

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA



SASKATOON CENTRE

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# NEWSLETTER

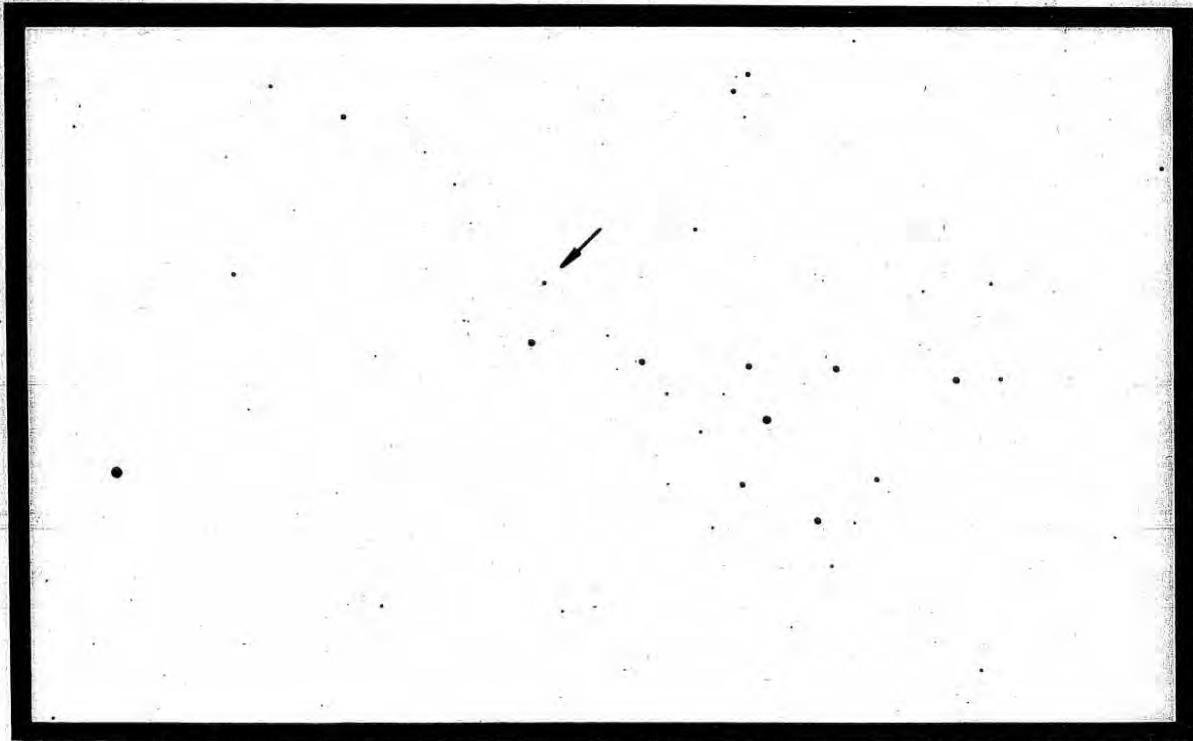
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## NOVA VULPECULAE 1976

Patterson Observatory photograph

November 14, 1976



Photograph of Collinder 399, showing nova. Star directly beneath it is 7 Vulpeculae, mag. 6.31. Photo taken for NEWSLETTER by G.N. Patterson.

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On behalf of the NEWSLETTER staff and myself, we wish you all a very  
HAPPY YULETIDE SEASON

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA



SASKATOON CENTRE

Once again the Christmas Season  
is almost upon us. This brings to us a  
new and beautiful section of sky with  
many clear but cold nights spent at a  
telescope either tracking or observing.

At this time I would like to  
wish you and yours a Joyous Noel and  
a prosperous, healthy New Year.

A handwritten signature in black ink, appearing to read "Jim Young". The signature is fluid and cursive, with a long horizontal line extending from the end of the "g" in "Young" towards the right.

Jim Young  
PRESIDENT

## CENTRE ACTIVITIES

### Members of the Saskatoon Centre:

I am honoured to be your Activities Co-ordinator; and being so I hope to fulfill my duties to their highest degree. In order to accomplish this however, your co-operation is an essential requirement.

As you are probably all aware, our Centre's observing projects have met with success at both the Winnipeg and Calgary General Assemblies. But we still regard ourselves as a small and inexperienced centre. Only through a variety of wide ranging activities can we acquire the experience necessary to involve ourselves in the more complex and significant projects that we aspire towards. This is where we as individual members come in.

Activities at Gordon Patterson's are proceeding well although the attendance of some of the less active and newer members would be appreciated. You and the Centre only stand to benefit from your active participation. These regular Saturday night meetings consist of astrophotography, observing, plus much theory involving books, slides and films. We're not all business however; lots of fun and interesting social activities also take place.

I would like to thank Merlyn Melby, the incumbent, for the organizational job during his term. Such activities as public Star Nights and, it is hoped, the regular Aucklands outing will be continued this year. Perhaps even a few extras will be included, but their success depends upon your involvement; for it is the members that make the Centre work. So get your money's worth and become more active. You'll find that there will be lots to learn because the R.A.S.C. extends far beyond Saskatoon; come with us to Toronto in '77 and you'll see.



Kevin Atchison  
Activities Co-ordinator

# DECEMBER METEORS

by Rob McAllister

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This month is a good one to observe meteors, as two showers are peaking; these being the Geminids and the Ursids. With clear dark skies, up to 60 Geminids per hour can be seen at peak, which is expected to occur on 13 December. In the city you will probably see only about one-half this figure. The Geminid shower has many slow moving fireballs; and is at one-quarter maximum for about two days before and after its peak. Evening twilight ends at about 6:02 PM C.S.T. on 13 December and the last quarter moon rises at about 12:47 AM later on that night.

The Ursid shower peaks on 22 December and is about two days long. The moon will be only two days old and will not interfere. Under ideal conditions this shower produces about ten meteors per hour at peak.

When watching for meteors, look about  $30^{\circ}$  away from the radiant in a circle. I find this works quite well. The radiant of the Geminid shower at peak is at right ascension 7h 28m, and declination  $+32^{\circ}$  (near Castor; northernmost "twin"); the Ursid radiant at peak is at RA 14h 28m and DEC  $+78^{\circ}$  (just over the bowl of the Little Dipper).

If possible, try to photograph meteors. The best method is to tripod mount your camera, leaving the lens (f-stops) wide open. Use a fast film such as Tri-x Pan, ASA 400 (black and white) or Fujichrome R 100 color slide film. Aim the camera  $30^{\circ}$  from the radiant (any direction) and expose 5 to 10 minutes, depending on the amount of light present. Wear warm clothing, as it is essential.

- - - GOOD HUNTING

# SOME ASTRONOMICAL TEACHINGS FROM ARISTOTLE

*by Halyna Turley*

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Conclusion of a two-part serial

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#### EDITOR'S COMMENT

As stated in the November issue of the NEWSLETTER quote "The following pages are a reprint of an essay which Mrs. Turley presented to her philosophy class..." Actually it's an offset copy (basically a photograph) of the original essay itself. No effort has been made to make any corrections to, or remove any of the professors marks and comments from the original copy. A work such as this can provide an insight into the amount of effort that goes into producing such an essay and of the standards that must be met.

But what of the mechanical workings of the spheres of planets and stars? Eudoxus' scheme of twenty-six concentric spheres can be used to construct planetary orbits very like the ones we actually observe. But what makes the planets move like this, what forces them to continue travelling along the intricate tracks, Eudoxus did not say. The most serious gap exists between the four spheres belonging to any one planet. Eudoxus treated each planet's track as an independent problem. The resulting scheme was mechanically unintelligible. My system, as you will see, will make consistent mechanical sense of the scheme.

Motion must be transmitted, for instance, from the innermost sphere of Jupiter to the outermost sphere of Mars. How is this done? The outermost spheres of all the planets moved in the same way--namely in step with the sphere of fixed stars--so whatever connection there was between the sphere of Jupiter and those of Mars must cancel out the effects of the three innerspheres of Jupiter, for it is these that together make Jupiter move in its own specific way. The simplest way of cancelling out these effects is to suppose that the mechanical links introduced by the three inner spheres of Jupiter are reversed, one by one, as one proceeds inwards to the outermost sphere of Mars. This would be the case if three additional spheres were interposed between Jupiter and the spheres of Mars, each of them moving in exactly the reverse way to one of the three

inner spheres of Jupiter; similarly for the other interplanetary gaps.

Suppose all these links in their celestial gear-system rotate uniformly in circles around their own axes and at the same time transmit to the inner spheres a motion whose ultimate origin is the connections which brings planetary theory into harmony with mechanical sense.

Now let us relate our theory to the system of spheres. Eudoxus supposed that the motion of the sun or moon involves either case, three spheres and that the motion of each of the planets involves four spheres (i.e. twenty-six in all).

Callippus made the positions of the spheres the same as Eudoxus did. But while he assigned to Jupiter and Saturn the same number as Eudoxus, he thought that, if one is to explain the observer facts, two extra spheres should be added for the sun and two for the moon; also one extra for each of the remaining planets (i.e. thirty-five in all).

But it is necessary, if all the spheres combined are to explain the observed facts that for each of the planets there should be additional spheres--one fewer than those hither to assigned--in order to counteract the former ones and bring back the outermost sphere of the next planet into its proper position. And only thus can all the agencies at work produce the observed motion of the planets. The number of all the spheres, both those which move the planets and those which counteract them will be fifty-five.

And this is our fully developed planetary scheme, representing the heavens as a nest of spherical shells with the earth at its centre. If we review the situation starting with the outermost we find the largest of all, the Divine, self-moving sphere, carrying the fixed stars. This sphere is the Unmoved Mover, the ultimate source of all celestial motion.<sup>9</sup> Saturn's outermost sphere rotates in step with the sphere, and three more spheres account for the planet's own proper motion. This comes directly from the innermost quartet, to which it was actually attached. Three counteracting spheres link the smallest of Saturn's spheres with the largest of Jupiter's four, so that Saturn in all has seven linked spheres associated with its motion. Jupiter in turn has seven, Mars, the sun, Venus, Mercury have nine each--five produce their motion, four are needed to counteract, and finally the moon has five.

Only the Divine sphere is entirely self-moving: the fifty-four linked spheres carrying the remaining heavenly bodies depend for their motion on the complex linkages which join them to it. The earth alone is stationary at the centre of the whole system of concentric spheres: the innermost sphere carrying the moon is the boundary between the mortal, "sublunary" world of the earth and the unchanging "superlunary" world of the heavens.<sup>10</sup>

This makes mechanical sense. It provides an intelligible system of linkages by which the motion of the outermost sphere

can communicate in turn to each of the fifty-four spheres within it. The sublunary world is where we find the four types of matter whose natural motion is limited and vertical. The superlunary world is composed of a fifth distinct type of matter, the fifth essence, whose motion is circular and nonending.

In our last session, I would like to close by answering any of your questions.

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(Student excitement has grown. Not only has Aristotle laid himself open to confrontation, but this is the last lecture!)

Student: We now know the mechanics of the spheres above us. But what causes them to move so?

Aristotle: As we know, the stars are made of aether, that most divine form in and around the celestial sphere. The stars and spheres come under the direct influence of the Primum Mobile, or Divine Mover.<sup>11</sup> It would, however, be better to say that most are strongly affected by it, for the Divine Mover is by its very nature both immovable and inactive.

The First Cause and Pure Form gives nothing to the Universe. Rather, it is an object of life and desire: all things are stirred to acquire some measure of its Form. The sphere of the fixed stars being nearest to the Divine Mover, acquires its form in greater measure than do more distant spheres, which is why it stays in a state of perfection and uniform rotation. The rotation is shared by all other heavenly

bodies. They too are striving, intelligent things and their spheres are in continuous contact. Each layer is in immediate contact with its neighbor and the whole is bounded by the celestial sphere.

Student: Some of us are interested in how this system of spheres explains one of the most interesting objects of the skies, the comet.

Aristotle: This is indeed a topic of much discussion. A comet seems to come from nowhere, moves apparently at random among the stars and in regions away from the Zodiac, undergoes comparatively rapid changes in form, size and brightness and disappears almost as abruptly as it came. We noted that in celestial regions, the home of aether, things tended to be external and unchanging. There are changes however when exhalations from a star catches fire. This star then becomes a comet.

These comets are meteorological in nature, they should thus be regarded as signs of the weather. Comets have a dry and fiery nature and consequently their appearance denotes dry and windy years. When the stone at Negos Potami fell out of the air it had been carried up by a wind and fell down in daytime--then too a comet happened to have appeared in the west. At the time of the great comet (371 B.C.) the winter was dry and north winds prevailed and the wave (a tidal wave which engulfed the towns of Helve and Bura) was due to the opposition of winds. Again in the archonship of Nichomacus (341-340 B.C.) a comet appeared for a few days about the equinoctical circle and simultaneously with it there happened the storm at Corinth. From these observations we notice that since the tails of comets are generated in the vicinity of the sun and are

always directed away from it. They point upwards in the morning and evening sky. This appearance is not unlike that of a rising flame, and encourages the notion that comets are exhalations in the upper atmosphere. . . . .

And so Aristotle would continue with the other obvious, plain and clearly apparent reasons of the astronomical world. It is apparent from the opinions consulted that the disgust for Aristotle's theories is wide spread. For example, comets were regarded as very particular omens of disaster. Aristotle's physical interpretation of comets did little to allay these fears. In keeping with this tone, Sambursky strongly suggests that Aristotle's development was a serious obstacle to scientific progress. "His influence on physical science was on the whole more negative than positive. Aristotle tended to fit all his findings into fixed patterns and construct on them a general theory which he declared absolute. The guiding principle of Aristotle's view of nature was teleology: the axiom that everything that happens is done for a certain end and the whole cosmos with all that it contains is the result of previous planning."<sup>12</sup> Thilly also makes a severe judgement. He notes that the Chaldeans and Pythagoreans had the same theory that comets had orbits like planets but "again the mighty weight of Aristotle clamped down on the theory that was right in preference for a theory that was wrong. This time the philosopher managed to save his scientific face by the single statement that comets and meteors were related, but that deduction was not so magnificent and had been made before. The right theory was luck, but the number of times that Aristotle managed to guess wrong in astronomy is almost incredible."<sup>13</sup>

Perhaps incredible--but placed in his time the concepts were believed and acceptable explanations for several observed events. In astronomy, he made few observations yet he inspired to frame the cosmos. He was without doubt well informed about previous work. His was a serious attempt to describe the cosmos in physical terms. He could not know that his system, his physics and his logic would one day so shackle human thought as almost to extinguish the spirit of science.

#### FOOTNOTES

1. S.A. Ionides. Stars and Men. The Bobbs-Merril Co., New York, 1939, Introduction.
2. Ionides, P. 375.
3. G.R. Mure. Aristotle. Ernest Benn Ltd., London, 1932, p. 81.
4. M. Clagett. Greek Science in Antiquity. Abelard-Schuman Inc., New York, 1955, p. 88.
5. S. Toulmin. The Fabric of the Heavens. Hutchinson & Co., London, 1961, p. 111.
6. Toulmin, p. 112.
7. G.E.R. Lloyd. Early Greek Science. W.W. Norton & Co., New York, 1970, p. 109.
8. Lloyd, p. 111.
9. Toulmin, p. 106.
10. Toulmin, p. 108.
11. H.C. King. Exploration of the Universe. Signet Science Library Books, Toronto, 1964, p. 59.
12. S. Sambursky. The Physical World of the Greeks. Routledge & Kegan Paul, London, 1956. p. 81.
13. F. Thilly. A History of Philosophy. Holt, Rinehart & Winston, New York, 1957, p. 183.

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1. Allan, D.J. The Philosophy of Aristotle. Oxford University Press, London, 1952.
2. Berry, A. A Short History of Astronomy. Dover Publications, Inc., New York, 1961.
3. Clagett, M. Greek Science in Antiquity. Abelard-Schuman Inc., New York, 1955.
4. Mure, G.R. Aristotle. Ernest Benn Ltd., London 1932.
5. Ionides, S.A. Stars and Men. The Bobbs-Merrill Co., New York, 1939.
6. Jaeger, W. Aristotle. Clarendon Press, Oxford, 1934.
7. King, H.C. Exploration of the Universe. Signet Science Library Books, Toronto, 1964.

8. Lloyd, G.E.R. Early Greek Science. W.W. Norton & Co. Inc., New York, 1970.
9. Mure, G.R. Aristotle. Ernest Benn Ltd., London, 1932.
10. Sambursky, S. The Physical World of the Greeks. Routledge & Kegan Paul, London, 1956.
11. Thilly, F. A History of Philosophy. Holt, Rinehart & Winston, New York, 1957.
12. Toulmin, S. The Fabric of the Heavens. Hutchinson & Co., London, 1961.

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NOTICE TO ALL MEMBERS OF THE EXECUTIVE COUNCIL

Executive meetings will be held at 7:15 PM C.S.T.  
in the Observatory on the date of all General Meetings.

Jim Young  
PRESIDENT

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The NEWSLETTER apologizes to those involved with the "PHYSICS FOR FUN" series for the omission of their announcement in the November issue.

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## THE NEWSLETTER - A PREVIEW FOR 1977

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This comes as a rather proud moment for the NEWSLETTER staff and myself; the announcing of a new format. For the sake of uniformity, it was necessary to complete Volume 6 in the old format.

One special note to begin with, however, and is directed mainly to those who are involved rather deeply with the Centre's activities. On seeing the new cover, your first impression will be that the NEWSLETTER has been given a name. This is not at all the case. The NEWSLETTER has a cover of its own inside & is printed on a pale yellow paper just a bit deeper than National's. However, unlike National's, it will contain only "newsy" material of the Centre's business, activities, and articles of a "non pure-science" nature. The pure-science (or near pure-science) section is printed on white paper and should be kept to a relatively serious nature.

The NEWSLETTER itself can now be 'just that'; the news of the Centre. The more informal approach here should have greater appeal to the less active members, the beginners, and the public at large. It could be spiced with a bit of humour here and there, and heaven forbid, the odd cartoon or "si-fi" serial, should some talented member so wish to publish one.

But the basic NEWSLETTER will still be the same one handed down to us by our Founding Fathers; the only thing changed is the presentation.

As stated earlier the white pages should be kept to a serious nature. Perhaps someday (and that someday may perhaps not be too far off, with the standards to which some of our members are developing) we will be publishing articles that will be of value to Research. If we don't take our work seriously, no one else will either.

The title on the cover refers to the entire "magazine" (or "journal" if you like, although such would hardly apply). It is a short "snap" name that identifies us abroad without any further explanation necessary. It's not a "wise" phrase or catchy thing that would tend to degrade our work in the eyes of professional people.

The cover is done in black, yellow, shades of blue, and white; the subject relating to the title. It is of the "wrap around" kind (like a magazine) and is secured by three staples forming a spine. However, the colored covers may not be ready till after the first or second issue, a simpler black and white version may have to be substituted for these.

On conclusion of Volume 7 (in December '77) a binder with a heavy weight cover designed to hold 12 issues will be available. Throughout the year the volume will be arranged to conclude with a complete table of contents at the front (pages 2 to 13), consecutive page numbering throughout, and a title/author index at the back.

A section containing black and white pictures printed on a glossy paper located between the white pages and the NEWSLETTER will be included if members submit material. (January's quota is almost filled already)

So what happens when the successive editor assumes office? He/she may decide to scrap the "magazine" altogether. Then the NEWSLETTER would simply revert to its former format. Or he/she may wish to just continue on as is, or with a modified version; avenues are all left open.

Quite a number of our members are now turning out some excellent work in the many fields of astronomy. Hopefully this publication will be able to achieve a level of excellence necessary to be capable of giving them the recognition they deserve.

MINUTES OF AN EXECUTIVE MEETING, SASKATOON CENTRE, RASC  
HELD IN THE OBSERVATORY, U of S, 7:15 PM, TUESDAY 16 NOV. 1976

Present:

Mr. Jim Young..... President  
Mr. G.N. Patterson.. Centre Rep.  
Mrs. Lillia Wilcox.. Secretary

Mr. Wendel Frenzel.. Councillor  
Mr. Greg Towstego... Librarian  
Mr. Merlyn Melby.... Editor

Absent:

Mr. Doug Beck..... Vice President  
Mr. Allan Blackwell. Treasurer

Mr. Kevin Atchison.. Activities  
Mrs Halyna Turley... Councillor

ITEM

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|---|---|--------------|
| 1 | Meeting called to order at 7:15 PM.   | Jim Young    |
| 2 | A questionnaire will be prepared to answer National's question where the Centres' think the Society should be headed. | G. Patterson |
| 3 | It is to be brought up at the General Meeting which day is best for the future General Monthly Meetings               | J. Young     |
| 4 | "Physics for Fun" will begin on Wednesday, Nov. 24 at 8:15 PM in room 107 - Physics Bldg.                             | G. Patterson |
| 5 | Darkroom equipment discussed re: funding.   | G. Patterson |
| 6 | Ron Waldron will give a talk at our December Meeting.<br>Dr. Skinner will be guest lecturer at January Meeting.       | G. Patterson |
| 7 | Library to be kept clean "PLEASE".  | G. Towstego  |
| 8 | New 1977 Observers Handbooks will be distributed to all paid-up members after General Meeting.                        | G. Patterson |
| 9 | Meeting adjourned at 7:45 PM.   | W. Frenzel   |

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MINUTES OF A GENERAL MEETING, SASKATOON CENTRE, RASC  
HELD IN ROOM B-110 , HEALTH SCIENCES BUILDING, U of S, 8:00 PM, 16 NOV. 1976

Present:

Mr. Jim Young..... President  
Mr. Doug Beck..... Vice President  
Mr. Allan Blackwell. Treasurer  
Mrs. Lillia Wilcox.. Secretary

Mr. G.N. Patterson.. Centre Rep.  
Mr. Kevin Atchison.. Activities  
Mr. Greg Towstego... Librarian  
Mr. Wendel Frenzel.. Councillor  
Mr. Merlyn Melby.... Editor

ITEM

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|----|---|--|
| 10 | Meeting called to order at 8:00 PM.   | J. Young                               |
| 11 | October Minutes adopted as published.   | Carried - W. Frenzel<br>K. Atchison    |
| 12 | Funds for darkroom equipment discussed.<br>Cost of \$76.00 passed.  | Carried - K. Atchison<br>M. Wesolowski |
| 13 | Date of General Meetings were discussed and it was decided to hold them on the <u>THIRD MONDAY</u> monthly. | J. Young                               |
| 14 | December General Meeting to be held on MONDAY 13th.   | J. Young                               |
| 15 | Questionnaire to be returned at December General Meeting or mailed before December 14th.                    | J. Young                               |

MINUTES OF A GENERAL MEETING - continued

ITEM

- 16 "Physics for fun" will begin on Wednesday, Nov. 24, at 8:15 PM, in room 107, Physics Building. J. Young
- 17 Lecture at January General Meeting will be Dr. Skinner. G. Patterson
- 18 Library to be kept clean by those who use it.  
All returned library books to be left on desk in Library "Please". G. Towstego
- 19 Question raised about the binding of the Journals, and to be done as soon as possible. Prof. Kennedy
- 20 Film on Binary Stars was shown. J. Young
- 21 The 1977 Observers Handbooks have arrived and will be distributed to all paid-up members at the Observatory after General Meeting. J. Young
- 22 Tape on Binary Stars by the late Dr. Heard is available at the Language Centre, Fine Arts. Prof. Kennedy
- 23 Meeting adjourned to the Observatory at 9:30 PM. D. Beck  
K. Atchison

Minutes prepared by Lillia Wilcox; Secretary.

**MEETING NOTICE**

Place ROOM B-111, HEALTH SCIENCES BLDG.  
Date DECEMBER 13, 1976 - Monday  
Time 8:00 PM, C.S.T.  
Purpose DECEMBER GENERAL MEETING

**ATTENTION ALL MEMBERS**

Enclosed with your NEWSLETTER you will find a questionnaire along with a stamped, self addressed envelope. Basically it is, quote "... an attempt to provide a meaningful reply to Dr. Percy's request for information ..." asked for in the NATIONAL NEWSLETTER of the latest JOURNAL. Please take this matter seriously, as a number of people have gone to a great deal of trouble and considerable expense.

You may remain anonymous; nothing would be gained by knowing which form was completed by you. However, if you are a SENIOR member and you still feel the question "AGE" too personal, simply answer in your 10 year age group (if you're 48, answer 40-50); knowing your exact age doesn't matter, it's the age group you fall into that's important.

And remember, if you are a beginner or an inactive member your answers are still important, VERY IMPORTANT. However, if you still do not wish to answer any of the questions, don't throw it away; MAIL IT BACK TO US by December 14.