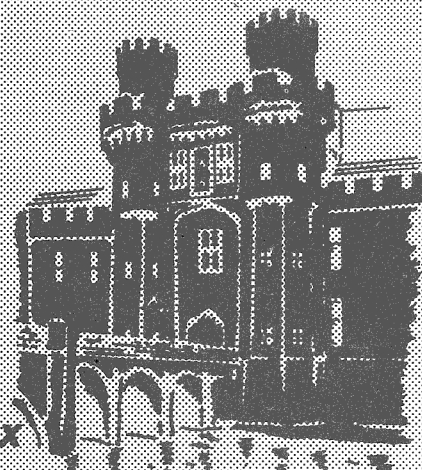


La Palma

GEMINI

Herstmonceux



Newsletter of the Royal Greenwich Observatory

No.10

April 1984

INT First Light

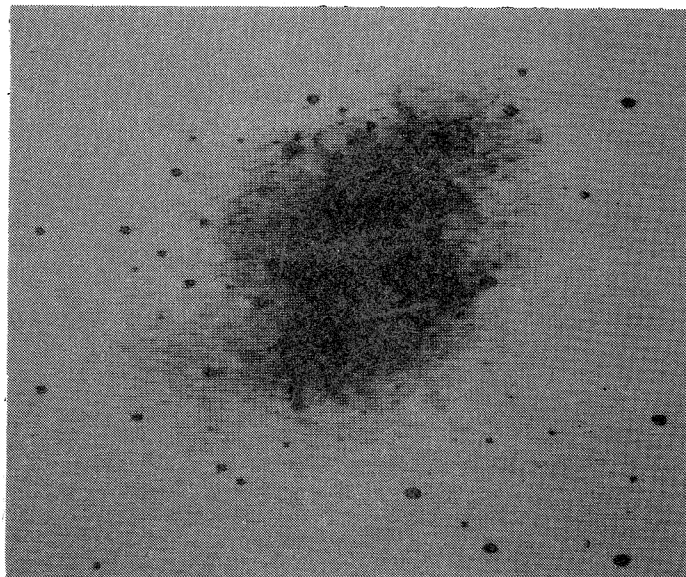
On the night of 1984 Feb 1/2, stars were first seen from the prime focus of the INT. The night was still and relatively calm. Unfortunately the R.A. drive was temporarily out of action while one of the radial pads supporting the polar disc was being adjusted. The main problems in getting the dome dark and the intensified TVs fired up were in finding all the appropriate switches - for example those to turn off the lights under the polar disc! Finally we could see the stars drifting past in both 2.5 metre and in the finder. In spite of the warm building and the fact the shutter had only been open for a short time, the images were 1 to 2 arcsec. Then came the first major task for the commissioning astronomer - to relate the star fields on the two different TV pictures, through the finder and the main instrument. This proved unexpectedly difficult and gradually the realization dawned that the two fields did not overlap. Depression was just setting in at the failure to resolve this problem when the lucky appearance of three bright stars drifting at sidereal rate into the prime focus TV field and a hurried search in declination with the finder showed that the finder was misaligned almost a degree to the north.

The final activity that night was to see if the telescope pointing was affected by the dome rotation. It was feared this might be so as a result of previous viewing with the finder and the realization that in places the building and telescope pier were in mechanical contact where polystyrene slabs or cement overspill had been left in between the structures. Indeed a 5 arc sec wobble in the telescope pointing was found when the dome rotation started and stopped. As a matter of some urgency, work is underway to improve this situation by removing the contact points.

The next night Feb 2/3, the R.A. drive was working again but the wind was high with gusts up to 80 km/hr. This meant it was not possible to open the dome except in the north. However it was possible to take the first steps towards bringing the telescope under computer control - the computer was reading both R.A. and declination encoders and in addition commanding the telescope to drive in R.A. Eventually after some experimentation setting the drive servos and commanding various rates, an acceptable tracking performance was obtained. This was achieved using only the velocity servo without taking account of positional feedback to the computer. This performance was acceptable for a rough determination of the polar axis alignment. Pointing at stars in the zenith and watching them drift in declination gives a measure of the misalignment of the polar axis in azimuth.

This drift was small (less than 5 arc sec in half an hour) suggesting an azimuth error of half a minute or less. Repeating the experiment with the telescope 6

hours over in hour angle and nearer the pole, in fact at declination of about $+70^\circ$, then showed a more serious misalignment in polar axis altitude of some 7 arc minutes from the desired position, the apparent pole about which the stars rotate in the sky. This apparent pole is distinct from, and 2 arc minutes higher than, the true pole (the extension of the earth's axis onto the celestial sphere) because of refraction.



This photograph of the Crab Nebula was taken from a single frame of the video recording made during "First Light" observations at the prime focus of the INT. The star identified as the Crab pulsar is the fainter of a pair of stars visible near the centre of the nebula.

For the third night in the "First Light" programme, the wind had dropped and hopes were high. However the seeing was initially very poor (worse than 5 arc secs) although this rather suddenly improved at about 2 am. With the computer now pumping out real coordinates to the LED indicators in the control room, the Orion Nebula was soon acquired in both finder and main telescope. At this point however considerable problems arose with focussing the INT. Later traced to the fact that manual focus did not work correctly when the telescope was in computer control, this difficulty proved both puzzling and irritating in the night. An initial focus made early on when the seeing was bad made possible the videorecording of TV pictures of the Orion nebula, the Crab supernova remnant and M51 the "Whirlpool" spiral galaxy. However an attempt to improve the focus when the seeing got

better proved disastrous and, with focus lost and unable to understand the problem during the night, no further videorecording or the planned check of the daytime polar axis adjustment proved possible.

The final night of the First Light programme came to a fitting climax when the seeing was found to be excellent with images 1 arc sec or better. These superb conditions were very gratifying, as the expectation of such fine seeing is what drew the UK Optical Telescopes to La Palma. As a result improved videorecordings of the Orion nebula and the Crab supernova remnant were made. Later on in the night the telescope was pointed at NGC 4151, the Seyfert galaxy in which a team of astronomers with strong RGO involvement had recently weighed the central black hole at 500 million solar masses. In between these observations, further more accurate checks were made on the polar axis alignment. Adjustments made since the first measurements two nights earlier had improved this but further small changes would be necessary until the final position was adopted. The night's work led to the discovery of a fault in the R.A. slow motion, in which the R.A. quick motion motors were taking current to oppose the slow motion drive! Obviously the identification and rectification of such faults is one major purpose of the Commissioning programme.

Relaxing at the end of the night with a bottle of Spanish brandy, the INT Commissioning team celebrated the success of the First Light programme and drank to the hoped-for scientific achievements of the telescope. Commissioning astronomers were impressed with the excellent conditions - clear from dusk-to-dawn on 4 consecutive nights with some excellent seeing. Let us hope all future observing runs will be as successful.

* * *

The design, building and commissioning of the new INT has depended on hundreds of people since plans for moving it were first mooted but the lucky few present during this First Light activity included Clive Amos, Tony Avon, Martin Fisher, Ian Hall, Arthur Milsom, Paul Murdin, Neil Parker, Michael Penston, Steve Preston and Reg Stokoe.

Michael Penston

RGO Manpower Reductions

Whilst the work on La Palma is proceeding at full pace, the RGO's staff on the island and at Herstmonceux have been reeling under the consequences of a large cut in the manpower and budget. The Astronomy, Space and Radio Board, under severe financial pressure, has decided that approximately 30 posts must be lost at the RGO over the next year. The normal process of retirements and resignations will not yield anything like that reduction and so special measures are having to be taken.

One step taken by the RGO's management has been to create a "redeployment list" of staff whose skills cannot be utilised within the ASR Board's new programme or whose posts are not consistent with future working methods. Those individuals are being encouraged to think seriously about premature retirement, but many staff are in the middle of their working lives. There is also the threat to staff in "mobile" grades of a compulsory transfer to another SERC establishment. Most of the scientists and other professional staff on the redeployment list are subject to that possibility. Once a transfer has been proposed, applications for premature retirement will not be accepted and so many staff and their families are having to face difficult decisions.

Once the reductions required for 1984/85 have been met, the future plans for the RGO's science programmes look more stable. The last few months have seen a good deal of speculation and uncertainty (a proposal to halve the total manpower was considered at one point) but it now looks as if many of the main projects will continue at close to the new 1984/85 level. The biggest casualty so

far is the programme to provide new instruments for the La Palma telescopes which will be hit by both staff and budget cuts. Re-instrumentation is the life-blood of world-class telescopes and so the RGO will be making a strong bid to the ASR Board for reinstatement of the programme.

Peter Davies



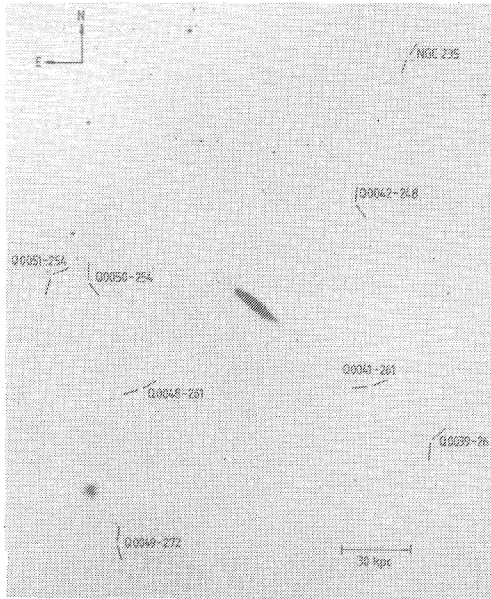
Prof John Kingman FRS, Chairman SERC visited the RGO on 27 January and is seen here with Alec Boksenberg and Janet Dudley who is entertaining them with stories from the archives. The Chairman's visit came at a time of very low morale at RGO amid rumours and speculation about the very future of the Observatory. Staff were somewhat reassured by his positive attitude to the future although with the main decisions resting with the SERC committee/board structure he could give no categoric assurances.

Discovery of bright QSOs in the fields of nearby galaxies

The spectra of high-redshift QSOs commonly show absorption lines due to the most abundant astrophysical elements, distributed in redshift from zero to the redshift of the background QSO. It is now widely recognized that these lines are mostly formed in the diffuse haloes of interstellar matter associated with intervening galaxies which are too distant to be observed directly, at least with ground-based telescopes. (Space Telescope, due to fly in 1986, should make it possible to search for the galaxies responsible for producing low-redshift systems ($z < 0.5$), as the exceptionally good seeing (FWHM ≈ 0.1 arcsec) will make it easier to resolve the faint, diffuse galaxy images from the bright, point-like QSOs).

In order to make full use of QSOs as probes of matter at earlier epochs, we must obviously gain sufficient knowledge of the properties of nearby galactic haloes. In the last few years we have learnt much concerning the halo of our own Galaxy, principally through IUE observations. However, there are many questions, of central importance to this problem, which cannot be answered by observations of the Milky Way halo alone, as these are of necessity conducted from our view-point within the disk. For example, how does the cross-section presented by a galaxy in absorption compare with its luminous dimensions? Are there gradients in the physical conditions and chemical abundance of the gas with distance from the disk? How does the size of the halo vary with galaxy morphological type? In particular, do dwarf galaxies, which may be abundant, possess extended gaseous haloes? How are galaxy haloes affected by group or cluster membership? Do galactic haloes show cosmological evolution over the time-scales sampled by QSO observations?

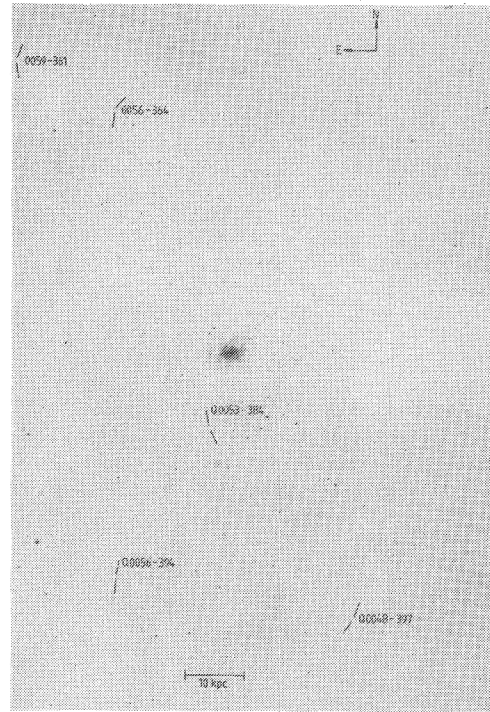
This is a formidable list of questions which are best answered by studying the absorption produced by nearby galaxies in the spectra of more distant sources, mainly QSOs and Seyferts, which lie by chance in directions close to the foreground galaxies and can thus be used to probe their interstellar media. At present only a few such cases of QSO-galaxy pairs are known and observations of these have indeed been successful in showing that diffuse interstellar gas, detected through absorption lines of CaII and NaI, commonly extends well beyond the optical dimensions of galaxies. However, for our purpose we would ideally like to identify many background probes in an area of the sky around a nearby galaxy, so as to sample its gaseous halo over a range of distances from the galactic disk. Furthermore, the background QSOs and Seyferts must be relatively bright ($B < 17$) for high resolution observations of their spectra to be feasible.



The fields of the galaxies NGC 253 (above) and NGC 300 (right), showing the locations of the QSOs and Seyfert galaxies discovered.

While this may at first appear to be a rather tall order, a team of RGO astronomers including Ann Pcoock, Michael Penston and myself, in collaboration with Chris Blades of the STScI, have been conducting for the last two years just such a programme of QSO searches which has proved to be highly successful. The search programme uses short exposure (12-20 minutes), low dispersion ($\sim 2500 \text{ \AA mm}^{-1}$) objective prism plates centred at the positions of nearby galaxies selected with preference for diverse morphological types and large angular dimensions. The plates are kindly taken on our behalf by staff of the UK Schmidt Telescope Unit at Siding Spring, Australia. An area $200 \times 200 \text{ kpc}$ centred on the foreground galaxy is scanned visually by Ann Pcoock to select QSO candidates, primarily on the basis of ultraviolet excess and/or evidence of emission lines in their prism spectra. In the second stage of the programme follow-up, low-resolution (210 \AA mm^{-1}) slit spectra are obtained with the Reticon Photon Counting System on the 1.9 m telescope of the SAAO. At this resolution it is straightforward to identify, among the sample of candidates, QSOs, Seyferts and background galaxies with bright and compact nuclei. To date this search procedure has been completed for 10 galaxy fields; in all cases we have identified several background sources sufficiently bright to probe the haloes of the intervening galaxies. Five out of the ten fields have yielded previously unknown QSOs; particularly interesting are NGC 253 and NGC 300, in the Sculptor group, where we have discovered respectively seven and three QSOs, as shown in the Figure.

The third and final stage of this work is now under way with a programme of high-resolution spectroscopy at the AAT aimed at detecting CaII absorption associated with the nearby galaxies and comparing the strength of the absorption at different locations in the galaxy haloes. These optical observations are a pre-cursor to more



detailed work in the ultraviolet with the Space Telescope: access to the ultraviolet absorption lines produced in the haloes will allow both a direct comparison with the redshifted QSO absorption lines and an in-depth study of the physical conditions and element abundances of halo gas. Having demonstrated that by careful searching of optimally exposed prism plates it is indeed possible to discover a significant number of suitable sources at interesting locations relative to foreground galaxies, we are now extending our search programme to several more fields and can begin to see within our grasp the means to make a major step forward in the understanding of galactic haloes.

Max Pettini

Upgrading the PDS

The PDS microdensitometer takes its name from the company that originally developed the system - Photometric Data Systems. This organisation was eventually taken over by Boller and Chivens who are of course well known for their telescope building activities. With the subsequent takeover of Boller and Chivens by what is now a rather large computer and engineering group, the PDS has become one of the products offered by the Perkin Elmer Corporation.

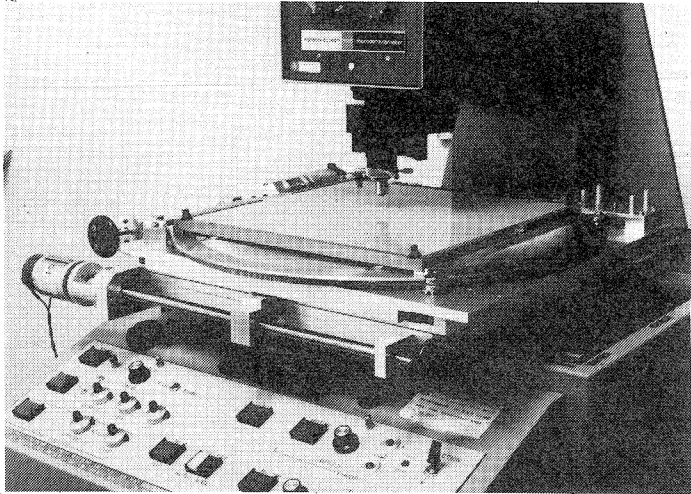
The RGO has had a PDS Model 1010A for approximately 10 years. During this time, the microdensitometer has provided astronomers with a means of accurately digitising photographic films and plates.

The PDS is a national facility and is therefore available to the whole UK astronomical community. Latest figures indicate that, on average, it is in use for approximately eight hours a day including weekends bank holidays etc. Non-RGO astronomers account for roughly 40% of current usage. The system has also been used by industry; areas of investigation have included the generation of display systems in military simulators and analysis of satellite photographs for mineral deposits.

Large numbers of PDS systems have been sold to research institutes throughout the world, including many observatories. A wealth of performance data on the system is thus available and it has been apparent for some time that significant improvements could be made to the system. The RGO is therefore currently working on a major upgrade to the PDS which will result in a system that can produce a significant improvement in data quality at high scanning speeds. The upgrade will also allow 14 inch square Schmidt plates to be measured more conveniently than at present.

From Twilights to Feathers

Although Perkin Elmer manufacture a slate bed PDS system which is capable of scanning Schmidt plates, the cost of replacing the RGO PDS, which was designed for a maximum plate size of 10 inches square, would be prohibitive. We therefore decided to look at the feasibility of providing a new carriage assembly for our PDS that would accommodate Schmidt plates. Scanning will be limited to ten inches in the Y axis but will permit a scan line of approximately 13.5 inches in X. The restriction in Y can be overcome by rotating the carriage assembly through 180 degrees. The carriage, designed and built at RGO by Brian Hucklesby and Jim Lester, will have provision for computer control of the rotation. As the photograph shows, the assembly has already been fitted on the PDS for initial trials. These proved encouraging and the assembly is currently undergoing further tests in the laboratory. It is our intention to provide plateholders for those plates commonly in use but we will retain the platen for the inevitable odd-sized plates.



The PDS microdensitometer showing the new plate carriage assembly, designed to hold 14-inch square Schmidt plates, in position.

Mounting a Schmidt plate in a plate holder necessitates some form of automatic focussing system since the plates sag under their own weight. Two such systems are currently under consideration but no firm choice has yet been made. It is likely that this will use some variation on the 'dam-busters' bombing method which is based on the principle of triangulation.

A major area for improvement in the PDS upgrade will be the electronics. The original system was of course designed several years ago and is now beginning to show its age. Our electronics engineer, Martin Ingle, is well advanced in the design for a new system and we hope to have the prototype ready by April 1985 providing we receive the necessary funds. The design goals of the electronic rebuild are to increase the speed at which accurate data can be obtained, and improve the quality of data especially at higher densities. The system will also be less susceptible to electrical noise and be more reliable than the present electronics.

Most users would agree that the present location of the PDS leaves something to be desired. Some of the recent stability problems in the machine have been traced to insufficient environmental control available in its present room. Although steps have been taken to minimise environmental effects, the only long term solution is to resite the system. Unfortunately, we must wait until the financial climate improves before we can do this, when it is also envisaged that the PDS itself be encased in an environmentally controlled cabinet.

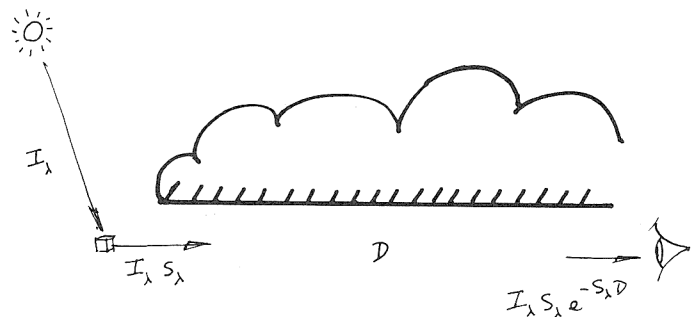
RGO's proposals for upgrading the PDS have generated a lot of interest in the astronomical community. The resulting PDS system will, we believe, offer researchers a faster, more accurate and reliable microdensitometer. The availability of such a facility will of course assume a new importance as La Palma becomes fully operational.

Emrys Davies

Those at RGO fortunate enough to occupy offices with a clear view to the South and West over Pevensey marsh and the Downs (mine faces the General Office!) get a splendid view in the winter of the phenomenon of sunset and the colours of the twilight sky. Indeed, the optical astronomer enjoys more than the usual opportunity to observe sunrise and sunset from some of the most spectacular sites in the world. The bustle of preparation for the night's work usually means that it is the former which is appreciated in the most relaxed frame of mind; perhaps over a beer or two before retiring to bed for the day.

The riot of orange, pink and purple to be seen when a ragged cloudscape is illuminated by the setting Sun is what usually captures the imagination and is so often recorded on film. But it is the amazing delicacy of the sequence of colours in a clear sky seen from a remote mountain top, low in contaminating aerosols, which I find fascinating to watch. Even in the clearest sky though, the phenomenon is not the same from day to day. Secular changes, due to upper atmospheric dust from volcanic eruptions or major desert dust storms, are of interest to observe. From the island of La Palma, the effect of Saharan dust is probably most noticeable during twilight and records of the appearance of the sky at these times may well prove useful to correlate with the other effects this natural pollutant is going to have on the life of the Observatory.

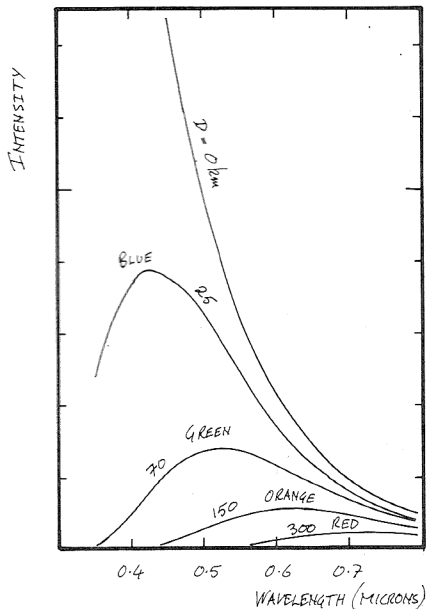
To try to understand the origin of these colours and to investigate the simplest possible model with which observations of the real thing might be compared, I felt that it might be useful to dip into the pages of AQ and see what Rayleigh scattering had to offer. In particular, I wanted to understand the beautiful pastel green sky you sometimes see between the orange-pink of the horizon and the pale blue of higher azimuths just after the sun has set or before it rises. These horizontal bands of colour are to be understood as the interplay between the scattering of sunlight into and out of our line of sight by the molecules of air which are much smaller than the wavelength of light. It is the first of these which gives the clear sky its characteristic blue colour because the scattering process depends so strongly on colour (it goes as wavelength⁻⁴). The scattering out of the line of sight modifies this by subtracting a proportion of the blue to produce the different twilight colours. This works in such a way that we can be left with a peak in the spectrum at a colour which depends on the distances involved. Perhaps the simplest way to understand how it works is to consider looking at a distant patch of blue sky along a path which is shadowed from direct sunlight by a large cloud.



When a large part of the sky is covered by cloud a distant patch of clear sky can appear to take on an unexpected colour.

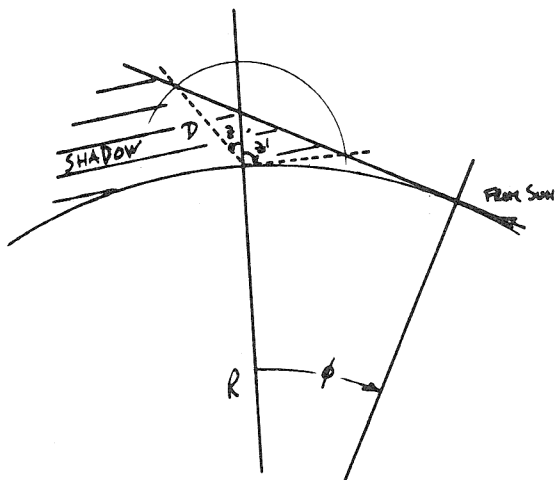
If we describe the spectrum of sunlight illuminating an element of air by I_λ , then the amount of light scattered towards our eye is proportional to $I_\lambda S_\lambda$, where S_λ is the wavelength dependent strength of Rayleigh scattering. After travelling a distance D in shadow, the beam will lose a fraction $e^{-S_\lambda D}$ at wavelength λ . Now $S_\lambda e^{-S_\lambda D}$ is a maximum when $S_\lambda D = 1$ so that, for a given wavelength λ , a distance can be chosen to give a peak in the spectrum at that colour, even green! If the incident sunlight is represented by a black-body at 6000 degrees Kelvin, you

get the spectra shown in the graph. They are very gentle curves of course and the colours are not at all saturated, just the pastel shades we observe. With the mean scattering strength from AQ, you would see green with a distance D of about 70 km.



The effect of Rayleigh scattering on sunlight for different thicknesses (D km) of air, showing that the peak in the energy distribution and hence the colour moves to progressively redder colours as this distance increases.

This picture is greatly oversimplified of course and aerosols, i.e. larger atmospheric particles, which scatter all wavelengths more or less equally, are going to make the colours even less saturated. Nonetheless it does seem to give a good feel for what is happening. During twilight itself, the geometry is different but the principle is the same. A distant part of the sky is being illuminated by the set Sun and we are viewing the scattered light through a shadowed atmospheric zone.



After sunset, the horizontal bands of pastel colours seen in a clear sky are due to sunlight scattered in the atmosphere.

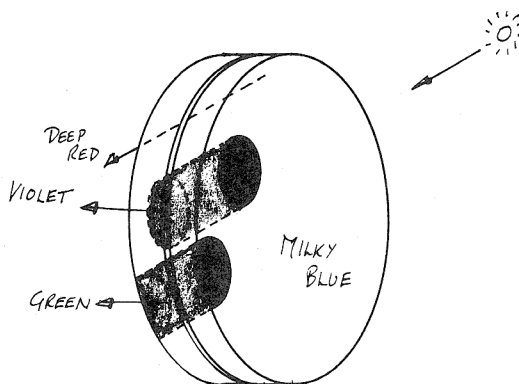
For a particular colour which will correspond to a distance D, the zenith distance z', z towards and away from the Sun respectively, is given by

$$z', z = \cos^{-1} \left[\frac{R}{D} (1 - \cos \phi) \right] \pm \phi$$

where R is the radius of the Earth and ϕ is the angular distance of the Sun below the horizon. Again this is much oversimplified because of aerosols, whose scattering depends more strongly on direction, refraction of the sunlight as it grazes the Earth and the fact that the density of the atmosphere decreases with height.

If you can't wait to get to La Palma to see how well the model works, don't worry; the RGO during a sunny lunchtime provides a splendid substitute. That ugly old lump of bubbled milky blue glass by the entrance to the gardens (we are told it once almost became a telescope) is a complete scattering atmosphere in miniature. By doing the following experiment, I worked out that a 1 cm depth of glass corresponds to about 20 km of air; a scale change of two million! So with the help of something to make a shadow, a hand is about the right size, you can make your own sunsets and reproduce the whole range of twilight colours in a most spectacular fashion. Beware, however, of being dubbed an eccentric, a fate which befell me long ago.

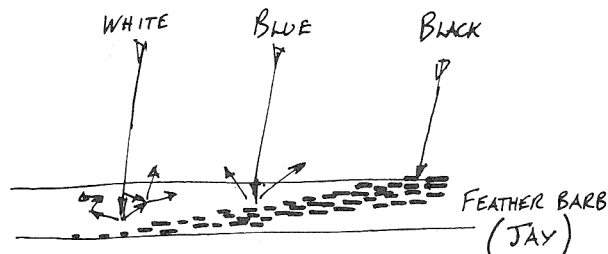
First, convince yourself that the milky blue is indeed due to Rayleigh scattering. Stand at the back of the disk and look through it in the general direction of the Sun. This works best in the winter when the Sun is lower in the sky; also there are usually fewer people around to observe your obvious eccentricity! You should see a splash of deep sunset red: all the blue, green and yellow has been scattered out of the beam by the 30 cm or so of pathlength through the glass. To mimic the twilight phenomenon, stand to the side of the disk and use your hand to make a shadow on the sunward face.



The unpolished mirror blank outside the formal gardens can be used to mimic the twilight phenomenon.

Start about a foot in from the edge and look into the shadowed zone from the side. As you move your hand closer to the edge, the scattered light passes through deep blue to violet. Now bring the shadow right up to the edge; the light diffusing through is now a faint grey-rose red. This is just like the colour at the horizon after the Sun has set. As you move your hand out and make the shadowed zone shallower, you pass through the whole range of pastel twilight colours; orange, yellow, pale green, light blue. It really works, try it! Let me know if you can understand the way light is polarized.

We can find a beautiful example of the same process at work in the animal kingdom. The blue wing-feather of a Jay, if you are lucky enough to come across one, will repay close examination with a strong hand-lens or a microscope. These feathers have a series of blue bands running across them at an angle. There is no coloured pigment at all save black.



The colours seen in the blue winged feathers of a Jay are not due to pigmentation but to scattered light.

The body of each barb consists of a milky white matrix of keratin, just like our mirror blank in its action. The blue scattered light is made visible by using blobs of

black melanin as a dark background. The melanin is on the surface of the feather at the black end of each band; the blobs sinking progressively deeper beneath the surface as you progress towards the white end. A great depth of scattering medium will scatter all colours equally; this is the reason the daytime horizon, even in a clear sky, appears white. So, this sequence of colour from deep blue to white is a direct physical analogy with the change in the blue sky as you look away from the zenith.

This method of producing blue colour is not at all uncommon in nature. The little blue damsel flies which can be seen hovering around the moat during summer and the blue face of the mandrill featured on Starlink are both coloured by scattering. Even blue eyes, especially those of Siamese cats, are examples.

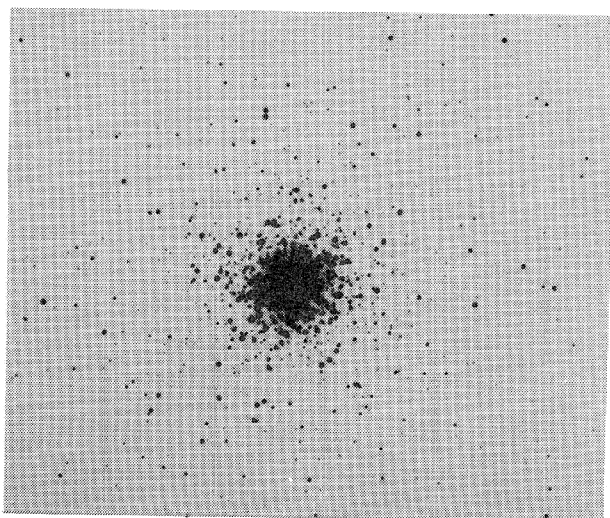
R A E Fosbury

Progress on La Palma (as at 2 April 1984)

During the first semester of observing the Intermediate Dispersion Spectrograph will be the principal instrument to be used on the INT. Following tests on the telescope simulator at Herstmonceux the spectrograph was shipped to La Palma in the autumn and was set up in a static configuration on the ground floor in order to test it together with its detector (the Image Photon Counting System which records spectral data from the spectrograph directly in a computer memory) and all the new computer software which has been written to control the instrument and data taking. During the move from ground floor to telescope the whole spectrograph was stripped down, a number of minor faults with Hartmann shutters, filter slides and flip mirrors were corrected, and everything was reassembled on the telescope. Here the stability of the spectrograph was again tested by examining its performance with the telescope set at different declinations and the turntable rotated to different position angles. Dianne Harmer and her colleagues were delighted to find that the physical flop and flexure was smaller, by about a factor of two, than it had been during the same tests at Herstmonceux. Several users of the software have remarked that the new routines are a joy to use and already a number of new procedures for scan correction in the IPCS, camera head rotation, spectrograph focus and focal plane tilt have been developed.

Commissioning of the Faint Object Spectrograph and Taurus will be delayed but the testing of the Prime Focus Camera should go ahead, as planned, in June.

Jacobus Kapteyn Telescope The 1.0m telescope has been named after the Dutch astronomer who, at the turn of the century, made pioneering studies of the large scale structure of our galaxy.



An historic first (guided) plate taken with the 1 m telescope of the globular cluster M3 on 1984 Mar 23/24 by Bob Argyle (60m IIIaJ+GG395).

During February and March a "task force" consisting of Derek Jones, Ralph Martin, Reg Stokoe, Bob Argyle, John Smith and Keith Pope has wired up the control desk, ironed out problems with the drive amplifiers, aligned the mounting of the telescope, tested the computer control programmes for pointing and tracking and taken a number of plates including a 60 minute exposure of the globular cluster Messier 3. Examination of this and other test plates showed up some shortcomings in the image quality and the commissioning team is now in the process of checking the mountings, support and alignments of the optical components in order to improve the performance.

Isaac Newton Telescope With the INT seeing "first light" in February (see Michael Penston's article in this GEMINI), one more milestone on the road to common-user operation of the telescope has been passed. However, the past few months have not been without their setbacks and these are almost certain to have a serious effect on the commissioning programme. The problem with the drive amplifiers reported in the last issue of GEMINI has now been resolved but there have been a number of other time-consuming problems during the last few weeks.

As reported by Michael Penston, the first of these was the discovery of an oscillation of the telescope whenever the dome was rotated. Telescope buildings are designed in such a way that the pier on which the telescope stands and the rest of the building are separated from each other at all points by a small gap, and any shaking of the building caused by wind loading or the reaction imposed on the whole structure when the motors start rotating the heavy dome structure from rest, should not cause any movement of the telescope itself. The coupling in the INT building has several causes and a team of people is now systematically cleaning out the gap at points where there is mechanical contact. In addition a team of vibration consultants has visited the island and conducted a comprehensive series of tests which, when analysed, will enable them to pinpoint those areas of critical importance. Until they have reported in detail it will not be possible to say exactly how much work will have to be done to isolate the pier or how long it will take.

The precise orientations of the two axes of the telescope are measured by reference to accurately ruled stainless steel tapes mounted on the perimeters of discs attached to the axes and read by stationary encoder heads. The system has been made to work reasonably well for the declination axis but for right ascension there have been problems with the stability of the reading heads and the mounting and alignment of the tape itself. Work is now in progress to remount the reading heads more rigidly and it may also be necessary to lift and re-lay the tapes to achieve greater uniformity of precision over the whole length of the tape.

William Herschel Telescope The telescope structure stands, fully erected, in Grubb Parsons's works at Newcastle. It is currently undergoing mechanical tests and tests of the computer software before being disassembled and stored in the summer. On La Palma the building is now up to dome rail level and ready for the dome which will be installed by Brittain Steel between May and the end of the year. The timescale for the installation of the telescope has been rendered somewhat uncertain by Grubb Parsons's announcement that they intend to cease telescope manufacture on completion of this project and it is not clear who will actually erect the telescope when the building has been completed.

Carlsberg Automatic Transit Circle On the night of 12 March the CATC was used to observe 200 stars in 2½ hours in fully automatic mode. The initial observations demonstrated the feasibility of the automatic operation and indicate that the desired rate of 1000 stars per night is possible.

General All those who have driven up and down the Mirca road (the shortest route from Santa Cruz to the site) will be relieved to hear that asphaltting of the surface will begin in September. Although there is no provision in the budget of the Instituto de Astrofísica de Canarias for the work, the autonomous government of the Canary Islands has approved an extraordinary budget to

underwrite the cost pending the availability of funds from central government. Unfortunately this seems to mean that the Mirca road will be completely closed for many months and access to the telescopes will only be possible via the much longer route through Garafia. However the Garafia road will be broadened and surfaced before the Mirca road is closed.

The IAC expects to take over the Residencia building from the contractors in November. Allowing about two months for decorating, furnishing and equipping means that they expect to be taking their first guests early in 1985. In 1985 June, the observatory will be officially opened by King Juan Carlos in the presence of the heads of state of the participating countries.

The governments of the Nordic countries (Denmark, Sweden, Finland and Norway) have approved a proposal to set up their own optical telescope on La Palma. Discussions are currently under way about sharing facilities and instruments with the British telescopes, and site testing is in progress to the east of the William Herschel Telescope. The telescope will be of 2.5-m aperture with an altitude-azimuth mounting and f/11 Cassegrain and Nasmyth foci (like the WHT); it will be housed in a rotating building and should be completed by about 1987.

The commissioning teams will be glad to see the arrival of summer and say goodbye to icy roads, horizontal icicles and frozen pipes in the temporary residencias; and summer will also see the fruition of their long months of frantic effort to get all the disparate components of a modern telescope system into operational order.

Paul Murdin and Roger Wood



The Seventh International Geodesic Conference was held in Rome in October 1883. It is not an occasion well remembered amongst scientists today, but it should be because it laid the foundations for the 1884 Conference which established Greenwich as the Prime Meridian of the world. That 1884 Conference was, in fact, the diplomatic icing on a very solid scientific cake of which the 1883 Conference was merely the main ingredient.

It was probably Hipparchus who first recognised and defined differences of longitude. He used Rhodes as his prime meridian; Ptolemy on the other hand used a particular small group of islands as his meridian because they seemed to him to form the western boundary of the known world. These were the Canary Islands (sound familiar?) and their use as a prime meridian continued well into the eighteenth century. In 1622 William Blaeu more specifically chose El Pico on the Island of Tenerife as the base line for his great terrestrial globes, whilst in 1634 the French, at the behest of Cardinal Richelieu, called for all European countries to use Hierro, the most westerly of the Canaries. This was still one of the lines being used by the French in the middle of the eighteenth century, although only as an alternative to Paris.

It was the publication of the first edition of the Nautical Almanac in 1767 that marked the beginning of the international use of Greenwich as a prime meridian. The United States Government officially announced its adoption of the Greenwich meridian for its nautical charts in 1850; the Imperial Russian Navy followed suit in 1853. The first moves towards establishing an official internationally acceptable prime meridian came in the 1870's. The unprecedented advances in rapid communications: railways, submarine telegraph cables and

so on, had already led to increasingly accurate time measurement and to the adoption of national time standards in most technically advanced countries - although it should be borne in mind that discussions on time zones, occasionally more than a little heated, were still going on, particularly in North America.

At the first International Geographical Congress in Antwerp in 1871 it was resolved that the Greenwich meridian be adopted for all nautical charts (but not for local coastal and harbour charts nor for land maps). Discussions continued at the second Congress in Rome in 1875, although G B Airy could still say in 1879 that "no practical man ever wants such a thing" as a prime meridian. Some eminent names echoed his thoughts, including Piazzzi Smyth and the American astronomer Simon Newcomb. The latter also declared, on the question of international time zones, that America would do as she wished, he could "see no more reason for considering Europe in the matter than for considering the inhabitants of the planet Mars".

By the beginning of the 1880's all of the major sea-faring nations, with the notable exceptions of France and Portugal, used Greenwich as at least the first of two or three alternative, prime meridians for navigational purposes. The French still used Paris, the Portuguese Lisbon. By the time the 1883 Rome Conference gathered, it was obvious that there was a general feeling of agreement that a prime meridian was needed and that, logically, Greenwich was the only choice (although someone did suggest Jerusalem). The British representative was W H M Christie, then Astronomer Royal, who saw Resolution III, 'That all the Governments represented should adopt Greenwich as the meridian', passed with a considerable majority.

Thus the 1884 Conference in Washington was really the diplomatic seal of approval on a great deal of scientific discussion. Forty-one delegates assembled in Washington and voted on Resolution II: 'That the Conference proposes to the Governments here represented the adoption of the meridian passing through the centre of the transit instrument at the Observatory of Greenwich as the international meridian for longitude'.

Of the twenty-five nations present only one, San Domingo, voted against: France and Brazil abstained. There had been much discussion but really very little argument. After all, 72% of world shipping at that time used charts based on Greenwich. The remaining 28% were divided between about ten different meridians. It was an unequal contest.

It is the centenary of this 1884 Conference that is being celebrated this year, particularly by the National Maritime Museum. The transit instrument has been taken to pieces, cleaned and polished and put back in working order. The line of the zero meridian will be marked in Greenwich Park by what is to become a permanent strip of white stones. A remarkable variety of activities will take place, some of which RGO staff will already have heard about! Roger Wood, for example, is organizing a celebratory cycle ride up the Meridian. Brighton Astronomical Society are walking along it to Greenwich. There will be meridian ale, meridian wine, meridian stamps and a whole lot more. A list of known events will be kept up to date on the notice board in the Castle Library, and more details can be obtained from the Public Relations Officer at the National Maritime Museum.

Our Exhibition Shop will be selling a selection of commemorative goods. And if you have children, June 26 is the date to remember. If you can stand the pace almost everything is going on in Greenwich Park that day. Including, would you believe, crossing the line, complete with immersion in an inflatable swimming pool and a certificate to prove it.

A more sober and scientific celebration comes in July with a week-long symposium on "Longitude Zero", again at Greenwich and again the details are on the Castle Library board.

Janet Dudley

1984 Open Season

The grounds of Herstmonceux Castle are open to the public each year from Easter to the end of September. Last year over 51,000 visitors were admitted.

Attractions include:

THE EXHIBITION - showing not only the work of astronomers but also the history of the Castle and the local flora and fauna.

THE GROUNDS - some 200 acres including formal gardens and a 2 km Nature Trail.

THE CASTLE - originally built in 1441. Apart from the rooms containing the Exhibition, the interior of the Castle is not normally open to the public.

THE 26-inch TELESCOPE - in 1984 for the first time this telescope will be open daily with a recorded commentary and astronomical displays.

In addition there will be special events during the year as follows:

Castle "open days" when the public may enter via the South Bridge to view special displays of material from the archives in the Staircase Hall. These dates in 1984 will be May 5-7, May 26-28, June 23-26, July 28-29, August 25-27, September 29-30.

Meridian Celebration Week 25 June - 29 June.

The RTC meridian telescope will be open with special displays and a recorded commentary on meridian astronomy and the history of the adoption of Longitude Zero.

Reflections Exhibition 7 July - 5 August.

This is an exhibition supplied by the Pilkington Glass Museum. It has been produced to commemorate the 150th anniversary of the birth in 1832 of Lewis Carroll, author of *Through the Looking Glass and What Alice Found There*. The exhibition tells the story of the development of the mirror: what types of glass and frames have been used for mirrors, mirrors for scientific applications etc. The exhibition will be located in the Equatorial Group. At this time the 36-inch telescope which is celebrating its 50th anniversary this year, will also be open.

Hours of Opening

Monday to Friday - Grounds & Teashop 12 noon-5.30 p.m.

Telescope & Exhibition 2 p.m.

Saturday/Sunday & Public Holidays - 10.30 a.m.-5.30 p.m.

Last Admission 5 p.m.

School parties and other organised groups are admitted throughout the year for Guided Tours of the Observatory. By the end of March this year over 1000 children and adults had either been on such a tour or booked and paid for a visit in the coming months.

Six Pips still going strong after 60 years

On 5 February 1924 the Greenwich Time Signal was broadcast for the first time. The practice started quite by chance a year earlier when Mr F Hope-Jones, an authority on electric clocks, was broadcasting a talk on the introduction of Summer Time and concluded by counting down from his watch the last five seconds before the hour. This practice was continued by the announcers for some time until, following a proposal by Mr Hope-Jones to broadcast an accurate time signal, a direct land line was installed between the Royal Observatory at Greenwich and the BBC control room at Savoy Hill. Sir Frank Dyson, Astronomer Royal at the time, gave a talk from 9.15 pm to 9.30 pm on 5 February 1924 to introduce the service. The signals were in the form of six pips at second intervals from second 55 to second 60. Two of the Observatory's Dent clocks were modified to send out the signals on the hour and the half hour. It was not until 1928 that the first fully automatic transmissions were made available

every quarter of an hour, and the following year the Dent clocks were further modified to run as synchronised clocks under the control of the Mean Time free pendulum, the Observatory's master clock.

In the early days the BBC six-pips time signal was treated very seriously. For example, the Astronomer Royal for Scotland, Professor R A Sampson, wrote complaining that the BBC was not 'treating signals with respect ...' 'sometimes they are sent through the middle of the performance of a band.' In reply, Mr J C W Reith (later Lord Reith) stated '... a change in temperament on the part of the conductor due to health or weather conditions, may easily make a difference of a minute, in which case the engineers, rather than cut out the musical performance, will so strengthen the Greenwich signals that they will rise above the performance ... The time signals will always receive first consideration.'

During the War, the Time Department of the Royal Observatory was evacuated to Abinger in Surrey, with a reserve station at the Royal Observatory, Edinburgh. The six-pips were generated from one or another of these stations until, in 1957, the Time Department was transferred to Herstmonceux. For the past sixty years the six pips have been transmitted 24 hours a day.

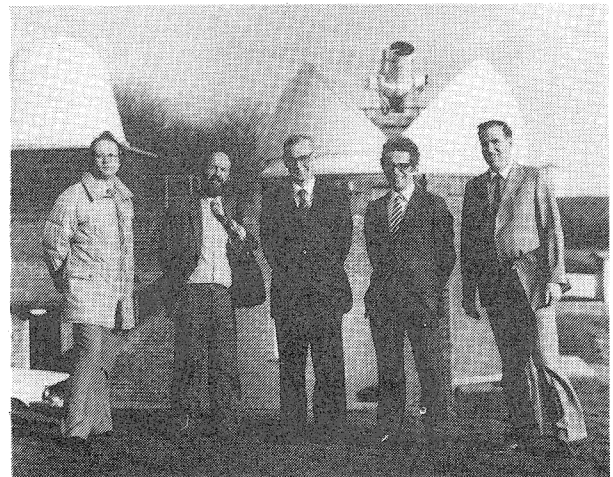
The clocks which control the six-pips time signal are, of course, no longer pendulum clocks but are now caesium atomic standards. The signals are transmitted to the BBC over a Post Office land line in the form of breaks in a 1,000 Hz carrier. A local tone is generated by the BBC which is switched by the signal from the Observatory.

Duplicate equipment at RGO and the BBC, together with two land lines, ensures that there is very little likelihood of failure of the system.

The Greenwich time signal consisted of six short pips until 1972 when it was modified to five short pips from second 55 to second 59, followed by a lengthened pip the start of which marks the minute. The introduction of the lengthened pip caused some comment from the public; one lady complained that it upset her dog and she had to switch off quickly before it started to howl!

Gradually the use of the signal spread and it is now broadcast throughout the world on the BBC home and world services. Its availability, reliability and accuracy are taken for granted by the millions who check their clocks and watches against it. In 1984, as in 1924, the time scale serves as a measure of the rotation of the Earth around its axis and Greenwich mean time is used in the navigation of ocean-going ships and for many other useful purposes.

(extracted from an article by Joy Penny in QUEST, 1974)



Richard Worth

Dr Ashley Catterall who became Secretary of SERC on 1 November 1983 in succession to Mr Brian Oakley CBE visited the RGO on 2 February 1984. He is seen here with John Pilkington, Peter Davies, Alec Boksenberg and George Wilkins outside the dome of the SLR.

CONFERENCES AND MEETINGS

RGO/Sussex University Seminars

Date	Venue	Speaker and Title
27 April	RGO	Dr J Meaburn (University of Manchester) "THE HALO OF THE 30 DORADUS NEBULA"
4 May	Sussex	Dr A J R Prentice (Monash University, Victoria, Australia) "ORIGIN AND EVOLUTION OF THE SOLAR SYSTEM"
18 May	Sussex	Prof I C Percival (Queen Mary College, London) "MODERN DYNAMICS AND ASTRONOMY"
25 May	RGO	Dr M J Barlow (University College, London) "THE EVOLUTION OF STARS TO PLANETARY NEBULAE IN THE MAGELLANIC CLOUDS"
1 June	Sussex	Dr J Binney (Oxford University) TITLE TO BE ANNOUNCED
8 June	Sussex	Prof M J Rees (Institute of Astronomy, Cambridge) TITLE TO BE ANNOUNCED
15 June	Sussex	Dr R Ellis (University of Durham/RGO) "GALAXY REDSHIFT SURVEYS: PAST, PRESENT AND FUTURE"

Seminars are held at 4.15 pm (tea from 3.45 pm), in Lecture Room PB1A7 at Sussex University or in the Castle Conference Room at RGO.

Max Pettini John Barrow

Workshops

EXTRAGALACTIC RADIO SOURCES AND THE OBSERVATORY ON LA PALMA

From 29 May, British astronomers should have, for the first time, ready access to an optical Observatory in the same hemisphere as the major synthesis radio telescopes. Thus we will no longer have to rely on the generosity of our American colleagues, or crane the AAT into the northern sky, to study radio galaxies or quasars that have been intensively observed at radio frequencies. Accordingly, it seemed an excellent occasion to gather a small group of astronomers working on problems raised by radio astronomy, with the objective of sorting out priorities and strategies (both observational and instrumental) in this area of research.

Proceedings began with Peter Scheuer (MRAO Cambridge) describing the wide range of problems which arise, or can be settled, at the boundaries between optical and radio astronomy. These range from deep questions on the matter density of the Universe and the origin of galaxies, through more closed questions on the nature of active nuclei and their collimated radio emission, to what Scheuer described as 'puzzles'. This category includes mysteries like why powerful radio sources occur exclusively in elliptical galaxies - an impressively simple fact which Scheuer warned us might have an explanation that was, 'in some fundamental sense, dull'. This possibility evidently haunts most workers in the area of active galaxies, where much time is spent correlating the baffling with the obscure.

The workshop moved on to questions of instrumentation. Bob Fosbury (RGO) and Alan Purvis (Durham) described the impressive array of instruments built or planned for the island. Spectroscopy particularly will be well served, with single-purpose efficient instruments like TAURUS and the Faint Object Spectrograph complementing the workhorse spectrographs. Andy Lawrence (RGO) showed results from

UKIRT, indicating the power of infrared photometry to sort out the various kinds of activity in galactic nuclei. He made a plea for there to be at least a JHKL photometer available for the La Palma telescopes, an idea which was generally supported by the meeting. Craig Mackay (IOA Cambridge) described the progress being made in techniques of image stabilization, and offered the prospect of resolutions of 0.3 arcsec. Naturally, there was consensus that expense should be no object in meeting this goal, but more practically it was agreed that an image stabilizer should be in modular form and usable with all instruments.

The sessions on research questions divided naturally into cosmological topics, and the mechanisms at work in nearby active galaxies. John Peacock (ROE) emphasized that one can extrapolate present data to show that radio surveys at middling flux densities offer the best chance of finding a redshift cutoff. By contrast, Chris Benn (Cambridge) pointed out the advantages of concentrating efforts in a deep survey of a small area. Observations at other wavelengths can be accumulated more quickly, and surprising relationships emerge. For example, the combination of the 5C12 survey and deep Schmidt plates has yielded evidence for a population of blue, faint radio galaxies. These objects are also found in Leiden/Berkeley deep surveys described by Marc Oort (Leiden). No-one at the meeting had any idea what they might be; another Puzzle. Malcolm Longair (ROE) discussed infrared and visual photometry of 3C galaxies. These objects are generally bluer than one would expect of a coeval stellar population, and the blueness correlates with the strength of the [OII] λ 3727 line. Here is a tantalizing clue that a galaxy-wide event, the blueness associated with star formation, is linked with a nuclear phenomenon (the emission lines).

Nearby galaxies were the subject of several discussions. Superb results from MERLIN for M87 (Virgo A) and Seyfert galaxies NGC 1068 and 4151 were presented by Ralph Spencer and Alan Pedlar (NRAL Jodrell Bank). Bill Sparkes (Sussex) showed amazing CCD images of the nuclear regions of Fornax A and NGC 1052. The complex dusty structures revealed in these images are a quantum jump in our mental picture of ellipticals, and constituted the prettiest Puzzle of the workshop. Robert Laing (RGO) pointed out that these dust lanes may well constrain the orientation of the radio jets in the host galaxy. Usually the dust lanes are edge-on so the asymmetric radio structures cannot result from relativistic beaming. Moreover, we hope not to find superluminal expansion in such objects! Charles Jenkins (RGO) discussed gas in radio ellipticals, and argued that if these objects are 'self-financing' and fuel their nuclei from stellar mass loss, then it is high time we found, and understood, the interstellar medium in ellipticals. At present only vestiges of it have been observed. Ian Wilson (RGO) addressed the question of how ionization is effected in active nuclei. He showed that the near-infrared sulphur lines are a useful discriminant between shock ionization and power-law continua.

This very selective account of the workshop shows that there are exciting prospects for research on active galaxies. We did not produce a Five Year Plan for radio astronomy, nor did we expect to. What the workshop accomplished was to show the participants where the pressure of research is concentrating to good effect; facts begin to cohere and diverse observations to lock together. I would guess that the redshift cutoff, the evolution of galaxies, and diffuse matter in radio galaxies, are areas of research where we shall soon see the telescopes on La Palma making fundamental contributions to our picture of The Universe.

Charles Jenkins

VERSAILLES WORKING GROUP

On 27 and 28 January this year, the RGO acted as host to a meeting of the Versailles Working Group, which is made up of the senior scientific advisers to the heads of state of the Economic Summit nations. In 1983 the Group

published a report on "Technology, Growth and Employment" and the meeting at Herstmonceux was to review progress since then.

The two day meeting, which involved the arrangement of simultaneous translation facilities, was a great success and the group were very appreciative of all the arrangements made for them.

Chas Parker

FORTHCOMING ATTRACTIONS:

- April 16-17 Meeting of European Science Research Council
- May 17-18 Workshop on "Microprocessors in SERC" (Neil Parker/Chas Parker)
- June 20-21 Herstmonceux Conference "Accretion (Discs)" (Michael Penston/Neill Reid)

Confirmed speakers:

Andrew King (Leicester)
 Mike Watson (Leicester)
 Geoff Bath (Oxford)
 Matt Malkan (Steward)
 Peter Meszaros (Penn. State)
 Alan Tennant (Cambridge)

Conference Summary:

Bill McCrea (Sussex)

Chas Parker

STAFF MATTERS

We regret to report the sudden death of Noel Curtis on 22 February only a few weeks after his retirement last December. At the request of Mrs Curtis donations received from RGO staff after the funeral (for which a wreath was purchased), were sent to the British Heart Foundation in his memory.

Retirements



John Pope

Joe Gietzen

John Pope who retired on 14 April joined the RGO Time Department at Abinger in 1944 where he was responsible for the maintenance of pendulum and quartz clocks. He arranged the changeover of the 6 pips signal from pendulum clocks to quartz clocks in 1949 using the switching phonic motors which he designed in conjunction with Muirheads and which, with modifications, are still in use today.

Between 1948 and 1954 John took part in three of the last solar eclipse expeditions organised by the RGO to Africa, Iraq and Sweden. These required accurate timing and cine photography of the eclipse using a method devised by R d'E Atkinson.

In 1956, just after he had moved to Herstmonceux his involvement with the Time Department came to an abrupt end. John relates what happened:

"I was installing time service equipment in the basement of the still unfinished West Building when I received a summons from the Astronomer Royal, Sir Richard Woolley. I hurried down to the Castle and standing smartly to attention in front of Sir Richard's desk heard him say 'Pope, I understand you are a qualified engineer so I want you to form an Engineering Department, recruit draughtsmen, set up a design office, and expand the Workshop so that we can start building our own instruments. But in addition I have another job for you - come with me.' He took me into the South Courtyard which in those days was full of large wooden huts. In one of these which housed the temporary workshop he introduced me to the newly-appointed Workshop foreman Mick Dermody. He then escorted both of us to another hut which was full of scrap iron, or so it seemed. There were rings and tubes, odd shaped iron castings and boxes marked 'glass with care'. Some had the remains of luggage labels tied to them others had only bits of string. Sir Richard, said 'These are the telescopes from Greenwich I want you two to set them up and get them working as soon as possible so that the RGO can start observing again'. With that he left us and when I had recovered somewhat I said to Mick Dermody 'How on earth are we going to sort this lot out - do you have any drawings?' Mick replied 'No there aren't any drawings but I do have these' and saying that he pulled out of his pocket some dog-eared postcards. 'These postcards were sold to the public at Greenwich before the war and they show what the telescopes looked like.' And so with the aid of these postcards and the memory of Jack Johnson one of the mechanics from Greenwich we assembled the 26 inch, 28 inch Astrographic and Yapp telescopes in the Equatorial Group domes."

That was John's first introduction to "large" telescopes; his only previous experience had been with the 3½ inch transit telescope used for time determination and on which he had been a regular observer. Incidentally John also observed at Greenwich, taking part in the programme of the simultaneous transit observations at Greenwich and Herstmonceux designed to determine the longitude of Herstmonceux.

In between building spectrographs in the new engineering department John started to become acquainted with even bigger telescopes and went with Sir Richard on observing runs at Mt Wilson and Mt Palomar. He took part in the initial discussions on the Anglo Australian Telescope in Australia in 1964 and had an exciting time flying around that country looking at possible sites. After that he had some involvement with the South African 40 inch telescope being built at Grubb Parsons, and then the INT. In 1968 he went to Canberra as one of the design team for the AAT and participated in its commissioning in 1974. While working with the AAT he travelled frequently between Australia and the UK and managed to see much of the world in the process and visited just about all of the world's major observatories.

On his return to the UK he became immediately involved in the initial planning of the NHO. He inspected several sites including Hawaii, California, The Cape Verde Islands and La Palma and carried out a number of cost studies both of sites and telescopes.

By 1975 he was devoting his time entirely to the design of the 4.2 m telescope and the procurement of this telescope has been his main occupation until now. Unfortunately John is having to retire before the telescope is operating on La Palma but at least he has had the satisfaction of seeing his magnum opus completed in Grubb Parsons factory in Newcastle.

We understand Alec has asked John to continue his involvement with the telescope as a part time consultant until it is installed on La Palma.

Joe Gietzen who took VPR on 9 April will be remembered in the future as the first Officer-in-Charge of the Observatory on La Palma having moved out to the island in September 1981 - and as such was the first member of staff to do so. He has been concerned with what is now the Observatorio del Roque de los Muchachos since its inception. In 1976 when even the site was still

undecided he became head of the NHO (Northern Hemisphere Observatory) Instruments Section and has worked on the project ever since.

He began his RGO career in 1954 in the Time Department at Abinger and later at Herstmonceux worked for several years in the Meridian Department. In those days there was a fiercely competitive team of observers on the RTC all anxious to have the record for the most number of stars observed in one night!

He leaves us just a few weeks before routine observing starts on the island and must be well pleased with his accomplishments over the past few years.

The first two staff to leave mid-career with 'premature retirement' under the RGO manpower reorganisation were Dave Munn and Sylvia Parsons from the Time Department who left in April.

Also Paul Wright and Andrew Read from Electronics are leaving soon having been propelled by uncertainties in the future to seek employment elsewhere.

We wish all of these every success in their future careers.

New Recruits



Richard Worth

Keith Tritton

Joe Gietzen has been succeeded as Officer-in-Charge of the Observatory on La Palma by Keith Tritton and he will move out to the island at the end of May. Keith and his wife Sue are no strangers to RGO having met here and worked here from the start of their professional careers until 1974. Then after working for two years in Thailand when Keith was a lecturer in Physics and Astronomy at the University of Chiang Mai, through the British Council, they transferred to the staff of ROE and Keith became Officer-in-Charge of the UK Schmidt Unit at Coonabarabran. He must have obtained some valuable experience there of operating telescopes at a remote observing site. In 1982 he was seconded to RAL as project scientist of the STARLINK computer network and since mid-1983 has been secretary of the AII committee based at Swindon.

At present Sue will be remaining in Edinburgh, but Welcome Back, Keith!

In the typing pool Mrs Sue Frizzell has replaced Lisé Karen-Alun who has been seconded to CERN for a year.

The success of the first year's work on the Laurie Cataloguing project has persuaded the Manpower Services Commission to extend the project by a further year from April. Under the initial agreement, individual staff (with the exception of the project supervisor, Adam Perkins) can only be employed for a maximum of one year and so a staggered change of staff has already begun. Janet Dudley and Adam are planning to exploit the educational value of selected parts of the Archives by preparing material for use by schools.

We are pleased also to welcome Ass. Prof. Tony Fairall who will be at RGO until the end of the year on sabbatical leave from the University of Cape Town. His

field of research is Active Galaxies and he is looking forward to a stimulating exchange of ideas with RGO's own active nucleus of researchers in the same field.

Congratulations

Congratulations to Donald Lynden-Bell now of IOA, Cambridge, on being awarded the Eddington Medal of the Royal Astronomical Society for his work on 'The collective effects in the dynamics of stellar systems'. For 7 years from 1965 Donald was at RGO, and amongst a plethora of stories about his time here we at Herstmonceux will long remember his delight in discovering that his house in Barcombe lay just a short way from the Greenwich Meridian, the intensity of his lunch time walks and talks with Bernard Pagel, and the exuberance of his lectures!

Cricket

Cricket - the epitome of an English summer day: the crack of leather on willow, the occasional ripple of applause, immaculately flannelled figures moving against the green. ... But - "RGO cricket - are we any good?" asked a member of the Time Department who shall remain nameless. "I always assumed it was like Charlie Brown's baseball team in Peanuts." Well, if the vagaries of one's team-mates can give the skipper similar moments of paralyzed despair ('Good grief!'), there are always the magical days when the sun shines and the team wins, and then, since we're all human, everything's roses.

For the RGO team, 1983 was an evenly-balanced year. "Played 14, won 7, lost 7 obviously indicates excellent planning and organisation of opposition", reflected one player on seeing the averages. Some truth in that, it must be admitted, and in terms of the quantity of cricket played, a considerable advance on the 5 matches won out of only 8 played in 1982. At the height of the season it was easy to forget the appallingly wet spring which effectively wiped out any play before June on the notoriously clay-clogged and moss-ridden RGO pitch. (Yet is it any wonder that all but one or two matches are played at home, opposing sides relishing the fine parkland setting and absurdly low clubhouse bar prices?) Dave Stickland, green-fingered pitch supremo, was gloomy. Then came the summer, and with the pitch smirking evilly under a relentless sun, it was time to drag the hose out of storage.

What of the game itself? The RGO team or, more accurately, pool of potential players, (some more potential than others), is composed of a few cricketers and a larger number of others of varying ability. Enthusiasm, the most important attribute, does not necessarily correlate with ability, and to a large extent compensates for its absence; though not a democracy, there is no place for the prima donna. With that proviso, all are welcome. Net practice, for the truly keen, takes place on Fridays after work, and Wednesdays too if there is enough demand. Most matches are played at home on Sunday afternoons, and are normally of 40 overs per side, no bowler being permitted more than 6 overs. These conditions vary: in particular, a handful of games, including the local derbys against the village pub, the Woolpack, take place on Friday evenings, and may be of 15 or 20 overs duration. Games can be predictable in the sense that, as the 1983 results suggest, half our opponents tend to be better, and half worse, than ourselves, and results will generally follow form. Our abject defeat by ten wickets at the hands of our strongest regular opponents, APV Crawley, on 31 July was compensated for a month later by victory by an identical margin over Orchard View caravan site. Some games are nearly always closely contested, such as those against the Woolpack or Moulseccomb, and there is always the possibility of an upset. Nothing last season quite matched the exciting finale against Moulseccomb in 1982, when from near-certain defeat at 13 for 4, RGO, needing 5 an over, hit back through Andrew Culton and Nigel Jones and with 7 required off the last three balls, Jon Hutchins hit his first-ever six and scrambled a leg-bye for a remarkable win. Yet there were individual highlights. Richard Brazier played in only four matches,

but his blazing 94 against UCL Physics Department took him to second in the batting averages, as well as affording great pleasure and amusement to the spectators. Philip Gibbs and Dave Pike were as usual impressive and consistent performers with both bat and ball, not to mention in the field, and Pike was yet again the most prolific scorer and six-hitter. Clive Tadhunter looked a reliable bat with a good technique in his first season, while Richard Ager, appearing twice at the end of the year, showed nice timing and tenacity. With the ball Hutchins and Pike took the most wickets (17 and 16 respectively), but the former was erratic and expensive: most bowlers had their good days but overall performances were patchy. Here the brightest prospect appeared in the final game of the season, when Charles Jenkins, on debut, startled a strong and confident UBAF side with his lively and accurate off-cutters, finishing with 4 for 13.

But for those to whom statistics are stultifying, and praise of individuals invidious, there remain the memories: Richard Brazier's all-out assault on UCL: David Calvert, for the Woolpack, bowled by a mesmerically slow leg-break from Richard Swifte which rolled over his shoulder as he knelt to sweep it, and trickled onto the stumps: Chris Lloyd, coming out to stop a hat-trick, joking with the bowler "Keep it off the stumps!" - the bowler obliging with a short ball outside the off stump which was edged in surprise to the keeper: the splendid batting display by Paul Lovatt-Smith, making 33 out of an RGO total of 67, despite retiring hurt halfway through: Dave Stickland coming into a defensive backs-against-the-wall situation at Stanmer Park, and characteristically bashing the ball all round the field with supreme disregard for tactics: and so on. My favourite memory is of the light-hearted afternoon with UCL Physics Department team. UCL skipper John Fordham gleefully charges down the wicket to his first ball from old sparring partner Bill Martin, only to find it coming straight at his head. He ducks awkwardly, falls over, and the ball flattens leg stump on the full toss. "Slipped out of my hand", explained Bill modestly.

So the future? A principal headache is the need to maintain a sufficiently large pool to be able to ensure an eleven (or thereabouts) for any particular Sunday, given holidays, observing trips, and the comparatively swift turnover of short-term staff of various kinds. Another is the pitch, which needs more money and attention than can be spared. Dave Stickland has worked hard and selflessly on it, but little real support has come from anyone else. Maybe the problems are in practice insuperable but since we're an Observatory, what price Astro turf?

Jon Hutchins

PS: Readers of Gemini are cordially invited to join the rush to arrange fixtures with us. No county sides please, but anyone of the calibre of, say, RAL 4th XI, should provide an evenly-matched contest! Contact William Lupton x3292 for details.

A funny thing happened

.... as I was flying home from La Palma

Two true stories selected from the many tales of the La Palma travellers.

THE FIRST STORY IS ABOUT RON BAKER WHO WAS FLYING IN FROM MADRID.

On this occasion, he was seated next to a rather attractive young lady. Ron, as some of you know, has recently (to his great credit) passed his Spanish language 'A' level. But in any case he is always ready for a chat, and, in this particular case it was clear that the young lady was not a seasoned traveller. Ron decided to break the ice with a little of his practised dialogue concerning both travelling by air and also his La Palma Observatory experiences.

During their 'in flight' meal, he picked up a small foil-topped container.

"Do you know" he said, (in his best Spanish).

"Do you know that these containers are packed at sea-level?"

"No" replied the girl, also in Spanish.

"Well they are" said Ron. "And what is more, they are packed at sea-level atmospheric pressure."

"Indeed" said the girl.

"Yes", said Ron. "But more importantly, we are now flying at a cabin pressure equivalent to 1500 metres elevation, which is much less than sea-level pressure."

"Caramba!" replied the startled Sefforita.

"Now of course" continued Ron. "It must be obvious to you that the contents of this container are now under pressure. And, if you are not careful, the contents could easily burst out when the container is opened."

"Si Si" answered the lass.

Whereupon, Ron, proceeded to demonstrate how the container should be safely opened.

He then emptied the contents into his cup.

Much impressed, the girl, having watched all this turned to Ron:

"Seffor", she said. "Do all Englishmen put Salad Cream into their coffee?"

STORY NUMBER TWO IS ABOUT PAUL MURDIN

Paul had arrived at Gatwick and was moving slowly forward in the queue of people working their way toward the passport checking desk.

Like most of his companions, Paul was feeling that slight, unreasoned apprehension that we all feel at these times. However, he was reassured that it was all necessary in the interest of National Security.

He was doubly reassured by the sight of the pair of officials at the checking desk.

Seated, a young lady was busily inspecting and, after a brief look at the owner, stamping each of the passports. But, by her side, was a companion.

He was a youngish fair haired man dressed in a rather crumpled suit. He was lounging against the desk with a bored look on his face. However, (perhaps it was something in the eyes) he had that watchful and casually attentive look that belied his relaxed appearance.

He was on the alert! Was he on the look-out for the unwelcome visitor? As Paul drew level with the desk, the young man suddenly came to life! His eyes fixed at a point along the queue behind Paul! Could it be the 'Jackal'? Was Carlos the assassin trying to sneak in?

The young man leaned towards the girl, and out of the corner of his mouth, he spoke.

"Ere", he said, "I still aint got rid of that bleedin cold".

Reg Stokoe

EDITORIAL

The long awaited "First Light" on La Palma has taken place but the pleasure at its success has been tempered by the manpower situation. In true 1984 fashion Big Brother, sheltered by the SERC umbrella, has decreed that 'about 30' staff should go this year out of a total of about 230. The "buff envelope" given to more than 60 staff has caused considerable despair and loss of morale around the Observatory and although it now looks as though the more drastic cuts once thought likely by the end of the decade will not take place, the very process of decision making in SERC ensures that unrest will continue for some time to come.

Items for inclusion in GEMINI No. 11 should reach me by June 8.

Margaret Penston

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