THE JOURNAL OF THE ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

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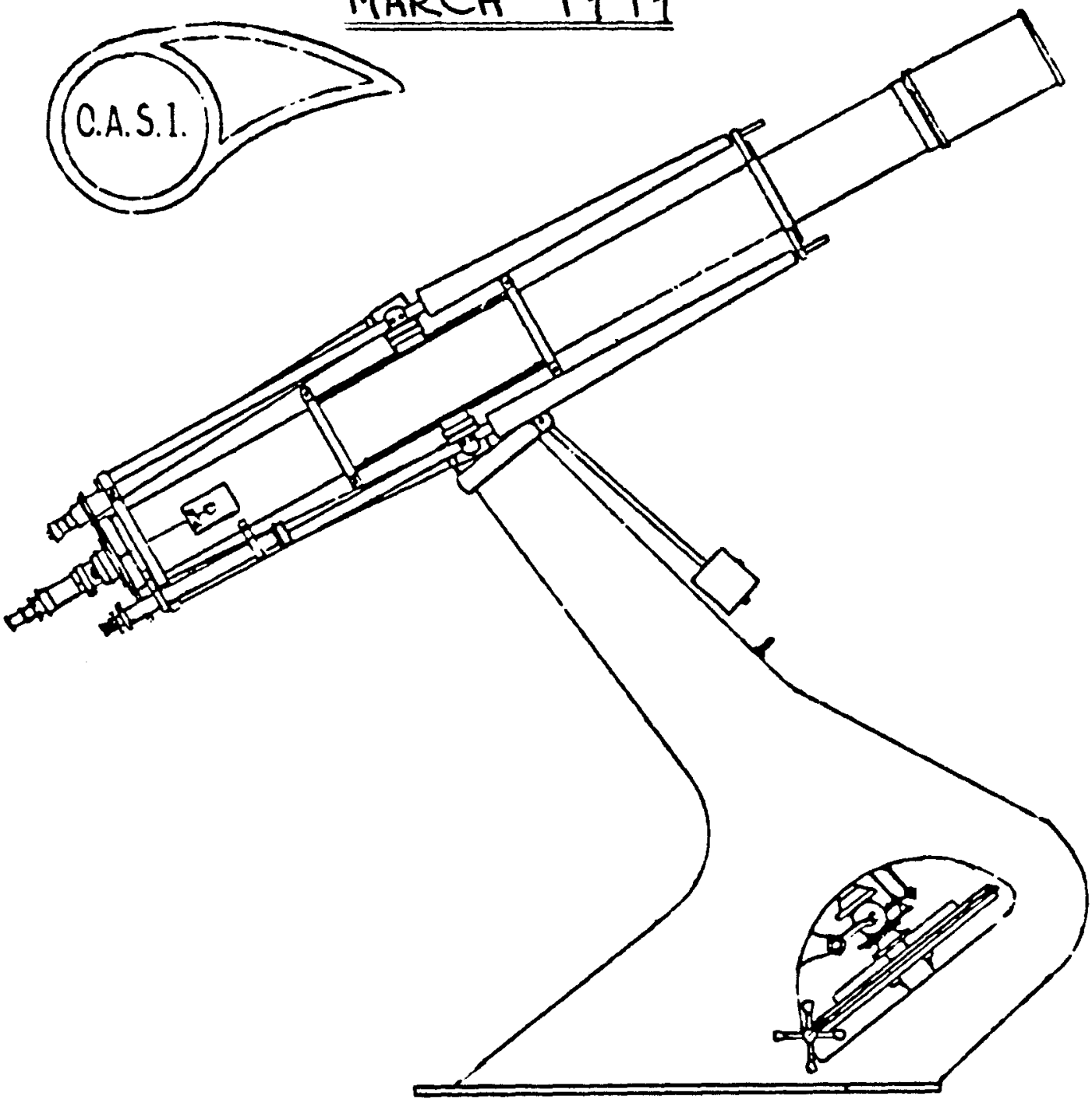
Your submissions of items for the Journal will be welcome.

MARCH 1979



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

Ursa Major is near the zenith, with the plough 'handle' pointing eastwards to Arcturus and Bootes, now well above the horizon by late evening. Leo is due south around midnight, with Hydra winding away south-eastwards beneath it. Virgo, also in the south-east, is fully visible by late evening. The western sky is dominated by Gemini, Taurus and Auriga. Orion is still visible but will be reaching the western horizon before midnight by the end of the month. To the north and north-west, Cepheus, Cassiopeia and Perseus can be found sweeping around Polaris.

THE SUN

Sunrise is at 06h50m at the beginning of the month, changing to 05h50m at month-end. Sunset changes from 17h30m to 18h30m. The Sun moves from Aquarius to Pisces during the month.

THE MOON - Phases

First Quarter	5d16h23m	Last Quarter	21d11h22m
Full Moon	13d21h14m	New Moon	28d02h59m

Occultations

Star	Phase	Mag.	Time
626	D	6.4	4d22h11.2m
1176	D	7.4	9d01h36.8m
2016	R	6.5	17d00h50.8m
2033	D	4.3	17d05h33.2m

D = Disappearance
R = Reappearance
Stars listed according to Zodiacal Catalog (ZC) numbers.

Eclipse

A partial eclipse of the Moon occurs on March 13th, the total duration of which will be visible from Britain.

Moon enters penumbra	13d18h11m	Moon leaves umbra	13d22h47m
Moon enters umbra	13d19h29m	Moon leaves penumbra	14d00h05m
Middle of eclipse	13d21h08m	Magnitude 0.858	

(Moonrise is at 13d17h40m)

THE PLANETS

Mercury reaches greatest elongation of 18° on the 8th at mag. -0.1. During the first week of March Mercury will be setting nearly two hours after the Sun, and this is in fact the best evening apparition of the planet this year.
Venus is a morning star at mag. -3.6, rising at about 0050 hours throughout the month.
Mars is rising only minutes before the Sun, so is not visible this month.
Jupiter is visible until early morning at mag. -1.9 in Cancer. It is stationary on the 26th, when its motion changes from retrograde to normal.
Saturn is in opposition on the 1st, in Leo at mag. +0.5.

Source: BAA Handbook 1979. Please note all times are U.T. (= B.S.T. minus 1 hour).
There is no major meteor shower this month.

ORWELL PARK OBSERVATORY LIFT

Most of us know that there is a lift connected with the Observatory which Colonel Tomline used. Colonel Tomline was the person who had the Observatory built, and the lift, which was water-powered. As the alternative route is 111 spiralling steps, there was some obvious incentive for the design of this.

But the lift has long been disused and no longer works, and requires some repair. It seems a great shame to leave refurbishing of this classic piece of rare industrial architecture untried - considerable effort and expense is expectedly needed, however.

As Orwell Park School auspices have been and still are much used in regard to the Observatory re-wiring and now, or imminently, work is to be commenced on making better

 parts of the outside of the buildings (in addition to work being carried on in and around the School proper), I thought it would be of [redacted] to find out the feelings held by people who are concerned and who may like to be concerned, with the reinstatement possible, of the lift.

Before last week, the idea of doing something about the lift was simply pigeonholed in the back of my mind, but when someone in charge of certain affairs at Orwell Park School rang me up about group visits to the Observatory (who to place messages with when our Chairman is unavailable) and mentioned that something is expected to be done to the lift roof by contractors hired by the School, it seemed a good opportunity to mention it.

The general feeling (it may be unanimous, I don't know - but at this stage perhaps unofficial) of the people in charge of running the School appears to favour something being done with the lift - putting it into working order and so on. But naturally, in view of the expense nominally likely, and need for some expertise and satisfaction of regulations, for a working lift, the task has been so far avoided. But it seems a possibility that certain approaches by School auspices may be forthcoming, to interest one or two official bodies who may be able to at least reduce the amount of capital expended by the School (and maybe the O.A.S.I. if they did accept the challenge of helping to do something with the lift). There seems no reason why the necessary relationships should not be established including perhaps factors who might gain some prestige value from being connected with either appraisals for or actual supply of items to put the lift back in working order. Within our midst we may have engineers and construction workers willing at least to look at the situation with due regard to its importance. Anyway, it seems we could be offered the lift for inclusion in our lease.

The matters concerning the lift will be brought up at the next Committee meeting, of the O.A.S.I., and if, before or after this, anyone would like to get in touch with me over the possibilities, it would help show interest.

RCA

OBSERVATORY AND SOCIETY HISTORIES

Charlie Radley and Royston Cheesman have been updating the previous scripts and a small publication similar in style to this Journal but in Elite type will shortly be available including a photograph of the Mansion at Orwell Park, and a map of where it is.

BAD-WEATHER CANCELLATIONS

It was with utmost regret that the February 16th meeting at Fonnereau Road had to be cancelled at very short notice owing to the atrocious transport conditions. It is hoped that if anyone did turn up for this meeting, they were not too disappointed, and that we will be able to programme this at a later date. Let us also hope that the whirls and eddies on March 23rd of "Interstellar and Intergalactic Matter" will contain no snow! Iain Nicolson will be giving the talk.

It is also trusted that any non-appearance of Section Directors which may have occurred during the snow-in will be forgiven. (No info. on this to hand!)

ARTICLES TO READ - "Venus Questions Answered" by Eric Burgess - New Scientist Feb.8 '79.

This article provides a first look at the data received from the Pioneer Venus mission. The nature of the atmosphere is extensively described, quoting densities, temperatures and the like at various atmospheric levels. The cloud layers are described in detail, giving the heights of the three main cloud levels, content and size of cloud particles, illumination and visibility at various heights down to ground level. (At the surface, general illumination is a 'lurid red' and visibility is 3 km.)

Comparisons are made between the Venusian atmosphere and the corresponding levels of the Earth's, and the author draws some conclusions and makes a few speculations on the evolution of Venus and its atmosphere.

Comet West, the brilliant comet of 1976, was racked by five violent events as it passed within 30 million km of the Sun three years ago. New methods of analysing the movements of the debris produced show that a series of brief but massive outbursts of gas and dust accompanied the break-up of the large, icy nucleus into at least four fragments. Only two other comets have ever split into as many pieces, and only four in the past 120 years have shown such clearly defined dust bands in their tails. Computer enhancement of yellow-light photographs of the comet's tail shows five prominent, narrow bands. Scientits at the Harvard-Smithsonian Center for Astrophysics and the Los Alamos Scientific Laboratory were able to trace the motion of the dust particles, and concluded that each band originated in a single outburst lasting at most an hour.

A further study followed the motions of the separating fragments of the comet's nucleus, and it was found that some of the splitting events not only occurred at the time of the dust bursts, but were also accompanied by sudden flares in the comet's overall brightness caused by gas bursts. For example, The initial splitting of the nucleus into two on February 19th 1976 produced a huge cloud of dust which formed the brightest dust band. The comet became brighter within hours as gas also poured off.

More subdued break-up of the nucleus and dust and gas flares have been observed in many comets, but events as violent as those affecting Comet West have never been recorded in such detail. The disruptions probably occur when a compacted dust-rich surface bakes hard and traps more volatile materials below. Pressure builds up within the comet's head and the surface eventually ruptures in spectacular fashion. Comet West was a classic example of a fragile new comet rich in volatile materials making its first close approach to the Sun. The four fragments now receding into deep space will each return in about a million years' time at intervals of a few centuries. But when they do return they will be pale shadows of their parent body after their rough handling by the Sun in February 1976. (New Scientist)

KENNEDY SPACE CENTER PREPARES FOR THE SHUTTLE by S.G. Harvey.

If the present schedule is kept, we should see the first orbital flight of a space shuttle on September 28th this year. The two crew on this flight will be John Young and Robert Crippen. They will take off from Canaveral and land 53 hours later at NASA's Dryden Flight Research Center, California.

The purpose of this article is to outline the functions of the Kennedy Space Center at Canaveral when the Shuttle becomes fully operational, to give readers some idea of what to expect, and also to provide a guide for later news leading up to, and covering, shuttle launchings.

Work started in April 1972 on converting the equipent and buildings from the then Saturn V launch facilities to those of the shuttle. The main launch pad used for the Apollo Moon missions has been stripped and restructured for shuttle launchings. The most prominent building at KSC is the giant Vehicle Assembly Building, of which high bays 1 and 3 will be used for the final assembly of the space shuttle, external tank and two Solid Rocket Boosters, collectively called the Space Transportation System. High bays 2 and 4 will be used to service and store incoming external tanks and SRBs. The only completely new buildings and structures that have had to be built are the two Orbiter Processing Facilities and the landing runway. The Orbiter Processing Facilities each consist of a building just outside the VAB, where Orbiters that have landed will be processed ready for assembly in the VAB.

After re-entry, Orbiters will land on one of the largest runways in the world, 1 500 feet long by 300 feet wide, with a 1 000 feet long over-run at each end. Connected to this main runway is an aircraft parking apron 550 x 450 feet in size, where the 747 Jumbo jet, used to carry the Shuttle throughout the U.S., will unload the Orbiter ready for processing for another launch. Once unloaded, the Orbiter will be taken along a 2-mile-

 long tow-way to one of the Orbiter Processing Facilities. There is another tow-way which will be used to carry the external tanks, which have been shipped to KSC by barge, to the VAB. A landing aids control building opposite the apron will control runway operations, and also help Orbiter pilots with landing their 68-ton glider with minimum trouble. Alternatively, a Microwave Scanning Beam Landing System can be used, which will be able to land the Orbiter from orbit with the astronauts asleep if they so wished.

When Shuttle Orbiters return to Earth, they must be made safe by removing explosive elements from the vehicle, removing payloads, and draining residual fuels. These proceedures have necessitated the construction of two new buildings, the Orbiter Processing Facilities (OPF), near the Vehicle Assembly Building (VAB), to receive the Orbiter immediately it has landed. Also to be removed are the forward reaction control system pods, hypergolic pods and auxiliary power fuel tanks. All these operations are carried out in a dust-free and environmentally controlled part of the OPF.

During re-entry of the Orbiter, the thermal protection tiles on the underside of the 'spaceplane' will inevitably heat up, as did the heat shields on the Apollo re-entries, However, the Orbiter's heat shield is completely repairable, by removing damaged tiles and replacing them with new ones. 34 000 of these tiles, named LI-900, go together in various shapes to form the shield. The tiles are made from 99.7% pure silica fibre, and can shed heat so readily that a block of LI-900 could be held in a bare hand at a temperature of over 1 300°C. (Which hardly seems believable, but this is what my script from Simon says - Producer).

Also to be checked-out in the OPF are the communications equipment and instrumentation, and the delicate landing gear. Each of the two OPF buildings consist of a 2 700 square metre 'high bay' and 2 320 square metre 'low bay'. The Orbiters never enter the 'low bay' areas, which are used for storing spare equipment, and are divided into a number of workshops each with its own task, for instance replacing a faulty engine or checking new spacesuits for leaks. With all the liquid gases being pumped around, it is possible that two might mix and spontaneously explode or give off poisonous fumes. To cover these possible eventualities, an emergency ventilation system is fitted in the 'high bays', as well as extensive high pressure water sprinklers systems in all areas.

The Orbiters are not the only part of NASA's Space Transportation System (STS) to require attention during landing and launch. The recoverable Solid Rocket Boosters (SRBs) are also processed at KSC. When the SRBs are exhausted of fuel at a height of 50 km, they fall back to Earth by parachute. Specially equipped vessels will move to the splashdown position and take the SRBs in tow back to KSC where they are split into segments for shipping to Thiokols factory, Utah. Here they are cleaned and refilled with propellant. The parachutes meanwhile are refolded in an old hangar at the nearby Canaveral Air Force Station. After the shipping of the segments back to KSC, the whole sequence starts again, with another launching.

To be continued. Simon hopes to follow any further changes to Kennedy Space Center, and to put up more detailed info and possibly photos if they become available.

NEWS REVIEW Due to exams. and communications problems brought about by last month's terrible weather, SGH was unable to get news through in time for this month's issue. Back to normal next month.

Caroline Herschel was born on March 16th 1750, eleven years after her more famous brother William. William came over to England to settle in 1757. Here he took up various musical posts, as organist and teacher of repute. In 1772 William was able to bring Caroline over to England from the family home in Hanover. She was probably appreciative of this move as at home she had had to run the family household alone. William was obliged to send sufficient money back to Hanover for a servant to be employed.

During the first few years in England Caroline participated in her brother's musical career, having been trained as a concert singer. William had much wider interests than music alone. His predominant hobby was astronomy, especially the construction of telescopes. Caroline enthusiastically joined him in his new interest. After many failures the Herschels became expert lens and mirror grinders, producing ultimately the best telescopes of their day.

When grinding some of his larger mirrors, William would remain at work for up to 16 hours. Caroline would physically feed him and occasionally would read aloud from books such as Don Quixote and Arabian Nights.

In 1782 William was able to give up his music career, taking up astronomy full time, having received a pension from King George III. William continued his systematic sweeps of the sky, being greatly assisted by Caroline, who acted among her many other duties, as note-taker. If Caroline had not been willing to help her brother as she did, William would probably never have achieved the immense number of observations and discoveries that he did.

In order to give Caroline more independence for her own astronomical research, William built his sister a telescope, but she was able to use it only when William did not require her assistance. In 1786 William went on a visit to Hanover. This gave Caroline a chance to do some sky sweeps of her own. On August 1st, she discovered a comet. This discovery established her place in the astronomical community. Between 1788 and 1797 she discovered an additional seven comets. Unfortunately, three of the comets were either simultaneously or previously discovered by other observers. The sixth and seventh were found by Messier and Machain respectively. Caroline's eighth comet in 1797 was discovered by Stephen Lee on the same night.

One of Caroline's most important contributions to astronomy was the indexing of the star catalogue compiled by the first Astronomer Royal, John Flamsteed, with the addition of a list of omissions. This work was later published. Caroline returned to Hanover after her brother's death. Here she commenced to prepare a catalogue of nebulae and star clusters discovered by William during his sky sweeps. The catalogue was never published but was of use to her nephew, John, in his astronomical researches. For the work involved in writing the catalogue, Caroline received the Gold Medal of the Royal Astronomical Society.

While she was in Hanover Caroline took a great interest in her nephew John's astronomical career. Caroline Herschel lived to the age of 98, dying in 1848.

ORWELL PARK 10-INCH (AND OTHER) TELESCOPE DRIVE OPTIONS by Roy Adams

Some issues ago (last August, in fact, amazingly!) I gave a sort of promise, non-commital as to time, of continuance of the articles about telescope drives, particularly in regard to the 10-inch at Orwell Park, but substantially applicable to any other existing or potential telescope equipment. As there has always been plenty to put in the Journal, and no urgency existed, the matter was left, but we now have a spare space.

Alan Smith and his co-workers made the present electric motor drive for the 10-inch and it is still running satisfactorily. But during the re-wiring period, it was painfully obvious that an independently-powered set-up would have kept going (hypothetically) while there was a long spell of manual-only use.

 Part III OTHER ELECTRIC DRIVE OPTIONS & MECHANICAL CONSIDERATIONS

I have already explained the main details of the present electric drive on the O.P.S. 10-inch. (June issue, O.A.S.I Journal) The squirrel-cage motor with integral gearbox and additional gearing is shown to be quite a reliable sort of drive if sized big enough for its duty, and has been run non-stop for over an hour to my knowledge, the unit usually being given a rest after such a time, though heating is not by any means excessive. I would like to say here that the motor and oscillator part of the drive is only a part, and that the original shafts and bearings all become part of the drive as well, and that in retrofits like the unit on the Orwell Park main telescope, the original parts need reconditioning and indeed sometimes replacing when they are missing, as some small increments are up the Dome.

Other O.A.S.I. members have carried on with implementing a good clean-up and are seeing that a decent clutch is in train to avoid jogging in the drive due to the sometimes-used process until recently, of disengagement and re-engagement of the main polar worm gears. Obviously, even with 1 440 teeth on the 3-feet diameter main gear, one for every minute of a day to fit the single-lead worm screw rotating at about 1 r.p.m., it is still a chancy thing for screw thread'crest'to meet main gear'valley' and sometimes many tries when viewing even at medium power, have to be made to get the subject centred in the eyepiece. This can be to a great extent eliminated by involving a direct quick-action limited-torque/friction clutch. The limited torque arrangement is so that any accidental considerable knock or pressure, as of someone falling against the end of the telescope, will be allowed to cause slip at the clutch to avoid possible stripping or other damage to the main polar gears. The old gears, extremely expensive in materials and in labour to replace today, are very strong but do have their limits. Which is another reason why we put a counterweight addition on the end of the countershaft - with the wish to put an auxiliary small sliding one on later - to prevent undue wear on the drive gears and to a small extent to ease the work of the drive generally. Some care in deciding the amount of counterweight has to be exercized, as to exactly balance the telescope may mean that sometimes the mass of the main 'scope tries to beat the drive and sometimes it doesn't - and that could mean a rather swinging image.

There are many considerations of the above sort to be borne in mind when selecting the combo of assemblies that goes into any drive for a seriously-used telescope. Just how much torque is required at the input point, how much to have in reserve, even choice of where the input point should be. What sort of gear ratios are best chosen, and how much of the reduction gearing should be in any gearbox integral with any gearmotor considered?

The latter is more important than it may seem where the mass and bearing friction of the telescope such as the 10-inch's are concerned - a very high reduction gearbox can be put on the end of a simple motor, but if the strain on the teeth of the output gear of the gearbox and the 'input' gear of the telescope shafting is too high, a few slivers of metal appear on the floor but no movement. Before that ultimate limit is reached, bearings and gearteeth wear out unduly fast.

But usually, it is the insufficiency of the motor output to turn all the gear shafts against friction, which can be a very large percentage of the total output needed, that is a choice-limiting factor. Also, the frequency at which the main impelling unit - that is the motor or what is substantially a motor - works. Even a quartz crystal oscillator working at the megahertz range (order of a million cycles per second) has to be 'divided' down to a frequency much lower, more suited to switch on and off, the elements of a motor system actually physically powering a telescope. If the frequency is too high at the output of the controlling circuit, where such is used, then the control may be too weak and the whole motor unit and whatever follows, will simply stall. At the other end of the scale, if the control is too slow in

frequency, juddering may occur, or the frequency may be too low to be smooth enough to be unnoticeable in the eyepiece or for astrophotography or other work.

A synchronous motor is designed for a specific small frequency range, a particular frequency plus or minus a few per-cent. This is fine for normal driving if there is a small range of variability in the oscillator that could be used to drive it, but it can not cope with quick adjustments or run the 'scope to substantially a different position in the sky (without awkward gear changes). If used without an oscillator, say using direct mains cycle frequency which of course is still controlled, but beyond our control by the Electricity Board, we are somewhat rock-bound for photographic guiding, but the suitable gearing match allows a very reliable drive motion for ordinary observation, keeping the object viewed in the eyepiece for a very considerable time according to original setting and eyepiece power. Usual direct mains Hz tolerance is short-term +/-0.1%.

Ordinary direct current motors could be used with rheostat increments (these are simply resistances or one variable resistance, capable of taking, essentially, a differing share of the voltage of a set (though often unfortunately, rather variable) supply so more or less power comes to the motor so it goes respectively faster or slower as required. But the control tolerance of a d.c. motor system with just a resistance controller is unlikely to be within +/- 5% tolerance, considering the Orwell Park telescope or even much smaller instruments with rather neglected bearings, owing to there being no positive 'stepping' or 'step-by-step' control of the motor against the varying load of friction in the bearings, pushes by the observer, and so on. (Yes, wind as well!)

There are various means of 'step-by-step' control open for use on d.c. motors, of the continuously rotating type, particularly using thyristors. Implementation of such may not be so simple or as cheap as some may think, or maybe as closely regulable, but I must admit I am not familiar with the use of thyristors, it being generally a fairly recent art. David Payne is a particularly well clued-up member of our society in regard to such things, and sometime, he may give us some reproducible gen on the sort of 'digital' systems he may try out on the 10-inch.

This is a good lead-in to stepper motors, which, when of suitable power and not too costly, I must say are my best choice for a telescope drive, as most of them have very large speed variability, and by their very name, are inherently step-by-step controlled. These motors can be supplied with integral gearboxes by manufacturers, and one is recommended to purchase the oscillator and pulse-shaping boards required, although I have made a prototype oscillator board with fine control and wide-range switching frequency control myself to go with a small stepper. Such motors work off a low-volt d.c. supply and thus are very safe and lend themselves to independent power supply arrangements reliable through any 'unforeseen' break in mains power supply, though the latter is now usually very reliable. For anyone contemplating a portable telescope or one remotely sited, I would strongly advocate the basic choice of a stepper motor. A second stepper unit could also be applied to the declination axis, on reasonably sized or even small, seriously used equipment, where a drive is desired.

The word, 'oscillator' may need describing to some - basically any control device is in this context an oscillator if it vibrates or switches current on and off repeatedly. Transistors, silicon-controlled rectifiers and capacitors - even thermal resistances are used in these, and circuits are legion, in variety, complexity or simplicity. Photoelectric cells and light-emitting diodes - neons or filament lamps, can also be increments of oscillators. Sometimes, various components are extremely miniaturized together in a 'chip' or integrated circuit - these are very small and can save time and cost, and are said to be good in terms of temperature compensation. Temperature changes can wreak relative havoc in electronic circuitry because often, without compensation, more current can go through a component, particularly copper-wire coils, at a lower temperature than at a higher one. Large parts change temperature slower than small, and Hz changes result.

I have corresponded with one person who has used an integrated circuit oscillator to control a stepper motor on at least two fair-sized reflecting telescopes (8-inch and

 PROGRAMME FOR MARCH 1979 At ORWELL PARK OBSERVATORY, NACTON, IPSWICH

TUESDAYS from 7 pm: Planetary Section Mar. 6th, 20th; Apr. [redacted]
Directors Mr. J. Deans, [redacted], Capel St. Mary 'P[redacted]e Gt. Wenham [redacted]
and Mr. J. Hood, [redacted], Ipswich. Whilst Mr. Deans is still a section director, his presence during the next few sessions can not be guaranteed owing to severe pressure of other work, but Mr. Hood and others will attend.

Tuesdays from 7 pm: Solar, Lunar & Planetary Section Mar. 13th, 27th; Apr. 10th
Directors Mr. J. Hood, [redacted], Ipswich
and Mr. M. Barritt, [redacted], Ipswich

WEDNESDAYS from 8 pm: Nebulae & Faint Objects Section Mar. 7th, 14th, 21st, 28th;
Directors Mr. D. Payne, [redacted], Wickham Market, Suffolk 'Phone Wickham Market [redacted] Apr. 4th & 11th
and Mr. M. Cook, [redacted], Ipswich 'Phone Ipswich [redacted]

THURSDAYS from 8 pm: Double Stars Section Mar. 8th? 15th, 29th; Apr. 12th
Directors Mr. J. Ranson, [redacted], Ipswich 'Phone Ipswich [redacted]
and Mr. D. Bearcroft. Others will be filling-in for Mr. Bearcroft awhile.

FRIDAYS from 8 pm: Variable Stars Section Mar. 16th, 30th; Apr. 13th?(Good Friday)
Directors Mr. R.S. Manning, [redacted], Ipswich 'Phone Ipswich [redacted]
and Mr. M. Siggers, [redacted], Ipswich

SATURDAYS from 8 pm: General Section Mar. 10th, 24th, 31st; Apr. 14th?(Easter)
Directors Mr. M. Barriskill, [redacted], Ipswich 'Phone Ipswich [redacted]*
and Mr. R. Adams, [redacted], Ipswich 'Phone Ipswich [redacted]
*Mike works nights; 'phone times somewhat restricted.

METEOR SECTION MEETS are usually held on Martlesham Heath outside Ipswich. Details of meetings and activities from Mr. D. Barnard, [redacted], Ipswich ('Phone Ipswich [redacted]) or from Mike Barriskill.

The next COMMITTEE MEETING is on March 17th, at 8pm at the usual place.

WINTER LECTURE PROGRAMME MARCH 23rd, 8 pm (Friday) at the FRIENDS' MEETING HOUSE, 39 FONNEREAU ROAD, IPSWICH. "Interstellar and Intergalactic Matter" is the subject of the evening, presented by Iain Nicolson. Bring yourselves and others.

Other meetings occasionally take place - for example, visits of other organizations to us, and of us to them. We aim to arrange at least a couple of trips to big observatories this year. Our provisional date for another OPEN DAY is September 29th (Saturday). Sometimes special observing projects are organized (such as participation in IJVTOP).

For MORE DETAILS about the ORWELL ASTRONOMICAL SOCIETY and activities, please contact any of the people already mentioned in the Observatory Programme, Editor Paul Burt, or Assistant Chairman, Mr. Alan Smith, [redacted], Ipswich, 'Phone Ipswich [redacted], or Treasurer, Mrs. P. Long, [redacted], Ipswich, 'Phone Ipswich [redacted].

PROSPECTIVE NEW MEMBERS ARE ALWAYS WELCOME. Ones and twos can be shown the Observatory (and weather permitting, some views through the telescope) after making sure someone will be or is up there - otherwise disappointment may result. All GROUP visits, however, must be arranged only through Chairman Roy Cheesman, [redacted], Ipswich.

TELESCOPE DRIVES, continued...

10-inch) and the data selectable from his letters is very interesting. The accuracy available from i.c. oscillators such as my correspondent used was the order of 10 times better than short-term mains via a synch. motor.

Now I've got started again, perhaps I'll be able to continue innext month's issue.

JOURNAL POST

When posting-off journals to members who usually receive them by post, I find some folk have forgotten to send s.a.e.s, stamps, or otherwise cover the sending, as is fairly easy to do in these fast-(or slow?) moving times. It would be much appreciated if after a reminder, if such becomes needed, thare is something done. Thanks RCA

MEMBER'S ADVERT: @ FOR ALL CLOCK REPAIRS big or S M A L L, ancient or modern, by competent craftsman Society member, 'phone Ipswich [redacted] (evenings) for all inquiries.

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

MARCH LECTURE

at the

FRIENDS MEETING HOUSE
39 Fonnereau Road,
IPSWICH.

on

FRIDAY 23rd MARCH 1979 at
8 p.m.

given by

IAIN NICOLSON, B.Sc.

on

INTERSTELLAR & INTERGALACTIC MATTER

ADMISSION FREE - EVERYBODY WELCOME