

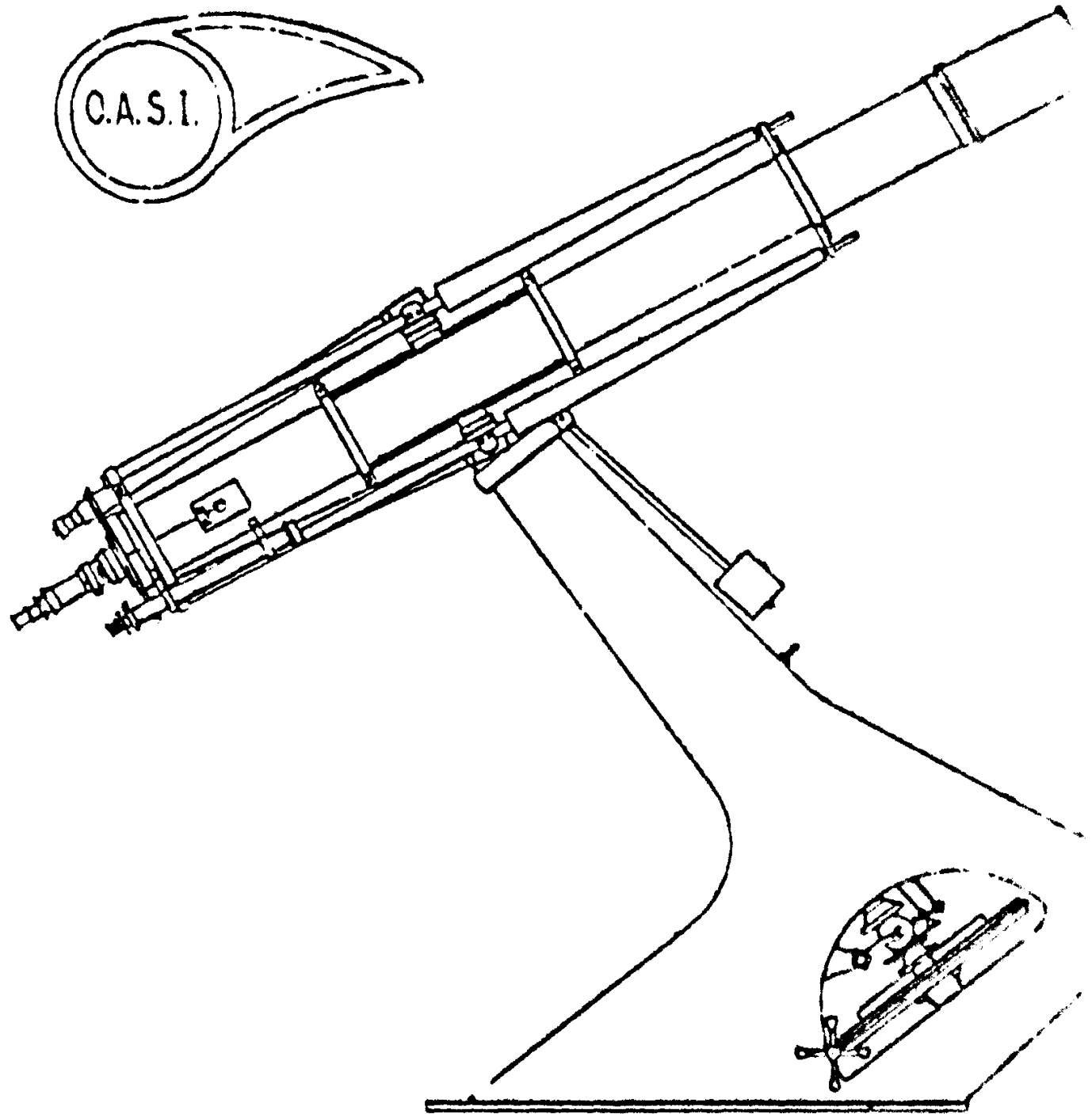
THE JOURNAL OF THE ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

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Your submissions of items for the Journal will be welcome.

AUGUST 1979.



The Orwell Park Observatory 10-inch Astronomical Telescope at Hacton near Ipswich

The conspicuous ⁱⁿ ~~the~~ ^{ness} of Cygnus dominates the zenith this month, surrounded by Draco and Cepheus to the north; Pegasus to the east; Delphinus, Sagitta and Aquila to the south; and Lyra to the west. Aquarius is well above the south-eastern horizon by late evening, with Capricornus just to the south of it. The western sky is filled by Ophiuchus, Hercules and Bootes, while over to the north-east Perseus and Cassiopeia are becoming prominent. And of course the Milky Way is at its glorious best at this time of year, sweeping right across the sky through the zenith.

THE SUN

Sunrise is at 04h20m at the beginning of the month, changing to 05h10m at month-end. Sunset changes from 20h00m to 18h50m. The Sun moves from Cancer to Leo during the month.

There is an annular eclipse of the Sun on August 22nd, visible only from parts of South America and Antarctica, sorry to say.

THE MOON - Phases (August)

First Quarter	1d05h57m	Last Quarter	14d19h02m
Full Moon	8d03h21m	New Moon	22d17h10m
		First Quarter	30d18h09m

Occultations

Star	Phase	Mag.	Time	
*2280	D	6.8	2d22h29.7m	D = Disappearance
2571	D	6.9	4d22h40.9m	R = Reappearance
405	D	4.4	14d00h39.3m	* denotes double star.
405	R	4.4	14d01h41.2m	Stars listed according to
*675	R	5.7	16d01h03.2m	Zodiacal Catalog (ZC) numbers.
678	R	5.5	16d01h18.4m	
682	R	6.0	16d01h55.0m	
806	R	5.1	17d01h46.8m	
820	R	6.0	17d03h20.7m	
*2223	D	4.0	29d19h59.5m	

Grazing Occultation

Star	Mag.	Limb	Time at start of track
*671	3.6	N	16d00h03m

The track begins just north of London, and travels about 20 miles north of Ipswich, and through Lowestoft. From data on computer readout, it can be seen that the track passes through Great Yeldham; 1 km SE of Long Melford; 1 km SE of Lavenham and about 2 km SE of Stowmarket. This is the 'delta sigma' track, for graze of the mean lunar limb. Mr. Alan Smith is in charge of an observation project in which some O.A.S.I. members will take part, and has experience in estimating the best amount of deviation (in the correct direction) to make for using gaps in lunar features - and finding what features - to give best results in timing the ACTUAL event. The details from us and other observers are fed-in with cloud permitting, on the actual times along the track some, to comparison calculations with the estimated ones in constantly - month by month - monitoring of the Moon's position to help keep and improve the accuracy of our Ephemerides and tide tables.

THE PLANETS

Mercury is at greatest elongation west of 19° on the 19th, at mag. +0.1, and will be rising about an hour-and-a-half before the Sun from then until the end of the month.

Its magnitude will brighten to -1.0 by the 30th, when it will be $0^\circ.7$ N of Jupiter.

Venus is at superior conjunction on the 25th, and will not be visible this month.

Mars will be rising at around 0000h this month, moving from Taurus to Gemini at mag. +1.5.

Jupiter is in conjunction on the 13th, and therefore is not visible this month.

(4) Saturn is setting, less than an hour after the Sun is set, lost in the sunset by the end of the month.

METEORS

The principal shower this month is the Perseid shower, with a predicted maximum of 68 per hour at zenith equivalent, on August 13th. Normal limits for this shower are July 15th to August 18th. Some bright, fine-trained meteors should be seen. The radiant co-ordinates are RA 03h04m, Dec +58°.

Source: BAA Handbook 1979. All times are U.T. (= B.S.T. - 1 hour).

HAS MINOR PLANET 704 INTERAMNIA, A SATELLITE?

We may be able to help in finding out this, about the time of the July 29th occultation of this minor planet by a star catalogued as SAO 144829. Although the predicted path about 300 km wide does not pass near England, observers in this country are being asked to observe the star SAO 144829 from as it were, 'control' zones outside the path, in monitoring the star's brightness. If it appears not to change from England, but does very briefly somewhere along the occultation path, it may well indicate that 704 Interamnia has a satellite, which is possible according to some scientists as it has been shown that the gravitational sphere of influence of such an inner solar system body is about 100 times its diameter.


It seems the chance of such an indication in these observations is small (which is natural) but it seems worth the try, as I suggested a few months ago in the O.A.S.I. Journal in regard to the possibility of finding a satellite of planet Pluto. RCA

SKYLAB RE-ENTRY, 1979 July 11, 16.32 GMT, on ORBIT 34 981

Well, it is all over at last. Except possibly for some shouting by the folk who paid highly for insurance cover, without at first bothering to calculate what the real chances were of themselves or their property being hit. Some reports of 'near-panic' which may be somewhat exaggerated, were seen, of people aiming for cover - insurance type - in Cornwall. Just one headland was said to be included in the possible fall path, 1000 or so wide, and this might be said to have an area of only a few square kilometres. Had the worried compared this small area with that of a fall area about 13 000 km by average 20 000 km, equals 260 000 000 km, and further, applied a reasonable factor in regard to the possible (?) entry of a Skylab fragment into a zone round them near enough to affect them, I doubt if any insurance would have been sought. I rate the chances of a personal injury 'hit' anywhere in the fall zone to have been something of the order of 100 000 000 000 to 1, assuming a couple of thousand meteoritic type fragments were 'generated'. Even so, a great deal of damage could have been done.

According to Aerospace Daily (July 13, 1979) NORAD confirmed that Skylab was still intact at 11.53 am U.S.A. Eastern Daylight Time, which is GMT minus 4 hours, and BST minus 5 hours. At 11.58 am, NASA officials reportedly expressed some surprise that Skylab's solar panels were still attached, as a few minutes before, the Apollo telescope mount batteries were sensed over Bermuda to be 100 degrees instead of the normal 60. (Whether Fahrenheit or Centigrade was not noted, but the difference indicates a great deal of overheating already having taken place in the solar cells, which just goes to show how temperature-rugged they are.)

At 12.51 pm, NASA received news that visual sightings of hot debris occurred at airports in Perth, Kalgoorlie, Albany and Esperance in Australia. The Kalgoorlie sighting of 20 to 50 fragments, took place at 12.33 pm. Such reports were first phoned in to NASA's Canberra tracking station. And so, Skylab demised, perhaps the best way in the circumstances it could have, on the opposite side of the Earth to its birthplace, in the dark of the Australian night, just over six years from launch. Its main part's plunge into the Indian Ocean was a great relief to NASA (and lots of other people) as next orbit round, its split-up 85 tonnes could have fallen on heavily populated USA areas. RCA

FROM OTHER JOURNALS  Shrinking Sun? Jack Eddy, of the Smithsonian Observatory in Massachusetts, recently reported that the Sun is decreasing in size at the rate of 10 km per year, to the disbelief of many astronomers, who feel that the 'discovery' upheaves one of the foundation stones of astrophysics, the belief that the Sun is a steady, unvarying star. (Page 5)

This is only the latest revelation from Eddy, who has already published a wealth of evidence gleaned from historical records, that the Sun varies on a timescale of centuries. His discoveries have implications for two current topics of research, the first being that the argument for relating the little ice age of the 17th century to changing solar activity now carries added weight. Plus, of course, any improved understanding of solar variability can help in predicting climatic changes over tens and hundreds of years. Secondly, since the ten-year search for solar neutrinos that should be produced by nuclear fusion reactions in the Sun's core has proven fruitless, some astrophysicists have argued that the Sun may have temporarily 'gone off the boil', with nuclear burning being shut down. A shrinking of the outer layers as the heat flow from the interior is reduced is exactly what theory predicts, so this presents problems for the steady star stalwarts, who could well have to do some re-thinking of the solar basics. (New Scientist)

Voice of a Black Hole? Radio astronomers at the Hale Observatories think they may have picked up bursts of radio waves less than a thousandth of a second long from M87, the largest galaxy in the Virgo cluster, 60 million light-years away. If confirmed, it means that the long-held assumption that the energy of radio galaxies (such as M87) and quasars comes from gas spiralling into a massive black hole, is probably correct. Optical astronomers at Hale had previously found indirect evidence for a massive black hole in M87, and astronomers at Jodrell Bank are now using the 76-metre Mark 1A radio dish to try and confirm the existence of the pulses. If they do, we are at last seeing right into the heart of an active galaxy. (New Scientist)

ARTICLES TO READ

"Transatlantic Ballooning" - New Scientist, June 28th. A look at the work of self-ballasting astronomical balloons in the upper atmosphere.

"Rocks that Glow in the Dark" - New Scientist, July 12th. Describes how the life-history of meteorites can be revealed by their thermoluminescence - the light they release when artificially heated.

"The Clock Inside the Sun" - New Scientist, July 5th. New studies of the sunspot cycle have cast doubt on conventional theories, and provide evidence instead for a 'clock' inside the Sun that times solar variations, and drives a 22-year cycle in solar luminosity that influences Earth's climate. (See 'From Other Journals')

NEWS REVIEW

by SOH

June 8th - Anik-D Hughes has been awarded a contract to help build two new communications satellites for Telesat of Canada. Under the prime contractor's direction, Hughes will supply propulsion systems, solar panels, spinning structures and bearing assemblies. The satellites, designated Anik-D, will operate in the 6/4 GHz frequency range. They will provide extensive coverage to most of Canada in the areas of television and telecommunications. (Hughes SCG)

June 20th - An Orbiting Space Platform NASA has awarded General Dynamics Convair Division a contract to outline the feasibility of an orbiting space platform. The idea is to have a device whereby many separate satellites of different types may be localized for easy Shuttle servicing. The platform would provide power and facilities for telemetry as well as stabilization. In return, NASA would charge rent. (NASA)

June 26th - Voyager 2 Jupiter Encounter Voyager 2 was due to take a close look at Jupiter on July 9th. The results of Voyager 1 outlined many new objectives, some of which are shown below:

- * The first high resolution pictures of Europa from a range of 2 million km

Page 6) * An attempt to obtain a colour picture of the newly-covered ring of particles surrounding Jupiter

* To maintain a watch on Io, with the aim of discovering, observing and mapping as many of its volcanoes as possible.

(NASA)

June 29th - ATS-6 Retires ATS-6, the communications satellite which has provided five years' service, three years more than expected, has been finally 'switched-off'. Through the last five years, it has demonstrated the use of satellites in education, telemedicine and teleconferencing. It is soon due to be boosted to a higher orbit than the geostationary one it is at present in. (Lockheed MSC)

July 2nd - SSME Engines A space Shuttle main engine has accumulated 4 422 seconds, just short of the 5 000-second total required for it to last its design lifetime. Also, another engine has been certified flight-worthy for Shuttle use at the National Space Technology Laboratories. By the time you read this, SSME's numbers 2005, 2006 and 2007 will have been shipped to KSC. (Rockwell SSG)

July 2nd - Enterprise on Pad 39A After three weeks on Pad 39A at Cape Kennedy, the Shuttle Enterprise with two SRB's and its ET has been moved back to the Vehicle Assembly Building. The aim of the 'exercise' was primarily to see whether there were any obstructions between Shuttle and rotating service structure. (Rockwell SSG)

(Some photos of the above Shuttle and service structure may be exhibited at the Open Day)

July 5th - Space Shuttle Radios Two types of radio are now being tested for use on the Shuttle. Based on Apollo hardware, one set is for Astronaut/cockpit communication and the other for use while gliding to Earth. The astronaut sets also allow heart-beat and life-support system status information to be relayed to the Shuttle. The Shuttle communications sets, as well as providing astronaut/cockpit comm's, will serve as the means of contact between Shuttle and aircraft. This set also has a facility to automatically broadcast on the international distress frequency - 243 MHz. (RCA G & CS)

July 11th - Pioneer 10 Crosses Uranus' Orbit Pioneer 10, the 259-kg spaceprobe, today crossed the orbit of Uranus. It is headed in the direction of Aldebaran in Taurus, but radio communication can only be maintained up to 1987. In a few months' time, it will be the first man-made object to enter interstellar space.

July 14th - Galileo to Jupiter The Jet Propulsion Laboratory is giving out contracts to industry for the construction of the Galileo-Jupiter probe. To be launched in 1982, the spaceprobe will be put into an orbit around Jupiter. One of its tasks will be to photograph extensively, Jupiter and its moons as well as launch a 'sounding' probe into the Jovian atmosphere. (TRW D & SS)

PIONEER SATURN ENCOUNTER

After its fly-by of Jupiter in December 1974, Pioneer 11 is now due to fly-by Saturn on September 1st of this year. Pioneer 10, the first of the two probes to reach Jupiter, is now on its way out of the Solar System (see News Review above).

Targeting options for the spacecraft were considered in 1975, 1976 and 1977. The 1977 manoeuvring decision was the most crucial, to pass the craft outside the ring system as opposed to flying between Saturn and its innermost ring. With the 'inner ring' option, scientists considered there was a significant chance of Pioneer 11 (P11) being destroyed. Consequently the closest encounter distance will now be 2.7 Rs (Rs = 60 000 km). P11 will descend towards the ring system at an angle of 6.5 degrees, when Saturn's gravitational pull will swing it round and it will then ascend, once more crossing the ring plane.

The main satellite for observation will be Titan. It has an estimated diameter of around 4 700 km. It is interesting not only because as is expected, it is the largest satellite in the Solar System, but also because it has a small atmosphere composed mainly of methane.

After Saturn encounter, radio communication will be maintained through (Page 7) to 1987. Thereafter the spaceprobe will pass into the depths of interstellar space. A few notes are included here for the benefit of readers. However, it is well to bear in mind PS is a very old spacecraft, and as such must be treated with respect. Therefore the times here may be subject to alteration as Mission Controllers feel is necessary.

August	2	PS is tracked 10 hours a day by Deep Space Network.
	22	The Imaging Photopolarimeter begins imaging. (It takes measurements of the intensity of reflected sunlight and the degree of polarization.)
	27	1.02 am Iphoebe closest encounter at 9 453 000 km.
	28	11.05 pm Iapetus closest encounter (1 039 000 km).
	30	6.34 pm Field of view now too small to photograph complete Saturn ring system.
	31	5.31 am Hyperion encounter (674 000 km).
September	1	9.04 am Dione encounter (291 000 km).
		9.34 am SATURN CLOSEST ENCOUNTER at 21 400 km.
		Speed now 108 000 k.p.h.
		11.00 am Saturn's rings seen in full splendour.
		11.34 am Enceladus closest encounter (225 200 km).
		3.34 pm Ithea encounter (341 900 km).
	2	11.05 am Titan encounter (356 000 km).
October	1	Encounter activities cease.

BLACK HOLE POSERS

by T.M. Keys.

I have been reading "The Iron Sun" by Adrian Berry, in which the author describes how future generations may overcome the difficulties imposed on space exploration by the barrier of the speed of light. He suggests entering a rotating black hole and emerging simultaneously at a 'white hole' elsewhere in the Universe, though theoretical justification of this is very involved and is not attempted in the book except by informal discussion. The possibility was not realized until 1975, when it was proven that all black holes rotate, so disproving the simple view of the black hole as no more than a collapsed star. It seems that if a rotating black hole is entered at the correct angle, the singularity at the centre is avoided and the astronaut (or his crushed remains?) emerges elsewhere.

Having reluctantly swallowed the story so far, I conducted the following 'thought-experiment'. Suppose an astronaut carries a radio transmitter through a black hole and emerges at a 'white hole' say, ten light-years away, then waits there for ten years, he would receive the radio waves that he sent before entering the black hole. Therefore, an observer near the 'white hole' would simultaneously receive two different transmissions from the same transmitter, one sent ten years before the other. How is this possible?

Still on black holes, the following problem occurred to me. The escape velocity v of a spherical mass M , of radius r is given by $1/2v^2 = GM/r$, so for a black hole of radius r , the minimum mass it requires to be a black hole is $rc^2/2g$ (taking no account of rotation). Therefore, if the total mass is large it does not have to be confined to a small volume.

Now, in the 'Big Bang', we are told, the whole mass of the Universe was concentrated together, so surely there must have been enough mass in a small enough volume to create a black hole. So how did the matter escape?

(I think the answer could lie in the fact that there was no space outside the primordial atom since the whole Universe was contained within it, and therefore the concepts of escape velocity, black holes and the like, were meaningless or inapplicable, though this seems to be an unsatisfactory answer)

My final poser is much nearer home "What are the reasons for ~~the~~ believing that the

Page 2.) forces governing the motion of the planets in the Solar system are gravitational, and not electrostatic, in origin?" The question is not as easy as it appears. As far as I can make out, the simplest answer is that if the forces were electrostatic, the planets would repel each other, and the orbit of Uranus would exhibit the opposite distortion, due to the proximity of Neptune, to that actually recorded.

I'd be glad to hear from anyone with any ideas on the above problems - my address is: 146 Westerfield Road, Ipswich IP4 3AF.

QUICK, 'START-THE-BLACK-HOLE-ROLLING' ANSWERS - OR RETURN DISCUSSION - RE THE ABOVE

First, in discussion of the nature and properties of black holes, why is it that astronauts are the bodies chosen to pass into them and possibly be thrown outside again? Has anyone seen any mention of astronauts going into an ordinary star like our Sun, whether or not to be ejected again? I guess 'no', because conditions there are obviously not conducive to humans or any cover we can fabricate. Why is it that the so-much-less amenable conditions in black holes are not noted, and one keeps to the 'hypothetical observer' principle, which Mr. Keys mentions here?

Assuming a black hole has the 'strength' to attract matter or 'radiation' to it so strongly that it might also have some way of ejecting it, what I would like to know is, how can any fabrication as we may conceive it, such as a radio transmitter be used in analogies about the possible actions of black holes? I seem to be answering with questions, but I can't deny that something capable of sending radio waves could be ejected and wait as mentioned above by Mr. Keys, and that it may be possible to analogize here with a fast supersonic plane that can also accelerate fast through the sound barrier - conceivably an observer (or listener!) in the correct position could at one and the same time hear both take-off that occurred distantly, and the somewhat later fly-by of the craft nearer at hand.

I never try to go too deeply into Creation, but it may be an answer to the 'Big Bang' point that there was no terribly concentrated Cosmic Egg.

About the electrostatics, it is all rather involved, but we do find evidence of charges both negative and positive, for example naturally in cloud-earth-surface relationships and apparently in complicated sunspot groups. I hope some interesting correspondence, to Mr. Keys, which perhaps he might care to pass on to me if he thinks it worth publishing in the Journal, will arise from this. Roy Adams

NOTABLE ASTRONOMICAL ANNIVERSARIES - JOHN FLAMSTEED

by Roy Gooding

August 19th marks the 333rd anniversary of John Flamsteed's birth. He was born at Darby in Derbyshire. Flamsteed suffered bad health all his life and this, at the age of fifteen caused him to leave school, and led to the pursuit of his hobby, astronomy. He began to construct his own instruments, and by 1670 received attention through the publication of several papers on astronomical topics. This in turn led him to become acquainted with Newton and he shortly gained his entrance to Cambridge.

During the mid-seventeenth century global sea exploration and trading was becoming very active. A severe limitation to navigation at sea, was the accurate determination of longitude. Charles II set up a committee to investigate possible methods for determining longitude at sea, which included Flamsteed. Flamsteed concluded that no method would work until an accurate star map had been produced. He petitioned the King to establish an observatory for this purpose. Charles II agreed to Flamsteed's request, appointing him to the new post of Astronomer Royal in 1675.

The observatory was built on a hill at Greenwich to the design of Christopher Wren. A limit of only £500 was made available for the building. The money was raised by selling old military gunpowder to merchants who were able to re-treat it for less dependance-requiring duties than those of Ordnance. Building materials came

from an observatory and other instruments that were being demolished: ... from a gate-house at the Tower; bricks, iron and lead from a fort at Tilbury.

When the observatory was complete, no money had been assigned for observational equipment. Flamsteed had to equip the observatory out of his own pocket and using whatever he could obtain from outside well-wishers and friends. His yearly income was only £100, and by 1683 he had to supplement this by taking private pupils in astronomy and mathematics.

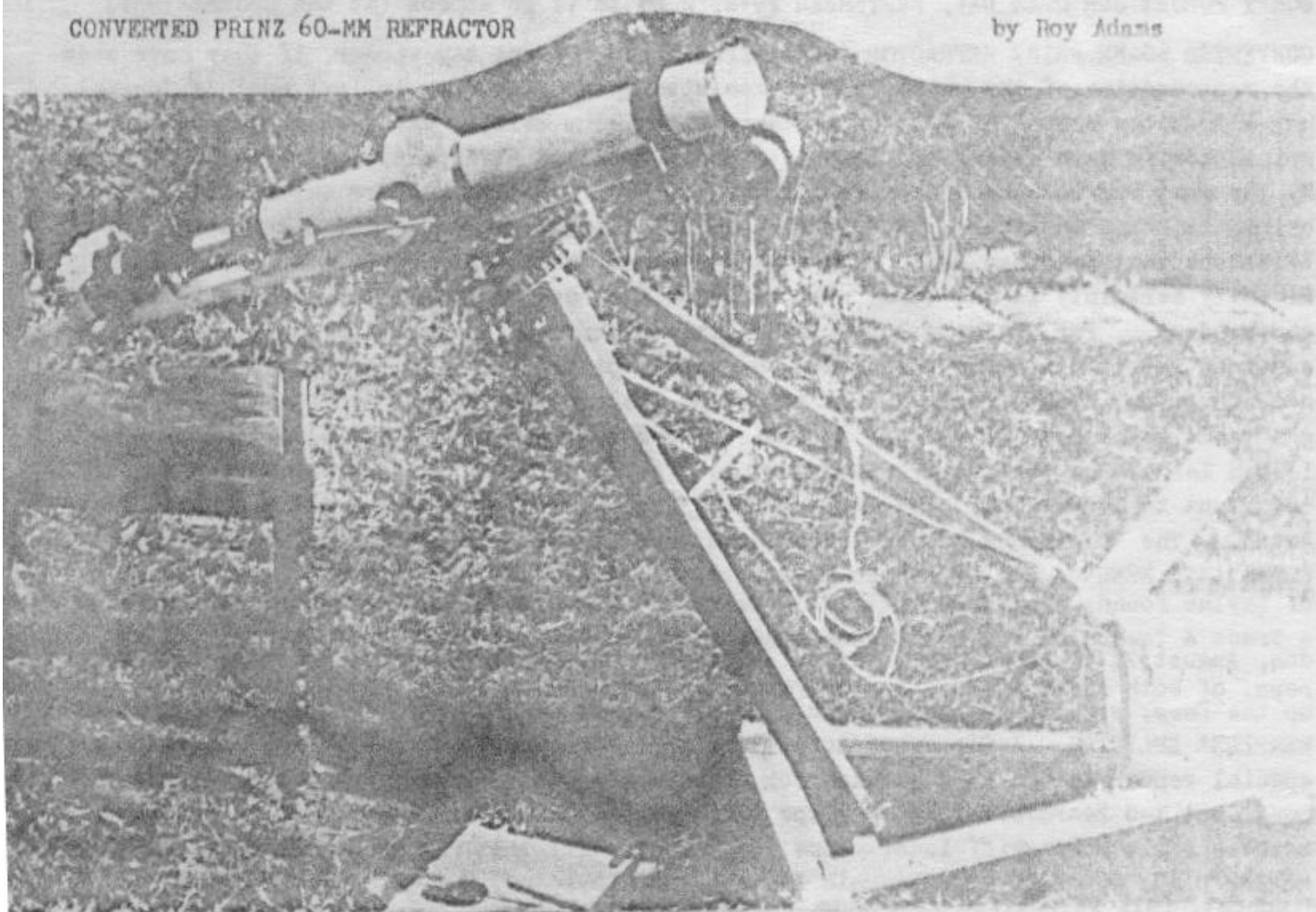
Flamsteed had to manage all the observation work himself until his father's death, when he was able to seek the services of Abraham Sharp. Sharp was an instrument maker and a tireless worker at processing observational results. He built a large mural instrument for the observatory which speeded up the work of measuring stellar altitudes. Flamsteed was one of the first observers to use a telescope in combination with a graduated arc for measuring angles. By 1703 more than 30 000 star positional measurements had been made with a greater accuracy than had been achieved before.

As he had had to supply his own instruments Flamsteed regarded the results his own property. Contemporary astronomers of the time, notably Newton and Halley, took a different opinion, that as Flamsteed had a salary from public funds, his results should be made public, and published as soon as possible. Flamsteed was not prepared to publish until all the results had been corrected for observational errors and reduced to a standard form. The delays caused much bad feeling. In 1708 Halley obtained a number of Flamsteed's observations and published them. Flamsteed's reply was to burn as many copies as he could find - a number totalling over 300.

The final version of Flamsteed's star catalogue did not appear until 1725, six years after his death. It consisted of three volumes, the second two being completed by Abraham Sharp and Joseph Crosthwait. The catalogue gave Greenwich an international reputation for precise observations that it has held ever since.

CONVERTED PRINZ 60-MM REFRACTOR

by Roy Adams



TUESDAYS from 7 pm: Planetary Section August 7th, 21st; September 4th

Directors Mr. J. Hood, [redacted], Ipswich

and Mr. J. Ranson, [redacted], Ipswich 'Phone Ipswich [redacted]

TUESDAYS from 7 pm: Solar and Lunar Section August 14th, 28th; September 11th

Directors Mr. J. Hood, [redacted], Ipswich

and Mr. M. Barritt, [redacted], Ipswich

WEDNESDAYS from 8 pm: Nebulae and Faint Objects Section August 1st, 8th, 15th, 22nd

Directors Mr. D. Payne, [redacted], Wickham Market, & 29th; September

Suffolk 'Phone Wickham Mkt [redacted] 5th & 12th

and Mr. M. Cook, [redacted], Ipswich 'Phone Ipswich [redacted]

FRIDAYS from 8 pm: Variable Stars Section August 3rd, 17th, 31st; September 14th

Directors Mr. R.S. Manning, [redacted], Ipswich

and Mr. M. Siggers, [redacted], Ipswich (8th Sep. subject to confirm.)

SATURDAYS from 8 pm: General Section August 4th, 11th, 25th possibly, and 1st &

Directors Mr. M. Barriskill, [redacted], Ipswich 'Phone Ipswich [redacted]

and Mr. R. Adams, [redacted], Ipswich 'Phone Ipswich [redacted]

*Best 'phone times between 6 pm and 7.30 pm any evening except Fridays.

METEOR SECTION A METEOR COUNT will be held at the Ship, Levington, on 11th August, starting at 10 pm, particularly for the Perseid meteors. Details of this section's work from Mr. D. Barnard, [redacted], Ipswich 'Phone Ipswich [redacted].

NEXT COMMITTEE MEETING August 18th, at 8 pm at the Observatory.

NORTH ESSEX CARAVAN CLUB RALLY AT ORWELL PARK August 1st to 5th. From approx. 8 pm on the Wednesday, Friday, Saturday and Sunday during the Rally, we propose opening up the Observatory and would like as many members as possible to come and help and come along and have a good time (bar will be open!)

DON'T FORGET OUR OPEN DAY, SEPTEMBER 29th, 2 pm to 11 pm approx (at the OBSERVATORY)

CONVERTED 60-MM PRINZ REFRACTOR (cont. from P. 9) One may wonder, if they have seen the reproduction of the photographs taken with this telescope, in last month's Journal, why I took the chance of putting any more pics in! Well, I was told it may be that the prints copied were glossy and that this added to other difficulties with the copier used. My (or our) regrets and apologies for the quality, assuring readers who haven't seen the originals, that they were OK. Anyway, I just thought readers might like to see the telescope that produced them, with attendant chair which as I mentioned, also helped! Rigidity certainly is the thing without which the best optics cannot perform well to the end-product. For the very large image scale picture of a sunspot group in last issue, a 3-inch x 9-inch x 5-foot plank was the telescope bed, not the lighter converted alt-azimuth, usual mount. But I will be trying the mount normally used, for the larger image scale work soon, as well as for more record pictures of the whole disk as were published last issue. I never attempted photography with the telescope before changing the mount to equatorial. It looks as if I'll have to save further details until next issue. The 'scope now has an independent power supply and electronic drive, variable.

EXTRA LATE NEWS A San Francisco newspaper has offered \$10 000 for the first sizeable bit of Skylab found, delivered to them. (We're not given a quantification of 'sizeable'!)

A Trade & Technology In Orbit conference is to be held at Wembley Conference Centre, London, August 27 to September 2 inclusive. Much British industry to be there, and top reps. of both ESA & NASA. Day entrance £1; entrance to films, extra. Poster expected up the Dome. Further details from S.G. Harvey, [redacted], Needham Market, Ipswich.

MEMBERS' SPLICING I was asked to put a report in about this, but so far have had no special report to put in - perhaps for obvious reasons! Anyway, we no longer have a P. Long, but two Bearcofts, and perhaps David B. will give some of us less enlightened members a bit more griff later - one RMC told briefly that all well at Kinsett last Sat. 14.

MEMBER'S AD: FOR SALE: Prinstronic Scientific Calculator, 8-digit green display, 10⁹⁹ exponent, full scientific functions & memory + AC mains adaptor, £22 o.n.o. T.M. Keys, [redacted], Ipswich. Tel. Ipswich [redacted].

DATES FOR YOUR DIARY

AUGUST 1st to 5th.

From approx 8p.m. on Wednesday, Friday, Saturday and Sunday. Observatory Open for the North Essex Caravan Club Rally at Orwell Park. As many members required to help as possible please.

AUGUST 18th.

As last month's Journal was a little getting out many members were unable to attend the meeting at the Observatory to talk about arrangements for the Open Day. There will be another meeting to which all members are urged to come to on Saturday 18th August at 8p.m. at the Observatory.

SATURDAY 29th SEPTEMBER

OPEN DAY AT OBSERVATORY.

Items of astronomical interest are still required for the Open Day. Please come along to the meeting at the Observatory on August 18th to discuss final arrangements - new faces at the meetings are urgently required.