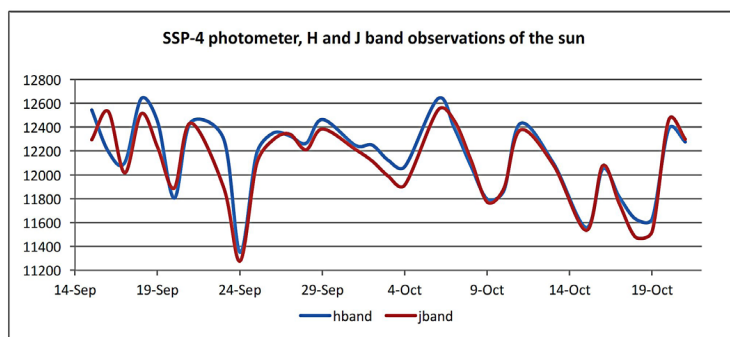


Figure 2. J- and H-band readings

days. This could be due to the Earth’s atmosphere; however most of these days there was good to excellent seeing (at least in the visual!).

The SSP-4 photometer data are collected in one dimension, one band at a time, which means these data cannot be linked to the same timestamp (see SQL code, Appendix A). The SSP-4 data also have to be aggregated over this larger time frame, perhaps by hour or by day (see R code, Appendix A).

Figure 3 on the left is the solar disc looking through the Hyperion Mark III eyepiece at 12 mm focal length; to the right is the SSP-4 eyepiece with a 25 mm focal length and the 1 mm reticle in the center (with some painting over the reflected bright spot). The SSP-4 uses an InGaAs diode the size of the reticle (roughly covering the IR frequencies from 1000 to 1800 nm, Optec Technical Manual 2001).

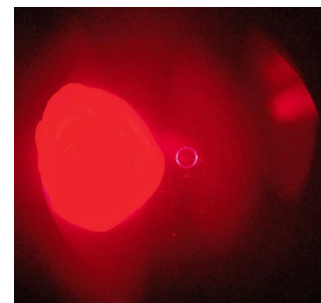


Figure 3 on the left is the solar disc looking through the Hyperion Mark III eyepiece at 12 mm focal length; to the right is the SSP-4 eyepiece with a 25 mm focal length and the 1 mm reticle in the center (with some painting over the reflected bright spot).

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SSP-4 PHOTOMETER CONTINUED...

Results Figure 4 shows six weeks of raw daily data aggregates with spline fits and error bars for the J and H bands. The red dashed line is a polynomial fit with 7 degrees of freedom; blue solid lines are connecting the mean daily values. With all the variability in the J and H bands it's very possible we're looking at background thermal radiation from the SSP-4 detector. The SSP-4 may not be cryogenically cooled enough to eliminate the background noise enough to discriminate a foreground signal. Also, the molecules in the Earth's atmosphere absorb and emit their own light, especially in the visible and near-IR portion of the spectrum, and any ground-based observation is subject to contamination from these telluric (earth-originating) sources [https://en.wikipedia.org/wiki/Telluric_contamination].

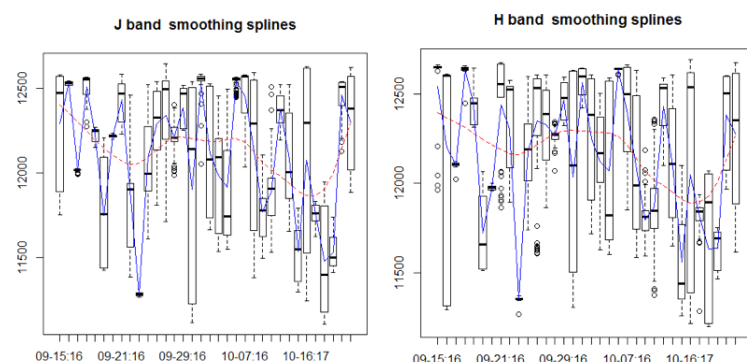


Figure 4. Raw data plots

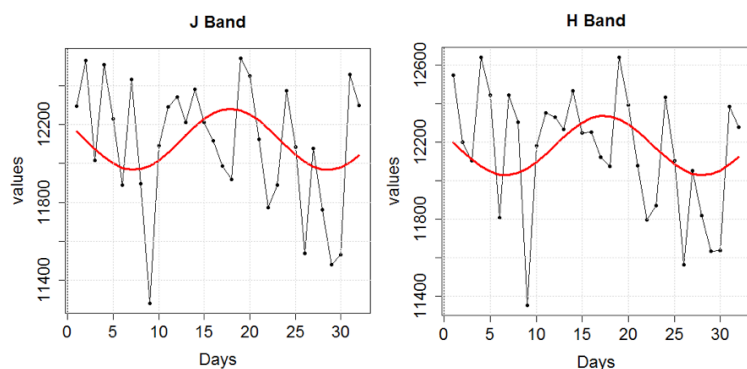


Figure 5. J- and H-band period plots

Discussion The J band covers approximately 1300 nm and the H band at 1600 nm in the near-infrared, which may distinguish plasma motion of the solar disc if we can discriminate against the telluric contamination of the Earth's atmosphere. The SSP-4 uses an InGaAs diode the size of the reticle (roughly covering the IR frequencies from 1000 to 1800 nm), and the H band covers the spectral Fe I line at 1565 nm (Ramsauer 1995). So, what we may be seeing are fluctuations in Fe I emissions of IR very close to the surface of the sun. However, the only way to understand what may be going on would be to have other observers with similar systems at a different longitude to compare observations.

Figure 5 shows a period of 21.3-day rotation with the J and H band given this small data set of 30 days (six weeks, with some gaps). This is very preliminary, but it is a start! (Foster 2010).

Given a two-month evaluation, I can see no way to determine if these differences between the J and H band data values are due to telluric scattering in the Earth's atmosphere or actual temperature differences on the sun's photosphere.

Acknowledgement Thanks go to the AAVSO for lending the SSP-4 photometer.

References

Foster, G. 2010, *Analyzing Light Curves, A Practical Guide*, Lulu Press, Rprog.R code: <https://www.aavso.org/software-directory>

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Optec. 2001, *Model SSP-4, Solid-State Infrared Photometer, Technical Manual for Theory of Operation and Operating Procedures*, Optec, Inc. Optical and Electronic Products, Smith St., Lowell, MI 9331; <http://www.optecinc.com>
Penn, M. J. 2008, 'Infrared Solar Physics', National Solar Observatory, 950 N Cherry Ave., Tucson, AZ 85726. email: mpenn@nso.edu <http://www.noao.edu/noao/staff/mpenn/>

Ramsauer, J., et al. 1995, 'Interesting lines in the infrared solar spectrum. II. Unblended lines between $\lambda 1.0$ and $\lambda 1.8 \mu\text{m}$ ', <http://adsabs.harvard.edu/abs/1995A%26AS..113...71R>; catalogue from <http://vizier.cfa.harvard.edu/viz-bin/VizieR?-source=J/A+AS/113/71>

Appendix A, Computer Code

```
#Python code for the ssp4 raw data file read and load to a sqlite3 database, G
Richardson.
import os.path
import sqlite3 as sqlite
from datetime import datetime
#import os
import csv

project_path = "c:/ssp4data/"
database = sqlite.connect(os.path.join(project_path, "ssp4.sqlite"))
cursor = database.cursor()
#comment out next line if table already exists
#sql = "create table ssp4data (year text, month text, day text, hh text, mm text,
g text, band text);"
database.execute(sql)
database.commit()

class Stuff:
    def __init__(self, dirname, dbName, tableName):
        self.dirname = dirname
        self.tableName = tableName
        self.indices = (
            (7, 11), # year
            (0, 3), # month
            (41, 42), # band
            (4, 6), # day
            (12, 20), # blank decimal hour (hh)
            (44, 54), # counts number
            (26, 29)) # test for counts
```

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SSP-4 PHOTOMETER
CONTINUED...

```

self.N = len(self.indices)

def parse(self, line):
    tup = []
    for n in range(self.N):
        ix = self.indices[n]
        field = line[ix[0]:ix[1]].strip()
        tup.append(field)
        #if (ix[0] == 7 and field >= "G"): print "%3d  %2d,%2d
"%s" % (n, ix[0], ix[1], field )
        #print "%3d  %2d,%2d  "%s" % (n, ix[0], ix[1], field )
    return tup

def processFile(self, filename):
    fname = os.path.join(self.dirname, filename)
    f = file(fname)
    while 1:
        #for k in range(2):
            try:
                L = f.next()
            except StopIteration:
                break
            values = self.parse(L)
            self.insertLine(values)
    f.close()

def insertLine(self, vals):
    tmp = ''
    for v in vals:
        tmp += str(v)+',' # remove trailing comma
    tmp = tmp[:-1]
    year = tmp[0:4]
    month = tmp[5:7]
    #day = tmp[10:11]
    band = tmp[8:9]
    hh = tmp[13:15]
    mm = tmp[16:18]
    counts = tmp[22:27]
    day = tmp[10:12]
    sql = "insert into %s values ('%s','%s','%s','%s','%s','%s','%s','%s');"
    % (self.tableName, year, month, day, hh, mm, counts, band)
    #print ""%s"" "%s"" "%s"" % (tmp[0:34],tmp[21:27],sql)
    #if (band == "H"): print ' %s %s %s %s %s %s ' % (year, month, day,
counts, band)
    database.execute(sql)
    database.commit()

dir = r"c:/ssp4data/"
s = Stuff(dir, "dbTest", "ssp4data")
f3 = ('20160914.raw', '20160915.raw', '20160916.raw', '20160917.raw', '20160918.
raw', '20160919.raw', '20160920.raw', '20160921.raw')
#f4 = ('20160922.raw', '20160923.raw', '20160924.raw', '20160925.raw')
#f5 = ('20160926.raw', '20160927.raw', '20160928.raw', '20160929.raw', '20160930.
raw', '20160931.raw')
#f0 = ('20161001.raw', '20161002.raw', '20161003.raw', '20161004.raw', '20161005.

```

```

raw', '20161006.raw')
#f1 = ('20161007.raw', '20161008.raw', '20161009.raw', '20161010.raw', '20161011.
raw', '20161012.raw', '20161013.raw')
files = f3
for f in files:
    s.processFile(f)

```

SQL for pulling data from Sqlite3 database:

```

drop view hband;
create view hband as
select year,month,day,hh,band,g
from ssp4data
where band = "H"
and g >= '11000';

```

```

drop view jband;
create view jband as
select year,month,day,hh,band,g
from ssp4data
where band = "J"
and g >= '11000';

```

```

.mode csv
.output sunview.csv

```

```

select h.month,"-",h.day,
round(avg(h.g),3), round(avg(j.g),3)
from hband h, jband j
where h.year = j.year
and h.month = j.month
and h.day = j.day
group by h.month, h.day;

```

R code for analyzing H and J band data from the SSP4:

```

# Work with ssp4 data hband compared to jband data
# http://stat.ethz.ch/R-manual/R-patched/library/stats/html/smooth.spline.html

```

```

# Run a time series analysis 2 columns of (hband,jband) data
# Initialization
library(MASS)
library(stats) # location of the time series modules
library(graphics)
library(lattice)
library(rgl)

```

```

# put the data SSP4 Hband_Jband.csv in R
setwd("C:/R/SSP4/")
WD <- getwd()

```

```

#### Specify the name and address of the data file, #####
#### read it in, save it as RData

```

```

infile <- paste(WD, "sunR.csv", sep="/")
ssp4 <- data.frame(read.csv(infile, header=TRUE))
outfile <- paste(WD, "ssp4.RData", sep="/")

```

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SSP-4 PHOTOMETER CONTINUED...

```
save(ssp4, file=outfile, ascii=FALSE)
```

```
summary(ssp4)
```

```
#require(graphics)
```

```
attach(ssp4)
```

```
plot(date, hband, main = "H band smoothing splines")
```

```
ssp4ma.spl <- smooth.spline(date, hband)
```

```
(ssp4ma.spl)
```

```
## This example has duplicate points, so avoid cv = TRUE
```

```
lines(ssp4ma.spl, col = "blue")
```

```
lines(smooth.spline(date, hband, df = 7), lty = 2, col = "red")
```

```
legend(7,-90,c(paste("default [C.V.] => df =",round(ssp4ma.spl$df,1)),  
"s( * , df = 17)"), col = c("blue","red"), lty = 1:2,  
bg = 'bisque')
```

```
x11()
```

```
detach()
```

```
## Residual (Tukey Anscombe) plot:
```

```
plot(residuals(ssp4ma.spl) ~ fitted(ssp4ma.spl))
```

```
abline(h = 0, col = "gray")
```

```
x11()
```

```
#require(graphics)
```

```
attach(ssp4)
```

```
plot(date, jband, main = "J band smoothing splines")
```

```
ssp4ma.spl <- smooth.spline(date, jband)
```

```
(ssp4ma.spl)
```

```
## This example has duplicate points, so avoid cv = TRUE
```

```
lines(ssp4ma.spl, col = "blue")
```

```
lines(smooth.spline(date, jband, df = 7), lty = 2, col = "red")
```

```
legend(1,-100,c(paste("default [C.V.] => df =",round(ssp4ma.spl$df,1)),  
"s( * , df = 10)"), col = c("blue","red"), lty = 1:2,  
bg = 'bisque')
```

```
x11()
```

```
detach()
```

```
## Residual (Tukey Anscombe) plot:
```

```
plot(residuals(ssp4ma.spl) ~ fitted(ssp4ma.spl))
```

```
abline(h = 0, col = "gray")
```

```
x11()
```

```
#### Set as time series #####
```

```
#m = -2.5 * log(jband) + 4.5
```

```
#load("ssp4ma.spl")
```

```
attach(ssp4)
```

```
ssp4ma.spl <- smooth.spline(ssp4)
```

```
(ssp4ma.spl)
```

```
tmp <- ts(ssp4)
```

```
tsp(tmp)
```

```
colMeans(tmp)
```

```
sd(tmp)
```

```
apply(tmp,2,min)
```

```
apply(tmp,2,max)
```

```
plot.ts(tmp, main="SSP4 H, J", xlab="Time", ylab="Daily Counts", ylim(0,5))  
x11()
```

```
plot.ts(tmp[,2:3], plot.type="single", col=c(2,3), main="Daily Counts", xlab="H  
red, J green", ylab="H and J band values")
```

```
x11()
```

```
plot.ts(hband, main=" hband", xlab=" day_counts", ylab="hband ")
```

```
x11()
```

```
plot.ts(jband, main=" jband", xlab=" day_counts", ylab="jband ")
```

```
x11()
```

```
plot.ts(hband, plot.type="single", col=c(1,2), main=" hband", xlab=" day_counts",  
ylab=" hband ")
```

```
x11()
```

```
plot.ts(jband, plot.type="single", col=c(3,4), main=" jband", xlab=" day_counts",  
ylab=" jband ")
```

```
x11()
```

```
acf(tmp[,2], main="hband")
```

```
x11()
```

```
acf(tmp[,3], main="jband")
```

```
x11()
```

```
jband <- tmp[,3]
```

```
#jband <- c(-2.5 * log10(jband) - 10.5)
```

```
days <- tmp[,1]
```

```
hband <- tmp[,2]
```

```
open3d()
```

```
# Needs to be a bigger window than the default
```

```
par3d(windowRect = c(100, 100, 612, 612))
```

```
Sys.sleep(0.1) # Allow sluggish window managers to catch up
```

```
parent <- currentSubscene3d()
```

```
mfrow3d(1, 1)
```

```
plot3d(days,hband,jband)
```

```
#plot3d(hband,jband,date)
```

```
grid3d(c("x", "t", "z"), col = "red", lwd = 1, lty = 1, n = 31)
```

```
aspect3d(.75, .75, .5)
```

```
legend3d("top", c("SSP4 H, J", "X-axis in days"), pch = c(1, 12))
```

```
useSubscene3d(parent)
```



PHOTOELECTRIC PHOTOMETRY PROGRAM UPDATE

JIM KAY (KJMB, AAVSO PEP SECTION LEADER)

Observations Since this is the first newsletter of the year a summary of the observations made by the PEP section in the previous year is appropriate. We had a productive year, which in keeping with our astronomical roots I am defining to be from winter solstice to winter solstice. So from December 21, 2015, to December 21, 2016, the section's twelve active observers contributed 2,625 observations of 110 stars, in seven bands covering both visual and infrared wavelengths.

The stars observed were of various types with 64 semiregular stars and 14 eclipsing binaries. The remaining 32 stars were a mix of Miras, symbiotics (ZAND), and Cepheids, as well as several that are now considered constant. The top dozen semiregular stars observed, along with the number of observations, are R Lyr 107, XY Lyr 98, ST Her 68, X Her 66, TV UMa 64, Y CVn 60, g Her 58, TU CVn 57, HK Lyr 47, alf Ori 46, V2119 Cyg 44, and EU Del 37. Eclipsing binaries observed consisted of TT Her 138, SW Lac 120, b Per 106, GO Cyg 94, V382 Cyg 80, LS Del 79, CN And 72, V1073 Cyg 69, bet Lyr 46, eps Aur 12, alf Com 6, V2291 Oph 5, eta Gem 2, and SZ Psc 1. Two S Doradus stars were observed: P Cyg 90 and rho Cas 81. These two stars were also used to test our inter-observer consistency, which is detailed in the *AAVSO Annual Report*.

Other frequently observed stars included T CrB 83, CH Cyg 61, V1687 Cyg 61, V636 Her 58, V398 Lyr 47, and BK Vir 16. Observers are encouraged to continue to observe these stars to focus our efforts.

Observation counts by observer are given below:

AAVSO International Database PEP data contributors 2015–2016

BSO	Scott Burgess	Maine	8
BVE	Erwin van Ballegoij	Netherlands	30
CCB	Charles Calia	Connecticut	51
CTOA	Tom Calderwood	Oregon	86
FXJ	James Fox	New Mexico	198
KCD	Carl Knight	New Zealand	30
KPL	Paul Kneipp	Louisiana	87
KJMB	James Kay	Vermont	122
LPD	Patrice LeMarchand	France	49
PGD	Gerald Persha	Michigan	1937
RPT	Patrick Rochford	Alabama	14

A well-deserved thank you goes to all these observers for continuing to provide highly accurate observations of bright stars.

PEP Manual A new PEP manual has been added to our website. This manual was written by Tom Calderwood and has gone through several reviews. The manual is very readable and covers observation and data reduction techniques, as well as conventions used by the PEP subsection for data submittal. This is a great resource and will be used as the primary text in the upcoming CHOICE course on PEP in the 21st Century.

PEP CHOICE Course An AAVSO CHOICE course entitled "PEP in the 21st Century" will be offered from May 8 through June 2 and will cover fundamental photometric measurement using single channel Photoelectric Photometers.

Observational and data reduction techniques and exercises are included. Both active and potential PEP observers are encouraged to enroll in this course. A more detailed syllabus is available on the AAVSO website. I am working to have two SSP3 photometers checked out and ready to loan by the time this course starts, so if you are interested in PEP but do not have a photometer contact me and we may be able to arrange a loan.

Constant Stars A section on constant stars may seem out of place in a newsletter on variable star observing. However, stars that are relatively constant are extremely valuable to observers who want to calibrate their equipment, or look for systematic errors in their observations compared to a standard system or to other observers. The PEP section has selected several stars that are believed to be constant that are currently in the AAVSO database. These stars are alf Cas, RU Cas, 1 Gem, and SY UMa. The star parameter list on the website has been updated to include these stars so that we use consistent comp and check stars for their observations. I encourage you to observe these stars and compare your results to other PEP observers. I am putting out a challenge to our observers to demonstrate less than 0.01-mag systematic error between us. Good Luck, and clear skies.

Error Quantification See the 2015–2016 *Annual Report* (to be published soon) for a description of our progress last year to reduce our systematic errors. It describes a study done by four of our observers to estimate observation and data reduction consistency between observers. PEP continues to fill a gap for highly accurate photometry of bright stars and fills a niche not covered by most of the upcoming all-sky survey. These data will become even more valuable to researchers as we reduce our systematic errors.

Infrared Photometry Near_IR photometry continues, with two observers providing 44 observations of Betelgeuse in the J and H bands. Photometry in these bands is expected to increase in the coming years as two other observers are working on H band calibrations using new custom filters specified and procured by Tom Calderwood (CTOA). The goal is to improve the transformation to the standard system.

Metadata Metadata are data that describe our data. Such things as the telescope used for an observation, the transformation and extinction coefficients, and the observer's location are metadata. The new PEP manual takes a first pass at recommending metadata for inclusion in the comment field of the extended file format for observations. I encourage you to take a look and include this information in your data submittals.

As always, an open invitation goes out to anyone wanting to try PEP. We have a range of long term and new observers, but could always use more. More information is available at the AAVSO PEP webpages at:

<http://www.aavso.org/aavso-photoelectric-photometry-pep-program> ★

YSO SECTION

MIKE POXON (POX), AAVSO YOUNG STELLAR OBJECTS SECTION LEADER

‘Tis the season to be jolly, all those lovely YSO’s are with us again! Bearing in mind its recent interesting behavior, I hope lots of you will continue to observe RW Aur. As of late November-December 2016 it appears to be going through another fade, though so far not as deep as a few months back. While you’re at RW Aur, don’t forget there are several other, not nearly-so-well-observed stars of similar type close by—AB Aur (always visible in binoculars!) with its T Tau type companion SU Aur, while in the same field we have GM Aur and GZ Aur, with UY Aur not far away. HH Aur is a bright YSO which has been unobserved for some time, with the most recent observation being March 2014—but it’s easy to find and suitable for small scopes, despite the fact that it appears to show little variation from about 8.6mv so may be more suitable for CCD monitoring. Don’t forget that quite a few YSOs go through periods of inactivity.

Just over the border in Taurus we have a host of interesting and active stars, again many of them quite close together. I always “do” CQ Tau and RR Tau together, with the rather fainter and less active AD Tau in its little “fractal cross” a close third. These three all lie inside the bright triangle of 116, 121, and 125 Tau. CQ Tau especially is extremely active, sometimes too variable to follow properly, if that makes sense!

Looking forward to a cloudy Xmas day—otherwise let’s face it, if you’re anything like me you’re like a bear with a sore head if it’s clear but you can’t observe due to being too full of food and wine. ★

AAVSO OBSERVING CAMPAIGNS UPDATE

ELIZABETH O. WAAGEN (WEO), AAVSO SENIOR TECHNICAL ASSISTANT (SCIENCE OPERATIONS)

Each campaign is summarized on the AAVSO Observing Campaigns page (<http://www.aavso.org/observing-campaigns>), which also includes complete lists of all *AAVSO Alert* and *Special Notices* issued for each campaign. *AAVSO Alert Notices* are indexed at <https://www.aavso.org/alert-notice-archive> and *AAVSO Special Notices* at <https://www.aavso.org/special-notice-archive>.

It’s been an extremely busy quarter for our observers!

Campaigns concluded since October 1, 2016

The campaign on the extremely interesting binary **AR Sco** from Dr. Thomas Marsh (University of Warwick) and colleagues requesting fast-cadence optical photometry mid-August through mid-September in support of XMM observations (*AAVSO Alert Notice 548*) has concluded. This fascinating binary system was the subject of an exciting paper in the July 2016 issue of *Nature* (“A radio-pulsing white dwarf binary star”, T. R. Marsh et al.) (<http://www.nature.com/nature/journal/vaop/ncurrent/full/nature18620.html>). A pre-print version is available at arXiv (<http://arxiv.org/abs/1607.08265>). A press release from the European Southern Observatory is available (<http://www.eso.org/public/news/eso1627/?lang>). Two observers contributed 1,590 multicolor observations to this campaign.

On September 1, Dr. Christian Knigge (University of Southampton) and colleagues requested coverage of the Z Cam-type cataclysmic variable **RX And** in support of target-of-opportunity observations to be obtained by Chandra. Visual observations and V photometry were requested through the 2016 observing season, or until concluded by Dr. Knigge (*AAVSO Alert Notice 549*). RX And was successfully observed in October and the campaign was concluded at the end of the month. 127 observers contributed 23,172 multicolor observations to this campaign.

On September 20, Dr. Mark Reynolds (University of Michigan) and colleagues requested that AAVSO observers monitor the cataclysmic variable

GDS_J1701281-430612 in support of HST/COS observations scheduled for early October. VRI photometry was requested through October 2016 for this system, which is ~15.2–16.2 R (V–R=0) (*AAVSO Alert Notice 551*). Three observers contributed 4,012 multicolor observations to this campaign.

The request in late September by Dr. Kirill Sokolovsky (National Observatory of Athens and Sternberg Astronomical Institute, Moscow State University) for AAVSO monitoring (multicolor photometry through at least the end of October) of the **Gaia16aye microlensing event** predicted for early October 2016 was carried out (*AAVSO Alert Notice 552*). 29 observers contributed 4,959 multicolor observations to this campaign from September 20 through December 2016.

Marcella Wijngaarden and Kelly Gourdji’s (graduate students at the University of Amsterdam/Anton Pannekoek Institute for Astronomy) request for AAVSO observers’ assistance during the month of October in providing optical multicolor photometry in support of their high-resolution spectroscopy of the peculiar High Mass X-ray Binary **V420 Aur (HD 34921)** being carried out at La Palma (*AAVSO Alert Notice 554*) was successfully concluded. 9 observers contributed 3,472 multicolor observations to this campaign.

The campaign requested in mid-October by Dr. Edward Sion (Villanova University) to monitor the recurrent nova **CI Aql** in support of observations with the HST Cosmic Origins Spectrograph scheduled for October and November 2016 as part of a study on short orbital period recurrent novae as Supernovae Type Ia progenitors (*AAVSO Alert Notice 558*) concluded successfully, as AAVSO observers reported the star was not in outburst and the HST COS observations were carried out. Ten observers contributed 32 multicolor observations to this campaign.

The campaign by Dr. Franco Giovannelli (Istituto di Astrofisica e Planetologia Spaziali di Roma) requesting AAVSO monitoring of **V725 Tau**, the Be star in the high-mass X-ray transient A0535+26/HDE245770, in order to plan for the X-ray outburst predicted to follow 8 days after the optical brightening that occurs at periastron passage (*AAVSO Alert Notice 562*), ran mid-November to early December. 17 observers contributed 802 multicolor observations to this campaign.

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The campaign on the bright star **b Per (HD 26961)** (*AAVSO Alert Notice 563*), launched at the beginning of December at the request of Dr. Donald F. Collins (AAVSO member, Swannanoa, North Carolina) and colleagues Dr. Robert Zavala (U.S. Naval Observatory, Flagstaff Station), Dr. Anatoly Miroshnichenko (University of North Carolina at Greensboro), and Jason Sanborn (Lowell Observatory), was successfully concluded. The predicted eclipse, or transit, of the third star across the system as it was predicted to transit the inner pair of the triple system during the week centered on December 15, 2016, was observed. This campaign was the fourth in a series by the AAVSO to observe transits among the three stellar components of this system in order to assist in untangling the complicated orbital relationships. Links to more information about this system and an animation, as well as to the three earlier AAVSO campaigns, may be found in the *Alert Notice*. 17 observers contributed 8,173 multicolor observations to this campaign December 2–December 31, 2016.

The campaign requested in mid-December by Roque Ruiz-Carmona (Ph.D. candidate, Institute of Mathematics, Astrophysics and Particle Physics, Radboud University Nijmegen, The Netherlands) for AAVSO assistance with his campaign to observe a set of **21 eclipsing cataclysmic variables (CVs)** with the William Herschel Telescope at La Palma in mid-December (*AAVSO Alert Notice 564*) was successfully concluded. Observers had been asked to obtain an image of each target two nights in a row so Ruiz-Carmona could examine them to determine his final list of observing targets. Time constraints on when the images had to be taken and when they had to be uploaded to the AAVSO forum discussion thread were extremely tight. The targets were imaged by AAVSO observers and Ruiz-Carmona was able to determine his final target list.

Campaigns initiated or re-activated since October 1, 2016

Special Note on beta Pic The BRiGht Target Explorer Constellation (BRITE-Constellation) satellite suite is studying the “stellar structure and evolution of the brightest stars in the sky and their interaction with the local environment.” The AAVSO is part of the BRITE-Constellation Ground Based Observations Team (GBOT), supporting cutting-edge science from the BRITE-Constellation satellites and coordinating with BRITE-Constellation scientist Dr. Konstanze Zwintz (Universitaet Innsbruck) and her team. The delta Scuti star **beta Pic (NSV 16683)** (3.80–3.86V) is one of the BRITE stars being focused on during this season and through 2017–2018 as a transit of the star’s planet’s Hill sphere (the region around a planet in which it dominates the attraction of satellites) is expected. The AAVSO’s webpage on the BRITE target stars was updated in November with information on beta Pic from Dr. Zwintz, and AAVSO observers are encouraged to observe this star (*AAVSO Alert Notice 566*, <https://www.aavso.org/aavso-alert-notice-566>). Its brightness makes bet Pic well suited to PEP and DSLR photometry; CCD photometry is also possible. As the amplitude of this star is very small, visual observations are very difficult but are welcome. High-precision BVR photometry and time-series have been requested. Please see the Alert Notice for information and observing instructions. Another campaign on bet Pic that is underway is being coordinated by Dr. Iva Laginja (Leiden Observatory, The Netherlands). Dr. Laginja writes “that observations are requested beginning now to help build a photometric baseline in preparation for the transit across the star of debris surrounding the planet predicted to occur between March 2017 and March 2018.” For details, please see http://home.strw.leidenuniv.nl/~laginja/documents/beta%20Pic%20photometry_ENG.pdf

At the beginning of October, Marcella Wijngaarden and Kelly Gourdji (graduate students at the University of Amsterdam/Anton Pannekoek Institute for Astronomy) requested AAVSO observers’ assistance through October in providing optical

multicolor photometry in support of their high-resolution spectroscopy of the peculiar High Mass X-ray Binary **V420 Aur (HD 34921)** being carried out at La Palma 2016 October 7 through 17 (*AAVSO Alert Notice 554*). The system is thought to contain a B[e] star with a dense plasma region, an accretion disk around a neutron star, a shell, and circumstellar regions of cold dust. This campaign was successfully concluded (see above).

Also at the beginning of October, Dr. Ashley Pagnotta (Louisiana State University) requested AAVSO assistance in monitoring the recurrent nova **V2487 Oph** in order to catch and observe its next outburst. Dr. Pagnotta wrote in *AAVSO Alert Notice 556*: “V2487 Oph is a recurrent nova that was first seen to erupt in 1998. During a search of the Harvard College Observatory plate archives for previous eruptions, we found one that was recorded in 1900. Based on the speed and magnitude of the eruption, and the coverage of the archival plates and other detection sources, we calculated how often V2487 Oph would have to erupt for us to have actually detected one random outburst on the plates, which is about once every 18–20 years.... As we are now 18 years from the previous (1998) eruption, we request regular AAVSO observations to help us detect the next eruption of V2487 Oph.” Observers were requested to make nightly observations in V or Clear once or twice a night. Since this campaign began October 4, 7 observers have contributed 11 multicolor observations to it.

In mid-October, Dr. Edward Sion (Villanova University) requested AAVSO observers’ assistance in monitoring the recurrent nova **CI Aql** in support of observations with the Hubble Space Telescope Cosmic Origins Spectrograph scheduled for October 31–November 2, 2016, and November 3–November 5, 2016. The observations were part of a study on short orbital period recurrent novae as Supernovae Type Ia progenitors (*AAVSO Alert Notice 558*). In particular, he needed to know 24 hours prior to the HST COS observations that CI Aql was not in outburst, in order to protect the instrumentation. Observers were asked to keep an eye on CI Aql with nightly snapshot images (V preferred) until November 12. This campaign was successfully concluded (see above).

Also in mid-October, Kelly Gourdji and Marcella Wijngaarden (graduate students at the University of Amsterdam/Anton Pannekoek Institute for Astronomy) requested AAVSO observers’ assistance in providing optical multicolor photometry of **CI Cam** (the B[e] optical counterpart of a HMXB system) in support of their high-resolution spectroscopy with the Mercator telescope + Hermes spectrograph in La Palma through January 2017 (*AAVSO Alert Notice 559*). CI Cam was in outburst and expected to return to minimum in January. 24 observers have contributed 1,813 multicolor observations to this campaign since it began October 19.

In mid-November, Dr. Franco Giovannelli (Istituto di Astrofisica e Planetologia Spaziali di Roma) requested AAVSO assistance in monitoring **V725 Tau**, the Be star in the high-mass X-ray transient A0535+26/HDE245770, in order to plan for the X-ray outburst that follows 8 days after the optical brightening that occurs at periastron passage. Periastron passage was to occur on 16 November 2016, so BVRI (especially V) coverage was needed beginning immediately and continuing for at least 15 days after periastron, until December 2 (*AAVSO Alert Notice 562*). This campaign was successfully concluded (see above).

In early December, a campaign on the bright star **b Persei (HD 26961)** was launched at the request of Dr. Donald F. Collins (AAVSO member, Swannanoa, North Carolina) and colleagues Dr. Robert Zavala (U.S. Naval Observatory, Flagstaff Station), Dr. Anatoly Miroshnichenko (University of North Carolina at Greensboro), and Jason Sanborn (Lowell Observatory). They requested high

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CAMPAIGNS UPDATE CONTINUED...

time-resolution observations of *b Per* (not beta Per) during the predicted eclipse, or transit, of the third star across the system as it was predicted to transit the inner pair of the triple system during the week centered on December 15, 2016 (*AAVSO Alert Notice 563*). This campaign was the fourth in a series by the AAVSO to observe transits among the three stellar components of this system in order to assist in untangling the complicated orbital relationships. Links to more information about this system and an animation of the orbits, as well as to the three earlier AAVSO campaigns, may be found in the *Alert Notice*. This campaign was successfully concluded (see above).

In mid-December, Roque Ruiz-Carmona (Ph.D. candidate, Institute of Mathematics, Astrophysics and Particle Physics, Radboud University Nijmegen, The Netherlands) requested AAVSO assistance with his campaign to observe a set of **21 eclipsing cataclysmic variables (CVs)** with the William Herschel Telescope at La Palma in mid-December (*AAVSO Alert Notice 564*). Observers were asked to obtain an image of each target two nights in a row so Ruiz-Carmona could examine them to determine his final list of observing targets. Time constraints on when the images had to be taken and when they had to be uploaded to the AAVSO forum discussion thread were extremely tight. This campaign was essentially identical in format to the ones successfully carried out by the AAVSO on his behalf in 2015 and in May 2016 (*AAVSO Alert Notices 524, 527, 543*). This campaign was successfully concluded (see above).

In mid-December, Dr. Christian Knigge (University of Southampton) and colleagues requested AAVSO coverage of the SU UMa-type dwarf nova **YZ Cnc** in support of Chandra X-ray observations to be carried out via a Target of Opportunity (TOO) triggering when the system is in a suitable outburst. Observers were asked to observe YZ Cnc one to a few times, widely spaced, per night, visually and in V or CV, continuing until the Chandra observations were carried out and the end of the campaign was announced. 48 observers have contributed 4,073 multicolor observations to this campaign since it began December 19.

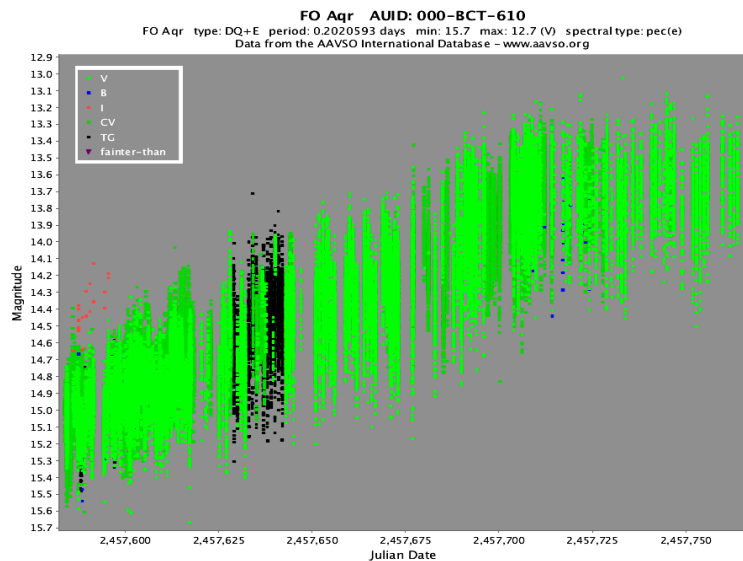


Figure 1. AAVSO light curve of the intermediate polar *FO Aqr* JD 2457583–2457775 (13 July 2016–21 January 2017).

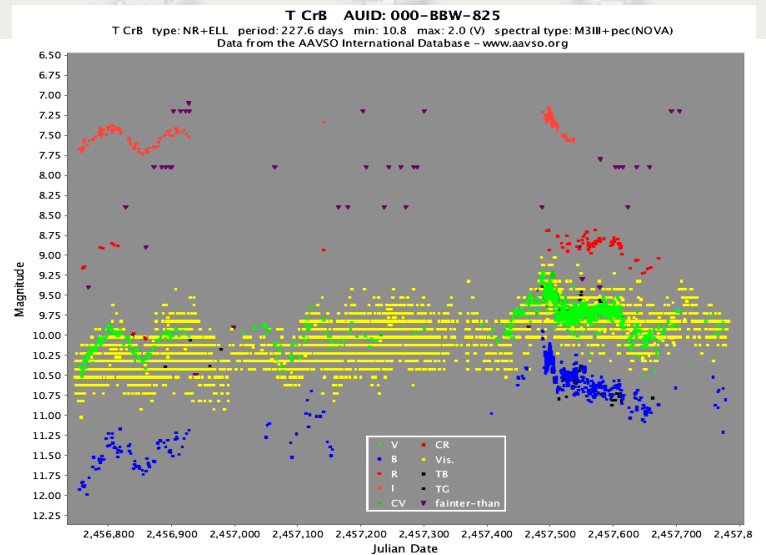


Figure 2. AAVSO light curve of the symbiotic recurrent nova *T CrB* JD 2456744–2457779 (27 March 2014–25 January 2017). 250 observers worldwide contributed 10,188 visual and multicolor observations to this light curve.

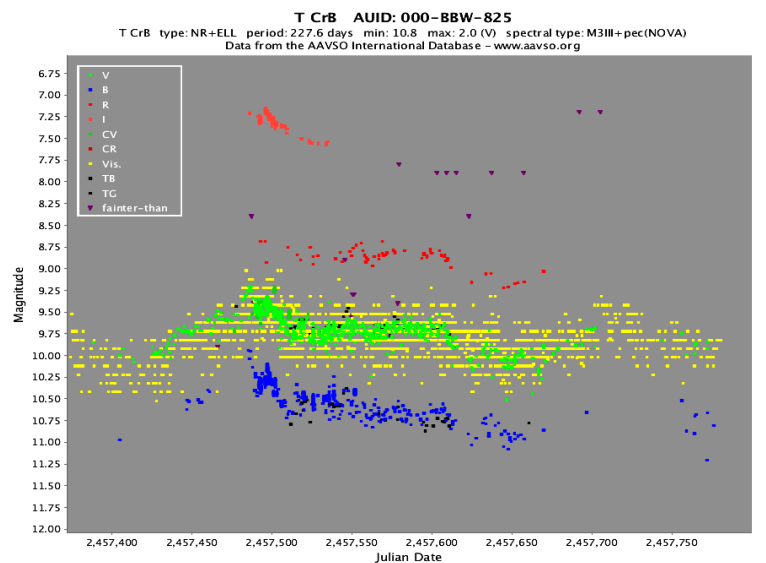


Figure 3. AAVSO light curve of the symbiotic recurrent nova *T CrB* JD 2457375–2457779 (18 December 2015–25 January 2017). 210 observers worldwide contributed 6,243 visual and multicolor observations to this light curve.

Campaigns in progress

In mid-July, Dr. Colin Littlefield (University of Notre Dame) and colleagues requested AAVSO observers' assistance in providing time-series observations of the intermediate polar cataclysmic variable **FO Aqr** until the system returns to maximum or goes into conjunction and is no longer observable. FO Aqr, which in its high state (maximum) is $V \sim 13.4$, was $V \sim 15$ in mid-July. The observations were requested to support the study of multiple periods and their evolution as FO Aqr returns to maximum (*AAVSO Alert Notice 545*). 39 observers have contributed 61,784 multicolor observations to this campaign since it began July 13 (Figure 1).

The call by the AAVSO in early April to monitor the symbiotic recurrent nova **T CrB** continues. T CrB, which entered a super-active state in February 2016,

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CAMPAIGNS UPDATE CONTINUED...

and was brighter and bluer than since before its last outburst in 1946, has faded somewhat after a very interesting episode (Figures 2 and 3). However, it has not returned to its normal minimum, and **it is important to continue the multicolor and visual observations as soon after conjunction as possible.** The most recent observations in the AAVSO International Database show T CrB at visual magnitude 9.8–10.0 on 2016 September 28.0 UT (respectively, OJR, J. Ripero, Madrid, Spain; BRJ, J. Bortle, Stormville, New York) and 9.979 V ± 0.007 (PEP) on September 25.0358 UT (PGD, G. Persha, Lowell, Michigan). T CrB has been observed twice in outburst (maximum at V \sim 2.0), in 1866 and 1946. Extremely interesting research by U. Munari et al. reveal an interesting correlation between the pre-outburst activity in previous outbursts and the current behavior. Please see *AAVSO Special Notice 415* for details.

The campaign from Dr. Jenő Sokolowski (Columbia University) and graduate student Adrian Lucy (Columbia University) on the jet-driving symbiotic star **V694 Mon (MWC 560)**, which had concluded at the end of April 2016 (*AAVSO Alert Notice 538*), was re-opened. V band photometry (and/or other bands) is requested to see if the star is flickering or even still in outburst. These data will help evaluate whether they should extend their X-ray research and whether AAVSO observers need to keep following this star, and will help correlate their radio data being obtained through January 2017. H-alpha or H-beta spectra would also be very welcome. See Figures 4 and 5. 61 observers worldwide have contributed 42,489 multicolor and visual observations of this star since the campaign began 26 February 2015.

The campaign on the bright (V \sim 6.7) colliding-winds binary **V1687 Cyg (WR 140, HD 193793)** from Dr. Noel Richardson (University of Toledo) and colleagues continues. Optical photometry was requested in support of multi-wavelength campaign studying dust behavior as the system passes through periastron. The campaign will run until at least August 2017 (*AAVSO Alert Notice 546* and *AAVSO Special Notice #419*). 18 observers have contributed 270 multicolor observations to this campaign since it began 3 August 2016.

Dr. George Wallerstein's (University of Washington) request continues for AAVSO coverage of the long period/symbiotic variable **R Aqr (AAVSO Alert Notice 535)**. Optical and spectroscopic coverage is requested and recommended, respectively, to continue at least for the next several years to cover the eclipse predicted for 2022 (but which may come early). Several other astronomers are also studying R Aqr closely and will be carrying out multi-mode, multiwavelength observations in the near future. The minimum of December 2015 was indeed faint, and the minimum in December 2016 was not as faint but still faint. Thus R Aqr needs to be watched closely! A historical light curve dating from 1843 was shown as Figure 1 in the January 2016 issue of the newsletter (<https://www.aavso.org/aavso-newsletter>).

The campaign begun in October 2015 continues on the enigmatic variable object **KIC 8462852 (AAVSO Alert Notices 532 and 542)**. Filtered time-series observations (BVRI) are requested in order to study the variations occurring at all timescales. This interesting star shows aperiodic dips (cause unknown) of a few tenths of a magnitude, which can last for days but show variations on very short timescales, and is rotating. Since the campaign began 2015 October 20, 80 observers have submitted 31,101 visual and multicolor observations.

The campaign on the X-ray black hole binary **V404 Cyg (AAVSO Alert Notice 520)** was officially concluded once it returned to minimum by 2015 July 23–August

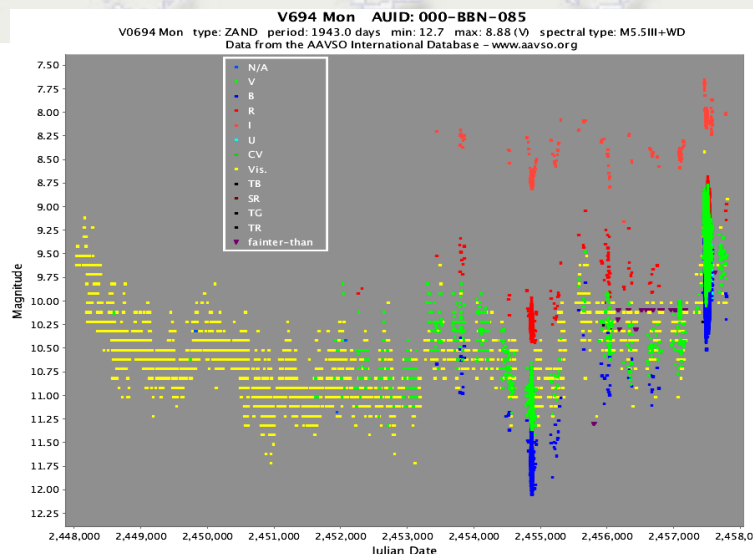


Figure 4: AAVSO light curve of the symbiotic star V694 Mon (MWC 560) JD 2447990–2457774 (8 April 1990–20 January 2017). 112 observers contributed 49,306 visual and multicolor observations to this light curve.

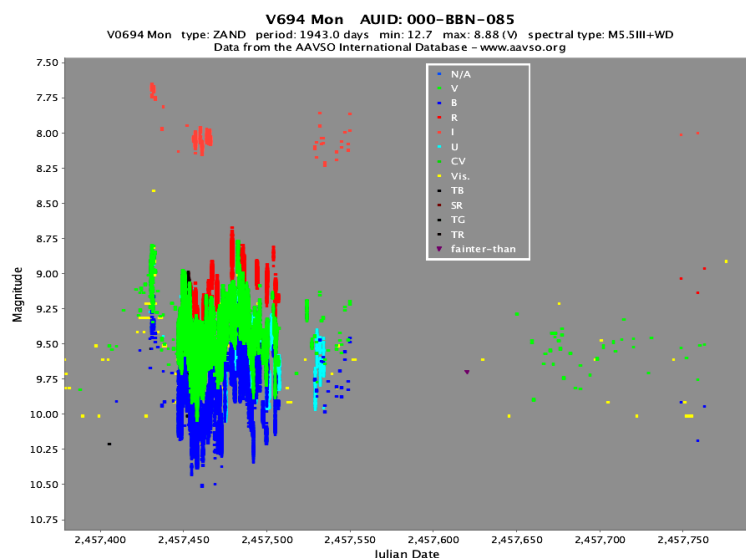


Figure 5: AAVSO light curve of the symbiotic star V694 Mon (MWC 560) JD 2457378–2457774 (21 December 2015–20 January 2017). 60 observers contributed 42,381 visual and multicolor observations to this light curve.

1 after its spectacular outburst on 2015 June 15. After a subsequent shorter and fainter outburst December 30–January 3, it again returned to minimum, where it has been since. As its behavior following these outbursts is clearly unpredictable, AAVSO observers are asked to continue obtaining multicolor photometry as well as visual observations. Since the campaign began, 90 observers have submitted 66,264 multicolor and visual observations.

Dr. Margarita Karovska's (Harvard-Smithsonian Center for Astrophysics) HST and Chandra campaign on **CH Cyg (AAVSO Alert Notice 454 and AAVSO Special Notices #267, 294, and 320)** continues at least through the 2017 observing season. Please continue your visual and especially your V and B observations. **The V and B data are crucial** for detecting certain significant system changes key to her research on this fascinating system (Figures 6 and 7). Visual observations are also important!

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Dr. Margarita Karovska and colleagues' request continues for AAVSO observer assistance in their campaign on the symbiotic variable **RT Cru** (11.2–12.6 visual magnitude). Chandra and Swift observations took place successfully in November 2015 (*AAVSO Special Notice #411*). Follow-up **continuing weekly or more frequent monitoring (B and V photometry and visual observations) is requested. High-resolution spectroscopy around H α and the [OIII]5007 A line, as well as the spectrum of the full range (echelle, for example), would be very helpful and most welcome!** Since this campaign began 2014 August 6, 20 observers have contributed 8,824 multicolor observations of this star.

Although the 2014–2015 campaign on **EE Cep** is officially concluded (*AAVSO Alert Notice 502*, *AAVSO Special Notice #387*), Dr. Cezary Galan (Nicolaus Copernicus Astronomical Center) writes that continuing observations, especially in I or even better in near-IR, would be very valuable and very much appreciated. Please continue to monitor EE Cep until at least April 2017.

This campaign on the rare FU Ori object **2MASS J06593158-0405277 (V960 Mon)**, which originally ran April–July 2015 (*AAVSO Alert Notice 518*), continues after being re-activated by Dr. Fabienne A. Bastien (Hubble Postdoctoral Fellow, Pennsylvania State University). Please continue your observations at least through the 2017 observing season. Dr. Bastien writes: "... We have very few constraints on what causes [these rare objects] to undergo their eruptions.... We would like to continue to monitor its behavior from the optical to the infrared (BVRJHK and/or the equivalent Sloan filters) as it appears to be changing." After plateauing from its slow decline (that was underway when the campaign began) for a few months, the star was more active and appeared to be resuming its decline, very slowly, shortly before disappearing behind the Sun in early May 2016. When it returned in September, the decline was continuing, but the star has been plateauing again since early October. Since the campaign began, 21 observers have contributed 3,084 multicolor and visual observations.

The campaign continues on the symbiotic nova candidate **ASAS J174600-2321.3** initiated in January by S. Otero, P. Tisserand, K. Bernhard, and S. Hümmelich (*AAVSO Alert Notice 510*). The predicted eclipse occurred in March–July 2015, but the nova was still at maximum until October 2016. A slight decline has been seen since then (Figure 8) but it is not known whether it is a normal pulsation cycle from the red giant or something else. Most recently it is at $12.256 V \pm 0.012$ on 2016 Oct. 20.9791 UT and $13.285 B \pm 0.016$ on Oct. 20.9781 UT (HMB, J. Hamsch, Mol, Belgium). **Following this star to see what is happening—is this the beginning of the decline or normal pulsation—is very important, and ongoing visual and instrumental data are essential.** Since this campaign began 2015 March 5, 15 observers have contributed 1,829 multicolor and visual observations to the AID.

The campaign organized by Dr. George Rieke (University of Arizona) and colleagues on four stars with developing planetary systems (*AAVSO Alert Notice 511*)—**RZ Psc**, **HD 15407A**, **V488 Per**, and **HD 23514**—continues. The Spitzer Space Telescope observations have been completed, but your observations throughout at least the 2016 observing season will be appreciated. Since this campaign began 2015 March 13, 41 observers have contributed 5,789 multicolor and visual observations to the AID.

RW Aur still continues to surprise! The campaign on this classical T Tauri star (component A) organized by Dr. Hans Moritz Guenther (Massachusetts Institute of Technology) continues but at a less intense level (*AAVSO Alert Notice 514*).

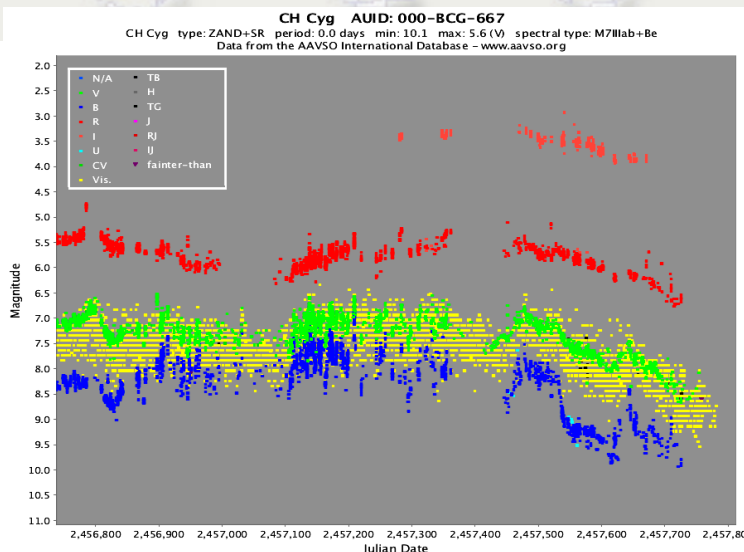


Figure 6: AAVSO light curve of the symbiotic star CH Cyg JD 2456737–2457777 (20 March 2014–23 January 2017). 195 observers contributed 12,559 visual and multicolor observations to this light curve.

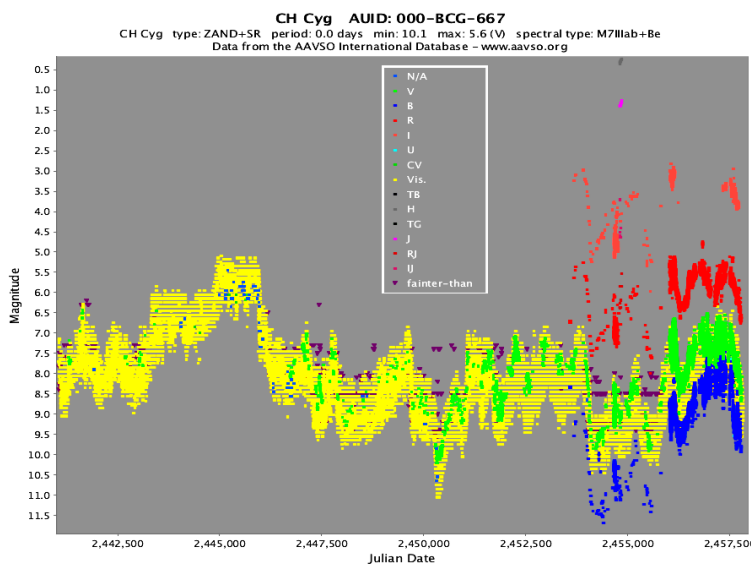


Figure 7: AAVSO longterm light curve of the symbiotic star CH Cyg JD 2441000–2457777 (17 February 1971–23 January 2017). 1,221 observers contributed 127,432 visual and multicolor observations to this light curve.

Dr. Guenther wrote: "RW Aur continues to be an exciting target. How long does the dimming last? Will it come back up to the usual brightness?... Does the color change, when (if?) RW Aur comes back to normal?..." Since 2015, its behavior has been complex. Most recently, after increasing in brightness to visual magnitude 10.0 at the beginning of November, it faded to 12.2 by the end of November, then plateaued around 11.9 until mid-January, when it brightened to about 11.7. See Figures 9 and 10. **Please continue to follow RW Aur closely.**

Dr. Robert Stencel's (University of Denver Astronomy Program) request to monitor **epsilon Aur** (*AAVSO Alert Notice 504*) continues as modified. Dr. Stencel writes that studies of the system are continuing and ground- and space-based observations are being carried out and proposed. "For these studies, a reasonable coverage of the light curve is important. Furthermore, we are approaching quadrature in a few years, and detailed studies like these are likely

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CAMPAIGNS UPDATE CONTINUED...

to continue, albeit less frequently.... If skilled observers each could obtain good photometry ONCE A MONTH, we should see a reasonably complete light curve continuing, benefiting the long term studies." Observers are asked to carry out CCD, DSLR, or PEP photometry (V, B, R, U; no time series) once a month. Since this post-eclipse campaign began 2014 September 17, 95 observers have contributed 2,284 multicolor and visual observations.

Dr. Eric Mamajek's campaign on **V1400 Cen = J1407 (1SWASP J140747.93-394542.6)** (*AAVSO Alert Notice 462*) continues through 2017. Since the campaign began in July 2012, AAVSO observers have continued to provide excellent coverage in search of the eclipse. Please continue your observations, as they are extremely important in helping to solve the puzzle of this interesting and possibly complex system (*AAVSO Alert Notice 462*). Six observers have contributed 3,735 multicolor observations to date.

Ernst Pollmann's campaign on **P Cyg**, an S Dor (= Luminous Blue Variable) variable (*AAVSO Alert Notice 440*), continues at least through the 2017 season and likely "for several more years." Since May 2011, 123 observers have contributed 6,616 observations to this campaign ideally suited to PEP and DSLR observers. See *Alert Notice 440* for comparison and check star information. Many thanks for your observations, and please keep on observing P Cyg!

Since Dr. Arne Henden suggested the very interesting and faint Mira variable **QX Pup** to AAVSO observers in 2008 as an observing exercise (<http://www.aavso.org/qx-pup>), 5+ cycles have been observed in I, along with a smattering of fainter-thans and a few R and two V observations, and the period in I_c has been determined by Sebastian Otero at 551.0 days. A single V observation at/near the minimum shown in I shows the V minimum may be 18.2 or fainter (MZK, K. Menzies, Framingham, Massachusetts). QX Pup is now just past maximum. I have been challenging you to obtain a V range for QX Pup, which is embedded in a reflection nebula (the Rotten Egg Nebula). However, the nebula obscures the Mira itself, and there is a close companion, so making positive observations in V is complicated and very difficult. If you want to try V observations, be sure to read the information and instructions on the webpage referenced above.

HMXBs and SFXTs High-Mass X-ray Binaries and Super Fast X-ray Transients, Dr. Gordon Sarty's list (*AAVSO Alert Notices 348, 354, and 377, AAVSO Special Notices #118, #129, #143, #213, and #220*, and description of research program in *JAAVSO*, Vol. 35, p. 327; article viewable at <http://adsabs.harvard.edu/abs/2007JAVSO...35...327S>).

Blazars Dr. Markus Boettcher's list (*AAVSO Alert Notice 353* at <http://www.aavso.org/aavso-alert-notice-353>).

Novae and R CrB

One galactic nova, and one bright nova in the Small Magellanic Cloud have been discovered since October 1. Also, several recent galactic novae continue to provide good observing opportunities, and R CrB may be continuing to recover from minimum.

V5854 Sgr (nova in Sgr = ASASSN-16ma = PNV J18205200-2822100) was independently discovered by ASASS-SN on 2016 October 25.02 UT at V~13.7, and by Yukio Sakurai (Mito, Japan) on October 26.380 UT at unfiltered CCD

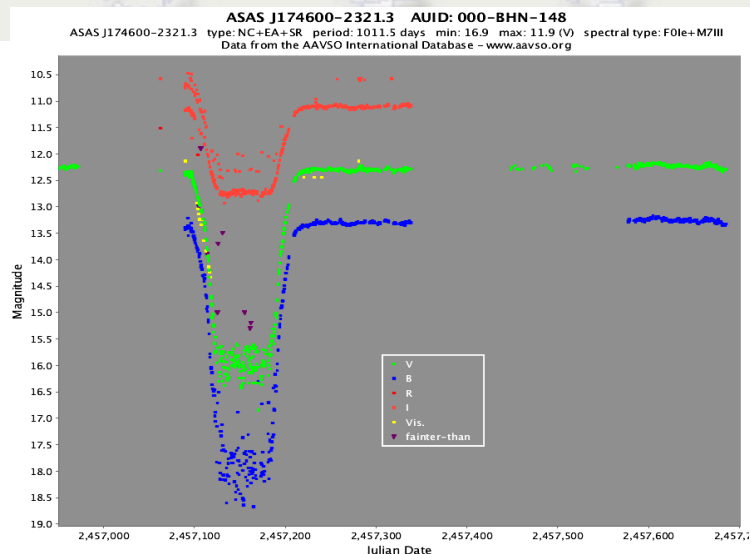


Figure 8. AAVSO light curve of the symbiotic nova candidate ASAS J174600-2321.3 JD 2456950–2457777 (19 October 2014–23 January 2017). 16 observers worldwide contributed 1,870 visual and multicolor observations to this light curve.

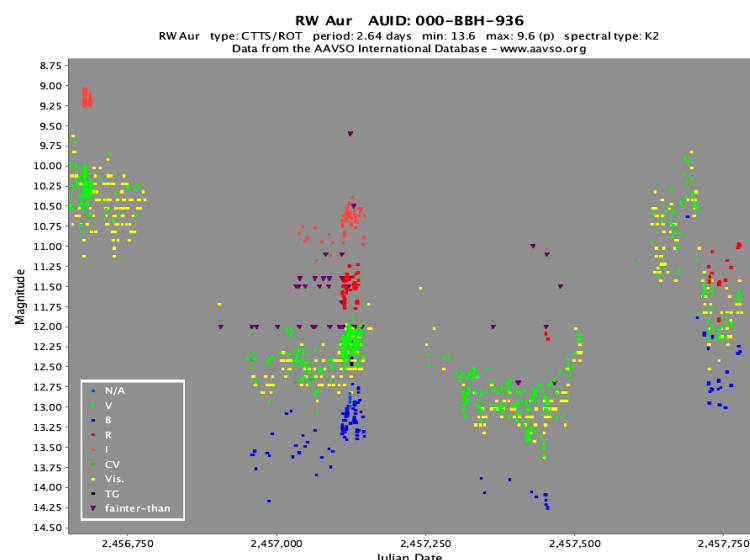


Figure 9. AAVSO light curve of the T Tauri star RW Aur JD 2456650–457777 (23 December 2013–23 January 2017). 78 observers worldwide contributed 2,893 visual and multicolor observations to this light curve.

magnitude 10.4. Its interesting light curve through November 2016 may be seen in Figure 11. As of 2016 Nov. 27.9971 UT it was 10.185 V ± 0.041 (HMB, J. Hambach, Mol, Belgium). 27 observers worldwide have contributed 202 multicolor observations through 2017 January 23.

MASTER OT J010603.18-744715.8 = Nova in SMC (Tucana) was discovered on 2016 October 14.19341 UT at unfiltered CCD magnitude 10.9 by the MASTER-OAFA auto-detection system and reported by V. Shumkov et al. in *ATel #9621*. This classical galactic nova in the SMC faded quite fast, and by Oct. 17.53190–53490 UT was 11.09 V ± 0.02, 9.98 R ± 0.09, and 9.93 I ± 0.07 (S. O'Connor, St. George, Bermuda). (*AAVSO Alert Notice 557*)

Older galactic novae that are still within observing range include:

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CAMPAIGNS UPDATE
CONTINUED...

V407 Lup (Nova Lup 2016 = PNV J15290182-4449409 = ASASSN-16kt), discovered on 2016 September 24.010 UT by the All Sky Automated Survey for SuperNovae (ASAS-SN) at 9.11 V ± 0.01 (*AAVSO Alert Notice 553*), continues to fade. As of 2017 Jan. 21.8056 UT it was visual magnitude 13.2 (PEX, A. Pearce, Nedlands, W. Australia), and as of 2017 Jan. 23.7194 UT it was <12.6 (WCG, C. Wyatt, Walcha, NSW, Australia). 21 observers worldwide have contributed 141 multicolor observations through 2017 January 23.

V1656 Sco (Nova Sco 2016 No. 2 = PNV J17225112-3158349 = ASASSN-16kd), independently discovered by Shigehisa Fujikawa (Kan'onji, Kagawa, Japan) on 2016 September 06.481 UT at unfiltered CCD magnitude 11.6, and by the All Sky Automated Survey for SuperNovae (ASAS-SN) on 2016 September 06.00 UT at magnitude 12.13 V (*AAVSO Alert Notice 550*), continues to fade. As of 2016 Oct. 28.4224 UT it was 15.92 V ± 0.03 (NLX, P. Nelson, Ellinbank, Vic, Australia). 8 observers worldwide have contributed 43 multicolor observations through 2017 January 23.

V5853 Sgr (Nova Sgr 2016 No. 2 = ASASSN-16ig = TCP J18010780-2631434), independently discovered by Koichi Nishiyama (Kurume, Japan) and Fujio Kabashima (Miyaki, Japan) on 2016 August 8.53233 UT at unfiltered CCD magnitude 10.7, and by the All Sky Automated Survey for SuperNovae (ASAS-SN) on 2016 August 6.96 UT at $V \sim 13.3$ (*AAVSO Alert Notice 547*), continues to fade. As of 2016 Nov. 4.9983 UT it was 15.099 V ± 0.111 (HMB, J. Hamsch, Mol, Belgium). 23 observers worldwide have contributed 549 multicolor observations through 2017 January 23.

V1655 Sco (Nova Sco 2016 = PNV J17381927-3725077), discovered on 2016 June 10.629 UT by Hideo Nishimura (Kakegawa, Shizuoka-ken, Japan) at unfiltered CCD magnitude 12.4 (*AAVSO Alert Notice 544*), continues to fade. As of 2016 Nov. 3.4398 UT it was 17.4 V ± 0.2 (NLX, P. Nelson, Ellinbank, Vic, Australia). 20 observers have contributed 2,054 multicolor observations through 2017 January 23.

V5668 Sgr (Nova Sagittarii 2015 Number 2 = PNV J18365700-2855420), discovered on 2015 March 15 UT (*AAVSO Alert Notice 512*) and recovered from its dust event by September 2015, continues to fade. Observations in September 2016 showed a very slight brightening, but the fading resumed, and the most recent observations showed it on November 19.4355 UT at 12.652 V ± 0.020 , 11.578 R ± 0.043 , 11.975 B ± 0.055 , and 12.339 I ± 0.125 (HQA, A. Henden, Center Harbor, NH), and on 2016 Nov. 24.0194 UT at visual magnitude 10.5 (CKB, B. Cudnik, Houston, Texas). 140 observers worldwide have contributed 4,549 multicolor observations through 2017 January 23.

V5667 Sgr (Nova Sagittarii 2015 = PNV J18142514-2554343), discovered on 2015 February 12 UT (*AAVSO Alert Notice 509*), continues to fade. As of 2016 Sep. 30.0542 UT it was visual magnitude 13.2 (CKB, B. Cudnik, Houston, Texas). 19 observers have contributed 443 multicolor observations through 2017 January 23. In the last newsletter it was indicated that Andrew Pearce's magnitude of 13.6 might be of a nearby star and not the nova. This is not the case, and apologies are extended to Andrew.

V2944 Oph (Nova Ophiuchi 2015 = PNV J17291350-1846120) was discovered in March and reached maximum on April 14 at magnitude V = 9.2. After fading with oscillations to about magnitude 12, it plateaued for about three months

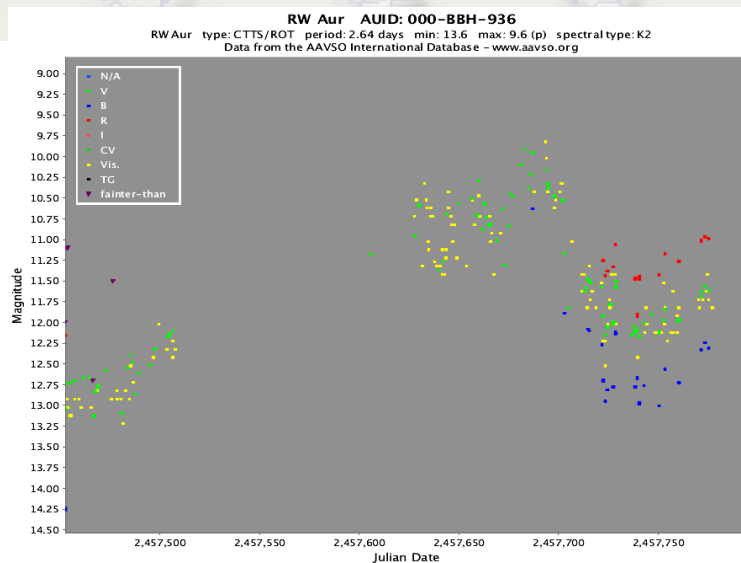


Figure 10. AAVSO light curve of the T Tauri star RW Aur JD 2457452–2457777 (4 March 2016–23 January 2017). 27 observers worldwide contributed 310 visual and multicolor observations to this light curve.

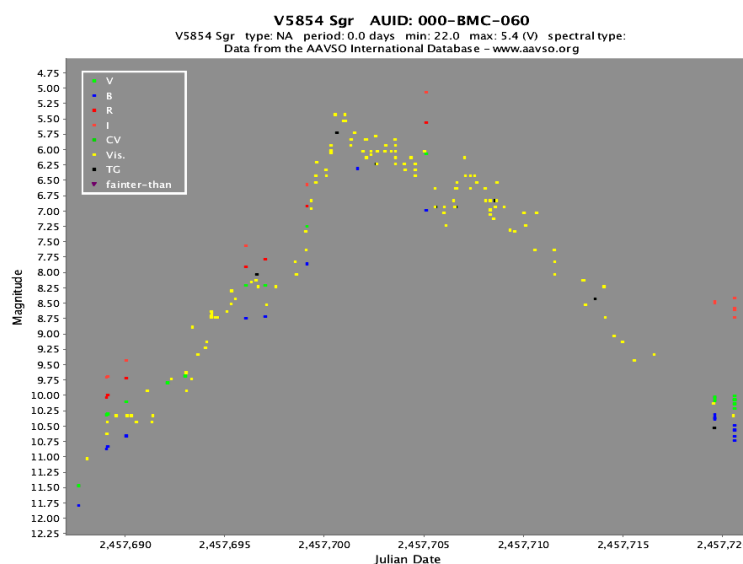


Figure 11: AAVSO light curve of V5854 Sgr JD 2457687–2457720 (26 October 2016–27 November 2016).

before brightening slightly and then continuing to fade. As of 2016 Oct. 10.0027 UT it was 16.086 V ± 0.040 (DKS, S. Dvorak, Clermont, Florida). 38 observers worldwide have contributed 1,104 multicolor observations through 2017 January 23.

V2659 Cyg (Nova Cygni 2014 = PNV J20214234+3103296), a highly reddened classical Fe II-type nova which had been very active as it declined, continues to fade steadily. As of 2016 Dec. 24.9898 UT it was 16.228 V ± 0.044 (DKS, S. Dvorak, Clermont, Florida). 82 observers worldwide have contributed 3,876 multicolor observations through 2017 January 23.

V1369 Cen (Nova Centauri 2013 = PNV J13544700-5909080) continues to decline slowly. As of 2017 Jan. 21.8313 UT it was visual magnitude 11.8 (A. Pearce, Nedlands, W. Australia). 71 observers worldwide have contributed

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CAMPAIGNS UPDATE CONTINUED...

13,694 multicolor observations through January 23.

V339 Del (Nova Delphini 2013 = PNV J20233073+2046041) continues to fade slowly. As of 2017 Jan. 1.0912 UT it was 14.603 V \pm 0.004 and 15.567 B \pm 0.004, (SRIC, R. Sabo, Bozeman, Montana), and as of 2016 Dec. 29.76 UT it was visual magnitude 14.5 (PYG, G. Poyner, Birmingham, England). 552 observers worldwide have contributed 79,099 multicolor observations through January 23.

R CrB Since July 2007, when it began fading from its maximum visual magnitude of 6.0, the prototype variable **R CrB** has been in some state of minimum. In July 2015 it appeared to be brightening, but it turned around again and had been slowly but steadily fading. After plateauing in late March-mid April 2016 it began brightening again and has been continuing to brighten—as of 2017 January 23 it was about visual magnitude 7.8 (several observers; Figure 12)—although it looks as though it may be starting to plateau or turn around again. Keep on watching **R CrB**—what is it going to do next?

Please keep observing and participating in as many campaigns as your schedule and equipment permit. The astronomers and we at AAVSO Headquarters are grateful to all of you who are participating in AAVSO Observing Campaigns, and we thank you for your contributions. You have been and continue to be a vital part of variable star research! ★

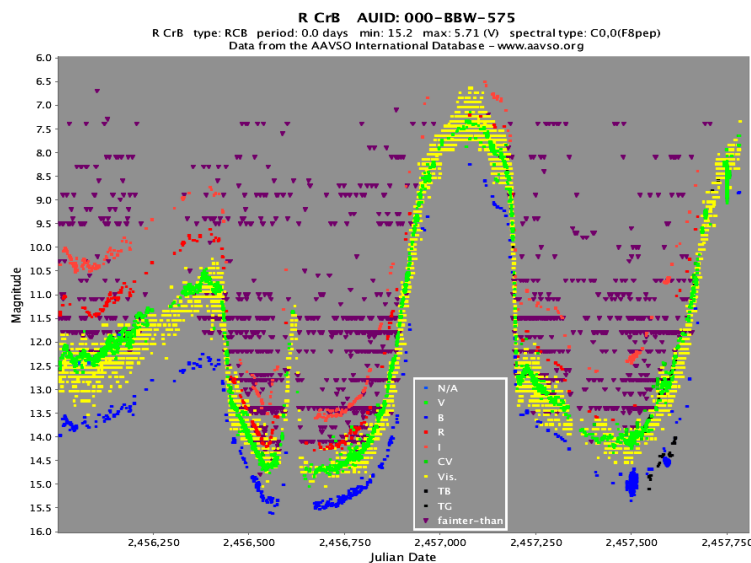


Figure 12: AAVSO light curve of *R CrB* JD 2456000 – 2457776 (30 August 2014 – 23 January 2017). 344 observers contributed 15,161 visual and multicolor observations to this light curve.

LOOKING AT LEGACY STARS

STARS OBSERVED RECENTLY AND RECOMMENDATIONS FOR THE NEXT FEW MONTHS

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SARA J. BECK (BSJ), AAVSO TECHNICAL ASSISTANT

This column is a quarterly summary of popular and important targets of the previous quarter as observed by the AAVSO community. This will help keep observers up to date on the observations being submitted to the AAVSO archives, and more importantly on what stars may need improved coverage by the community.

We encourage observers to keep a smaller subset of variables at the top of their observing planning via the Legacy and Program lists for LPVs and CVs (see <https://www.aavso.org/lpv-section-file-downloads> or the LPV lists, and <https://sites.google.com/site/aavsovcvsection/aavso-legacy-cvs> for the CV list). These lists were established to provide guidance on which stars had the best-observed light curves and thus had greatest potential for science if those stars continued being observed. There are thousands of other stars that are still regularly observed, and many objects not on the lists above remain worthy targets for variable star observers, visual and CCD alike.

Twenty best-covered stars of the LPV Legacy program, as measured (mainly) by number of nights observed (both visual and CCD observing considered), 2016 September 16 through December 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
T Cas	Cas	00:23:14.27	+55:47:33.2	37	62	7	31
W Cas	Cas	00:54:53.85	+58:33:49.2	38	61	5	30
omi Cet	Cet	02:19:20.78	-02:58:39.5	43	59	6	13
R Tri	Tri	02:37:02.33	+34:15:51.4	66	84	6	7
R Aur	Aur	05:17:17.69	+53:35:10.1	29	58	3	24
g Her	Her	16:28:38.54	+41:52:53.9	40	79	2	8
X Oph	Oph	18:38:21.12	+08:50:02.7	29	55	4	13
R Lyr	Lyr	18:55:20.1	+43:56:45.8	31	66	4	30
R Aql	Aql	19:06:22.24	+08:13:48	33	50	7	16
CH Cyg	Cyg	19:24:33.06	+50:14:29	61	86	10	61
AF Cyg	Cyg	19:30:12.84	+46:08:52	57	85	3	7
RT Cyg	Cyg	19:43:37.77	+48:46:41.3	43	81	4	8
khi Cyg	Cyg	19:50:33.91	+32:54:50.6	104	88	3	21
EU Del	Del	20:37:54.7	+18:16:06.3	47	85	4	13
U Del	Del	20:45:28.23	+18:05:24	51	82	3	13
T Cep	Cep	21:09:31.78	+68:29:27.1	51	71	7	25
S Cep	Cep	21:35:12.82	+78:37:28.1	31	54	4	28
miu Cep	Cep	21:43:30.49	+58:46:48	56	85	6	44
V Cas	Cas	23:11:40.72	+59:41:58.9	41	63	6	14
rho Cas	Cas	23:54:23.03	+57:29:57.8	57	81	7	18

N(vo) = number of observers making visual observations

N(von) = number of nights with visual observations

N(co) = number of observers making CCD observations

N(con) = number of nights with CCD observations

Target lists for observers vary throughout the year, and the number of observations received changes depending upon a star's observability in a given season as well as whether there is special interest—for example, an observing campaign or recent notable activity. Quarterly totals also help to highlight what new and interesting data sets the AAVSO now holds.

Below are the most- and least-observed stars of the LPV and CV Legacy lists, showing the number of visual and CCD observers (*N(vo)* and *N(co)*) along with the total number of nights observed (*N(von)* and *N(con)*).

Twenty least-observed stars of the LPV Legacy program (both visual and CCD observing considered), 2016 September 16 through December 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
R Ari	Ari	02:16:07.1	+25:03:23.6	9	23	3	5
W Tau	Tau	04:27:57.18	+16:02:36.1	13	23	5	21
X Cam	Cam	04:45:42.18	+75:06:03.4	15	33	0	0
R Gem	Gem	07:07:21.27	+22:42:12.7	11	16	2	6
Z Pup	Pup	07:32:38.05	-20:39:29.2	3	22	1	4
R Cnc	Cnc	08:16:33.82	+11:43:34.5	6	15	2	4
X Cnc	Cnc	08:55:22.87	+17:13:52.5	10	21	0	0
R Car	Car	09:32:14.59	-62:47:19.9	5	26	0	0
R LMi	LMi	09:45:34.27	+34:30:42.8	2	5	2	1
S Car	Car	10:09:21.88	-61:32:56.3	5	22	0	0
VY UMa	UMa	10:45:04.02	+67:24:40.9	15	36	0	0
SS Vir	Vir	12:25:14.4	+00:46:10.9	2	6	0	0
R Vir	Vir	12:38:29.94	+06:59:18.9	5	13	0	0
RS UMa	UMa	12:38:57.54	+58:29:00.2	16	47	0	0
R Hya	Hya	13:29:42.77	-23:16:52.7	5	16	0	0
T Cen	Cen	13:41:45.55	-33:35:50.5	1	6	0	0
R CVn	CVn	13:48:57.05	+39:32:33.2	5	21	0	0
R Cen	Cen	14:16:34.31	-59:54:49.2	4	16	0	0
S Boo	Boo	14:22:52.91	+53:48:37.2	14	23	1	1
RU Her	Her	16:10:14.52	+25:04:14.3	11	26	3	4

Observations are strongly encouraged as these stars become observable. Observers should consider adding any of these stars to their observing programs to improve coverage of the legacy stars.

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LEGACY STARS
CONTINUED...

Twenty best-covered stars of the CV Legacy program, as measured (mainly) by number of observers and nights observed (both visual and CCD observing considered), 2016 September 16 through December 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
WW Cet	Cet	00:11:24.72	-11:28:42.9	4	18	8	88
EG And	And	00:44:37.19	+40:40:45.6	39	71	4	23
RX And	And	01:04:35.52	+41:17:57.8	60	83	44	80
AX Per	Per	01:36:22.69	+54:15:02.3	18	61	7	17
KT Per	Per	01:37:08.51	+50:57:20.4	17	66	4	20
TT Ari	Ari	02:06:53.09	+15:17:41.7	13	60	7	22
TZ Per	Per	02:13:50.94	+58:22:52.7	17	65	8	37
GK Per	Per	03:31:12	+43:54:15.4	22	68	6	52
SS Aur	Aur	06:13:22.47	+47:44:25.6	28	62	4	23
U Gem	Gem	07:55:05.21	+22:00:04.7	20	56	4	26
SU UMa	UMa	08:12:28.27	+62:36:22.2	8	39	3	33
Z Cam	Cam	08:25:13.18	+73:06:39	25	68	6	40
AT Cnc	Cnc	08:28:36.89	+25:20:02.9	6	20	6	47
T CrB	CrB	15:59:30.16	+25:55:12.6	58	80	8	19
CH Cyg	Cyg	19:24:33.06	+50:14:29.1	61	86	10	61
EM Cyg	Cyg	19:38:40.11	+30:30:28.4	22	71	8	33
VW Vul	Vul	20:57:45.06	+25:30:25.7	7	32	9	43
SS Cyg	Cyg	21:42:42.78	+43:35:09.8	84	87	16	82
AG Peg	Peg	21:51:01.97	+12:37:32	41	75	8	27
DX And	And	23:29:46.7	+43:45:04.6	18	55	4	25

Stars in CV Legacy list with no visual or CCD observations (both visual and CCD observing considered), 2016 September 16 through December 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
RX Pup	Pup	08:14:12.3	-41:42:29	0	0	0	0
BB Vel	Vel	08:36:49.26	-47:22:37	0	0	0	0
CU Vel	Vel	08:58:33.01	-41:47:51.5	0	0	0	0
AG Hya	Hya	09:50:29.75	-23:45:17.2	0	0	0	0
OY Car	Car	10:06:22.24	-70:14:04.9	0	0	0	0
TT Crt	Crt	11:34:47.26	-11:45:30.9	0	0	0	0
TW Vir	Vir	11:45:21.16	-04:26:05.7	0	0	0	0
MU Cen	Cen	12:12:53.91	-44:28:15.8	0	0	0	0
V485 Cen	Cen	12:57:23.28	-33:12:06.5	0	0	0	0
V803 Cen	Cen	13:23:44.53	-41:44:29.6	0	0	0	0
V504 Cen	Cen	14:12:49.18	-40:21:37.5	0	0	0	0
U Sco	Sco	16:22:30.78	-17:52:42.8	0	0	0	0
MU Ser	Ser	17:55:52.77	-14:01:17.1	0	0	0	0
V618 Sgr	Sgr	18:07:56.9	-36:29:36.9	0	0	0	0
V1830 Sgr	Sgr	18:13:50.65	-27:42:21	0	0	0	0
V533 Her	Her	18:14:20.51	+41:51:22.6	0	0	0	0
FM Sgr	Sgr	18:17:18.25	-23:38:27.8	0	0	0	0
V4021 Sgr	Sgr	18:38:14.88	-23:22:47.1	0	0	0	0
PW Vul	Vul	19:26:05.04	+27:21:57.7	0	0	0	0
LV Vul	Vul	19:48:00.7	+27:10:19.5	0	0	0	0
V476 Cyg	Cyg	19:58:24.47	+53:37:06.7	0	0	0	0
QU Vul	Vul	20:26:46.02	+27:50:43.2	0	0	0	0

As above, observations are strongly encouraged as these stars become observable and observers should consider adding any of these stars to their observing programs to improve coverage of the legacy stars. ★

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






























to subscribe today!

Sign up for the AAVSO online forums to read about or contribute to discussion on observing campaign targets. Postings will be sent to you by email and will also be available for viewing online. Visit <https://www.aavso.org/forum>





























JULIAN DATE / MOON PHASE CALENDARS

2,450,000 plus the value given for each date
































JANUARY 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1  7755	2  7756	3  7757	4  7758	5  7759	6  7760	7  7761
8  7762	9  7763	10  7764	11  7765	12  7766	13  7767	14  7768
15  7769	16  7770	17  7771	18  7772	19  7773	20  7774	21  7775
22  7776	23  7777	24  7778	25  7779	26  7780	27  7781	28  7782
29  7783	30  7784	31  7785				

FEBRUARY 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1  7786	2  7787	3  7788	4  7789
5  7790	6  7791	7  7792	8  7793	9  7794	10  7795	11  7796
12  7797	13  7798	14  7799	15  7800	16  7801	17  7802	18  7803
19  7804	20  7805	21  7806	22  7807	23  7808	24  7809	25  7810
26  7811	27  7812	28  7813				

MARCH 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1  7814	2  7815	3  7816	4  7817
5  7818	6  7819	7  7820	8  7821	9  7822	10  7823	11  7824
12  7825	13  7826	14  7827	15  7828	16  7829	17  7830	18  7831
19  7832	20  7833	21  7834	22  7835	23  7836	24  7837	25  7838
26  7839	27  7840	28  7841	29  7842	30  7843	31  7844	

Moon calendars courtesy StarDate online

<http://stardate.org/nightsky/moon/>

THE AAVSO MENTOR PROGRAM

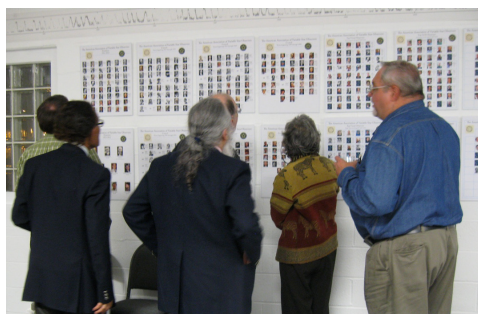
Since the earliest days of the AAVSO, experienced observers have helped new observers by corresponding, answering questions, and even providing personal guidance at the telescope.

If you would like to talk with an experienced variable star observer, contact the AAVSO and we will put you in contact with the mentor program coordinator, Donn Starkey. Just send us an email (mentor@aaavso.org), or call 617-354-0484 to let us know you are interested in this program.

Ideally, Donn will be able to provide you with names, addresses, and phone numbers of active AAVSO observers near you. If there are none located in your area, he can at least provide you with more distant contacts. A simple phone chat with an experienced observer may provide all the feedback you need to continue progressing as an AAVSO observer.

Visit the AAVSO mentor program webpage:

<http://www.aaavso.org/mentor-program>



BY POPULAR DEMAND!

A set of twenty pdf centennial posters exhibited at AAVSO Headquarters is available for downloading from our ftp site.

The posters show portraits of the AAVSO's Directors, Presidents, Secretaries, Treasurers, Council members, and Staff from 1911 to 2011, and the top Visual, CCD, PEP, and Photographic/Photovisual observers. For more information go to: <https://www.aaavso.org/aaavso-100th-anniversary-commemorative-posters>

or use this link:

<http://tinyurl.com/cge9t9s>

THE AAVSO WALTER A. FEIBELMAN SUITE

The Feibelman Suite at AAVSO Headquarters is available to guests who are in the Boston/Cambridge area to perform an AAVSO-related task, that is, the purpose of their visit is to do something for or related to the AAVSO. For details about the suite or making a reservation, please visit

<http://www.aaavso.org/walter-feibelman-guest-suite>.



See the following pages for important information about membership renewals and contributions.

JOIN THE AAVSO!

AAVSO 2017 New Member Form

Please send application, first year's dues, and application fee to:

AAVSO, 49 Bay State Road
Cambridge, MA 02138, USA

Date: _____
 Full Name: _____
 Full Address: _____

 Telephone 1: _____ Telephone 2: _____
 E-Mail: _____
 Birth Date: _____ Vocation: _____
 Telescopic Equipment: _____

 Astronomical Experience (if any): _____

 How did you learn about the AAVSO? _____

Types of Membership Offered and Dues

Annual:	Adult	US \$75.00 per year
	Associate (Under 21)/Pension/Limited Income	US \$37.50 per year
Sustaining:		US \$150.00 per year
Developing country [†]	(for members residing in low income countries):	US \$25.00 per year

Membership is prorated through the end of the year, starting with the current month.

All applicants also add a one-time, \$10.00 application fee.

Please consult the following table to find out how much to pay, including application fee.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept*	Oct*	Nov*	Dec*
Annual	\$75.00	\$68.75	\$62.50	\$56.25	\$50.00	\$43.75	\$37.50	\$31.25	\$100.00	\$93.75	\$87.50	\$81.25
A/P/LI	\$37.50	\$34.38	\$31.25	\$28.13	\$25.00	\$21.88	\$18.75	\$15.63	\$50.00	\$46.88	\$43.75	\$40.63
Sustaining	\$150.00	\$137.50	\$125.00	\$112.50	\$100.00	\$87.50	\$75.00	\$62.50	\$200.00	\$187.50	\$175.00	\$162.50
Developing Country [†]	\$25.00	\$22.92	\$20.83	\$18.75	\$16.67	\$14.58	\$12.50	\$10.42	\$33.33	\$31.25	\$29.17	\$27.08

*Please note that if joining in September-December, the following year's dues are already being collected, so we request that you pay for the end of this year and for the following year.

[†]Developing countries EXCLUDE Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, the Korean Republic, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, the United States.

Dues (see chart): US \$ _____ **Application fee:** US \$ 10 _____

Donation (optional): US \$ _____ to _____ fund (see box on right)

Total payment (dues + fee + donation): US \$ _____

Contributions (see last page for descriptions):	
AAVSO General Fund	\$ _____
The Endowment Fund	\$ _____
Annual Campaign Fund	\$ _____
Building Fund	\$ _____
Janet A. Mattei Research Fellowship	\$ _____
Margaret Mayall Assistantship Fund	\$ _____
Solar Fund	\$ _____
AAVSONet Fund	\$ _____
Member Sponsorship Fund	\$ _____
Student Meeting Scholarship Fund	\$ _____
Director's Discretionary Fund	\$ _____
Contributor-Specified Restricted Funds	\$ _____

_____ I have enclosed a check / money order _____ Please charge my credit card (Visa or Mastercard)

Credit card #: _____ Exp. Date: _____ Security Code (on back of card): _____

Cardholder's Name (as on card): _____

Billing address (if different from above): _____

Signature: _____

2017 MEMBERSHIP RENEWAL

On this page is a copy of the AAVSO membership renewal form for 2017. You may also renew your membership online. Safe and secure online payments are possible by visiting <https://www.aavso.org/membership-renew>. If your postal or email address has changed, please also take a minute to update your personal profile online. Simply click "User login" at the upper right of the home page, then go to "My account." In addition to your dues, your contributions to the AAVSO further support the organization's activities and are very much appreciated. Also, on the next page you will find descriptions of the various funds to which you may contribute.



AAVSO
Membership and Subscriptions
49 Bay State Rd
Cambridge, MA 02138-1203

Name _____
 Address _____
 City _____
 State/Province _____
 Zip/Postal Code _____
 Country _____

Payment and Contact Information

My **check** for \$_____ is enclosed.
Checks must be in US funds and made payable to AAVSO.

For payment by **credit card** please complete the section below.
All fields are required.

Visa Mastercard
 Card Number _____
 Exp Date: ____/____

Card Security Code (3-digit number on the back of your card): _____
 Total to be charged: \$_____

Name on card: _____
 Signature: _____

If the billing address for this credit card is different from your address above, please provide it here:

Billing Address _____ City _____
 State/Province _____ Zip/Postal Code _____ Country _____

Please make any changes necessary to correct and complete your membership contact information below:

Name: _____
 Address: _____
 City: _____ State/Province: _____
 Zip/Postal code: _____ Country: _____
 Phone: _____ Email: _____

2017 Membership Dues Renewal Form

Membership Type *(please check one)*

Annual \$75 Sustaining \$150
 Student/Limited Income \$37.50

Contributions *(see next page for descriptions)*

Annual Campaign	\$ _____
AAVSO General Fund	\$ _____
Endowment Fund	\$ _____
AAVSO Building Fund	\$ _____
Janet A. Mattei Research Fellowship	\$ _____
Margaret Mayall Assistantship	\$ _____
Solar Fund	\$ _____
AAVSONet Fund	\$ _____
Member Sponsorship Fund	\$ _____
Student Meeting Scholarship Fund	\$ _____
Director's Discretionary Fund	\$ _____
Contributor-Specified Restricted Funds	\$ _____
TOTAL ENCLOSED	\$ _____

SUPPORT THE AAVSO

In order to sustain the AAVSO and its operations, we rely on the generous support provided by members, sponsors, donors, and staff. Together we are the AAVSO. Your gift is a way for you to say that you believe in what we are doing and that you want it to continue moving forward. Every dollar given and membership purchased benefits the AAVSO in a necessary and unique way.

AAVSO Funds The following is a list of the specific funds to which you may contribute. If you do not wish to specify how you would like your donation to be used, the AAVSO will determine the fund where it is needed most and place it there.

AAVSO General Fund

This fund is an unrestricted one and supports the general operations of the Association.

Endowment Fund

This is a professionally managed fund, invested for the perpetuity of the AAVSO. From time to time, transfers from this fund into the General Fund are made as necessary to meet operating deficits of the Association.

AAVSO Building Fund

This fund is dedicated to replenishing the Endowment Fund for the cost of purchasing the new headquarters building (49 Bay State Road, Cambridge, MA 02138), to provide funds to refurbish the building, and to cover other costs incurred with the purchase.

Janet A. Mattei Research Fellowship Program

This fund enables a visiting scientist, postdoctoral researcher, or student to perform research at AAVSO Headquarters with the goal of disseminating the results throughout the astronomical community.

Margaret Mayall Assistantship Fund

This fund helps finance a summer student at AAVSO Headquarters who works on variable star-related projects and research while learning about the AAVSO and variable stars in general. Only the accumulated interest and not the principal may be used.

Solar Fund

This fund helps to pay the staff costs of running the section, publishing the *Solar Bulletin*, and travel expenses for visiting solar researchers.

AAVSONet Fund

This fund pays for refurbishment and maintenance of telescopes, cameras, mounts, computers, software, and hardware required to operate the AAVSO's robotic telescope network.

Member Sponsorship Fund

Funds donated to this program pay the membership dues for those active variable star observers who want to become members of the Association but cannot afford the dues.

Student Meeting Scholarship Fund

Donations to this fund pay for up to 10 student registrations per annual meeting of the AAVSO.

Director's Discretionary Fund

The corpus, contributions, and income derived from the investments allocated to the Director's Discretionary Fund are considered temporarily restricted for the unrestricted use by the Director for the benefit of the Organization.

Contributor-Specified Restricted Funds

These are gifts and contributions made to the Association for restricted purposes as specified by the donor thereof. All such restricted funds of the Association shall be administered in strict accordance with the instructions of the donor. The Association is not obliged to accept any assets so offered.

If you wish to contribute to one or more of these funds please fill in the amount on the appropriate line on your renewal form and include it in the total. *All contributions are tax-deductible in the USA.*

You may also donate online at: <https://www.aavso.org/support-aavso>

Thank you for your support of the AAVSO!