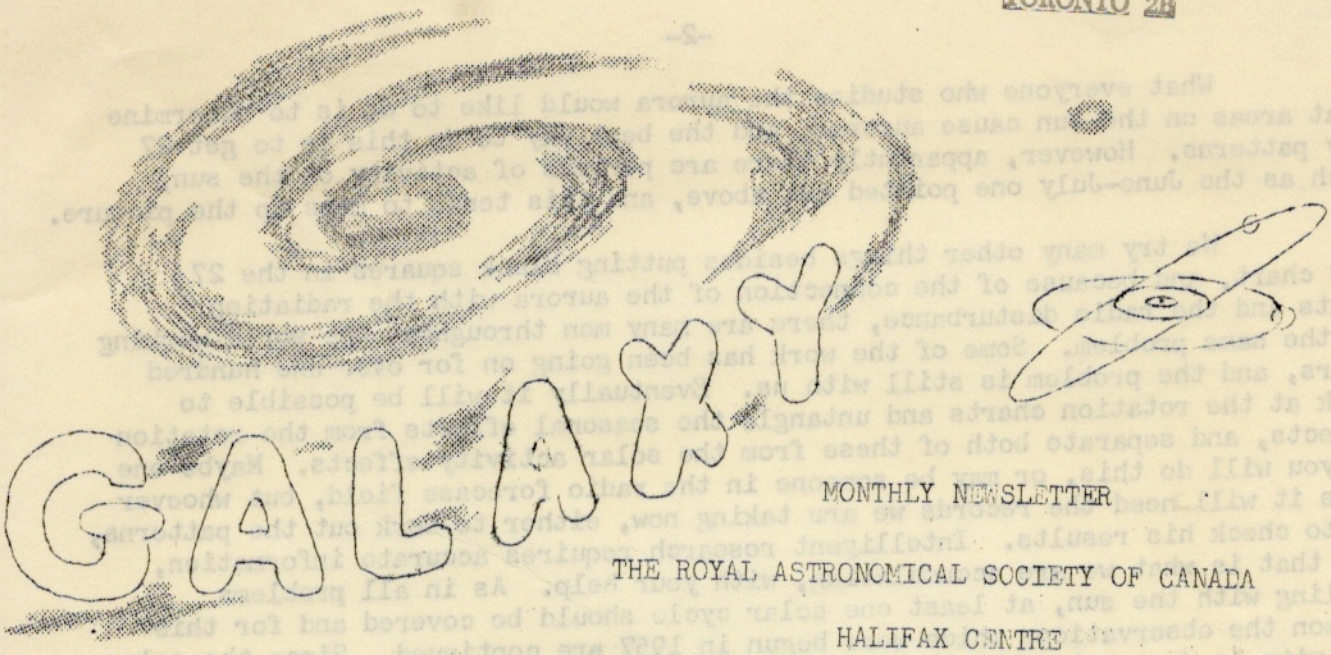

MONTHLY NEWSLETTER

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

HALIFAX CENTRE

MARCH-APRIL-MAY 62

AURORA SECTION: The following has been taken from the U.S. Visual Observations, Newsletter #55, Ithaca, New York, March 1962.

"We have not received all your reports, but according to the magnetic records, March 8 was about as dead a day for auroras as we have had. March 5 and 6 were much better, and we don't yet know about March 13.

All the books say that auroras show a 27 day periodicity, and this is presumably due, if it exists, to a 27 day rotation period of the sun. This is the reason that we plot the auroral data in the 27 day table. Similar tables are used by the Central Radio Propagation Laboratory of the National Bureau of Standards in predicting the occurances of troubles in radio transmission. However, as you can see from examples we have just discussed, our results are not so good. At the time of the last Newsletter we thought the 8th of March might be a good day because of the activity from September through November on the 17th and 18th rotation days. As it turned out we should have picked the 5th and 6th days and this is indicated by the auroras which were seen on January 10 and 11. As a general rule the spring and fall months are the most active, but it is obvious that in 1961 there was a big increase in activity from June 21 through August 13. From July 18 to August 13 there were only three days when auroras were not seen south of Alaska.

What everyone who studies the aurora would like to do is to determine what areas on the sun cause auroras, and the best way to do this is to get 27 day patterns. However, apparently there are periods of activity on the sun, such as the June-July one pointed out above, and this tends to mess up the picture.

We try many other things besides putting black squares in the 27 day chart, and because of the connection of the aurora with the radiation belts and the radio disturbance, there are many men throughout the world working on the same problem. Some of the work has been going on for over one hundred years, and the problem is still with us. Eventually it will be possible to look at the rotation charts and untangle the seasonal effects from the rotation effects, and separate both of these from the solar activity effects. Maybe one of you will do this, or may be someone in the radio forecase field, but whoever does it will need the records we are taking now, either to work out the patterns, or to check his results. Intelligent research requires accurate information, and that is what we are accumulating, with your help. As in all problems dealing with the sun, at least one solar cycle should be covered and for this reason the observations which were begun in 1957 are continued. Since the solar activity is decreasing things are getting less and less interesting, and more observations are of the "no aurora" type. Although they are not so interesting, these observations are as necessary as the detailed drawings of the active auroras which are becoming so rare."

No reported sighting of aurora, in the Halifax Area, has been made since the last issue of GALAXY. However, 11 negative reports have been received.

BOY SCOUTS AND GIRL GUIDES RECEIVE INSTRUCTION: After receiving a series of lectures on astronomy, from Mr. Bert Allen, forty Boy Scouts tried both a theoretical and practical test for their STARMAN'S BADGE, on March 14, 1962. Twenty Scouts are now wearing a new badge.

At present eighteen Girl Guides are receiving instruction prior to trying a test for their ASTRONOMER'S BADGE. Mr. John Hault is assisting Mr. Allen in this work.

PLANETARY SECTION: Attached to this issue of GALAXY is BULLETIN NO. 3, INSTRUCTION SHEET NO. 1, and PLANETARY FORM NO. 1. For further information on this Section please contact Mr. Bert Allen, 419 Windsor Street, Halifax, Nova Scotia. (Tel. 454-1812)

COMET AND NOVAE SECTION: Accompanying this issue of GALAXY is further information which has been received from the National Co-Ordinator, Mr. Jim Low.

The following is a continuation of the article on COMETS which appeared in the February issue of GALAXY.

THE ORBIT OF COMETS

(a) Elliptical Orbits;

Of the thousand known comets, nearly a hundred are known to move in elongated ellipses, most famous among these, Halley's comet. Halley, a contemporary of Sir Isaac Newton, was the first to suggest that the comet observed in 1682 was the same that was seen 75 years and 151 years earlier; and predicted its next visit early in the year 1759. He did not live to see his prediction come true; but the comet appeared as forecast in April, 1759, and made two subsequent appearances on schedule.

(b) Other Orbits

The orbits of the other 900 comets have not been definitely ascertained. It is possible that these too move along elongated ellipses; or, they may move along parabolic or hyperbolic curves. It is of the utmost importance to be able to ascertain the route followed by a comet. Comets that move in elliptical orbits return repeatedly to perihelion. Comets that move on either of the other two orbits appear only once to terrestrial observers. They probably come from infinite space, and after making a 180 degree detour about the sun, return to infinity.

Regretably, it is impossible to ascertain the orbits of many comets.

When the comet is close to the sun, the curvature of the three orbits is nearly identical, making it almost impossible to distinguish among them. At great distances from the sun, when the orbits diverge from one another, the comets are too faint for observations.

Many astronomers believe that all comets move in elliptical orbits with periods varying from a low value of 3.3. years for Encke's Comet to a high value of many hundreds of years, at speeds varying from a fraction of a mile per second when remote from the sun to nearly 300 miles per second when at perihelion.

For those of you who have been unable to attend the regular meetings and receive up to date information concerning this Section I would like to say that two comets have recently been in a position for viewing. Comet Seki's path can be plotted from the following data;

DATE 1961-62	R.A. (1950)	DECLINATION	MAGNITUDE
Dec. 7	23:34.3	-24d 59.m	9
Dec. 17	23:34.7	-22d 32m	10
Dec. 27	23:37.9	-20d 56m	11
Jan. 6	23:42.5	-19d 41m	12
Jan. 16	23:48.0	-18d 39m	13

This was a telescopic comet in the constellation Aquarius and no reported siting was made by any member of the Halifax Centre.

The second comet to appear recently was Seki-Lines, 1962c. In the early part of April it could be seen with the aid of good pair of binoculars but a small telescope was required for more careful observation. Using the following data it will be seen that the comet passed near the constellation Aries and the Pleiades.

DATE 1961-62	R.A.(1950)	DECLINATION	MAGNITUDE
April 2	0:42.0	7d 36m	1
April 6	1:42.2	17d 11m	2
April 10	2:31.8	21d 53m	4
April 14	3:14.4	24d 40m	5
April 18	3:50.6	26d 15m	6
April 22	4:21.2	27d 04m	7
April 26	4:50.0	27d	8

Three reports have been received from members of the Halifax Centre on comet Seki-Lines:

(1) April 4, 1962, 19:40 A.S.T., Comet 8.5 degrees west and 2.0 degrees below Venus, first magnitude with a 2 degree tail.
Father M.W. Burke-Gaffney.

(2) April 15, 1962, 20:00 A.S.T., Comet 5 degrees due west of the Pleiades, sixth magnitude with a 2 degree tail. (8 x 30 binoculars.)
Bert Allen

(3) April 20, 1962, 20:30 A.S.T., Comet 6 degrees above the Pleiades, seventh magnitude. (3 inch refractor)
John Connelly.

METEOR SECTION: Three members of the Meteor Section turned out to view the Lyrids Meteor shower on the evening of April 21/22, 1962. The program consisted of (a) recording number and magnitude of meteors in the general area of the radiant, (b) plotting the paths of the meteors on a star chart to the correct scale and direction and (c) photographing as many meteor trails as possible.

This shower has its radiant in the constellation Lyra and is associated with the Comet 1861 I which had a period of 416 years. The Observer's Handbook for 1962 lists a single hourly rate of 15 but during 03:00 to 04:00 hours on April 21/22 only four meteors were recorded and all of these were estimated to be of second magnitude or less.

Those attending were:

Dr. R. L. Aikens
Mr. John Hault
Mr. Bert Allen

Fog and overcast skies prevented the planned viewing of the Eta Aquarids meteor shower which had its predicted maximum at 04 hours A.D.S.T. on May 5th.

GALAXY: The Halifax Centre wish to thank Claudia Gahan of the Nova Scotia Museum for typing the stencils which made possible this issue of GALAXY.

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
COMET AND NOVA SECTION

Bulletin No. 2 March 1, 1962

The Comet and Nova programme is gradually taking shape. To date, I have received replies to Bulletin 1 from the ten Centres of Halifax, Hamilton, Kingston, London, Montreal, Niagara Falls, Ottawa, Quebec, Vancouver, and Victoria. More than half show a definite interest in this programme, and I have received the first negative reports from the Montreal Centre.

As you probably know, the General Assembly of the R.A.S.C. will be held in Edmonton on May 18-20. Although the C & N section has just started, it is hoped that it will be possible to represent this section in the display that will be held. If your Centre has decided to take part in this programme, would you please send me reports made by your members, or if observations have not been made, please send a list of names of those who will take part and the areas they will observe. To be sure that your Centre is represented as taking part in the C & N section, reports should be sent to me no later than April 15.

To date, five forms exist explaining the C & N programme in detail, and all Centres should now have these. There is one type of search not described on these forms which may interest observers of deep sky objects. It is possible a telescopic nova may appear in a galaxy or star cluster. If he wishes, the observer may make a systematic search for novae in these objects, and made reports on C & N form #2.

Keep watching the sky. <u>You</u> may discover a new star!

411 Brixton Avenue
St. Lambert, P.Q.

Jim Low
National Coordinator,
Comet and Nova Section,
Standing Committee on
Observational Activities,
Royal Astronomical Society
of Canada.

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

Discovery of a Comet or Nova

If you notice an unusual object in the sky, try to follow this procedure in making a report of it:

1. Make a drawing of the immediate region of the new object, noting the date and time (and time zone).
2. With the aid of a star atlas, estimate the Right Ascension and the Declination of the object.
3. Estimate its magnitude. In the case of a comet, this may be done by comparing with stars that are out of focus in the telescope or binoculars.
4. Contact another observer immediately and have him check your observation. If possible, the other observer should be familiar with the sky.
5. If the discovery is confirmed, send an air-mail letter or telegram, giving the location, brightness, and date, to:

Jim Low
National Co-ordinator
Comet and Nova Section
411 Brixton Avenue,
St. Lambert, P.Q.

C. & M. Form No. 3

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

Observations of Comets and Novae

The following procedure is only a guide for reporting an observation and it is not necessary to follow it exactly. However, the date, time, and seeing conditions should be included on all observations.

A. OBSERVATION OF A COMET.

1. Make a drawing of star positions in the region of the comet. This should cover an area of several degrees at least.

2. Note the time, and seeing conditions.

3. Mark the position of the comet on the chart you have just made of the region.

4. Make a detailed drawing of the comet, ... and comment on colour and unusual details.

5. Note the time when you finish the drawing.

6. If you have a telescope, place it such that the comet is in the centre of the field of view. Then let the comet drift across the field, and note the time (to nearest second or tenth of a second) when the comet first touches the limit of the field of view. Then note the time when it is last seen when leaving the field. The difference of these times will enable determination of the comet. This should be done for the head of the comet.

7. Estimate the magnitude of the comet.

8. Note any change in position during the observation.

9. Give details about instrument used for the observation.

B. OBSERVATION OF A NOVA.

1. Estimate the magnitude of the nova, and give the names (or positions) and magnitudes of the comparison stars.

2. Note the colour, and unusual details, if any.

3. Note the time and seeing conditions.

4. Make as many observations as possible during the early life of the nova - every few hours, if possible.

Reports should be sent to the chairman of the Centre's Comet and Nova Section for forwarding to:

Jim Low
National Co-ordinator
Comet and Nova Section
411 Brixton Avenue,
St. Lambert, P.Q.

C. & N. Form No. 4

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
COMET AND NOVA SEARCH REPORT

OBSERVER ..... AREA NO. .....

ADDRESS ..... MONTH .....:19.....

..... TIME ZONE USED .....

TELEPHONE NO. ..... POWER OF BINOCULARS .....

R.A.S.C. CENTRE ..... OR TELESCOPE USED .....

Day	Time	Mag.	Part of Sky *	Day	Time	Mag.	Part of Sky *
1				17			
2				18			
3				19			
4				20			
5				21			
6				22			
7				23			
8				24			
9				25			
10				26			
11				27			
12				28			
13				29			
14				30			
15				31			
16							Total No. Observation

* To be used if you have no specified area. Give area you search in Right Ascension and Declination.

Please use the 24-hour system, with 0 hours at midnight. This will avoid confusion. The magnitude given should be the faintest magnitude of the stars clearly seen.

This is for negative reports only. If you note anything unusual in your area, have it observed by one other member to check on it. Then send a wire to the National Co-ordinator. At the end of the month give this report to the chairman of your Centre's Comet and Nova Section for forwarding to:

Jim Low National Co-ordinator
411 Brixton Avenue,
St. Lambert, P.Q.

C. & N. Form No. 2.

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

PLANETARY SECTION

Bulletin No 3 April 5, 1962.

PROGRESS REPORT — Since Bulletin No 2 was published I have heard from four more centres bringing the total participating to 11. The new contacts are as follows:

Centre	Contact	Address
Edmonton	Franklin Loehde	11542 65 St., Edmonton, Alta
Toronto	L. A. Chester	12 Duggan Ave., Toronto 7, Ont.
Victoria	Robert Peters	2371 Arbutus Rd., Victoria, B.C.
Windsor	Arthur Rae, Jr.	Renaud Line, R.R.#1, Belle River, Ont.

This and future Bulletins will be directed specifically at the representatives of the participating Centres although they will contain some information which should be passed on to other active observers in the group. Centres which publish newsletters have a ready means of doing this; to my knowledge Calgary, Halifax, and Montreal have already included information on the planetary program in their publications.

INSTRUCTIONS AND REPORT FORMS — Included with this Bulletin are sample copies of the first set of instructions and report forms which I have designed for the Section's use. The "General Instructions" cover the use of Forms No 1 and 1-J (no sample of the latter is included since it is identical to Form 1 except for the addition of a suitable outline for drawing Jupiter). Form No 2 is for recording Jovian satellite phenomena and should be self-explanatory. A number of Centres have shown interest in these satellite observations, and because the work requires relatively little training, it should appeal to a larger number of our members than will the full program of making drawings, etc. This is an opportunity for anyone with a telescope to make a useful contribution to astronomy.

Copies of the instructions and report forms are yours for the asking. Probably not too many should be ordered for a start until it is possible to judge the amount of interest present in your Centre. I will endeavour to answer all requests as promptly as I can, but there will inevitably be delays when I have to run off further supplies. Centres which already have report forms for these observations may continue to use them; the standard forms are merely a convenience for the Co-ordinator. As usual, your comments and suggestions regarding these forms will be most welcome.

ANNUAL MEETING DISPLAY — Those who have already sent me copies of 1961 observations should be advised that I will be using a representative selection of these to prepare a couple of display boards for the Edmonton meeting. The source of the contributions will be clearly indicated on these. I look forward to having the opportunity of meeting a number of my correspondents at Edmonton.

VENUS — Mr. Klaus Brasch, Co-Chairman of the Montreal Centre's Planetary Section, has devised a very thorough program for studying Venus, which will be well placed this summer. I will be glad to supply anyone interested with a copy of this program; however, it should be emphasized that this is of an advanced nature and that all contributors are expected to make intensity and filter observations.

Geoffrey Gaherty, Jr., National Co-ordinator,
Planetary Section, Standing Committee on
Observational Activities.
636 Sydenham Avenue, Montreal 6, Quebec.

ROYAL ASTRONOMICAL SOCIETY OF CANADA
Planetary Section

GENERAL INSTRUCTIONS

INTRODUCTION

Much of our present knowledge of the objects in the solar system is due to observations carried out over many years by dedicated amateurs around the globe. The person considering devoting his time to planetary work should bear in mind that although the human eye is prone to errors against which one must be constantly on guard, it also has a number of advantages over the photographic plate in this field. A systematic means of recording observations eliminates some sources of error and makes the analysis of the work of various observers easier.

It should be emphasized at the outset that planetary observations are by no means easy. Beginners may well become discouraged at the lack of detail on a planet; the eye requires considerable training in order to perceive slight differences in contrast near the limit of visibility. Even more frustrating in seeing detail which is beyond one's (present) ability to sketch. Many will give up in despair, a few will be sufficiently intrigued to try again, and I can guarantee that the latter will be amply rewarded for their patience.

INSTRUMENTS FOR PLANETARY RESEARCH

Telescopes. There is little to choose between a refractor and a reflector of the same aperature provided that the optics are good. Although a 3- or 4-inch can show detail worth recording, a 6-inch or greater will more than repay the extra cost. An equatorial mount with drive is a help but by no means an essential.

Eyepieces. Considerable thought should be given to obtaining a good set of eyepieces. For telescopes of small focal ratio (i.e. f/5-f/9) the Huygens eyepiece should be avoided. An orthoscopic is the best, but the lowly Ramsden can be very useful with objects near the horizon if the object is so placed in the field that the eyepiece's chromatic aberration exactly cancels out the effects of atmospheric dispersion. Suitable magnifications depend on the seeing conditions and the object under observation. Powers in the range 150-250x will be found most useful on average nights; with excellent seeing higher powers may be used on Mercury, Mars, and Saturn.

Filters. A set of coloured filters may be found helpful under certain conditions. For instance, red filters (such as the Kodak Wratten 25) emphasize detail on Mercury and Mars, and a deep blue filter (Wratten 47) will make it easier to detect the shadings on Venus.

Timekeeping. An ordinary watch is sufficient for most purposes since high accuracy is not essential. The watch should be set by radio time signals and checked periodically. All times should be recorded to the nearest minute except in special cases.

REPORT FORMS

Form No 1 has been designed to make certain that all necessary information regarding an observation is recorded in a uniform manner. Virtually all the data must be entered at the time the observation is made; if left till later, any number of errors may creep in. The following is a description of the type of information required:

Local Date and Time. The double date is always used here (e.g. January 24/25). The times when the drawing was begun and completed should be given using the 24-hour system, 0h at midnight, and the kind of time (e.g. E.S.T., P.D.T., etc.) indicated.

U.T. Date and Time. For comparison purposes Universal Time (i.e. Greenwich Mean Time) is always used. The correct number of hours should be added to the local time to give U.T. (see "Solar, Sidereal and Ephemeris Time" in the Observer's Handbook). In areas where Daylitht Time is in effect, one hour less than the number given in the Handbook should be added. The double date is not used here, the date changing at 0^h U.T.

Seeing. The steadiness of the telescopic image is usually recorded on a numerical scale with 0 representing seeing so bad that no detail can be made out to 10 when the image is absolutely steady for long periods of time (never achieved in practice!). On most nights the seeing is around 3 or 4, and values above 6 are recorded very infrequently.

Transparency. This gives the clarity of the sky and is usually taken as the magnitude of the faintest star visible with the naked eye at about the same altitude as the planet.

Central Meridian and "K". The central meridian of the planet at the time of observation may be calculated for Mars and Jupiter from tables in the Handbook or the American Ephemeris. Since Mars has many permanent surface features and a well-known rotation period, longitudes are given in terms of an internationally agreed upon system. The Ephemeris predicts the meridian that will pass through the centre of the disk at 0^h U.T. each night, and from this it is possible to calculate the central meridian (or "C.M.") for any other time. Because Jupiter's surface is not visible, two arbitrary longitude systems are used as a reference: System I for regions between the middle of the North Equatorial Belt and the middle of the South Equatorial Belt, and System II for the rest of the planet. "k" is the fraction of the planetary disk which is illuminated and is useful in comparing drawings of Mercury and Venus. It is tabulated in the Ephemeris.

Station. The location where the observation was made may not necessarily be the same as the observer's mailing address and so should be indicated here.

Drawing. A two-inch diameter circle should be drawn in this space with a pair of compasses except for drawings of Jupiter and Saturn. For Jupiter, Form No 1-J with the especially printed outline should be used. This outline has the correct shape for Jupiter's slightly elliptical disk, and the planet should be drawn so that its belts are parallel to the major axis of the ellipse. Since the aspect of Saturn's rings changes continuously, no outline can be given. For accurate drawing the dimensions of the disk and ring system must be taken from the Ephemeris and suitable ellipses drawn. After a drawing is completed its appearance may be improved by carefully blacking in the background with a felt-nibbed marking pen (such as the Carter's "Marks-a-Lot").

Intensity Estimates. Another circle may be placed here for recording the intensities of the features observed (see p.3).

Observer's Remarks. Any information that may be useful in interpreting the drawing should be entered here. Most observers err on the side of making too few remarks; something that might not seem important at the time may take on a greater significance when compared with other observations. Remarks may be continued on the back of the form provided that nothing is written on the back of the drawing itself.

All observations should be sent to your Centre's planetary chairman not less frequently than once a month. If drawings are sent by mail, please do not fold the form across the drawing.

MAKING A DRAWING

The observer should equip himself with the following before going to the telescope:

(a) Some sort of drawing board to which the report form can be firmly attached.
(b) A suitable pencil (my own preference is for the 2B lead). One with an eraser attached is a great convenience; otherwise
(c) A fairly soft eraser, perhaps sharpened to a point.
(d) An "artist's stump". This is a small roll of blotting paper sharpened to a point (obtainable for a few cents from any art supply store) which is used

to smooth out pencil lines and give more even shading.
(e) A flashlight or other source of illumination which makes the drawing paper about the same brightness as the planetary image in the telescope. A red light is neither necessary nor desirable.

I would strongly recommend that no attempt be made to start drawing for at least 20 minutes after going to the telescope. During this time more and more detail will become apparent, and by the time the drawing is begun one will have a good idea of what is visible. The main details should be sketched in to form reference points. Great care must be taken at this stage since the drawing may later be measured for positional information. Then the finer detail is added, starting with the preceding part of the disk since this is the side that is rotating away from us. After smoothing out the pencil-work with the "stump", the drawing should be compared with the planet to make certain that it is an accurate copy. The actual time spent drawing should not be more than about ten minutes so that the positions of the features do not change appreciably during the period.

Since a beginner will often waste much time at the telescope in learning to manipulate pencil and stump, it might be a good idea to practise copying drawings and photographs published in magazines. Almost anyone can learn to make useful planetary drawings in time, and one accurate drawing is worth much more than a large number of pretty but careless sketches.

ESTIMATING INTENSITIES

The value of a drawing can be enhanced by the addition of quantitative estimates of the relative intensities of the features observed. For most planets a 0-10 scale is used where 0 is taken as the darkness of the sky background, and 10 as the brightest markings possible. Some rough guides to intermediate values are listed here:

Venus:	Average surface brightness	=9	Mars:	Exceptionally dark markings	=1
Jupiter:	Brighter Zones	=7-8		Normal tone of greenish areas	=3
	Darker Belts	=2-3		Normal tone of reddish areas	=6
	Polar regions	=4		Tone of clouds at the limb	=8
Saturn:	Outer part of ring B	=9		Polar caps at brightest	=10

Due to the special problems in observing Mercury, a 0 darkest - 5 brightest scale is often used with the average surface brightness taken as 3. With experience one can become quite consistent in assigning intensity numbers. Observations should be recorded on a rough sketch in the space provided. (Those familiar with standard Jovian nomenclature may prefer just to list the belts and zones with their observed intensities.)

OTHER DATA TO ACCOMPANY DRAWINGS

Under the "Remarks" section of the form various notes can be made on the colour and conspicuousness of the observed details. These may be recorded on another rough sketch or described verbally. The relative conspicuousness of Jupiter's belts and zones (considered separately) can be conveniently estimated by throwing the telescopic image out of focus and noting the order in which the belts (or zones) reappear as the eyepiece is refocused. The most conspicuous should be marked "1", the next most conspicuous "2", etc.

Geoffrey Gaherty, Jr, National Co-ordinator,
Planetary Section, Standing Committee on
Observational Activities.

April 4, 1962.

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

Observation of the Planet .....

Local: Date..... 19... Time ..... Zone .....

U. T.: Date ..... 19... Time .....

Telescope: Aperature ..... Type ..... Power .....

Seeing (0 worst-10 best) ..... Transparency (0 worst-5 best) .....

Central Meridian: I .....II ..... k .....

Observer ..... Mailing Address:

Station ....

R.A.S.C. Centre ....

Drawing:

Intensity Estimates:

Observer's Remarks:

Planetary Form No 1