NATIONAL NEWSLETTER

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Identifying a Meteorite

Once a meteor has fallen to the surface of the Earth, it starts to blend into its surroundings, becoming buried by soil, and eroding away. Nevertheless, a meteorite should look quite different from the terrestrial rocks in the area in which it is found. The most obvious giveaway is the presence of iron, which will not be evident as a metal in earthbound rocks. If some uncertainty still exists, a chemical test is in order. It consists primarily of testing for nickel, and then etching the surface to show the "Widmanstätten pattern", not found in terrestrial rocks. The following chemicals will be needed: ammonium hydroxide, dimethylglyoxine, concentrated nitric acid, reagent alcohol, distilled water, shellac, diluted with 3 parts alcohol.

Note that the nitric acid is very dangerous. Do not touch it or inhale the fumes.

`1. Remove a small metallic piece of the meteorite and put it in a test tube.
`2. Add 5 cc of a solution of 1 part water and 6 parts nitric acid.
3. Heat for about 2 minutes. Much of the specimen should dissolve; watch it until its size does not decrease.
4. If the piece contains iron, the liquid will be brownish-yellow.
5. Allow the liquid to cool to room temperature and let the residue settle.
6. Pour the clear solution into another test tube.
7. Slowly add a few drops of ammonium hydroxide to the clear solution, applying agitation. A reddish precipitate will indicate the presence of iron in a brownish liquid.
8. Keep on adding ammonium hydroxide until you have about three times the volume of the original clear solution.
9. Pour the liquid into another test tube. This liquid should contain the nickel in solution.
10. Mix a few drops of dimethylglyoxine with 10 cc of ethyl alcohol in another test tube, and pour this into the liquid hopefully containing the dissolved nickel.
11. If nickel is present, a pink precipitate should form.

To etch the meteorite, start by grinding and polishing a flat surface on it (as in making a mirror). Seal the rest of the meteorite with diluted shellac, leaving the polished surface free, and allow it to dry. Now comes the tricky part, to get the "Widmanstätten pattern":

1. Pour 6% nitric acid into a dish to about 6 cm.
2. Brush the acid quickly and evenly over the polished surface. Do not allow the acid to rest in any area longer than necessary.
3. The Widmanstätten pattern should appear in about 10 seconds as a criss-cross of lines and shapes.
4. Quickly wash the meteorite in running water and blot it dry.
S. Do not at any time touch the etched surface.
6. Examine the surface and remove any dust.
7. Brush the acid over the polished surface again, and repeat the above processes until the pattern is clearest and is free of stains.

To protect the meteorite, lacquer the entire surface.

If you are not sure of any of the procedures involving the chemicals, contact someone with knowledge in that area.

ROLF MEIER
Ottawa Centre
– from 'Astronotes'

Recent Aurora Activity

Recent months have brought much activity in the way of Aurora Borealis, after a relatively quiet winter. As the north pole of the Earth becomes exposed to solar radiation once again, these displays should become more frequent, although the events of the last few months have been unusual in this year of a quiet sun.

The first activity was noted on April 10/11, when a faint homogeneous arc was seen in the northern sky.

A most interesting display took place on April 17/18. Things began with a faint homogeneous arc at about 20:00. At this time, it developed and spread, reaching the zenith by 22:00. Then there was a system of at least 4 homogeneous arcs visible. Then the structure changed to a single wide, very bright green arc at an elevation of 20 to 30 degrees in the northern sky. At about 23:00 this system began to develop rays and curtains, the display reaching a peak between midnight and 1:00. At this time, many fine rays were evident, forming a comb-like structure with a bright curtain at either end. By this time too, activity had reached the zenith, and by 2:00 extended as far south as Scorpio.

The next few nights were also active, particularly the nights of April 19/20 and 20/21, when bursts of bright red and green appeared.

On April 18, I observed a new group of sunspots, possibly related to these events.

ROLF MEIER
Ottawa Centre
– from 'Astronotes'

University of Toronto Staff Build 60 Foot Radio Telescope

A 60′ radio telescope built by the University of Toronto staff is now operating in Algonquin Park. The antenna bowl will eventually be computer-controlled and will look at radio sources automatically, in accordance with a pre-established program. For the present, however, it is being steered manually. The computer component should be completed within a year.

Research grants from the National Research Council provided most of the $250,000 funds needed for the radio telescope and also the site.

The 60 foot radio telescope will serve a useful purpose. Larger facilities cannot be spared for extensive monitoring of extra-galactic radio sources, in this case the type that undergo intensity changes over a period of time.

By looking at these variable galactic radio sources, which correspond to large scale explosions, scientists say they hope to understand more about the nature of these explosions. Particular attention will be put on quasars, galaxies that have abnormally bright nuclei as a result of explosive events.

“Our problem will be to try to see if radio emissions can tell us by which mechanisms explosions are released and how the galaxies evolved; possibly even how they were formed”, says Dr. Seaquist. “Even our Milky Way has experienced such energetic explosions.”

U of T scientists will also use the telescope to determine the composition of some interstellar gases.

From the University of Toronto News Bureau

Hipparchus, the First Astronomer

The Greeks were people of a strong philosophical trend of mind. They were interested first of all in the interpretation of the world about them on a geometrical basis. Among the Greeks are many names of importance, including Thales of Miletus, a philosopher who held that the Earth is spherical and that stars shine by their own light. He also predicted several eclipses with some accuracy. Pythagoras, better known as a geometer, thought that the Earth revolved about the Sun. Eratosthenes devised a method for determining the size of the Earth, which he held to be spherical; Aristarchus of Samos developed a heliocentric hypothesis for the relationship of Earth and Sun and also applied a geometrical method for the determination of the diameters and distances of the Sun and Moon. But not one of the aforementioned made systematic or pains-taking observations; not one interpreted his observations to any considerable degree. To find a man who deserves the title of first astronomer, we must turn to Hipparchus.

Hipparchus of Nicaea lived in the second century B.C. Little is known of his life and of his writings – only one has been preserved though there are many references

in other works. At his observatory on the island of Rhodes, he performed his research and observations with the best instruments of his time, although at some time he probably visited Alexandria, the cultural centre of the ancient world. Our knowledge of his work appears in the statements of his admirer Ptolemy of Alexandria, later himself to gain fame as an astronomer of note.

Among Hipparchus' many achievements, one occurred when he attempted to measure the size of the Sun and Moon and their distances from the Earth. He felt the need for a type of mathematics that, by applying measurements made on Earth, would enable him to measure objects far out in space. (He later estimated the distance between Earth and Moon as 60 times the radius of the Earth.) Hipparchus then developed trigonometry which continued to aid him in his work. A summary of his other contributions may be grouped under four separate headings.

First, his scheme of motions, which he applied with some degree of success to the Sun and Moon. Associated with this were his observations in connection with the length of the year, his preparation of solar tables (the first of their kind), his careful observations of the Sun and Moon, and his improvement of the method of predicting eclipses. Hipparchus apparently attempted to apply his scheme of motions to the planets also, but without success; consequently, he contented himself with taking a long series of observations of these bodies and left to some future worker the task of their interpretation.

Secondly, having noted the sudden appearance of a star in a position where before there had not been one visible, Hipparchus conceived the idea of making a star catalogue and carried it into effect. This catalogue gave the positions of the stars and references to a definite co-ordinate system. All of the 1,080 stars in it were classified into six gradations of brightness (the beginning of our modern system of visual magnitudes.)

Thirdly, it must be noted that Hipparchus had formed the practice of comparing his own observations with those of previous observers. To his surprise he found a progressive change in the distances of the stars from the equinoctial points, all of these having increased in celestial longitude while the latitudes were unchanged. He concluded that a change of reference point in the system of co-ordinates had taken place and he was the first to recognize the very remarkable astronomical phenomenon known to us as the precession of the equinoxes.

Finally, he took careful observations of all possible astronomical events and phenomena.

Laboring under extreme difficulties, without good instruments Hipparchus produced results which are truly amazing. He was the first who devoted his life to a careful study and systematic observation of the heavenly bodies, and attempted interpretations of what he saw. Hipparchus ranks above his predecessors in this field and is rightly to be regarded as the first real astronomer.

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Activities of the Centres

The following are excerpts from some of the reports that have been received after presentation at the General Assembly.

Saskatoon Centre

The Saskatoon Centre has been very busy during 1973. General and Executive meetings were held monthly, and the minutes of all meetings were published in the Centre's newsletter.

Speakers for General Meetings included Dr. Iwanowska, speaking on Copernicus, Dr. Skinner on Cosmology; Jacob Wiebe provided slides of a Solar Eclipse; Dr. Holden and Gordon Patterson spoke on their trip to the General Assembly in Ottawa; and Dr. Ian Halliday spoke on Comets.

Classes in Fundamentals were held on Tuesday (directed by Gordon Patterson), alternating theory with optional topics. Astrophotography (directed by Gordon Patterson) and the Observer's Group were held on Saturdays. The members' achievements in terms of attendance and a final examination were recognized by the issuing of certificates at the end of the class. At the end of this year's class 11 certificates were awarded. Four in Astrophotography and seven in Fundamentals.

Wednesdays and Sundays are reserved for open house (directed by Wendel Frenzel and helped by Halyna Kornuta and Ron Waldron). Group tours were arranged on Fridays with groups from around the province coming to Visit the observatory. Two four-week courses on Astronomy were given to two separate groups of Girl Guides as assistance in the awarding of their astronomer's badge.

In July the Saskatoon Centre's First Annual Wiener Roast Picnic was held, followed by a game of baseball till sundown. As the sky darkened members set up telescopes to view the clear sky. After a midnight snack the evening wound up.

Elections were held in October, bringing in new executive members and changing the executive position of Vice-President to Vice-President/Public Relations.

In November and December three Centre members gave lectures at the Saskatoon Library. Alan Blackwell – Meteorites; Ron Waldron – The Christmas Star; and Gordon Patterson – The Comet Kohoutek.

The observatory of the Saskatoon Campus, University of Saskatchewan, is a home for our Centre and is presently undergoing extensive renovation, resulting in improved library facilities and such features as a new dark room, telephone and a number of display cases. These are open to the public and they include a particularly interesting display of meteorites.

In all it was a very busy year for everyone at the Saskatoon Centre.

F. A. HOLDEN

Ottawa Centre

The past year has been a very busy and interesting one for the Ottawa Centre. Last June the Centre hosted the 1973 General Assembly, held at the Carleton University campus. Over 200 delegates from across Canada attended and the response was very gratifying to the arrangements Chairman Malcolm Thomson and the Centre President, Mary Henderson.

During the winter months from September to May, eight public lecture meetings were held that were well attended. In June the Centre prepared a public display on astronomy and the RASC in connection with the opening of the new central building of the Ottawa Public Library.

The Observers' Group continued its very active program under the direction of Ted Bean. Regular monthly meetings were held from September to June, with attendance averaging close to 80. Further evidence of the success of this group is the participation in the program by many different members at each meeting. The 16-inch telescope at North Mountain has been used extensively and many beautiful photographs of a wide variety of stellar objects have been obtained. A busy summer program is envisaged for this site. The Quiet Site continues in use, particularly for meteor observing.

Astronotes has continued and developed under the editorship of Rolf Meier during the past year and its arrival each month is awaited with anticipation by all members. Although intended as a local newsletter describing activities and subjects of interests primarily to Ottawa Centre members, its articles have attracted wider interest with requests for copies from the United States and England. Articles have even been reproduced in other commercial publications popularizing astronomy — sometimes without acknowledgment.

The variety of the Centre's activities continues to attract new members and the membership in the Centre recently passed the two hundred mark for the first time.

In June the Centre held its last meeting in its locale for many years – the Library of the Geophysical Building. Changes in the government use of old Dominion Observatory site, where the Geophysical Building is located, have necessitated a change in meeting place for Ottawa Centre. Negotiations are still underway to find a spot that is both conveniently central and adequate for both Observers' Group and public lecture meetings. It is expected that a suitable location will be obtained to start the fall program on schedule in September.

The future of the Ottawa Centre continues to be very bright.

Windsor Centre

The year 1974 brings about a healthy increase in membership to the Windsor Centre. Inducements have been the successful installation of a Celestron Reflector Telescope at the St. Clair College campus and regular 1st and 3rd Tuesday public "star nights," rain or shine. The programmes have been manned mainly by student members and

their committees. This year to date, the observatory has seen eight Cub groups, Brownies, Scouts, and other organizations from the area, having an average number of approximately thirty in each group.

The fee structures have, in the main, been updated to that of the Toronto Centre, with the exception of a slight subsidy for Senior Citizen members. This should result in a somewhat healthier balance sheet by year end and will afford an opportunity for inviting more professional speakers to our meetings.

The Windsor Centre started the year with a Comet programme meeting, featuring Comet Kohoutek in the newly opened Windsor Library auditorium, attended by an overflowing crowd. As follow up, the Centre is investigating the possibilities of distributing notices of meetings and other related information from this location, thus taking advantages of the huge traffic flow.

All other regular monthly meetings have been held at the St. Clair College campus. In May the meeting took the form of a field trip. This year the Windsor Centre toured the "Solid Dish" Radio Telescope facilities in Stinchfield Woods, Ann Arbor, Michigan.

The spirit and enthusiasm displayed at the two executive and council meetings held thus far at the residence of the president will ensure a successful year.

HENRY LEE

Victoria Centre

The membership of the Victoria Centre now stands at 78, plus 14 Life members, total 92.

During 1973, seven regular meetings were held, as well as two others of particular interest.

On January 23rd the Anniversary of Copernicus was observed. The lecture "Copernicus and Modern Science" was given by Dr. W. Iwanowska and was greatly enjoyed, and the Centre honoured by the visit of the outstanding astronomer from the country in which Copernicus lived. This lecture was also given, open to the general public, at the Newcombe Auditorium.

On Febuary 15th we were favoured by the visit of a prominent Canadian astronomer, Dr. Helen Hogg of the David Dunlap Observatory, who spoke on "Variable Stars in Global Clusters".

The meeting of November 14th was held at the Dominion Observatory Optical Shop where the equipment for the figuring of the "Canada-France-Hawaii" telescope was exhibited, and explained by Mr. R. Dancey. Although the mirror blank was on hand, it had not been unpacked but from the dimensions of the cases, the size and weight could be appreciated.

A joint meeting was held with the Vancouver Centre at the Vancouver Planetarium, and joint meetings of the Vancouver and Victoria Centres are to become regular features of our activities.

The first members of the Telescope group have completed their mirrors, and a second group is now at work under the very able Director of Telescopes, Mr. G. R. Ball.

Facilities for observing have been arranged by Mr. Ball, with the co-operation of the

University of Victoria, with three instruments available – a 12″ reflector, 10″ Celestron Schmidt-Cassegranian, and a 4″ Alvin Clark refractor, and at the D.A.O. the 16″ is also available under the supervision of our Director of Telescopes.

The exhibit at the Hobby Show, and the stall set up at the D.A.O. on the Saturday evenings during July and August for the distribution of literature and the giving of information, continued, as in former years.

E. E. BRIDGEN

Good Observing Techniques

Usually when the sky clears after a rain, the stars are noticeably brighter since all of the dust in the air has been washed away. However, observing right after a rain may cause a few problems because water droplets in the air may give you a distorted image of your object. Occasionally, a good afternoon shower will leave a good sky by night but it is very rare to get a perfect night. The first time I can recall such a night was in the middle of June. Usually winter provides the best night for observing because no dust or water droplets exist to ruin observation, however, ice crystals may cause uneven scattering of light. Sometimes stars of 7th magnitude are seen on a clear winter night; if stars of 6th magnitude are seen in July the seeing is considered excellent. A good test of atmospheric conditions is to point a telescope towards a star or planet and if the image appears hazy or the wrong colour, the seeing is below par. Other enemies include mosquitoes (wear insect repellant) and very cold temperatures (dress warmly!). Observations should never be done through a window because the hot and cold temperatures create a draft which results in vibrating the telescope and the unsteady air makes the image of a star or planet "boil and dance".

Since Mars is coming close to the Earth this fall, amateur astronomers should attempt to photograph or make sketches of the planet. When making sketches one must remember that a long sketch will end up distorted due to the rotation of the planet, especially in the case of Jupiter and Saturn. It is a good idea to keep your drawings brief and don't ruin your eyesight by looking at bright lights. A good idea is to clamp a small flash light onto your sketch pad. When doing so, use a red light as this colour of light will not ruin your sight. If a red light is not available, use a piece of red plastic over the light. It is interesting to note that even short viewing of the television screen will cause stars to appear reddish for a long period of time. This is caused by a lack of red in the screen-light and the fact that your eyes are not sensitive at this end of the spectrum. in any case, the viewing of television is a very poor preparation for observing.

If you practice the above methods, observation of stars and planets should be more fun. Good luck in observing!

DAVE PRISTUPA,
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