UPCOMING EVENTS:

11-23 Wednesday: Full Moon
Jupiter at Opposition

11-26 Saturday: Monthly meeting of the Society at Regener Hall, UNM

11-30 Wednesday: Moon occults Regulus--Graze in N.M.

12-1 Thursday: Last Quarter Moon
Society Board of Directors Meeting at UNM Physics and Astronomy Department Building, Room 186, 7:30 p.m.

12-3 Saturday: Graze Occultation--Observing Party at John Adams Middle School, 4:00 a.m.
Star party at Shooting Range Park

12-8 Thursday: Lecture by Dr. S.A. Gregory on "Cosmic Voids: Much Ado About Nothing", at UNM's Regener Hall at 7:30 p.m.

12-9 Friday: New Moon
Final UNM Campus Observatory Night for this Year—from 7:00 p.m. until 9:00 p.m.

12-10 Saturday: Dark Sky Night at Gran Quivira

12-13 Tuesday: Geminid meteor shower: Radiant at 7h 32m, +32 deg; Peak at 6:00 p.m. MST

12-16 Friday: First Quarter Moon

12-17 Saturday: Society Potluck Dinner

12-21 Wednesday: Winter Solstice

THE NOVEMBER MEETING:

Dr. Jack Burns, Director of the Institute for Astrophysics of the University of New Mexico, will talk about Astronomy with a Supercomputer at our November meeting. The meeting will be held Saturday, Nov. 26th, at 7:30 p.m. in Regener Hall on the UNM campus.

Dr. Burns, an associate professor in UNM's Physics and Astronomy Department, is a leader in the field of astronomical supercomputing. He spent six months last year as a Visiting Senior Research Scientist at the National Center for Supercomputer Applications, a National Science Foundation-sponsored facility at the University of Illinois. He has used supercomputers for the research involving cosmic jets and the evolution of the universe.

He joined the University of New Mexico in 1980, after working as a postdoctoral researcher at the National Radio Astronomy Observatory. He received a B.S. in astrophysics from the University of Massachusetts and an M.A. and Ph.D. in Astronomy from Indiana University. Dr. Burns is the author of more than 65 scientific papers and has presented numerous talks at professional meetings. He is a member of the American Physical Society, the American Association for the Advancement of Science, the American Astronomical Society, the Royal Astronomical Society of England and the International Astronomical Union.

LAST MONTH'S MEETING:

The October meeting of the Society was held at Regener Hall on the main UNM Campus. Attendence was a little bit lower than usual, as can be expected with a move, but there was plenty of free parking east of Regener Hall and over 300 seats in the auditorium. So come to the November meeting and fill some of them. On display was a 6" telescope that has been donated to the Society. It is now available for rental by members from Alan Trever, Telescope Curator. See the back page for his phone number.

The speaker was Dr. Bel Campbell of the UNM's Physics and Astronomy Department. As a professional astronomer, she has worked at many major observatories worldwide, and often commutes to Chile. She gave us an informative slide show of several observatories and talked about some of the behind-the-scenes happenings at them.
UPCOMING DECEMBER POTLUCK DINNER MEETING:

There will be a potluck dinner in place of a meeting on December 17th. As you read in last month's Sidereal Times, our society has grown too large to have an open invitation to someone's home. When you have over 200 members ... What would you do if everyone showed up?

This year's potluck dinner--Winter Solstice Celebration (as I like to call it) -- is going to be held at Chapman Hall located at 9500 Constitution Avenue NE. This is the site of St. Paul's United Methodist Church. Several other places were considered. This particular location was chosen because it has kitchen facilities, tables and chairs, and most of all--the price was right.

Last year, our Winter Solstice Celebration included not only delightful dishes prepared by our members (or their wives) but also a slide show. This year I would like to see much more sharing. If you have photos, slides, posters, or anything other people might enjoy seeing--bring it with you. Most important bring yourself. Your entire family, friends, and neighbors are always welcome.

There will be one more article published regarding this event. It will appear in the next issue of the Sidereal Times. The article will contain more detailed information on what to bring and who to contact. In the meantime, see the map to the right. Save it in your membership packet ... This will not be our last Winter Solstice Celebration! --George Pellegrino, President

A VISITOR FROM DOWN UNDER VISITS LOCAL STARPARTY:

November's star party at Shooting Range Park was made even more special by a visit from Rev. Robert Evans, the world famous super nova discoverer from Australia. While out at Shooting Range Park, Rev. Evans got to see several galaxies he never saw before. Several members had questions for our honored guest and were most grateful for the opportunity to meet such a famous amateur astronomer.

Rev. Evans is now an honorary member of our Society and has agreed to send us a new article for our newsletter each time he discovers another super nova. Many thanks are given to fellow member Cal Currier for inviting Rev. Evans to join us.

SOMETHING'S IN THE WORKS!--JUPITER NIGHT AT THE UNM CAMPUS OBSERVATORY:

There is another public function being planned, even as this newsletter goes to press. Vice President Dave Finley and fellow member Dr. Bel Campbell are planning a special event for the opposition of Jupiter. Although the opposition will occur the night of November 22nd to 23rd, the event will probably be held on December 2nd, or the following Friday night, at the UNM Campus Observatory.

We will be needing lots of help and some telescopes! Please come to the next meeting for more details on this and other important issues!

MEMBERSHIP UPDATE:

The Society presently has 159 general members, 48 family members, and 5 honorary members. There have been 10 renewals. Thank you to those of you who have renewed. The Society wishes to welcome the following new members who have joined during the last two months:

Elizabeth Cochran
Judy Forster
Charles Linn
Curtis W. Smith
Gerald & Kirk Cessac
Shirley A. Fox
Len Lorence
John Warns
Edward Drizcek
Harold Henthorn
Anna M. Ortega
Frederick Weber
Daniel Flegel
Damian Jelso
Mark A. Runsey
Charles & Constance Wetterer
PSST!! WANNA FIND A NEW PLANET?

Yes, there is a possibility of a tenth planet. The strongest evidence for this body is the small perturbations in the orbits of Uranus and Neptune—the type of perturbations that, when seen in the orbit of Uranus led to the discovery of Neptune and which spurred Percival Lowell to direct the search (performed by Clyde Tombaugh) that found Pluto. These are small but nagging orbital perturbations, made more nagging by the fact that Pluto, once thought to be their cause, is now known to be too small to have a sufficient gravitational effect on Uranus and Neptune to explain them.

Dr. Robert S. Harrington, a specialist in celestial mechanics at the U.S. Naval Observatory in Washington, D.C., has made a detailed study of these orbital perturbations, resulting in an article in the October issue of The Astronomical Journal in which he proposes orbital elements and a present position for the possible planet. Harrington, who is an extremely careful worker, does not say there is a tenth planet. He only says that there is "a good possibility that there is at least one undetected planet in our solar system". His analysis gave a number of possible orbits and presents positions for it.

His predictions are not a pinpoint position, but a pair of general areas where the planet may be. The best candidate is around R.A. 16 hours, Dec. -38 degrees, in the region of Scorpius, but he is quick to point out that "any search should use the above only as a starting point to cover the indicated broad region", which ranges from R.A. 14 to 20 hours and declinations from -15 to -60 degrees. The planet, Harrington says, may be as bright as 14th magnitude.

This last summer, many of us heard Dr. Clyde Tombaugh recount how thoroughly he searched the sky for years after finding Pluto, with no other planets showing themselves. Harrington acknowledges that Tombaugh did not likely miss any planets in his search area, but points out that the position he feels likely for Planet X is in an area "only marginally covered, at best, by this magnitude by Tombaugh."

Planet X, according to Harrington's analysis, may be 101 Astronomical Units, or nearly 9.4 billion miles, distant from the sun at aphelion. Pluto, you recall, is 39.A.U. from the sun at aphelion. Harrington's "good case" orbit for Planet X takes it around the sun once every 1,019 years. The planet, which may be four times as massive as the Earth, has, Harrington suggests, a highly eccentric orbit inclined more than 32 degrees to the Ecliptic, or nearly twice as much inclination as that of Pluto, which has the most highly-inclined orbit of any planet yet known.

In spite of Harrington's solid reputation, the low probability of success will probably deter nearly all professional observatories from mounting a search for Planet X. The predicted magnitude of 14, puts the object, if it exists, well within the range of amateur photographic surveys. This could be a chance for a careful, patient project that could bring immortality to some amateur astronomer.

--Dave Finley, Vice President

DR. TOMBAUGH REVISITED (MENTALLY):

Are we alone? 200 billion suns (stars like our sun) in our Milky Way (our own galaxy). 10 billion galaxies. An average galaxy has 100 billion stars. Therefore 10 to the 21st power of suns are in the universe. Well, suppose we assume a grain of sand is one millimeter in diameter. Then 10 to the ninth grains are in a cubic meter of sand. . . . not enough sand. Consider a strip of ocean beach one meter deep by 100 meters wide by a kilometer long. That's 10 to the 14th grains. . . . still not enough sand. But there are 10 thousand kilometers of ocean beaches on the earth. That's 10 to the 19th grains. So, for every grain of sand in the ocean beaches of earth (one meter deep) there are 100 suns in the universe. "DON'T TELL ME WE'RE ALONE!"

OCCULTATION TIMING UPDATE:

TOTAL OCCULTATIONS: The table below lists the total occultations that we can observe for the month of December.

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SA366 LUNAR OCCULTATIONS (STANDARD COVERAGE) COMPUTED FOR ALBUQUERQUE (LAT | MORGAN, N
35.073 LONG 106.493) FOR 1980 DENVER, COLORADO IS THE STANDARD STATION AT LAT 39.676 LONG 104.952, CODE SE402
GRAZING OCCULTATIONS: Has everyone heard about the member backing off a cliff in the dark, towing his scope on a dolly? No, the scope stayed up above. Oh, yes, there were no injuries (Pride?--yes. Very good sport!--yes). And then we were clouded out!!!

On Saturday morning, December 3rd at 5:03 MST, there will be a grazing occultation which can be observed right here in Albuquerque. This event will take place on the grounds of John Adams Middle School located at 5401 Glencroo Road NW (South of I-40 and approximately 0.5 mile East of Coors Road and on the North side of the street). Jerry Goffe will show the event on a video monitor for those that do not have a telescope with them. The public is also invited. Those people that do have a telescope and would like to participate in the timing and recording, please call Mac at 296-3983. We hope to set up a string of observing sites to get some good results and have some fun. This should be a red-letter morning!

The night of December 27th/28th will provide us with the last graze occultation for this year. This lunar occultation will occur at 00:24 MST on Wednesday morning at a location North of Santa Fe. Call Mac for this double star of Mag. 3.8 of the 75% sunlit moon at Alt. 33 deg. and Azimuth at 104 deg. Because of the bright moon, this occultation is rated as marginal. The next predicted graze occultation for our region will not be observable until September 1989! So, if you wanna, ya gotta get with it!!!

1989 NEW AND FULL MOON PHASES IN UNIVERSAL TIME:

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EL CIELO ESTRELLADO

Touring the "Local" Group

The immense scale of the visible universe is easy enough to acknowledge but hard to appreciate. To relate the vastness of space to distances in our ordinary experience, Robert Burnham, Jr. offers a simple and useful mental model (Burnham's Celestial Handbook, Vol. 1, p. 15). This model is based on the curious fact that the ratio between one light-year and the average Earth-Sun distance (1 a.u.) is nearly equal to the ratio between a mile and an inch (i.e., 6,336:1). Accordingly, in order to conjure up an image of the Earth sitting just one inch away from the Sun, we can visualise the relative distances to other objects in the sky. For example, Saturn would orbit about eleven inches from the Sun while Pluto would be (at the present time) some two and one-half feet away. In this scheme, the relatively close star Sirius would lie within walking distance (approximately eight and one-half miles) whereas the brilliant supergiant Betelgeuse might be located somewhere near the Great Lakes (1800 miles distant). This mental game works reasonably well for stars, etc., in our region of the Milky Way, but what about extragalactic objects? The model distance to relatively nearby M31 would be over two million miles. Try to compare that distance with one inch and the mind boggles! Hence, the description of our own family of galaxies as "the Local Group" is slightly amusing even if it is accurate on the appropriate scale. A tour of the Local Group will probably never be as much fun since the object will be lost in the dazzle of our own Milky Way.

As the accompanying finder chart shows, a fair number of Local Group galaxies dot the constellations of Andromeda, Cassiopeia and Triangulum. In addition, the object-rich (e.g., M34, M76, M103, Double Cluster) plane of our own galaxy sweeps across the northern part of this region.

The great Andromeda Galaxy, M31 (2000.0 coordinates: R.A. 0 hr. 42.2°, Dec. +41° 16'), has to rank high on just about anybody's observing list. One reason for M31's popularity is that it is a fine object for anyone (even for the unaided eye under a dark sky). M31 appears as a faint, elongated smudge of light. The wondrous thing is that something so far away can be seen so well. Keep in mind that M31 is a pretty impressive spiral galaxy with a mass of over 300 billion solar masses (twice that of the Milky Way) and an optical diameter of 50 kiloparsecs. In binoculars, the view gets better. Even under light-polluted city skies, the galaxy's bright stars and prominent disk (12.50) are discernable. Modern large telescopes will reveal a wealth of detail, including a few faint nebulae and clusters of rich stellar associations. The brightest star cloud (mag. 12-13) lies 50° southeast of the center of the galaxy and even has its own NGC number—NGC 206. A comprehensive discussion of M31's features lies beyond the scope of this article; however, reference materials exist, including a nice observing manuscript by Brian Skiff (see Deep Sky for Fall, 1984, pp. 8-15) and even a detailed atlas (Paul W. Hedge, Atlas of the Andromeda Galaxy. U. Wash. Press, 1981).

M31 is accompanied by several satellite galaxies. Two of these companions lie nearby: M32 (0 hr. 42.7°, +40° 52') and NGC 205 (0 hr. 40.4°, +41° 41'). At magnitude 8.2, M32 is bright and compact. The total visual magnitude for NGC 205 is 8.0; however, this object appears considerably fainter because it is larger and more diffuse. A similar situation exists for a pair of more distant Andromeda satellites, NGC 147 (0 hr. 39.2°, +48° 30') and NGC 185 (0 hr. 39.0°, +48° 20'). These elliptical galaxies have similar total visual magnitudes (9.3 and 9.2, respectively) but NGC 185 is more easily detected by its greater condensation near the core. Under a sufficiently dark sky, both objects are fairly easy targets for an 8" scope. The visual extension provided by these dwarf systems is entirely accurate. The total luminosity of each galaxy is many hundreds of times less than that of M31.

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Wayne M. Trott
DUES: Please note the expiration date on your mailing label. If you are due for membership renewal, you may send your dues by mail to:
Albuquerque Astronomical Society, P.O. Box 54072, Albuquerque, NM 87153 or give them to the treasurer at the next meeting. Please include the membership application that is sent with your newsletter when it is time to renew. Discount subscriptions to Sky & Telescope and Astronomy Magazine publications are available through our Society. Include any publication renewal mailers and subscription payment as part of your renewal check. Membership dues are $10.00 per year and $2.00 per additional family member. Membership Packets cost $1.75 each for new members or renewing members without the Packet.

ARTICLES: If you would like to submit an article for the Sidereal Times, contact Bruce Levin at the listed number below. Please submit articles within two weeks after the latest Society meeting. Computer files in ASCII format are preferred.

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