

# CANOPUS

**The Astronomical Society of Southern Africa**

**Johannesburg Centre**

**Monthly Newsletter for March 2001**

## **Contents:**

**Editorial**

**Notice of Meeting**

**Life in the Universe..... Jan Eben van Zyl**

**Solar Eclipse June 2001 ..... Brian Fraser**

**The Web between the Worlds..... Evan Dembskey**

**Delta Scorpil report ..... Sebastian Otero**

**Finding Names for dazzling Stars ..... JPL News**

**2MASS Mission accomplished! ..... NASA News**

**Variable of the Month ..... Brian Fraser**

**Puzzle Corner ..... Gill Stewart**

**In The Sky This Month ..... Brian Fraser**

**The Sir Herbert Baker Library, 18a Gill Street, Observatory, Johannesburg  
P.O.Box 93145, Yeoville, 2143**

## Editorial

As we approach the Autumnal Equinox, Venus is starting to fade from it's glories of earlier in the month and our attention moves more overhead ( when the clouds permit that is... ). Jupiter and Saturn are both nicely positioned for late evening viewing, and those of you who prefer to check the early morning heavens, Mars is looking good an hour or two before sunrise and is quite close to it's nemesis ( Antares ) at this point in it's orbit.

The February monthly meeting was a "sell-out" and Malcolm Barnfield's presentation on Sundials was very well received, as were the many other short topics presented on the evening. Now we know the theory behind the Sundial and how to construct it - this could form the basis of an interesting project for the Centre. Also, many of us who were previously ignorant of the device, now know what a Herschel Wedge looks like and how it is used.

Some bad news for society members, and for local astronomy as a whole, is that our dear friend and variable star fundi, **Danie Overbeek**, suffered a stroke a few weeks back. The good news is that he is out of hospital and his doctors are amazed at the rate of his recovery. *Get well soon Danie.*

Our busiest correspondent, Brian, keeps us in touch with the skies above and is standing in for Danie by presenting the variable of the month. This month he touches on the Mira type variable, S Carinae.

The answer to Gill Stewart's puzzle from the last issue can be found hidden in the depths of this issue and another of her cryptic puzzles finds it's way into these pages. No one was clever (or brave) enough to supply the answer - so no name is being trumpeted forth this month!! However, if you can supply us with the answer to Gill's new puzzle, your name will appear in the next issue in glorious bold type.

After an absence of several months, we find the first in a series on Life in the Universe from one of our favourite writers and a respected author in his own right - Eben van Zyl. I expect that you, like your editor, are really looking forward to his insights on this much thought about and discussed topic.

Have you ever wondered where Stars get their names from??? Our friends at NASA's Jet Propulsion Laboratory supply us with the answer. *And finally* - check the notices for two of our planned outings for which we now have firm dates. Contact a Committee Member if you are interested in attending.

The Editor - *chris@penberthy.co.za*

<b>Committee of the Johannesburg Centre of the ASSA for 2000/1</b>		
Chairman	Tom Budge	484-4740 - farthings@iafrica.com
Vice Chairman	Chris Stewart	763-3301 - cstewart@alcatel.altech.co.za
Secretary & Treasurer	Constant Volschenk	972-6038 - tabbie@icon.co.za
Librarian	Ed Finlay	616-3202 - edwin.finlay@ucb-group.com
Curator of Instruments	Frans van Nieuwkerk	609-8158 - machteld@iafrica.com
P.R. and Media Liaison	Wolf Lange	849-6020 - wlange@mail.sbic.co.za
Viewing Officer	Constant Volschenk	972-6038 - tabbie@icon.co.za
Members	Evan Dembskey	680-9304 - evan@telemessage.co.za
	Melvyn Hannibal	435-6007 - melvynhannibal@metroweb.co.za
Editor of CANOPUS	Chris Penberthy	793-7480 - chris@penberthy.co.za
Our Web Address is <a href="http://www.aqua.co.za/assa_jhb.htm">www.aqua.co.za/assa_jhb.htm</a> Send e-mail to <a href="mailto:assa_jhb@aqua.co.za">assa_jhb@aqua.co.za</a> and fax us at (011) 339-2926		

## Notice of Meeting

The **March** meeting of the Johannesburg Centre of the Astronomical Society will be held in the Sir Herbert Baker Library, 18a Gill Street, Observatory, on Wednesday the 14<sup>th</sup> of March, 2001 at 20:00.

**Topic:**

**Galaxies**

By: **Barbara Cunow** of UNISA

*Most Excellent*

*Not to be*

### Future Meetings

April 11 <sup>th</sup>	Special Planetarium Show	Claire Flannagan
May 9 <sup>th</sup>	T.B.A.	
June 13 <sup>th</sup>	Eclipse explained	Medley of Speakers
July 11 <sup>th</sup>	A.G.M.	All Centre Members
August 8 <sup>th</sup>	Eclipse Experiences	Miscellany of Speakers

*If you have any ideas for topics or subjects that you feel should be presented at future meetings of the Johannesburg Centre, please contact one of the Committee members, or email us with the details thereof.* *Ed.*

### Dark Sky Viewing

On the Saturday nearest New Moon at Tom Budge's Farm in the Magaliesberg. *Remember that this is by arrangement only* as most observers will be following specific viewing programmes and if you don't have your own 'scope, you should contact one of the observers ( e.g. at the monthly meeting ) to arrange some eyepiece time with them.

24 <sup>th</sup> March	18 <sup>th</sup> August	<b>Year End Star Party 2001</b>
21 <sup>st</sup> April	15 <sup>th</sup> September	"T.B.A."
19 <sup>th</sup> May	13 <sup>th</sup> October	8 <sup>th</sup> December ( <i>provisionally</i> )
23 <sup>rd</sup> June	17 <sup>th</sup> November	
21 <sup>st</sup> July		

### Public Viewing ( *weather permitting* )

Public viewing nights are on the Friday nearest First Quarter, and are held at the Old Republic Observatory, 18a Gill Street, Observatory, Johannesburg. Starting time around 19:30.

30 <sup>th</sup> March	24 <sup>th</sup> August
25 <sup>th</sup> May	21 <sup>st</sup> September
29 <sup>th</sup> June	19 <sup>th</sup> October
27 <sup>th</sup> July	23 <sup>rd</sup> November

### New Members

We would like to welcome the following new members to the Johannesburg Centre:

**Louise McBride    Shirley Schwartz    Martin Hale    Lerike Cross**

We wish you many enjoyable years of clear skies.

## Jo'burg Centre Outings for 2000/1

Your Committee is making arrangements for several outings during the year. Amongst these are some old favourites as well as a couple of new ones which should prove interesting.

**Nylsvlei** - we have a booking for the weekend of the 14<sup>th</sup> - 16<sup>th</sup> September for 30 people.

Boyden - dependant on availability of a suitable weekend.

**Haartebeeshoek** - Sunday 22<sup>nd</sup> of July at 14:00. ( Just be by the main gate from about 13:45 ).

A visit to the Suikerbosrand Nature Reserve.

Tswaing Crater - still trying to set up a day visit under the guidance of Prof. Reimold

Other ASSA Centres ( e.g. the Pretoria Centre ) - and try to see if we can organise some joint ventures.

## Telescope Making Classes

Would you like to make your own telescope?...or finish off a partially finished one? Well your opportunity has arrived (once again). Join the Telescope Making Class being held under the guidance of Brian, Evan and Chris. Contact Brian on 803-8291 if you are interested.

---

## Telescopes for Sale

Make: Tasco  
Type: Refractor 76.2 mm  
Focal length 1200mm  
finder scope 6x30mm  
mounted on tripod  
24 hour clock drive  
counter weight plus dust caps

Extra's	Sun filter	Eyepieces	OR 4mm (300x)	
	Moon filter		SR 4mm (300x)	
	2x Barlow lens		SR 5mm (250x)	
	Sun screen		OR 6mm (200x)	
	erecting prism		HM 9mm (133x)	K
	herschel wedge	12mm (100x)		HM
	2x lens holders	12.5mm (96x)		H 20mm
	slow motion controls	(60x)	K 22mm (54x)	
			HM 25mm (48x)	

*ALL LENSES AND EXTRAS IN SPECIAL MADE WOODEN BOX COVERED WITH LEATHER  
TELESCOPE IN PERFECT CONDITION !!!*

PRICE **R1800.00** OR highest offer

Contact: Tom Ferreira (011) 811 1065 or (083) 661 0213

---

I am attaching details of a telescope for sale. The contact person is Bill Lockhart, although the telescope belongs to a Mrs Pretorius. I think it belonged to her husband. I'm not sure about the condition of the scope, but Bill has said the mirror is excellent. The whole scope is about 6' long.

For further details about the 'scope, it's condition and cost, please contact Bill on 083-244-9138

---

## LIFE IN THE UNIVERSE

The question as to whether life is prevalent in the universe is often asked, not only by laymen but also by astronomers. One of the best, most closely and logically set out approaches to this question is that by Prof Stuart Clark in his very interesting and well-written book "Life on other Worlds and how to find it", published by 'Springer-Praxis. He refers to the fact that Fred Hoyle had shown in his book "The Intelligent Universe" that the probability that life appeared on Earth is vanishingly small. But Clark rightly points out that once certain steps in the chain of life had been taken, further steps would follow as a matter of course. If this were not so, life would be a very rare accident and we could consider ourselves tricky to be alive!

The argument runs as follows: If life is prevalent in the universe, why haven't intelligent beings on nearby planets made contact with us? Maybe our instruments are too crude to pick up the very faint signals coming from planets tens of light years distant. Maybe we are older and therefore more advanced than our near neighbours so that they are not yet able to send signals or to receive signals from us. Besides, a message from a planet circulating around Alpha Centauri, our nearest stellar neighbour would take 4,3 years by radio. If we replied immediately on reception of the message, another 4,3 years would elapse before "they" at Alpha Centauri received our reply, i.e. 8,6 years - you could hardly speak of a two-way conversation - not to speak of the time lapses in the cases of other stars further away. Would you care to listen? The immensity of space and the fact that nothing, not even radio signals, can travel faster than the speed of light, place severe limitations on our being able to communicate with aliens when our radio industry is still less than one hundred years old. This seems to be an insurmountable problem, for the present. Clark states that he is unhappy in accepting that life is an incredibly low probability event and therefore he cannot accept the religious explanation that an omnipotent "Guiding Hand" made an impossible event come true. Therefore the probability of life coming about

on a planet which has all the necessary conditions, must be higher than it seems.

Clark therefore takes the stance that life is an "emergent phenomenon" which is a phenomenon that cannot be predicted from a knowledge of its components, the cells and DNA molecules, etc, which go to make up life. Life may just happen when a sufficiently complicated and correctly orientated system of components begins to work in unison.

At that stage one must postulate an emergence, for example, the atoms which make up your body are not separately alive, but jointly, and in unison, they constitute cells and organs which together produce the living being, which is you and you are alive. He may add to Clark's exposition the case of hydrogen and oxygen. There is certainty about the existence of hydrogen, the most prevalent substance in the universe; and oxygen is made in copious amounts in the nuclei of stars. When these two elements come together they combine explosively to form water, the most important constituent of the living cell. Water is therefore very plentiful in the universe and in the Solar System. Clark cites the wetness of liquids, a property which the constituent molecules do not possess. Each ant in a colony is an insignificant insect, but in their thousands they display a remarkable emergent group intelligence. Packs of dogs and nations of humans also display emergent properties. Another way of saying this is that the whole is greater than the sum of the parts. Somewhere between the simple, inanimate laws of physics and chemistry and the complex behaviour of biological systems, life emerges - it is thus emergent, and bridges the gaps between the sciences.

When certain complex states are built up, life emerges as a certainty. Self organisation is another property that stems from the attainment of complex systems. Take the case of water spiraling down the plug hole. If you disturb the flow, it rapidly reinstates the spiral motion. We can sum this up by saying that life possesses the property of decreasing entropy whereas the

universe at large displays increasing entropy, ie the disorganisation in the universe is constantly increasing. We can say that the universe is like a broad, deep steady-flowing river. All the water is steadily flowing downhill; but here and there, at the edges there are eddy currents where the water tends to circulate in a backward direction as if to decrease entropy. Life is therefore an inescapable property of the Universe. Where the conditions are just right it is a truism to state that if an event can happen, it will happen. What are the right conditions? Firstly there must be a steady supply of energy. The parent star must not be too massive nor too light so that the temperature on the planet will be just right so that, Secondly water can exist in it's liquid phase. The region around a star where this condition prevails is called the ecosphere. If the ecosphere is too narrow, because the star is too light or because it is too cool, there will be a lesser probability of finding a planet in the ecosphere, e.g. Mars is just outside and Venus just inside the Sun's ecosphere.

Nearer to the Sun than the ecosphere water would have turned to steam which would have been blown away by the solar wind. Outside the ecosphere water freezes to ice - the moons of the outer planets are all mostly covered with ice. In the ecosphere water is found as gas (vapour), liquid and solid (ice). Now, the astonishing thing about water is that when it cools down, it shrinks as other substances do, but not all the way to freezing point. It reaches its densest at 4°C above freezing point. Ice therefore forms on top of a lake, while the water below remains at an equable 4°C. Organisms in the water below the ice can therefore survive. If water got denser all the way to its freezing point, ice would sink to the bottom and lakes and seas and oceans would be solid ice with a thin layer on top melting the

day and then freezing over at night - what a skating rink! Jupiter's moon Europa was found by the Voyager space probes to be covered with a layer of ice 70 km thick floating on a global ocean of water 30 km thick. The space probe Galileo corroborated this finding.

Now to get back to the conditions for life to form: The third condition is that the planet must have an atmosphere so that water on the surface does not evaporate away into space, but remains liquid. The atmosphere of the Earth may have been very different in the past when life was first formed. We shall see about that in the next article. Fourthly the axis of rotation of the planet should be between 20 and 30 degrees from the vertical on the ecliptic so that the variations between the seasons are not too great. Four of Sun's planets, Earth, Mars, Saturn and Neptune have inclinations of their axes in this range. Fifthly the mass of the planet must fall in the range 0,4 Earth mass and 2,35 Earth mass in order to, develop a "correct" atmosphere. Sixthly, the period of rotation of the planet must be somewhat less than 96 hours, otherwise the day temperature will rise too high and the night temperature will fall too low. Seventhly, the planet must see to it that the mass of its star is not too great, actually, not more than 1,3 solar masses otherwise its period of residence in the main sequence of the Hertzsprung diagram will be too short, bearing in mind that the Sun has been on the main sequence for five thousand million years. Eighthly, the planet should rather not form around one of a binary star system to avoid temperature complications and to avoid instability of its orbit.

HOW THEN HAS THE EARTH FORMED?

*(See the article next month or watch this space!)*

**Jan Eben van Zyl**

---

## **Solar Eclipse June 21st 2001**

*There are still just a few seats available on one of the Eclipse Flights to Lusaka on the 21<sup>st</sup> June. Ensure your place at the first eclipse of the 21<sup>st</sup> Century by contacting Brian Fraser as shown below..*

Brian Fraser Tel H (016) 366-0955  
W (011) 871-0370  
email: [brian.fraser@macsteel.co.za](mailto:brian.fraser@macsteel.co.za)

---

## The Web Between the Worlds

---

With the cost of even the most basic books spiraling out of reach, the World Wide Web is becoming ever more important as a means of introducing and educating newcomers to the world of astronomy. Bill Ferris created this useful site, I'm sure, with just that in mind. With pages on deep-sky viewing, planetary observation, a glossary and telescope acquisition tips it is a worthwhile site for the beginner or intermediate level enthusiast, and is certainly cheaper than a visit to the local book store.

<http://hometown.aol.com/billferris/>

Star Worlds claims to be "the largest searchable directory of organizations, institutions, associations, companies, and so on, involved in astronomy and related space sciences, together with other entries of interest ( currently more than 6,200 entries with all practical details available and about 6,000 hot links)". It is indeed one of the better astronomy related search engines, and includes a number of local entries that are of particular interest.

<http://cdsweb.u-strasbg.fr/~heck/sfworlds.htm>

It has been nearly 30 years since the last large-area near-infrared survey of the sky was carried out. The Two Micron Sky Survey (TMSS;

Neugebauer & Leighton 1969) scanned 70% of the sky and detected ~5,700 celestial sources of infrared radiation. Since that time there has been a revolution in the development of infrared detector technology. New, large format, sensitive array detectors can now detect astronomical objects over 100 million times fainter than those detected in the TMSS.

<http://www.ipac.caltech.edu/2mass/>

Databases always have their uses. Here are a couple that members of ASSA have found particularly useful. I wasn't impressed with NED's retrieval form, but it seems adequate for the task at hand. The Digitized Sky Survey comprises a set of all-sky photographic surveys in E, V, J, R, and N bands conducted with the Palomar and UK Schmidt telescopes

<http://stdu.stsci.edu/dss/>

NED is built around a master list of extragalactic objects for which cross-identifications of names have been established, accurate positions and redshifts entered to the extent possible, and some basic data collected.

<http://ned.ipac.caltech.edu/>

**Evan Dembskey**

---

## Delta Scorpii

From: Sebastian Otero [SMTP:varsao@fullzero.com.ar]  
 Sent: Tuesday, February 13, 2001 7:22 AM  
 To: vsnet-chat  
 Subject: [vsnet-chat 4076] IBVS# 5026

Dear friends:

You may find an IBVS on delta Scorpii at

<http://www.konkoly.hu/cgi-bin/IBVS?5026>

It was written by Chris Lloyd, **Brian Fraser** and myself.

Best regards,  
 Sebastian.

---

## Finding names for dazzling stars

MEDIA RELATIONS OFFICE  
JET PROPULSION LABORATORY  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
PASADENA, CALIF. 91109 TELEPHONE (818) 354-5011

<http://www.jpl.nasa.gov>

FOR IMMEDIATE RELEASE: February 7, 2001

### *WHY DAZZLING STARS ARE GIVEN BORING BUT USEFUL NAMES*

---

Of the 100 billion stars in our Milky Way galaxy, only a handful have colorful names, while the rest are designated by letters and numbers that are the stellar equivalent of a Social Security card.

The colossal task of naming stars lies with the International Astronomical Union, an organization of professional astronomers that is the only internationally recognized authority for assigning names to celestial bodies. Scientists and space agencies worldwide recognize and use its names.

With a few exceptions of stars whose heritage is rooted in ancient nomenclature, celestial bodies are named with mundane catalogue numbers based on their positions in the sky. These names, like PSR0531+219, may not sound very romantic, but astronomers say it's the only way they can keep track of the stars and find them again. As modern technology enables scientists to detect more stars, the International Astronomical Union updates its catalogue.

"With more stars needing names, astronomers have been running out of numbers, so it has been necessary to add digits, just as phone companies add new area codes as the population grows," said Dr. Rolf Danner of NASA's Jet Propulsion Laboratory, Pasadena,

Calif. Danner is a scientist with NASA's Origins Program, a series of missions to study the formation of galaxies, stars, planets and life. One Origins mission, the Space Interferometry Mission, will pinpoint the location of stars with greater precision than ever before possible.

Long ago, ancient Arabic astronomers named most of the brightest stars, like Algol and Rigel. Greek astronomers named some, like Sirius, while Romans named others, like Regulus. Stars are also named after the constellation, or area in the sky, where they are found. Astronomers have divided the sky into 88 constellations. The brightest stars in a constellation are named with a Greek letter, starting with alpha for the brightest. For example, the brightest star in the constellation Orion is named Alpha Orionis. Ancient Arabic astronomers called it Betelgeuse.

More information about how stars are named can be found at the International Astronomical Union website at:

<http://www.iau.org/starnames.html>.

More information on Origins is available at <http://origins.jpl.nasa.gov>. JPL manages Origins for NASA's Office of Space Science, Washington, D.C. JPL is a division of the California Institute of Technology in Pasadena.

---

### NEAR SHOEMAKER SURVIVES ASTEROID LANDING

NEAR Shoemaker is still operational after surviving an amazing soft landing on the surface of Minor Planet Eros on 12<sup>th</sup> February. The spacecraft took some remarkable final shots of the Asteroid's surface as it approached its target landing site. Check the NEAR website for up-to-date news.

<http://near.jhuapl.edu/news/>

**MISSION ACCOMPLISHED BY TWIN-TELESCOPE SKY SURVEY**

Date: Fri, 23 Feb 2001 13:50:23 -0500 (EST)

From: NASAnews@hq.nasa.gov

RELEASE: 01-26

After scanning the entire sky and capturing breathtaking and scientifically important images of galaxies, stars and other celestial objects, a pair of infrared telescopes has finished its survey work.

For the past three and a half years, the twin telescopes of the Two Micron All-Sky Survey (2MASS), located in Arizona and Chile, have conducted the first high-resolution digital survey of the complete sky. The successful completion of observations marks a milestone in modern astronomy. For the next two years, data processing will continue for the 24 terabytes of archive data, which is enough to fill more than 2,000 hard drives on the average home computer.

"These telescopes have given us the first detailed global view of our Milky Way galaxy and the galaxies that lie beyond," said Dr. Michael Skrutskie, of the University of Massachusetts, Amherst, 2MASS principal investigator. "The resulting databases and source catalogues are a treasure trove which will be mined for discovery by scientists and the public alike for decades to come." The University of Massachusetts was responsible for the development and construction of the 2MASS telescopes and cameras and managed the collection of survey data.

"The 2MASS telescopes and cameras operated with incredible efficiency and were workhorses for more than a thousand nights," said Dr. Roc Cutri, a scientist at the Infrared Processing and Analysis Center (IPAC) at the California Institute of Technology and NASA's Jet Propulsion Laboratory in Pasadena, CA. "The facilities collected data 99.5 percent of the available time during the mission, and only a few nights were lost due to hardware failures. That's a remarkable record for any astronomical observatory on the ground or in space."

IPAC developed the software system to convert raw digital data from the telescopes into stunning images and catalogues useful to astronomers. IPAC also archives and distributes those data to the public via the Internet, in essence, turning home computers into desktop observatories.

The 2MASS survey is the most thorough census ever made of our Milky Way galaxy and the nearby

universe. It detects infrared wavelengths that are longer than the red light in the rainbow of visible colors. Infrared light penetrates dust more effectively than visible light, so it is particularly useful for detecting objects obscured within the Milky Way, as well as the faint heat of very cool objects that give off very little visible light of their own.

To cover the entire sky, 2MASS used two highly automated, 51-inch (1.3-meter) diameter telescopes, one at Fred Lawrence Whipple Observatory on Mount Hopkins, AZ, the other at the Cerro Tololo Inter-American Observatory in Chile. The Arizona telescope began operations in June of 1997, while the Chilean telescope began scanning the sky in March 1998. Both facilities completed their work on Feb. 15.

Catalogues containing more than 300 million stars and galaxies extracted from the images have begun to yield significant astronomical discoveries, and will provide an invaluable reference frame to steer NASA's Space Infrared Telescope Facility (SIRTF), scheduled for a 2002 launch, and other future infrared space missions.

The survey has:

- \* Uncovered numerous stars with such unique characteristics that astronomers have had to update a century-old classification system of known types of stars, and also unveiled the coolest brown dwarfs, or failed stars, known to date;
- \* Detected previously unknown galaxies seen behind the disk of our own Milky Way;
- \* Mapped new star-birth regions both in our Milky Way and in other galaxies; and
- \* Discovered many new, dust-obscured active galaxies and quasars in the distant reaches of the universe that were missed by earlier surveys that used visible and ultraviolet light.

A sampling of 2MASS images is posted at:

<http://www.ipac.caltech.edu/2mass/gallery>

Additional information about 2MASS is available at:

<http://www.ipac.caltech.edu/2mass> and at:

<http://pegasus.astro.umass.edu/GradProg/2mass.html>

## Variable of the Month

### S Carinae

The constellation of Carina is one of those left over from the carving up of the ancient constellation of Argo Navis. It contains many interesting objects - Canopus the second brightest star in the sky, eta Car that enigmatic nova-like object that, 150 years ago, was second only to Sirius in brightness.

One of the brightest Mira type variables, S Car lies not far away from eta. In fact if you are looking in that area with a pair of binoculars they just about lie in the same field of view.

S Car has a period of about 149 days and varies from magnitude 6.9 down to about 11.0. When it is bright it is easy and interesting to follow as it has a number of quite convenient comparison stars in the vicinity.

**Brian Fraser**

### The Hunter and the Hare

The Solution

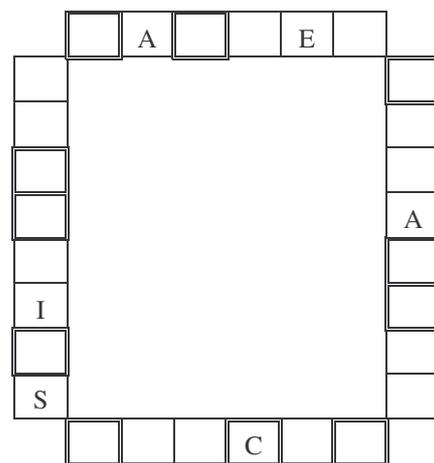
	1	2	3	4	5	6	7	8	9	10
<b>a</b>	E	U	L	A	K	A	T	N	I	M
<b>b</b>	S	M	T	A	N	L	T	A	X	A
<b>c</b>	U	E	D	M	H	N	U	I	F	L
<b>d</b>	E	I	L	E	G	I	R	R	O	I
<b>e</b>	G	S	V	L	O	T	N	A	D	N
<b>f</b>	L	S	F	K	A	A	V	L	E	L
<b>g</b>	E	A	A	L	P	K	I	S	B	A
<b>h</b>	T	B	L	J	H	P	I	A	S	H
<b>i</b>	E	E	H	I	Q	S	X	I	A	I
<b>j</b>	B	E	N	R	A	R	T	F	Z	G

The 11 Star names are:-

a10-a4 Mintaka	h2-b2 Bassiem
a8-j8 Nair Al Saif	a6-g6 Alnitak
h9-h5 Saiph	j1-b9 Bellatrix
d7-d3 Rigel	g10-a10 Alniam
e7-a3 Nihal	j5-j1 Arneb
j1-a1 Betelgeuse	

**Gill Stewart**

### The Zodiac



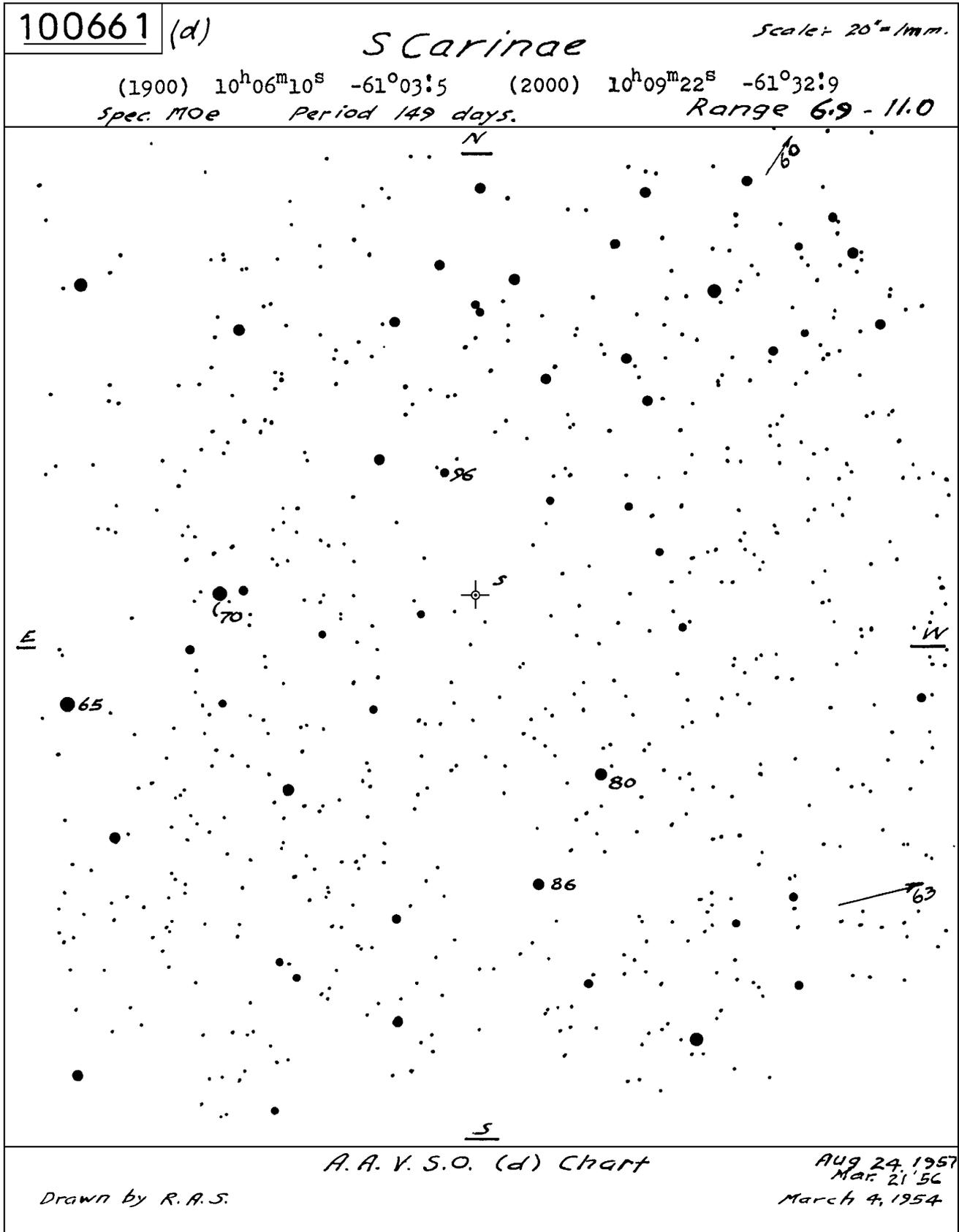
	A			I				U	
--	---	--	--	---	--	--	--	---	--

In the blocks across and down, write the names of four well known constellations,

Then taking the letters in the blocks with the double outline, work out a 5<sup>th</sup> constellation and write it in the blocks below the puzzle.

NOW - *be really **bold*** and submit your answer to the editor before the 20<sup>th</sup> of March for it to be included in the next issue of Canopus.

## Star Chart for Variable of the Month



Star Chart courtesy of the AAVSO Website

<http://www.aavso.org>

# The Sky this Month

## March 2001

dd hh	dd hh
1 18 Saturn 2.1 N of Moon	18 19 Pluto stationary,
2 08 Jupiter 2.9 N of Moon	20 08 Neptune 2.2 N of Moon,
3 02 FIRST QUARTER	20 10 Moon at apogee,
3 20 Mercury greatest brilliancy	20 13 Equinox,
4 15 Mars 5.5 N of Antares	20 20 Mars 10.2 S of Pluto,
7 10 Venus stationary	21 13 Uranus 2.5 N of Moon,
8 06 Moon at perigee	22 18 Mercury 2.1 N of Moon,
9 17 FULL MOON	25 01 NEW MOON,
10 07 Mercury 0.2 N of Uranus	25 05 Venus 14.4 N of Moon,
11 12 Mercury greatest elong. W(27)	29 04 Saturn 1.8 N of Moon,
15 20 Mars 2.0 S of Moon	29 21 Jupiter 2.5 N of Moon,
16 21 LAST QUARTER	30 05 Venus in inferior conjn.

## April 2001

dd hh	dd hh
1 10 FIRST QUARTER	17 19 Venus stationary
5 08 Moon at perigee	17 23 Uranus 2.9 N of Moon
6 22 Mercury 10.0 S of Venus	20 20 Venus 9.5 N of Moon
8 03 FULL MOON	23 08 Mercury in superior conjn.
13 02 Mars 1.4 S of Moon	23 12 Mercury 4.5 N of Moon
15 15 LAST QUARTER	23 15 NEW MOON
16 14 Jupiter 5.1 N of Aldebaran	25 15 Saturn 1.6 N of Moon
16 16 Neptune 2.6 N of Moon	26 13 Jupiter 2.1 N of Moon
17 06 Moon at apogee	30 17 FIRST QUARTER

## LOCAL TIMES of RISE and SET for the MAJOR PLANETS - 2001

Site Location:- Long. **+28.0** deg. Lat. **-26.0** deg.

Local Time:- UT **+2.0** hrs.

Date	Sun		Mercury		Venus		Mars		Jupiter		Saturn	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
Mar 02	06.03	18.37	04.10	17.15	08.42	20.00	23.07	12.38	12.13	22.55	11.34	22.30
Mar 12	06.09	18.27	04.04	17.07	08.07	19.17	22.46	12.20	11.39	22.20	10.58	21.53
Mar 22	06.13	18.16	04.20	17.09	07.13	18.25	22.23	12.01	11.06	21.46	10.23	21.17
Apr 01	06.18	18.06	04.48	17.15	06.07	17.30	21.59	11.40	10.34	21.13	09.48	20.41
Apr 11	06.23	17.55	05.25	17.25	05.04	16.42	21.33	11.16	10.03	20.41	09.13	20.05
Apr 21	06.27	17.46	06.15	17.40	04.16	16.05	21.04	10.49	09.33	20.09	08.39	19.30