

## CONCLUDING REMARKS

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### 1. GENERAL

How does one examine a colloquium event so as to gauge whether it has been a success? I don't know of a canonical way to do this but one obvious possibility re-studies the scientific goals proposed by the SOC. When I do do this, I find that the formal papers and the conversation have at least touched on every one of the enumerated topics.

I am going to make my own estimate by describing three precepts in the following sections and by drawing a conclusion after each of them. I make no claim that this procedure is novel. We came to the meeting with our individual funds of background knowledge according as we are, variously, specialists in some sub-topic of Algols or are stellar generalists, who know at least something broadly about these stars. I think that I fall into the latter category and this flavors my remarks.

### 2. RE-EMPHASIZING INHERITED WISDOM

A colloquium serves one purpose if it reminds us of things that we have been familiar with and makes us recall them to see if we still believe them in the familiar way.

I make a non-exhaustive, non-ordered list of concepts which are not new and which appear to continue to form a continuing framework for thinking about Algols. (a) The ring structure around a gainer may be discontinuous. (b) There exist disks of very different z-extents. (c) Very large scale UV-absorption transients have been documented for some systems and we should be alert for their appearances in more binaries. (d) Non-KLOF mass loss has an important role to play at some evolutionary stages. (e) It is possible to observe accurately the radial velocity curves of the cool members of systems such as RX Cas and SX Cas. (f) Bounded instabilities, presumably pulsational ones, exist in the losers or in the disks or in both. (g) The concept of mass-transferring "splash" needs much more development. (h) It is not completely clear at what evolutionary point(s) the common-envelope phase of evolution comes into play. (i) For those Algols which have well-developed disks it is necessary to pay attention to the difference

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between the equatorial and polar radiation fields. (j) Bet Lyr continues to be the exemplar of fast evolutionary stages. I think our understanding of these thoughts has not been changed by the colloquium.

In many respects, it would be surprising if this list were very short. I conclude that it indicates that we have moved substantially from ground-zero in study of Algols - a sort of tepid endorsement of the colloquium.

### 3. NEW EMPHASES ON FAMILIAR KNOWLEDGE

A second purpose of a colloquium is to recognize how we must inflect information already in hand.

Just as before, I summarize topics which I think exemplify this intention. (a) It used to be that we had only light and velocity curves providing observational data. We now see that good coverage of (V/R), polarization, and H-alpha curves supplement the classical information and inform us directly about the circumstellar environment. (b) Clearly there is dust in at least some Algol systems. We must consider seriously the extinction caused by it and localize it more exactly. Could it be that the dust forms around the L1-point? (c) Some of the Algol systems have been known to be troubled by stellar "third light", which could not be quantified suitably up to now. It is clear that high-resolution CCD's can cope with this limitation for some small angular separations which defeat aperture photometry. (d) The modelling of 2nd harmonics in the radial velocity pattern for RX Gas shows the level of refinement to which we are now aiming. (e) The photospheric light scattered by circumstellar gas has always been an abstract possibility in light curve studies. Polarization measures give limiting values for scattered light levels and emphasize that the scattered light does not present a photospheric distribution to the observer. (f) Out-of-the-plane gas has also always been a conceptual possibility. The simplest interpretation of polarization curves shows that this gas does exist for certain Algols. It is also noteworthy that line profiles can be modelled to yield a similar non-zero z-distribution for H alpha, at least for Algol itself. (g) If the 275-day cycle for intrinsic variability in the long-term photometry of Bet Lyr is not a statistical seasonal alias, it certainly is one of the most important observational facts concerning this system discovered for a considerable time.

My belief is that this list is far from negligible and that it conveys a reason for considerable satisfaction with the scientific sense of the colloquium.

### 4. FUTURE POSSIBILITIES

If one has some measure of insight, it should be possible to reason from the science of the colloquium to meaningful new understandings and prospects for new research programs.

I offer some speculations and rhetorical questions in this direction. (a) Since we believe that Bet Lyr is unique, could it be

that we have over-estimated the time scale for fast-mass-loss evolutionary stages? (b) Even if this latter is an idea without content, we must certainly continue to monitor Bet Lyr, and at least a few other systems, with as many techniques as possible as frequently as possible. (c) I. B. Pustyl'nik and L. Einasto have begun the development of modelling for gas-embedded close binaries. Some extended effort to apply this work to Algols should be begun. (d) There remains more than a little dissatisfaction with the concept of "Serpentids". Such a situation is generally best handled by sharpening an operational definition for further scrutiny. (e) We can certainly speak meaningfully of disks modelled from observations which respond to continuum radiation and disk models are also developed from line information. Is it obvious that these are one and the same disk spatially and with a unique velocity field? (f) Do emission/absorption processes also occur in a scattering disk? (g) Can we work on line-scattering disks in the near future? (h) How does the flowing gas get out of the orbital plane?

Obviously, this is a wish list that comes from someone with a zero clairvoyance quotient. Nonetheless, the circumstance that one may form some of these questions in near-real time can be understood to be a considerable testimonial to the effectiveness of the colloquium.

## 5. FINAL MATTERS

When the colloquium opened, there was some question of whether Algols connect at all with much of the rest of stellar and galactic astronomy and astrophysics.

I wish to suggest some personalized speculations which speak to this matter. (a) If we know one thing about stellar astronomy and galactic astronomy at present, it is that interest in disks shows no signs of abating. I suggest that Algol disks occupy a small-scale and low-activity disk structure (a boundary value condition) which it behooves us to understand before astronomers in general can be said to understand more extravagant disks. (b) From a theoretical point of view, an Algol disk should represent a 3D structure that modern computers can begin to handle in detail. (c) There should also be broad interest dynamically in the mechanical perturbations of disks (hardly glimpsed at the present) in the Algols which are members of triple stellar systems. (d) We should continue to look for Algols in open, and possibly globular, clusters. It would be surprising if this is not a field shortly to become productive and to open a dialogue with people interested in the clusters themselves or in using them for scaling stellar evolution or distances.

In sum, we have come to the end of a colloquium whose subject matter seems to offer openings presently and imminently to a considerable portion of the rest of observational and theoretical astronomy.