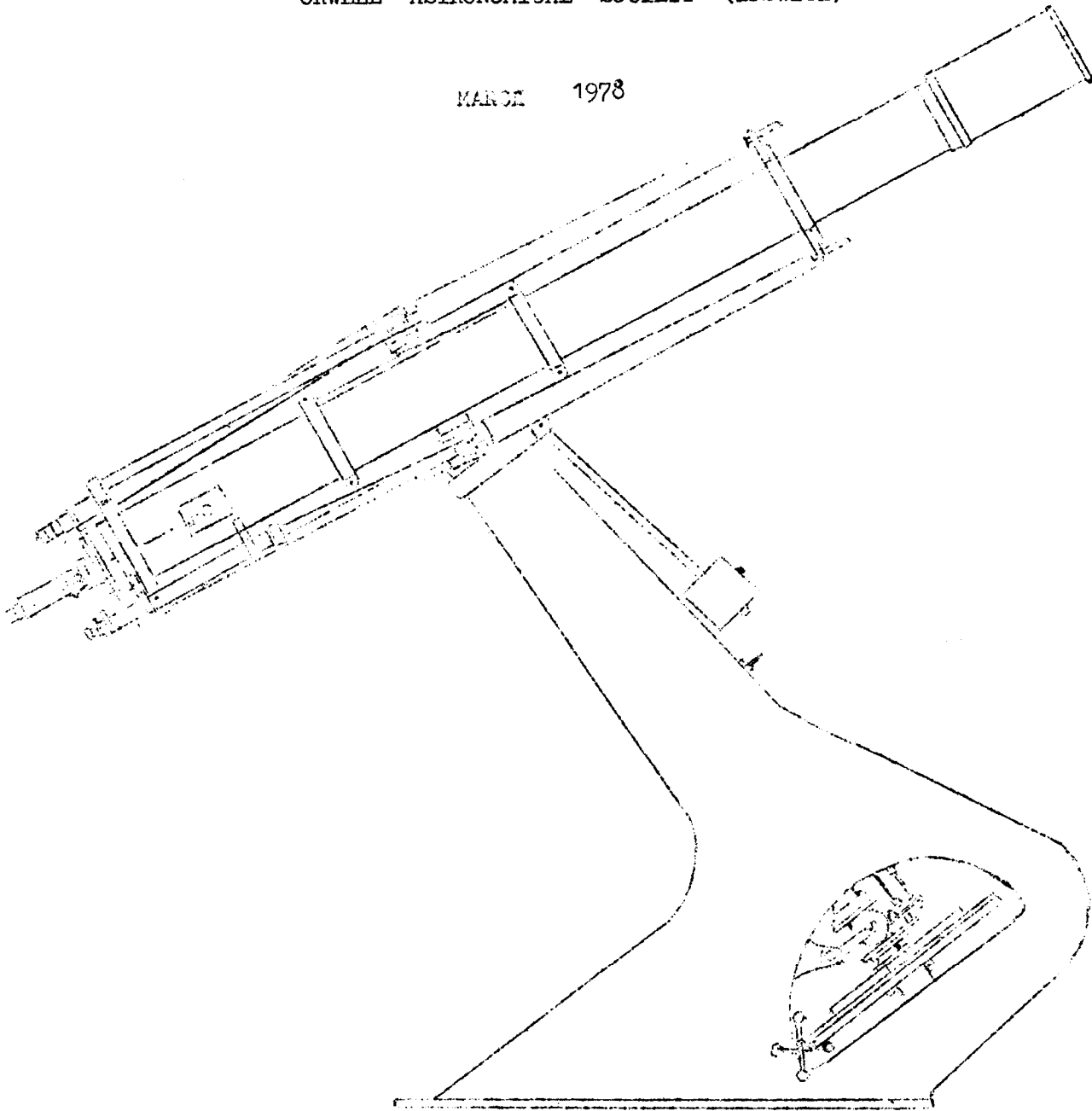


JOURNAL OF THE
ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

MARCH 1978



Editor: Mr. Mark Howe,
[REDACTED],
BURY ST. EDMUNDS,
Suffolk.
'Phone Bury St. Edmunds [REDACTED]

THE NIGHT SKY as seen from Orwell Park in March.

Leo dominates the Southern aspect this month; Gamma Leonis, about 8°N of Regulus, is an easy telescopic double of magnitudes 3 and 4. The Plough is in the zenith at midnight. Below Leo are two rather obscure constellations, Sextans the Sextant and Crater the Cup. The latter does, however, with a little imagination, look like a goblet tilted towards the East.

THE SUN

Sunrise and Sunset this month are at 07h40m and 1800 respectively, the Sun passing from Aquarius to Pisces during the month.

THE MOON - Phases

Last Quarter	Mar	2d08h34m
New Moon	Mar	9d02h36m
First Quarter	Mar	16d18h21m
Full Moon	Mar	24d16h20m
Last Quarter	Mar	31d15h11m

Occultations

star	Phase	Mag.	Time
475	} all disappearance	7.4	13d21h02.4m
618		7.2	14d22h27.4m
741		5.7	15d20h25.0m
878		5.5	16d20h17.2m
896		7.4	17d00h28.0m
1147		5.1	19d00h06.0m
1145		6.7	19d00h25.7m*
1364		6.5	20d22h31.7m
1465		6.3	21d21h55.8m
1468		4.9	21d23h25.2m

* denotes time is correct for latitude and longitude of Greenwich. Stars listed according to Zodiacal Catalog (ZC) nos.

THE PLANETS

Mercury should be well seen (relatively speaking) this month, reaching elongation 19° on Mar 24. Mercury will be 1.3°N of Venus on the 12th. and 4°N of it on the 28th.

Venus is becoming visible again in the Western skies after Sunset, 10° away from the Sun and at mag. -3.4. Through a telescope it will appear nearly circular (phase defect 0.013) - take great care when observing near the Sun.

Mars has approximately zero magnitude this month, still in Gemini.

Jupiter is decreasing in magnitude (-2.0 to -1.7) in Taurus.

Saturn is in Leo close to Regulus, The contrast highlighting the yellowish colour of Saturn.

COMET SCHWASSMANN-WACHMANN

	R.A./h,m,s	Dec./°,'
Mar 3	4,54,19	29,44.2
13	4,57.32	29,32.8
23	5,01,49	29,23.5

Chiron (Object Kowal)

The present state of our knowledge about this object (which has been designated a minor planet) is approximately as follows:

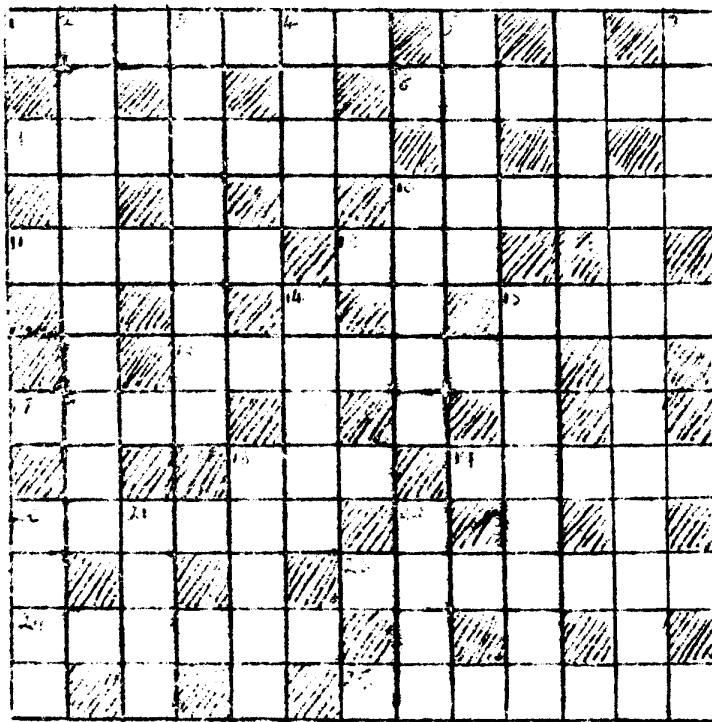
Orbit: perihelion distance 8.51 AU (just inside the orbit of Saturn), aphelion distance 18.89 AU (just inside Uranus' orbit), eccentricity 0.379, inclination 7°, period of revolution 50.7 yrs.
 Diameter: of the order of 10² km.
 Albedo: unknown.

Further information on the last two points should become available by the 1990s, when Chiron (present magnitude 18) will have brightened up to mag. 14.5.

Women Astronomers. The American Astronomical Society, whose first woman president is Dr. Margaret Burbidge, has announced that no more of its meetings will be held in states which have not ratified the Equal Rights Amendment ~~XXX~~ to the US Constitution. This follows the "severe discrimination against women in astronomy" such as being denied viewing time at observatories "because they are women".

Ultraviolet Astronomy. Ultraviolet (UV) radiation has been detected from stars by the use of a specialised telescope on board the Apollo-Soyuz spacecraft. The significance of this apparently facile observation is that previously it was thought that the amount of interstellar gas in the region of the Sun is too great to allow UV radiation from other stars to reach the Earth. Also, much information about the surface temperature/total energy output relationship of different stars may be gleaned from UV observations, which is important to an understanding of stellar evolution. (Nature-Times News Service)

CROSSWORD - This month we have another crossword of an astronomical nature compiled by Paul Burt of Needham Market.



DOWN

- 2) Earth's axial wobble;
- 3) We are still probing its beginnings;
- 4) All known planets do it;
- 5) And they do it on this axis;
- 6) Nebula in Lyra;
- 7) Animal depicted in two constellations;
- 10) Type of Lunar feature known as Rima in Latin;
- 11) Position of inferior planets relative to Sun;
- 14) Constellation depicting the world's largest animal;
- 15) Member of a well known crater chain on the Moon's central meridian;
- 18) Constellation below Orion;
- 20) You'll find Arc-turus here during Spring evenings;
- 21) Well-known Southern constellation;
- 22) Constellation originally part of Argo Navis.

ACROSS

- 1) Line of sight 'close' approach;
- 8) Exploding fireball;
- 9) A meteor seen in December could be one;
- 10) Early series of Lunar probes;
- 12) Member of the 'Summer Triangle';
- 13) Atmospheric constituent essential for intelligent life as we know it;
- 15) Period of time on an astronomical scale;
- 16) Pertaining to the stars;
- 17) We look through it when observing the heavens;
- 18) Unit of illumination;
- 19) Imaginary Martian feature;
- 20) Comet in Saturn's rings?;
- 23) Type of variable star;
- 24) Inconsp-cuous equatorial constellation;
- 25) Small crater in Mare Imbrium named after 19 Italian astronomer.

Introducing part one of a series about the recent Voyager Mission. The whole has been compiled by Mr. SG Harvey of Needham Market, specially for the OASI Journal, from the latest sources available.

The fact that the Voyagers were launched in 1977 is no coincidence, for the year was picked because it afforded a unique alignment of the outer planets, saving fuel and allowing the Voyagers to pass Jupiter and Saturn quickly and using the 'sling-shot' effect to speed on to the outer planets. The first launched Voyager (Voyager 2, henceforward abbreviated to V2) will take longer to ~~XX~~ reach Jupiter, arriving there on July 9, 1979. The later launching of the second Voyager (V1) affords a more free trajectory through space, and will arrive at Jupiter before V2 - on March 5, 1979, if all goes well.

V1 will fly past the giant planet in such a way as to proceed to Saturn and make a close encounter with Saturn, by far the biggest of Saturn's satellites with a diameter of 3000 miles (4900km) and a mean distance from Saturn of 758 000 miles. The trajectory for V1 is coded as jst (Jupiter, Saturn, Titan). If V1 is successful in its encounter with Titan, the second spacecraft will fly by Saturn in such a way as to continue on to Uranus and perhaps even Neptune. The trajectory for V2 is called 'Jupiter, Saturn, with options'.

The Voyagers, and indeed any spacecraft, for that matter, cannot pass close ~~XX~~ to Titan and continue on to Uranus for one main reason - the orbital planes of Titan and Uranus are too unlike.

The arrival at Saturn of V1 is scheduled for November 12, 1980, and August 27, 1981 for V2. If the flight continues to Uranus, V2 will arrive there on January 30, 1986. It might also be able to reach Neptune about 1990. Thus V2 may get its name into the Guinness book of records as being the longest mission so far - 12 years flying through interplanetary space, covering a distance of 30 AU (4.5 billion km = 2.8 billion miles).

On the approach to Jupiter, the cameras will start photographing the planet about 80 days in advance of the closest approach, ie in December 1978. The spacecraft will also be looking out for hydrogen clouds (Jupiter is thought to contain a large proportion of hydrogen) surrounding the planet and in the orbits of the satellites. The pictures will hopefully contain a great amount of detail, better than the best obtained by Pioneers 10 & 11 in 1973 & 1974. About 8 days before closest approach the whole planet will be surveyed by the wide-angle camera on board, while the narrow-angle (teletphoto) camera concentrates on detailed pictures of specific features (NO points for immediately thinking of our old friend the Great Red Spot) in the Jovian atmosphere.

Once at Jupiter, V1 will flyby within 4.9 Jupiter radii (c. 350 000 km) from the centre of the planet on 1249h UT, March 5, 1979. The spacecraft passes within 415000 km of Amalthea, Jupiter's small innermost planet, and within a mere 22 000 km of Io, innermost of the big Galilean satellites. It will fly almost parallel to Io's orbit, slightly below for about 5 hours, thereby showing us the South Polar region of Io. Shortly after that the spacecraft will be occulted by Jupiter. After ~~XXX~~ emerging from the planet's disk, V1 will pass within 700 000 km of Europa, make a close pass by Ganymede and finish up exhausted (wouldn't you be after all that?), passing by Callisto at about the same distance.

After these close approaches, the spacecraft will observe Jupiter for about another month until just before the other spacecraft is due to arrive, and V2 starts its observations of the planet.

V2's encounter is slightly different in that the craft must fly further away from the planet in order to preserve the option to fly to Uranus. V2 will start photographing Jupiter in April 1979, about days before the closest approach (10 Jupiter radii) on July 9, 1979 at 23.00h. V2 will then pass by Callisto, make a very close approach (55 000 km) to Ganymede, and finally pass on to Europa. At the end of it all we should have more or less complete pictures) and thus maps - of the two satellites Ganymede and Callisto. Amalthea will be passed at a distance of half a million km, but since this satellite is so close to Jupiter as to be difficult, if not impossible, to observe from Earth, the Voyager photo's will be important even if they are from a reasonably large distance. V2 is occulted by Jupiter on its way out from close approach.

SG Harvey

EXO BIOLOGY pt. 9

Present Attempts at Contact

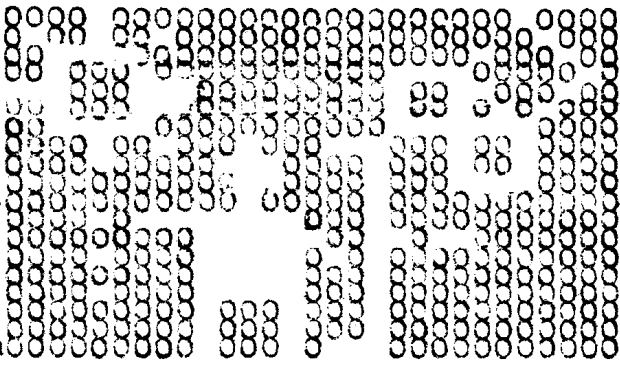
As far as the present is concerned we are rather severely limited: we cannot yet travel to the stars (conveniently) anyway), even though space travellers such as Neil Armstrong are erroneously termed 'astronauts'. Optically, there isn't much we could do (even the Sun isn't bright enough to be visible at the distance of the nearest likely civilization). Radio is a possibility which has already been used, although without success.

Signals broadcast from a transmitter will travel much farther if they are beamed, ie directed at one locale, than if they are broadcast over the whole sky. Hence before we can make contact with an alien race we must discover where it is most likely to be found. This has already discussed in the previous section, and if we apply these 'standards' to the stars which are closest to us, we find only a few which might be suitable. Out of the twenty closest stars only three of them are similar to the Sun and they are called Epsilon Eridani, Epsilon Indi and Tau Ceti.

In 1960 Frank Drake started 'listening in' to Tau Ceti and Epsilon Eridani, using the 85-foot, radio telescope at Green Bank, West Virginia. The attempt was officially called Project Ozma, but nicknamed 'Project Little Green Men'. Drake analysed the data but found no evidence of regularity suggesting the presence of intelligent life. Since then no noteworthy attempts have been made to transmit or receive such signals.

It is very possible that in future other such schemes will be begun, and the content of the possible transmissions has been a subject of great discussion. Perhaps it will be something like the one below, in which a series of pulses might be sent to represent circles and spaces, and then set out by the receiver as it is shown (the only way you can arrange 551 dots into a rectangle is into 19 rows of 29 signals or 29 rows of 19 signals). Unfortunately this is not a very good example, as witness my comments (in brackets).

"A notional television picture of 19 lines, each consisting of 29 signals. It evidently shows a being (robot?) who, as the Pythagorean diagram (some kind of native robot bird?) indicates is intelligent and numerate. He is pointing to the innermost of three planets, presumably his home (he is pointing to the last drop coming from a prickly fruit: he is dying of starvation). The marker to the right probably indicates his height, and the symbol 1011 (?) may be a binary number. If so, it probably reads towards the left (why?) and stands for 13. The being's height is perhaps equivalent to 13 wavelengths of the frequency of transmission (the robot's height is perhaps equal to 13 prickly-fruit diameters)."



What are the chances that we will be lucky and find a suitable civilization which wishes to make contact? In answering this we must not forget that such a society might get bored with sending signals to other stars if they did so for a long time without getting any positive results. It has also been speculated that there could be a sort of Galactic Civilization which forbids member ~~XX~~ races to contact societies which have not yet 'matured', in which case we would be certain to be unsuccessful in our attempts. It would seem fairly likely then, that a civilization might only try to make contact with others for, say, a hundredth or a thousandth of its lifetime.

We might make an estimate of the number of civilizations trying to make contact with others as being about 50 000. Put in another way, the distance of the nearest broadcasting extra-terrestrial life would be approximately 1000ly. We might be well advised to look for another means of making contact!

CROSSWORD SOLUTION

- Across: 1) Appulse; 8) bolide; 9) Geminid; 10) Ranger; 12) Deneb; 13) Air; 15) aaeon; 16) stellar; 17) time; 18) lux; 19) canal; 20) Encke's; 23) Cepheid; 24) Scutum; 25) Carlini.
 Down: 2) Precession; 3) universe; 4) spin; 5) polar; 6) Ring; 7) near; 10) rille; 11) elongation; 14) Cetus; 15) Arzachel; 18) Lepus; 20) East; 21) Crux; 22) Vela.

* * *

Calling All Budding Science Writers!!!!

This is your chance to make a name for yourself as a purveyor of glwing astronomical information to the general public! All you have to do is write something of a vaguely astronomical nature and send it in to me at the address on the front cover. The article may be, for in stance, about an astronomical observation you or a friend have made, a problem you have (astronomical in nature, please, this is not Claire Rainer's column!), a recent development in astronomy or a book about astronomy you have read (recently) - or even about whether Tolly Cobbold beer is as good as Greene King's, ~~XXXXXX~~ as long as you can give it an astronomical angle. Articles to reach me by the 15th. of the month prior to publication, please.

THE LOCAL SYSTEM

(As described by Patrick Moore on 'The Sky at Night' Wednesday 8th February, 1978)

by Paul Burt.

The local cluster of galaxies, known as 'The Local System', in which our own Milky Way is situated, consists of about 24 galaxies within an area over 2million light years across. The system is dominated by two giant spiral galaxies, M31 in Andromeda and the Milky Way, 150,000 and 100,000 light years across respectively.

The medium sized members include M33 in Triangulum, which is a patchy spiral galaxy about one-sixteenth the size of M31, and the Magellanic clouds. The latter are no longer thought to be satellites of the Milky Way, but galaxies in their own right, making a close approach. The SMC is an irregular galaxy one-sixteenth the size of the Milky Way, and the LMC is possibly a barred spiral $\frac{1}{4}$ the size of the Milky Way. Both these galaxies are rich in interstellar gas, and there is a band of this gas some 200,000 light years long connecting them to the Milky Way and extending beyond.

Clustered around the three spirals, M31, M33 and the Milky Way, are the dwarf irregulars and ellipticals, the most common types of galaxy, and also the smallest and sparsest. An astronomer on a planet in one of these dwarf galaxies may have as few as three stars to observe in his sky!

Clusters of galaxies are themselves believed to be clustered into groups of 3 or 4, these 'superclusters' being up to 180 million light years across. Our Local System is a comparatively small cluster and is probably part of a supercluster in Virgo, 65 million light years away.

These giant clusters (there is another in Hercules) may be the building blocks of the universe, and by studying our Local System we can further our knowledge of the formation and evolution of the Universe.

Paul Burt.

SPACESHUTTLE by Wayne Brieske.

The Spaceshuttle is N.A.S.A.'s first reusable space vehicle. The Space Agency has plans for more than five hundred shuttle flights. The N.A.S.A. scientists are racing against time because they wish to send it up to save Skylab which is gradually falling to the Earth. The Spaceshuttle will be sent up into orbit and it is hoped that it can get near to Skylab and with an extendable arm from the Shuttle will push Skylab back into a safe orbit. The 117feet long, 10 ton Skylab can then be used by more astronauts on future missions.

In August this year Cape Canaveral will have the external propellant tank and booster attached to the Spaceshuttle for its maiden flight with a two man crew next year.

Rockwell International Space Division was awarded \$2000 million because in 1972 Rockwell had plans to design, develop and build two orbiters (Spaceshuttle) along with structural and propulsion specimens. When the orbiter reenters the atmosphere the air frame(or outside body of Spaceshuttle will reach a temperature of 1100 to 1600°C

WHAT IS IT! by R.M. Cheesman

In the middle of October Mrs. Cheesman (thats the wife) said 'why do'nt you clear up the rubbish in your garage.' It seemed a bit sad to chuck all this lovely rubbish away so I put it in one big heap in the middle of the garage to see what was in it of interest.

There was: a dining room table top; a plastic table top. a couple of old radios; a childs cot; electric date stamp; old water pipes; a matchbox motorway game; a ball-cock out of an old oil tank; some old tins of black paint; 200 yards of electrical wire; and so the list went on and on and on and on, etc.,

It seemed an awful waste to chuck all these goodies away so again they went back into their various hiding places where the wife would not notice them, while I thought of what to do with them.

An idea struck me and talking to various members of the Society about my plans was greeted with - impossible, never on a month of Sundays and other abuse. With this encouragement I started and nearly 600 hours later finished it. It has not been seen completely by anybody (not even me) but your chance is on Wed. 8th March 7p.m.
(see Programme for March '78)

by C.F. Radley

As well as receiving the Orwell Astronomical Society Journal you may have considered buying one or more of the lavish national or American magazines. It can be a problem choosing which of the wide variety to subscribe to. This article reviews some of the better astronomy magazines in an effort to help your decision.

Unfortunately there is not one astronomy magazine as such available off the shelf at newsagents or book shops, yet..... However some more general magazines are available that way:

New Scientist is weekly and can be seen on newstands, it usually contains one or two astronomy items.
The same applies to Scientific American which is monthly.
Flight International is a weekly magazine which has regular "Spaceflight" feature.

The specialist astronomy magazines are on the whole available by subscription only.

1. The British Astronomical Association publish a bi-monthly Journal. Circulars are also published every four weeks to cover unpredictable discoveries etc. The Handbook is annual and gives complete predictions for the coming year. If you join the B.A.A. you automatically receive the Journal and the Handbook. For an extra £1 you can receive the Circulars. Non-members can buy the Handbook for £1.50 from the B.A.A. The Journal contains reports of the observing sections and in-depth review articles, many of a historical nature. The B.A.A. is rather expensive at about £10 per year depending on age etc. If you are seriously interested in joining write to :- The Assistant Secretary,
British Astronomical Association,
Burlington House,
Piccadilly,
London W1V 0NL

2. Britain's popular astronomy magazine Hermes is published by the Junior Astronomical Society (J.A.S.). The J.A.S. also publish eight Circulars per year, while Hermes is quarterly. J.A.S. members automatically receive both of them. J.A.S. also give cheap rates for Sky and Telescope which is reviewed below. The J.A.S. is excellent value for money at £3.20 per year (£2.80 for under 18's) For FREE leaflet write to:-
The J.A.S. Secretary,
[redacted], Ilford,
Essex. IG1 3PD

3. Sky and Telescope is the world's largest astronomy magazine, published in the U.S.A. Monthly it contains innumerable photographs and drawings mostly in colour. It has many star charts, diagrams and tables of predictions. There are two ways to receive this magazine -
a) Direct from the U.S.A. Send an international money order made out to "Sky Publishing Corp" to :-
The Sky Publishing Corporation,
49-50-51 Bay State Road,
Cambridge,
Mass, 02138,
U.S.A.

The subscription is \$ 17.50 for one year, \$33 for two years.

b) The cheapest way of buying Sky and Telescope is via the J.A.S. (see above) which is effectively the British agent. You still receive the magazine by direct air mail from the U.S.A., although you usually receive your first copy one month late simultaneous with your second copy since they are posted monthly. After that they are all straight off the press.

The current J.A.S. rate of £3.15 for one year, and £15.10 for two years. Due to the strengthening pound these prices will fall by a few shillings in a few weeks time. Details will be announced in the J.A.S. Circulars which are sent to our Orwell Observatory. Send cheque/P.O. made out "Junior Astronomical Society" to :-

Guy Fennimore, [redacted],
West Bridgford, Nottingham, NG2 6JE.
Tel. [redacted]

4. Finally, The Astronomer is Britain's leading magazine for active amateur observers. It is monthly and always right up to date. It contains predictions for comets, asteroids, special occultations etc. Its subscribers send observing reports to the editor who formats and prints them. It is an excellent way of keeping in touch with the latest happenings in the sky. The Astronomer runs a photographic nova patrol, which already has discovered one nova. Nova Sagittae 1977. For the monthly magazine send 30p for one sample copy or £4 for a full year subscription to the address below. For an extra £2 you can join the Astronomer Early Warning Circular Service which gives you star charts and other details of important developments within a few days of their discovery. They also have a telephone service! Speed is their motto.

Address: The Astronomer,
[REDACTED],
Earls Barton,
Northampton, NN6 0PP

At the meeting of the Society's Committee on Friday 3rd February it was decided to continue with our subscriptions to:

The British Astronomical Association	(B.A.A. Handbook)
The Junior Astronomical Society	(Hermes)
The Astronomer	(The Astronomer)

in addition to the above authority was given to subscribe to:

The Astronomer Early Warning Circulars
The Sky & Telescope.

All these magazines will be sent direct to the Observatory and will be in the current magazine rack before being filed in the Library.

The Society also receive editions of other Societys' magazines which will also be in the magazine rack/Library.

NOTE: All current editions of magazines in the rack are ~~not~~ for loan until they are filed away in the Library.

Notes by C.F. Radley.

Ian Ridpath is an up and coming freelance journalist who writes on matters pertaining to astronomy and spaceflight. He started off as editor of the J.A.S. magazine "Hermes" and he is still one of their main contributors and he also contributes on a freelance basis to "New Scientist" on astronomical and spaceflight matters. More recently he has published two popular books; the latest "Signs of Life" deals with the possibilities of other life in our galaxy. Ian tells me another of his books will be appearing on bookstalls in July. Ian also published an astronomy annual "Stars and Space 1977". Unfortunately "Stars & Space 1978" was not published but he still hopes for a "Stars and Space 1979". From time to time you will hear Ian's voice on B.B.C. radio, he advises them on spaceflight and related topics.

Having introduced our speaker I will now introduce his lecture subject;-

In 1961 the late U.S. President John F. Kennedy made an historic speech, defining the first goal for his space programme....."I believe that this nation should set itself the goal, before the end of this decade is out, of landing a man on the Moon and returning him safely to the Earth." Kennedy was martyred and to restore national pride at falling behind the Russians in space, Project Apollo was born.

Apollo did not land one man on the Moon, it landed twelve! Also it put another eighteen in Lunar orbit. Kennedy's deadline was beaten by five months. Since Apollo we have seen Skylab and soon we will see the Spaceshuttle.

However, travel to other stars still seems a fantasy..... or does it? As early as 1949 the British Interplanetary Society, under Arthur C. Clarke and Ken Gatland, had designed a rocket fully capable of reaching the Moon; they were ridiculed. Yet after Kennedy defined the goal it only took eight years to build and launch that rocket!

Ian Ridpath will show us that history seems to be repeating itself. For the British Interplanetary Society have now designed an unmanned space probe capable of reaching Barnard's star, which is six light years away. 'Project Daedalus' is the name of this plan. Daedalus could be built tomorrow, we already have the fundamental technology. The catch is a small matter of 100,000,000,000 dollars, ten times the cost of Apollo.

Eventually Daedalus - or a version of it will be built, probably as an international undertaking. We already have four space probes heading out of our Solar System, Pioneers 10 & 11 and Voyagers 1 & 2. But they will take millions of years to reach another star, because they were launched by ordinary chemical rockets; slow and inefficient.

The key to Daedalus is its Nuclear Fusion Rocket propulsion system. Fusion is basically a controlled hydrogen-bomb, similar to the power supply of the Sun and the stars.

The Daedalus rocket would use lasers to detonate pellets of deuterium (mini H bombs) at a rate of one a second. This way the rocket could rapidly build up a speed equal to one-tenth the velocity of light, hence taking sixty years to reach Barnard's Star which is six light years away. Daedalus would flyby the star relaying back scientific information to Earth. After that Daedalus would be discarded, being a one-way unmanned probe. Barnard's Star is interesting because it is the only star, other than the Sun, known to have planets, and is quite close to our Solar System. Daedalus would revolutionise astronomy in the same way as the planetary space probes of recent years.

But I have gone on long enough! Come to The Friends Meeting House, Fonnereau Road, Ipswich at 8p.m. on Friday 17th March, to hear and see Ian Ridpath tell us the whole story.

Charles Radley.

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

Programme for March, 1978.

TUESDAYS from 8p.m. Planetary Section.

Director: Mr. J. Deans, [REDACTED], Capel St. Mary, Phone GT. WENHAM [REDACTED]
and Mr. J. Hood [REDACTED], Ipswich.

7th March
21st "

WEDNESDAYS from 7p.m. Astronomy for Beginners:

This month's meeting on 8th March will be the first showing of the home-made 'Cheesman Planetarium' and the subject of this showing will be 'The night sky as seen from Ipswich throughout the year'.
(programme number one) NOT TO BE MISSED!!

WEDNESDAYS from 7p.m. Solar, Lunar & Planetary Section.

Director Mr. R.M. Cheesman, [REDACTED], Ipswich.

1st March
15th "
22nd "

THURSDAYS from 8p.m. Double Stars Section

Director Mr. D. Bearcroft, [REDACTED], Ipswich, Phone [REDACTED]

2nd March
16th "
30th "

FRIDAYS from 8p.m. Variable Stars Section

Director Mr. R.S. Manning [REDACTED], Ipswich, Phone [REDACTED]
and Mr. M. Siggers, [REDACTED], Ipswich

VISITS TO THE OBSERVATORY organised by Mr. R.M. Cheesman.

WEDNESDAY 1st March at 8p.m. Friendship Club (C)
SATURDAY 18th " at 7p.m. St. John's Cadets (B)
SATURDAY & SUNDAY 25th & 26th March from 8p.m.
East Anglian Caravanning & Camping Clvb (C) (C)

OTHER MEETINGS

FRIDAY 17th March at 8p.m. at the Friends Meeting House, Fonnereau Road, Ipswich illustrated talk by
I. RIDPATH on 'JOURNEYS TO THE STARS'

METEOR SECTION

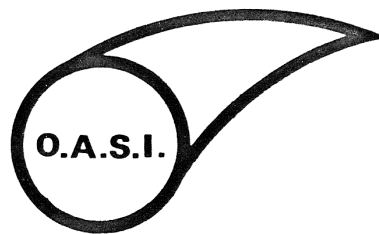
Director Mr. D. Barnard [REDACTED], Ipswich Phone [REDACTED]

SPORADIC METEOR COUNT on SATURDAY 11th MARCH. Meet OUTSIDE the Golf Hotel, Foxhall Road at 8 p.m. irrespective of weather conditions.
Everybody and anybody welcome to come along!.

TWO DATES NOT TO BE MISSED!

Wednesday 8th March from 7p.m. at the Observatory
and

Friday 17th March at The Friends Meeting House. at 8p.m.



Orwell Astronomical Society (Ipswich)
presents
a lecture entitled

JOURNEYS TO
THE STARS

by

Mr. I. RIDPATH

on

FRIDAY 17th. MARCH 1978

at 8p.m.

at

The Friends Meeting House
Fonnereau Road, Ipswich

REFRESHMENTS

ADMISSION FREE

Secretary: Mr. M. Stow,
13 Ladywood Road,
Ipswich.