

Genini

a publication of the Minnesota Astronomical Society

FEBRUARY, ~~1989~~ 1990

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MAS RECEIVES \$20,000

The MAS has received a grant of \$20,000 toward the observatory. The Onan Family Foundation made the grant in memory of Charles W. and Elizabeth H. Onan. Charles and Elizabeth Onan were the parents of MAS member Mary Williams. The money has been deposited in a money market account yielding 8 percent interest.

FEBRUARY MEETING

The February meeting will be held Tuesday, Feb. 6. Steve Odewahn from the University of Minnesota will give the program. He will talk about the University's plate scanning machine and his own research on galaxies, done using the machine.

We are unable to have this program at the University as originally planned, so it will be at the Science Museum.

The program for the March 6 meeting has not yet been determined. Call the telephone line, 643-4092, for that information.

DEEP SKY EYE

By Max Radloff

On any list of amateur favorites, the Double Cluster will rank at or near the top. Although it is easily one of the most spectacular

sights in the heavens, the twin clusters are only two of the many in this part of the sky. This month I will discuss four of the other open clusters nearby which can be found and enjoyed even if you only take the **Continued on page 2**

DEEP SKY EYE

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telescope out in your back yard for a few minutes on one of these winter evenings.

The finding chart will guide you to these clusters once you have found the Double Cluster. The number of stars on the chart has been kept to a minimum because all these clusters are within one finder field of the Double Cluster and can be found by noting their relative position to the Double Cluster. Just remember, because you will be observing between the zenith and the pole, in an inverting telescope the view in the eyepiece will be the same orientation as the chart.

About two degrees north-northwest of the Double Cluster is Stock 2. This appears quite large because it is relatively close to us. Because it is about a degree in diam^e*=====*

GEMINI

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All members of the Society receive "Gemini." Non-members may subscribe to "Gemini" for \$8 per year by sending a request and enclosed check made out to "MAS" to the editor at the address listed above.

Send articles and exchanges directly to the editor. Articles for publication are due the 15th day of the month preceding the month of publication. This is usually the same as the 15th day of the month following the month of publication of the preceding issue.

ter, the best view may be through the finder or in binoculars. Unless you have an eyepiece that has

a field of view significantly larger than a degree, it won't show the cluster separated from the surrounding field stars. Through an average eyepiece with a field of one degree, Stock 2 is still a nice sight, with several dozen stars, many of eighth and ninth magnitude spread across the field.

Trumpler 2 is located about three degrees southeast of the Double Cluster. It is a good object in a small telescope, about 20' in diameter and distinctly elongated in an east-west direction. Near the center is a seventh magnitude red star, surrounded by a handful of eighth and ninth magnitude stars and additional fainter ones.

Like Trumpler 2, NGC 957 is also elongated in an east-west direction. NGC 957 is about two magnitudes fainter than the previous clusters and contains a couple dozen stars of 10th magnitude and fainter. The brightest star is on the southern edge but it is a field star superimposed on the cluster and not a cluster member.

A more challenging object is Basel 10, much smaller and dimmer than the other clusters. It is a little knot of 11th magnitude and fainter stars only a couple of arc minutes in diameter. Once you have found it at the position indicated on the chart, see if you can resolve it with high power.

Good luck and clear skies!

ANNOUNCEMENTS

We have a new voice mail service. The service we had been using was sold and a 30-second limit on the messages was imposed, making it impossible to record anything other than the basic information about the meetings.

We now have the capability to record messages up to three minutes long. The messages will be changed at least three times a month. Besides the information on meetings and star parties, the messages will **Continued on page 3**

ANNOUNCEMENTS

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contain information on new discoveries and other items of interest in the sky.

As before, it is always a good idea to call to check on the place for meetings. If you have any suggestions about improving the phone messages or some information you think should get out to members quickly, call Max Radloff at 451-7680.

The new phone number is 643-4092.

The club has received a donation of copies of Sky & Telescope from 1981 to present. If you are interested in these, please call Max Radloff.

The following yearly handbooks are available: the Observer's Handbook of the Royal Astronomical Society of Canada, \$11; Guy Ottwell's Astronomical Calendar, \$13; the Floppy Almanac from the U.S. Naval Observatory, \$6 for the disk, an additional \$2 for the manual.

These will be available at meetings until sold out. If you would like more information on these publications or if you would like to have one mailed to you, call Max Radloff.

We also have copies of the Arizona Database, containing information on over 16,000 deep sky objects. The information comes on two 5¼" floppies in a compressed format that expands to over four megabytes.

To use it you need a hard drive and database program that can import Dbase III files. The disks are bootable and contain installation instructions and the programs to expand the data. The club has the IBM format disks available for \$7.

A MacIntosh version is available through the mail and an Amiga version will be out soon. If you want more information, please call Max Radloff.

We have had a letter from a couple in Madison, Wis., who went on the Sky & Telescope astrophotography trip to Ayer's Rock in Australia last year. If you are considering this trip, they are willing to answer any questions you may have.

You may call Jim and Marjean Jondrow at 608-233-8165.

The Science Museum of Minnesota is planning a trip to Baja for the July 11, 1991, solar eclipse. Plans are to leave July 9, stay overnight in Los Angeles and fly to Baja on the 10th. The group will then travel by bus to a private resort on the Gulf of California, about three miles from the center line.

The resort has facilities for about 25 and tents will be provided for the remainder. All meals and camping equipment are included and the cost will be \$1,175.

MAS and SMM members will receive a discount. The return will be on July 14. In addition to viewing the eclipse on the 11th, there will be a side trip or two and four nights of dark sky observing at a latitude of 23½ degrees.

For more information, call the Continuing Education department at the Science Museum, 221-9438.

Celestron has announced a photo contest. There are eight categories, with three prizes--\$300, \$100 and \$50--in each category. Photos must be taken with Celestron equipment. The deadline is April 30, 1990. If you would like to enter, please call Max Radloff to get a complete set of the rules.

The annual convention of the North Central Region of the Astronomical League will be held on Saturday, April 28, in Madison. Speakers will be Lowell Doherty and John Mathis from the University of Wisconsin.

There will also be an open house on both Friday and Saturday nights at the Madison Astronomical Society's Carl Fosmark Observatory.

Amateurs are invited to give papers and enter the photo and art contests. Registration forms will be available at the meetings through

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ANNOUNCEMENTS

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April or can be obtained from Max Radloff.

The star party dates for 1990 have been set and are given below, although there are still a couple of sites to be determined. Star parties will be on Friday evenings, with Saturday as an alternate in case of bad weather.

Weather information will normally be on the phone line (643-4092) after 6:30 p.m. on the date of the star party. In the event that information does not get on the line, you can get it from Lauren Nelson, 644-1254.

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April 27 or 28
May 25 or 26
June 22 or 23
July 20 or 21
July 27
Aug. 11
Aug. 17 or 18
Sept. 21 or 22
Oct. 19 or 20

During the third week in March, it is possible to view almost all the Messier objects during a single night. If you would like to make the March star party into a Messier Marathon, we will make special preparations, including choosing an optimum site, providing some munchies and warm drinks and printing some special forms to help you find as many objects as possible. (Some can be seen only at dusk and others only at dawn.)

Plans for July 27 are to have a star party together with the astronomy clubs from Brainerd and Duluth at a very dark site somewhere well north of the Twin Cities. Because of the difficulties in coordinating three clubs, we will not be able to have an alternate date for the July 27 party.

Please call Max Radloff by July 27 if you are interested in the Messier Marathon or have a suggestion for a site.

SEEING DOUBLE

By Bob Liesenfeld

Last time we took a look at the beginnings of the study of double stars. We'll now move on to some of the other individuals who played a part in the early study of these systems of stars.

One of the first astronomers to make use of the information gathered by Herschel was a German by the name of Friedrich Wilhelm Struve. Wilhelm (as he is most often called in the

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SEEING DOUBLE

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literature) was born in Altona in 1793 but emigrated to Russia as a young man, where he became director of the Dorpat Observatory.

This observatory was equipped with many instruments, including a fine nine-inch Fraunhofer refractor on an equatorial mount. This was one of the first truly modern telescopes and Struve made good use of it, observing up to seven doubles a minute with remarkable accuracy.

In 1833 the Russian Emperor Nicholas called Wilhelm to set up the great observatory at Pulkovo. Here Wilhelm continued his work on double stars and published several exhaustive catalogs, valued today for their accuracy and often used in determining the orbital elements of pairs.

Wilhelm's contribution to this facet of astronomy can be seen on many star charts, such as Norton's, by the common occurrence of the symbol Σ , followed by a number. These designations refer to entries in one of the many catalogs of double stars which Struve produced.

Upon his retirement, Wilhelm appointed his son Otto as director of Pulkovo. Otto carried on the intense study of doubles and produced a catalog of his own, designated by the symbol $O\Sigma$. The Struve family produced other noteworthy astronomers, including Otto II, who was director of Yerkes Observatory for many years and founded McDonald Observatory in 1939.

Another name in the history of double star observation is the Rev. T. W. Webb, who in 1859 published the first edition of his "Celestial Objects for Common Telescopes."

This remarkable volume, still in print today, contains thousands of detailed descriptions of double stars, nebulae and other objects, arranged by constellation. The section on double stars is particularly useful because it contains data on the position angle and separation from many observers over many years.

This kind of information is vital for the calculation of the shape and period of the orbit of a binary pair. Because most visual binaries have orbital periods of hundreds or even thousands of

years, it is apparent that data gathered over even an entire lifetime may not be adequate for the computations.

The information in this book is presented in a highly abbreviated format; however, with a little thought it can generally be "decoded." A contemporary of Webb was the "eagle eyed" Rev. W. R. Dawes, known for his empirical Dawes limit, a convenient means of estimating the resolving power of a given diameter of objective.

Dawes was a dedicated double star observer and could resolve or split many doubles beyond the capabilities of his contemporaries, thus leading to the nickname.

The name S. W. Burnham stands out in any review of double star observers. Burnham had a full-time **Continued on page 6**

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SEEING DOUBLE

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career as a district court report but spent his nights studying doubles and preparing a catalog. He is noteworthy not only for his renown keen vision but also for the fact that, though he remained "only an amateur astronomer" his entire life and never abandoned his legal profession, he worked side by side with many renown astronomers at several large observatories, including Yerkes.

This acceptance of his work by the professional circle speaks highly of his talents and demonstrates what a gifted and dedicated "amateur" can accomplish.

Some of the more recent researchers in this field include R. G. Aitken and Paul Couteau. Aitken published an exhaustive catalog of pairs, incorporating many earlier works. Couteau has published an excellent book, "Observing Visual Double Stars," which, although marred by several editorial errors, is still a very useful text.

There are, of course, many other noteworthy names in the history of double stars and this brief review only scratches the surface of a fascinating subject.

Next time we will begin to take a look at some of the facets of observing doubles and how you can make meaningful measurements to compare with some of Webb's century-old data.

BOARD NEWS

From Steve Korzenowski
MAS president

The annual budget report will be presented before the February meeting program.

MAS is planning to erect a warming house at the Metcalf observing site.

Remember, this is your club and your ideas, opinions, comments, suggestions, hopes, dreams and desires are welcomed and encouraged. You can be heard and represented by either writing a letter, making a phone call or just rappin' with your favorite board member. Board meetings are open to the general

membership; you can't vote but you can come and be heard. So if you've got something to say, for goodness sake, speak up!

ELECTION RESULTS

Vice president
Board member

A VOICE IN THE WILDERNESS

By Harold Doweiko

This has been a record year for comets! The year 1989 saw the discovery or recovery of 34 comets, beating the old record of 33 discoveries/recoveries set in 1987. One comet, known as Comet Austin, is of special interest, not simply because I happen to live in Austin, Minn.

Although Comet Austin is a prime telescope object for observers in the southern hemisphere at this time (early January, 1990), preliminary orbital calculations suggest that this comet should be visible in the morning skies from Minnesota during the months of March through May. If the comet lives up to predictions, it should be as bright as second magnitude or possibly even as bright as first magnitude by late April or early May.

The time around May 8-13 should be an especially good viewing period if preliminary calculations are correct. The moon will not be visible in the morning skies and the comet should rise at around 2-2:30 in the morning, according to my calculations. By 3:30 in the morning, the comet should be about 20 **Continued on page 7**

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degrees above the eastern horizon, well above any distortion on the horizon. This should make the comet an easy target for naked-eye observations, especially because the comet is predicted to have a tail several degrees long.

It should be noted that these predictions are based on preliminary data which may be revised over the next few weeks. The comet should present a fine telescope object in January and February, however, and should be well worth the effort to view. Sky & Telescope should present the latest orbital calculations in their February or March issues.

Editor's note: See page 135 of the February edition of Sky & Telescope.

Another comet, Tuttle-Giacobini-Kresak is predicted to reach perihelion on Feb. 7. This comet has a history of multiple discoveries over the years and was first discovered on May 3, 1858. At that time, the comet was moving away from the sun and was visible from Earth only for about a month. Various estimates of its orbit gave a period of between 5.8 and 7.5 years.

This comet then faded from view for a half century and was not seen again until June of 1907. At that time it was estimated to be 13th magnitude and it was moving away from Earth. Unfortunately, Comet Giacobini, as it was known, never brightened beyond 13th magnitude and it was lost shortly after its discovery. Seven years later, W. H. Pickering suggested that the comet seen in 1907 was the same as the comet discovered in 1858 by Horace Tuttle.

The comet then was lost for almost another half century because of a poorly defined orbit and poor observing conditions. It was not until April of 1951 that Lubor Kresak recovered Comet Tuttle-Giacobini and sufficient observational data was obtained to allow for an accurate orbital computation. The comet's orbit was computed to have a period of 5.5 years. It remained near magnitude 10 until after perihelion, when it started to fade.

Comet Tuttle-Giacobini-Kresak's history is most remarkable in that, although it is usually quite faint, in 1973 its brightness increased from magnitude 10 to magnitude 4! This took place

over a one week time span that started on May 26. At that time, Comet Tuttle-Giacobini-Kresak had brightened from magnitude 12 to magnitude 8, to the surprise of both amateur and professional astronomers. The next day the comet's brightness peaked at magnitude 4. By June 2 the comet's magnitude had dropped back to magnitude 10.

The reason for this episode of brightening is not known but it suggests that the comet should be watched closely during its present approach to the sun. The February issue of Astronomy provides coordinates for Comet Tuttle-Giacobini-Kresak during the observational period.

COMET NEWS

By Max Radloff

It has been a long time since a really bright comet has appeared in our skies but the long drought may come to an end this spring with the appearance of Comet Austin. This comet was discovered in early December by Rodney Austin of New Zealand and it is predicted to become the brightest comet of the last decade.

It is currently deep in the southern skies at 9th magnitude but during the next four months it will travel north and brighten to first magnitude.

During the last part of February, Comet Austin will brighten to seventh magnitude and will be placed very low in the evening sky. It will stay close to the sun during March and early April, brightening rapidly to first magnitude by perihelion on April 9. It will then be in the northern skies and will set at the end of evening twilight and rise at the beginning of morning twilight.

At the end of April and through **Continued on page 8**

COMET NEWS

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out May it will move away from the sun and fade slowly, and by May 22 it is predicted to be 100 degrees from the sun, while remaining brighter than third magnitude.

After that, Comet Austin will quickly move south and fade below naked-eye visibility.

As we all know, comets do not always perform as predicted. Comet Kohoutek is synonymous with astronomical disappointment because it was several magnitudes below the original estimates and Comet West is fondly remembered as one that was even brighter than predicted.

We can only wait and observe what Comet Austin will do. Even if it does not live up to the predictions, Comet Austin will be better than any comet of the 80s and, if it exceeds predictions, it will be remembered as "The Great Comet of 1990."

No ephemeris is given for Comet Austin because astronomy magazines should have prominent coverage of it by March, when it first becomes visible.

Ephemerides are given below for the other comets. Positions for epoch 2000.0 are given for 0h UT on the indicated dates.

Comet Skorichenko-George is the brightest of the three telescopic comets now visible. At the beginning of February it will be at ninth magnitude and it will brighten by less than a magnitude by the end of March.

Periodic Comet Schwassmann-Wachmann 1 is a very unusual comet having a nearly circular orbit beyond Jupiter's. It is normally invisible at 17th magnitude but it has outbursts at irregular intervals when it brightens as much as nine magnitudes.

In the past, the outbursts have lasted about a week and have occurred approximately every other month. The outbursts are variable in intensity, with the comet typically brightening to 12th magnitude. If you patiently observe the comet's position, you should get a glimpse of this most unusual object. Positions are given weekly for the times this year that it is more than 30 degrees from the sun.

Feb 4
Feb 11
Feb 18
Feb 25
Mar 4
Mar 11
Mar 18
Mar 25
Apr 1