

A SPIRIT OF SEARCH

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Abstract

A description is provided of a nova-search program that is guided by studies of historical novae and their distribution on the Milky Way.

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1. New Departures

To advance my variable star studies during the summer of 1978, I created a nova-search program, but it soon became apparent that I had not made the most productive use of my time because I had not researched historical novae. With the coming of winter, I determined to put down the binoculars, open the textbook, reassign priorities, and design a more productive program.

2. Oriental Towers

In the year 1181 A.D., Chinese astronomers were among the first to discover a brilliant "lamp" near the ruddy star Eta Cygni. According to ancient historical writings, Chinese astronomy prospered as a result of the creation of an astronomical bureau whose principal functions were the observation and interpretation of celestial portents, as well as the creation and maintenance of a reliable calendar. Many observatories -- Oriental Towers -- were constructed throughout the Chinese empire, and it was the custom for royally appointed observers to search the skies from dusk to dawn for celestial visitors.

In studying the Oriental records, we find approximately twenty stars recorded, and they are both novae and supernovae. Among them are the supernovae of 1006 A.D., 1054 A.D., 1181 A.D., 1572 A.D., and 1604 A.D. (Stephenson and Clark 1977).

Because of the commitment of the Chinese spirit to seek out and observe these "events", a superb contribution remains intact and available for inspection. Modern-day nova hunters must also personify this "spirit of search," for without it the star atlas remains on the shelf to gather dust. Peter Collins(1978) refers to the spirit of the nova-search observer as follows: "The nova hunter must cultivate the patience of a stone buddah, maintaining his enthusiasm through the reaches of time and starry space." In the summer and fall of 1979, I experienced through my program a spirit of new beginnings, a spirit of the ancient Chinese astronomical vision.

3. Windows in the Sky

Researching the available data on historical novae (e.g., Payne-Gaposchkin 1957) I noticed a high frequency of novae in certain constellations, such as Sagittarius, Scutum, and Lacerta. Plotting the novae on an atlas such as Norton's or the Skalnate Pleso Atlas of the Heavens revealed that the historical novae gather or "cluster" in certain areas of the sky. I refer to these as "windows" -- areas where a high or moderate level of nova activity has occurred. Some windows are associated with star clouds, others with the galactic center or spiral arms of our galaxy. Likewise, there are areas apparently deficient in nova activity that may be found near large dust clouds which obscure

portions of the galaxy.

The AAVSO's Nova Search program divides the sky into areas 10 degrees of declination by about 1 hour of right ascension. Once we relate the windows and deficient areas to AAVSO Nova Search areas, we have a proper framework for documenting the activity. Those areas which correspond to the high-activity windows are called "common areas", and are to be given emphasis in nova-search programs. These common areas should be searched on a regular, nightly basis, and if past performance is an indication of things to come, they will continue to yield relatively high returns.

4. Identification of Common Areas

Figure 1 shows the division of the sky into the AAVSO Nova Search areas. A great percentage of novae occur in a band along the galactic equator, about ten degrees on either side. This band consists of the following nova search areas, with the common areas marked with an asterisk: 13, 14, 15, 16*, 24, 25, 26*, 27*, 28, 40, 41, 42, 43, 61, 62*, 63*, 64, 77*, 78*, 79, 87, 88, 89*, 97, 98, 99*, 100, 106, 107, 108, 109, 117, 118*, 119*, 120, 126B, 126C, 127A*, 127.

5. Constellations of Binocular Stars

A good star atlas is an essential part of the program. Beginning with the Skalnate Pleso Atlas of the Heavens, I found memorization a moderate discipline. As the months slipped by I became aware that my limiting magnitude had increased by about 0.5 mag., to 8.0 or 8.2 mag. It became necessary to use Atlas Borealis and Atlas Eclipticalis for my confirmation of interlopers. Memorization of constellations of binocular stars is a practical method of searching for novae. Just as the ancients created constellations in their myths, so the nova hunter may also create constellations for an equally honorable purpose. It is a romantic endeavor to think of yourself as taking part in an ancient art, the invention and recognition of constellations.

Properly done, nova searching can be as personally exciting as it is scientifically valuable. It depends on one's commitment, patience, and determination.

REFERENCES

- Collins, P. L. 1978, Journ. Amer. Assoc. Var. Star Obs. 7, 64.
- Payne-Gaposchkin, C. 1957, The Galactic Novae, North-Holland, Amsterdam.
- Stephenson, F. R. and Clark, D. H. 1977, "Ancient Astronomical Records from the Orient", in Sky & Telescope 53, 2, 84.

NOVA SEARCH AREAS

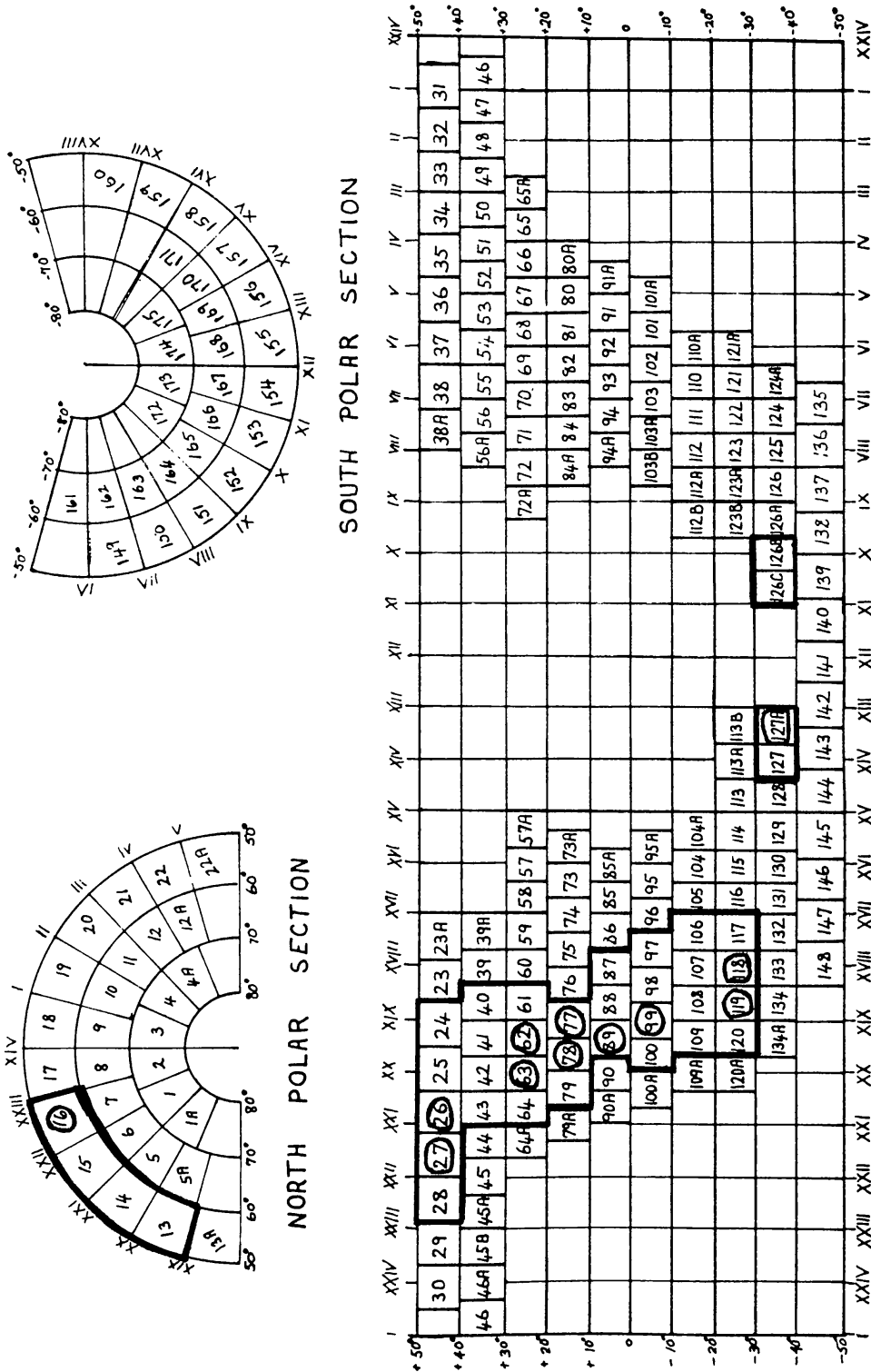


Figure 1. The Nova Search areas established by the Nova Search Committee of the AAVSO. The band in which a great percentage of novae occur is outlined. The "common areas" are those whose numbers are circled (see text).