

SIDEREAL TIMES

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Member of the Astronomical League

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HELP!

Planning for the Princeton Expedition to the 30 June 1973 Solar Eclipse off Mauritania have run into a great problem. The most likely way out at the moment seem to be the use of helicopter to get from the deck of a ship onto Tidra Island; surface methods will not work. Anyone having a hunch on how we can obtain the use of a helicopter and pilot for the eclipse expedition (other than paying high rentals) should contact Norm Sperling as soon as possible. If we cannot find a way around this problem before 17 November the expedition will be in jeopardy.

A grazing occultation rated "marginal" will cross the center of AAAP-land just before sunrise Wednesday, 29 November 1972. It is the southern limit of the graze of Z11360, BD -03 3169, magnitude 8.2, 6:38:55 AM EST. Waning crescent 32% sunlit. Moon altitude 44.8° , moon azimuth 169.7° , sun altitude -4.5° (which is the reason this is so marginal). The line of graze, corrected for altitude, runs approximately from the corner of Carter Road and Cleveland Road; crosses Rosedale Road 1/3 of the way from Province Line to Carter; Crosses US 206 just north of Coxs Corner; crosses Princeton Pike and Quaker Bridge Road where they are closest to each other across Stony Brook; crosses US 1 at Duck Pond Run; crosses Village Road West at Post Corner.. A map of the line is available at Duncan Planetarium.

Aleph, the "Princeton Wholebook of Tools, Resources and Alternatives", has two pages devoted to the astronomical activities of the AAAP, Duncan and State Museum Planetaria. The editors have given a very creative treatment to the spread, and like the name of this newsletter so much, they say it "wins the unofficial aleph award given without recognition for the best title of a publication in untitled categories", which for those not with it means they like it and us.

One common factor among most of the really successful amateur astronomy clubs around this country is the Club Observatory. The achievement, after long struggle, of an operating astronomical observatory is indeed the strongest cement their members have. They have labored long sweaty hours together and won. Yet there are a few clubs that were not quite up to the task, or whose members were not really sincere about personal commitment. Those clubs foundered before the walls were up or the pier poured; diffused and died. That is the risk we will be taking should we decide to house our fine antique 6" refractor in an observatory fit for its future use. Do not underestimate the resources it will demand of the club and its members -- yourself included. We'll all have to put in the kind of hours that only officers have invested so far. When we finish, after years, rather than months, we should have a facility where we can educate ourselves all the better in the fabulous features of the sky. We should be able to do astrophotography and perhaps spectroscopy, and learn for ourselves the techniques and accomplish some worth-while studies. These are things we can't yet do for lack of a good mount for the scope.

Yes, I think we ought to organize and build our own observatory. The club will be far better for the experience as well as for having the observatory. But as you commit the club, remember that you also commit more of yourself than before. It's a gamble. We can win big. Or we can lose big. Let's win this one. NS

MINUTES OF OUR FIRST MEETING: 5 NOVEMBER 1962

After introductory remarks by Robert Sanders, founder of the Association, it was moved that the name of the organization be Amateur Astronomers Association of Princeton. The motion was passed. Mr Sanders suggested that three committees be formed, and appointed members as follows. Meetings and Programs: Gifford Havens, chairman; Stan Wells, Nancy Harris. By-Laws: Fred Bowers, chairman Milo Wadlin, Ron Rogers. Nominating: it was suggested that this committee wait for a couple months to allow members to become acquainted. After some discussion of meeting dates and times it was decided to hold meetings on the Second Monday of each month. The next meeting will be on 10 December 1962 at 8 PM.

There was some discussion of telescopes owned by members. Six members have their own telescopes, and four have observatories. Mr Sanders suggested that the next meeting be devoted to telescopes. A motion to make Sanders temporary chairman was passed. He offered to have the next meeting at the Lawrenceville School. A motion to adjourn was passed. Gifford Havens.

((Anyone knowing the whereabouts of these or other early members of the club should renew their contact and urge them to join us for the 10th anniversary.))

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MINUTES OF OUR LATEST MEETING: 10 OCTOBER 1972

The lectures at Peyton hall were announced. They are open to the public, including club members. They begin at 7:30, with a non-technical lecture at 8. The 2 telescopes atop Peyton Hall are open for observing during the open house. The first lecture was 16 October, given by Doug Richstone, a graduate student at the University and a former amateur astronomer. His topic was "Quasars".

Next on the agenda was our 10th anniversary this November. Discussed was the place and time. 4 or 5 restaurants were mentioned and the club decided that the time of the meal should be as close to 7 PM as possible, and the prices moderate.

John Church reported on the club's 6" telescope. Repairs include ordering a finder scope and other items totalling \$49.10. A motion was made and seconded to refund that amount plus \$17.65 for a motor to make a clock drive, totalling \$66.75 in all. The motion passed without opposition. The club is now trying to trace the early history of the scope, which appears to be about 100 years old and bears no visible labels. Letters have been sent to 7 historians of astronomy, with pictures and descriptions of the instrument.

Treasurer Barry Hancock reported we had \$489.53 in our accounts, before reimbursing Mr. Church. Orders for the 1973 Observer's Handbook were taken. Program Chairman Bob Richardson reported that no speaker for the November meeting had yet been found because no date had yet been set. Rodger W. Gordon of Lehigh Valley will speak in December.

Since the topic of a club observatory came up 5 times unbidden, a general discussion of the topic was opened. Norm Sperling emphasized that such an effort will take great commitment of personal time and labor by many members, but that the rewards can be considerable. Since members generally feel that such an effort should be undertaken, and all members present signified they were willing to commit themselves to the labor, the business portion of the November meeting will be devoted to preliminary discussions on a club observatory.

For those members desiring an astronomy lecture at Princeton University at 8 PM on the second Tuesday of the month, as usual, even after attending the 10th anniversary dinner the night before, take heart! That happens to be a regularly-scheduled Observatory Open House. The scopes will open at 7:30, and a non-technical lecture will be given by a graduate student in astrophysics at 8, in the lecture room, Peyton Hall, Ivy Lane.

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Star Parties are coming up, too. A star party is an event to which amateur astronomers bring their own portable telescopes, and get to look through everyone else's, as well. In addition, astronomy students from PDS attend. Star parties are scheduled for the first clear night of the following sequences: 3-4-5 November, 7:30 PM. 10-11-12 November, 7:30 PM. 1-2-3 December, 7:30. 8-9-10 December, 7:30 PM. Within each sequence, whichever is the first clear night, bring you scope out and join us. If Fridays 3 or 10 November, the star party will be held in conjunction with the regularly-scheduled observing session at the New Jersey State Museum Planetarium, West State Street, Trenton. If on any of the other dates, the star party will be held on the soccer field behind Princeton Day School, Great Road, Princeton (a mile and a half north of US 206 on Elm Road, which becomes Great Road.) You are sure to enjoy these moonless nights with your fellow amateur astronomers. Come even if you don't have a scope -- you'll get to use everyone else's. And the students usually bring some refreshments.

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EASILY-OBSERVED LUNAR OCCULTATIONS FOR NOVEMBER AND DECEMBER times and angles accurate at Princeton Junction; approximate anywhere in New Jersey. All at least moderately easy with 3 or 4 inches aperture.

DATE	E. S. T.	MAG.	%SunLit	CuspAngle	Comments
Nov 10	5:23:31 PM	8.1	20	74°S	deep twilight
Nov 12	8:47:10 PM	7.0	38	44°N	easy w/ small aperture
Nov 13	7:12:37 PM	5.5	48	18°N	18 Aquarii; happens during AAAP Dinner. Possible with binoculars.
Nov 14	6:07:15 PM	7.0	58	80°N	
Dec 9	6:35:00 PM	7.2	15	37°N	
Dec 10	6:19:35 PM	8.0	22	47°N	

I have timed occultations of 9th magnitude stars accurately with my 4". Mark these on your calendars and try to observe at least one. I'd be happy to hear your reports. John A. Church.

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Cdr. Joseph L. Richey has a special three-dimensional twin slide projector that is no longer of use to him. It comes complete with slide holders and special glasses. He is interested in swapping it for a compound reflector of approximately equal value. He invites inquiries from anyone interested in buying or trading for this special 3-D projector. Contact him at 609-799-0440.

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"Ramifications of the Search for Life in the Universe" is the topic of a special day-long conference to be held Saturday 18 November at Boston University. The host and organizer is Dr. Richard Berendzen, who ran last year's Conference on Education In and History of Modern Astronomy, in New York City. At least a few people from this area plan to go up for the conference. Transportation has not yet been arranged, and details of starting time have not yet arrived. Contact Norm Sperling for further information in the Princeton area, or Dr. Berendzen in Boston.

ANCIENT ASTRONOMICAL INSTRUMENTS
was the topic of the October 10 meeting of the Amateur Astronomers Association of Princeton, which was attended by 26 people. The lecture was given by Mr. Dick Waldron of the NJ State Museum Planetarium in Trenton. Mr. Waldron gave an extensive slide show of the many obsolete ancient instruments, such as the Han Sundial, Armillary Spheres, the Polos, and Hero's Dioptra.

Most of the instruments created were for display, as they were fashioned out of brass, ivory, sometimes even gold, and were extremely intricate in design. Some instruments were quite large also, like the 14-foot tall armillary sphere built somewhere around 1590.

Mr. Waldron explained how man first became interested in the heavens about 10000 years ago. Certain celestial events, for example, coincided with the rising of the Nile River. Others served as a simple calendar, and the sun was used to measure the unit of time now called a day. The lecture ended at 9:10 PM by more modern time-measuring devices, after a brief question-answer period.

Mr. Waldron's articles appear monthly in Cluster, and his lectures may be heard at the State Museum Planetarium.

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NEW TEN-INCH REFRACTOR IN CRANFORD'S OBSERVATORY
A fine 10" refractor, made by the Amateur Astronomers Incorporated of Cranford, NJ, was presented to Union College's Sperry Observatory in a ceremony 10 October. Well over 100 people attended, representing not only the AAI and the college community, but also a number of amateur astronomy organizations in New Jersey and Pennsylvania. The Observatory, built by the College, has 2 domes, as well as a large meeting room, offices, workshops, and storage. The large refractor finishes the first phase of the project. Work has already begun on the 24" reflector, which will replace the 12.5" reflector temporarily in the other dome. This cooperative effort between the club and the college also includes the teaching of courses by club members, and their use of all the observatory facilities. The observatory is open for public viewing (that includes YOU) every Friday night.

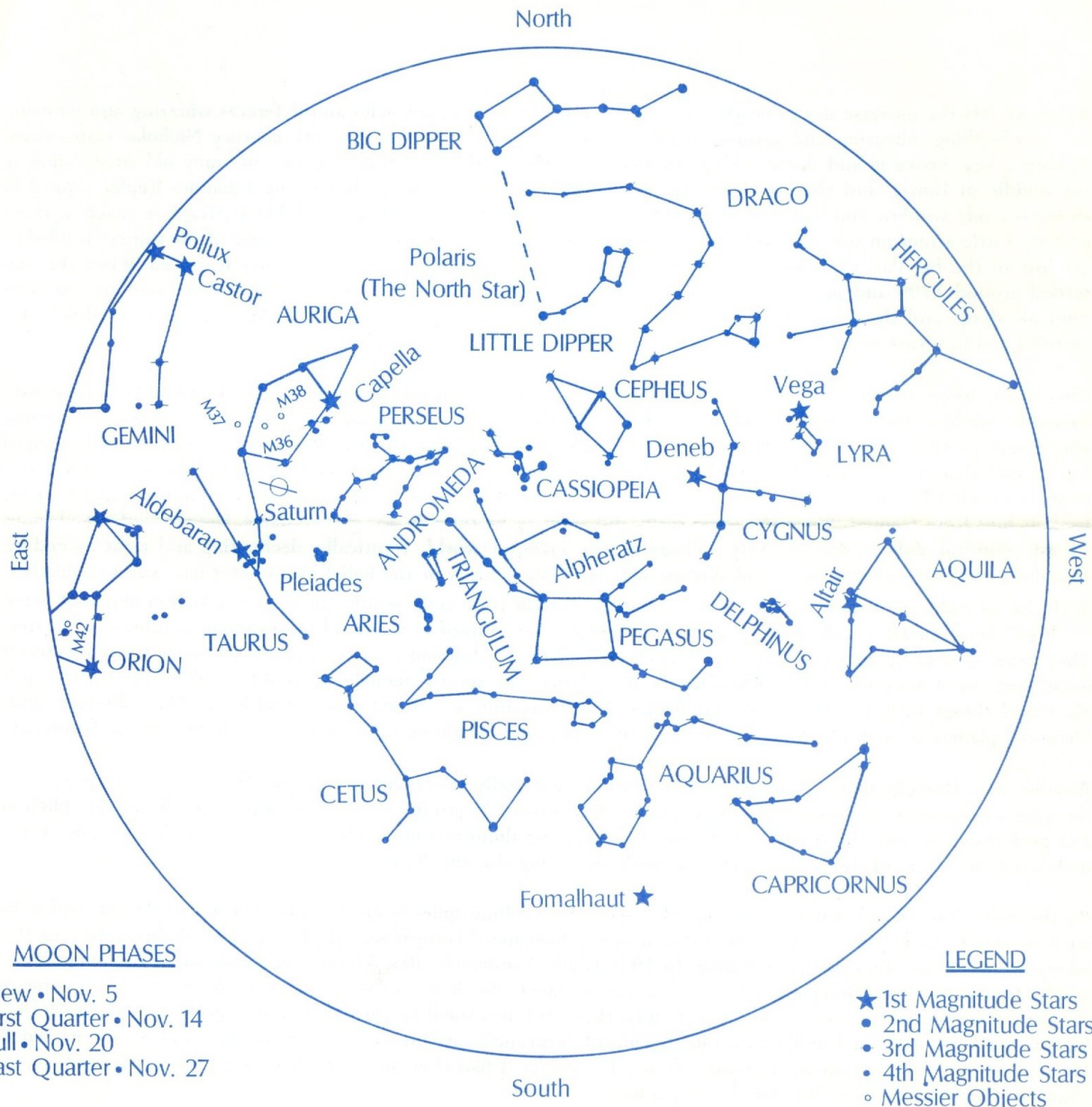
The editors of Cluster met after the presentation ceremony, with representatives of the AAI and the Lehigh Valley Amateur Astronomy Society of Bethlehem, Pa. While actual participation in Cluster is presently not appropriate to their clubs, the AAI will begin sending an observer to Cluster's monthly meetings, and arrange future cooperation when it becomes feasible. The LVAAS has granted Cluster permission to reprint their newsletter articles, including the fine column by Rodger W. Gordon.

Your editors hope to continue offering you the best in New Jersey amateur astronomy through cooperation among the clubs and planetaria. All the participating groups welcome readers from elsewhere at their functions. The meetings are accessible, interesting and informative. You are sure to meet many new friends with the same interests you have.

THE NOVEMBER SKY

A GUIDE TO THE PLANETS AND CONSTELLATIONS TO BE SEEN IN THE EARLY EVENING

Prepared by the New Jersey State Museum Planetarium



THE MAP ABOVE DEPICTS THE SKY AS SEEN AT 9 P.M. NOVEMBER 1,
8 P.M. NOVEMBER 15, 7 P.M. DECEMBER 1.

SATURN IN THE CONSTELLATION TAURUS IS THE ONLY PLANET VISIBLE
FOR THE TIMES SHOWN.

SO HOW MANY ARE THERE NOW?

or

Why Can't They Leave It Alone?

(Part II)

When we left the universe it was neatly packaged in a museum case, epicycles and deferents whizzing and whirring, the whole thing wheezing and gasping, slowly grinding to a halt. In the sixteenth century Nicholas Copernicus, lacking a key, broke in and shifted things around a bit, placing the sun, in the manner of crazy old Aristarchus, in the middle of things, and chasing the earth out to show position. After he left young Johannes Kepler slipped in through a side window and had a go at encasing the planets in geometric shapes and, like Pythagoras, teaching them to sing. Little attention was paid to Kepler's efforts, especially by the planets, and the music of the spheres tended to get lost in the big flap that developed over just where the earth was and whether or not it moved. When the dust settled around 1700 and people had a chance to look around a bit they discovered that old Aristarchus had been right all along, and that the earth was zooming around the sun at quite a good clip. But even in all of this house cleaning and furniture moving no one thought it necessary to add any planets.

That event, however, was not long in coming. Once the telescope was invented it became only a matter of time until someone would claim to have sighted a seventh planet. The man who so claimed was William Herschel and anyone who knew anything about him could have predicted it. Herschel believed that the moon was inhabited by winged bipeds and that the sun was the abode of a race so shy that it kept a fiery curtain over all of its doings — or at least that's what he said. It shouldn't have created the fuss it did when in 1781 Herschel found number seven staring back at him from Gemini. Since the thing really did seem to be there it was given a name, Uranus, and soon legions of astronomical duffers dotted every hillside in the civilized world, frantically declinating and right ascending, thumbing through ephemerides, and dusting off dated star charts in the belief that wherethere was a seven there might be an eight. And there was. Neptune was discovered in 1846 and a whole spate of intra-Mercurial planets were "sighted" between 1847 and 1878. But these intra-Mercurials proved to be merely an example of mind over matter. They were all seen by amateurs like that French physician who doubled as town carpenter and since paper was scarce made notes on a piece of lumber. When he ran out of space he simply planed off his old calculations, and, to top it all, timed things with an old pocket watch that lacked anything so refined as a second hand. The collective intra-Mercurial planets were dubbed Vulcan and are still assiduously sought at every total solar eclipse, thus far fruitlessly.

Anyone who thought that it was over with Neptune, was sadly mistaken. Before the nineteenth century gave up the ghost, a clamor arose about still another planet. The reason? Neptune, instead of changing speeds only at aphelion and perihelion, became the scandal of the sky by staggering about in a most unseemly manner. Either the planet was inebriated or, more likely, it was playing tag with something else out there.

By this time "out there" was very far indeed — over three billion miles from the sun. A special technique had to be used to search for Planet X, a technique that involved high-speed comparison of photographs of the section of sky where Planet X was thought to be hiding. In 1930 Clyde Tombaugh, after blinking at hundreds of jumping photographs finally saw something blink back — the ninth planet. But it wasn't long before astronomers, who are never ever satisfied, began to complain about it. It was, they said, too small to perturb Neptune in the way in which that planet was being bothered and was probably one of Neptune's satellites run amok. In their wrath they named it Pluto and began talking hopefully about still another planet. I had thought, from their long silence that, with everything else that they have on their minds, they'd forgotten. Not so.

Planet X is back and bigger than ever: three times more massive than Saturn, twice as distant as Pluto and moving, as one might expect, backwards, around a star it probably can't recognize as its parent. Or least at something like that should, they say, be out there somewhere. After all these years we're no more advanced than the Greeks. They weren't sure how many planets there were then, either.

AN ANTIMATTER HYPOTHESIS FOR THE 1908 SIBERIAN METEOR
(reprinted with permission from October 1972 Star Dust, National Capital Astronomers, Washington, DC.)

Dr. Clyde L. Cowan, Catholic University physicist, spoke to NCA on the Tunguska, Siberia, meteor of 1908 at the 9 September meeting. This object was seen to explode at high altitude after following a northward trajectory. The first men to study the meteor were part of a very carefully planned Soviet expedition to Tunguska in 1923. They found no meteorite and no crater: only a devastated swamp forest.

The trees had all fallen radially outward from the swamp that remained. From considerations of the mechanical force this required, the meteor fall produced the equivalent of the explosion of 30 MegaTons of TNT. Analysis of burn marks on the trees yielded an equal thermal energy -- an amount much larger than the thermal output of such a TNT explosion. Thus, a nuclear or antimatter explosion is indicated.

The Soviets gathered all available visual reports of the Tunguska meteor fall. These are of uncertain reliability, but significantly, no reports of a visual streak or cloud trail following the fall were received, casting doubt upon the hypothesis of a small, low-angle comet as the origin.

Theory indicates that a fist-sized rock of antimatter can cause a 30 MegaTon explosion. An experimental test is whether or not the amount of (radioactive) carbon-14 in the global atmosphere was doubled at the time. This would result from antimatter neutrons being captured by the earth's atmosphere of 78% nitrogen to form C^{14} , plus proton.

Meticulous analysis of Arizona tree-ring samples by Dr. Cowan and his staff indeed showed that 1909 had the highest C^{14} values yet detected in the atmosphere, a result confirmed by both pine and oak tree rings.

Dr. Cowan indicated that future research on the antimatter hypothesis for the 1908 Siberian meteor would include C^{14} analysis of both Northern and Southern Hemisphere tree rings. He pointed out the great need for more C^{14} dating laboratories.

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The Princeton University Observatory will be open to the public for 5 more Open Houses this academic year. The public is invited at any time between 7:30 and 9:30 PM (an hour later in May). The program will consist of illustrated, non-technical lectures and the opportunity to view the sky with the 4-1/2 and 9-inch Clark refractors atop Peyton Hall. Lectures will begin promptly at 8 PM and will be repeated if attendance warrants. All programs will be held regardless of weather conditions. In the event of inclement weather the lecture will be given and observing will depend on the status of the sky after the lecture. Please do not call the Observatory.

Special accommodations will be made for groups. Requests defining the group size and age range should be made in writing to V.R. Boscarino, Administrative Officer, Princeton University Observatory, Peyton Hall, Princeton, NJ 08540. Peyton Hall is located on Ivy Lane, between the Math Tower and Palmer Stadium.

The Observatory will be open on 14 November and 13 December 1972; 9 February, 10 April and 10 May 1973.

ROAM THE NOVEMBER SKIES WITH ROXANNE TOBIN

With Autumn in full swing the observer will note many new stars, constellations and other celestial objects. The skies of November abound with clusters, galaxies and double stars as the rich star fields of the Milky Way set in the West.

Rising about 10 PM in the northeast is the prominent constellation of Auriga, the Charioteer. Auriga is first seen when the brilliant star Capella rises, twinkling even on steady nights. Auriga has 3 Messier objects, all of which are open clusters. Located inside Auriga is M36, and M38 almost in the center of the 5-sided figure that makes up the body of Auriga. M37 is located halfway between Theta and ElNath, a star shared with Taurus. All 3 clusters are about magnitude 6.5, and visible in small telescopes. Auriga offers 2 double stars to the casual or beginning amateur astronomer. The first is 14 Aurigæ, a 5th magnitude star located between El Nath and Iota. This double has a separation of 14" and the companion is of 7th magnitude. The other double is Theta itself, a second-magnitude star with a companion of 7th magnitude. The companion is separated from the primary by 4" and can be used as a test for a 4" telescope.

To the right of Auriga comes the constellation Taurus the Bull, containing the first-magnitude star Aldebaran. Taurus contains 2 Messier objects, the first being the well-known open cluster the Pleiades, also known as the 7 Sisters. This cluster is number 45 in Messier's list, easily observed best under very low power, or binoculars (or even the naked eye). Taurus also contains the famed M1 or Crab Nebula, the remnants of a supernova in 1054 AD. The Crab has a magnitude of 10.6 and is located just above Zeta. Taurus also has 2 double stars of note, the first being Aldebaran itself. It has an 11.2 magnitude star at a distance of 121" and may be difficult to find unless the sky is dark. E572 is another double that should be much easier to locate. The magnitude of both stars is 6.5, and the separation is 4".

A little while after Taurus rises, one of the most prominent and interesting constellations in the sky, Orion, rises, filling the dark winter sky with 2 first magnitude stars. Betelgeuse marks Orion's right shoulder, while Rigel is his foot. One of the most beautiful Messier objects is located in the hunter's sword, the Great Nebula in Orion, or M42. Directly attached to it is the smaller, less prominent M43. The Nebula appears to be a small, misty patch in small telescopes, but a 3" or more will reveal the delicate structure of it. Orion is full of double stars, many of them visible in a small telescope. Probably the most prominent is Theta in the sword. This is a group of 4 stars more frequently referred to as the Trapezium. The stars are located in the center of M42, and range from 6th to 8th magnitude. Rigel is also a double star with a 6th magnitude companion at 9". Sigma Crionis is a very fine group of double stars with fine colors. In a 4", 8 stars are visible all within 15". The magnitude of these range from 4th to 11th.

The reader is encouraged to locate these objects on the star chart here, or in other useful charts. The centerfold chart in Sky and Telescope magazine will be quite helpful. Norton's Star Atlas will help the amateur locate these and many other objects of great interest.