Editor: George Bolland, 25 Deneside, East Dean, Eastbourne, BN20 OHY.



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# Federation of Astronomical Societies

September 1984

## FIRST LIGHT ON LA PALMA

by Philip Taylor
(Brighton A.S.)

Commissioning a modern astronomical observatory is no longer simply a matter of putting up a telescope and adjusting the optics: nowadays an observatory has a huge, associated panoply of electrical, electronic and computing technology which must all be built, installed, tested and optimized for its working conditions. Compound that job with a remote site, difficult of access and with sometimes hostile weather conditions and you might begin to get an idea of the work associated with the completion of the new La Palma observatory in the Canary Islands.

The first phase of this ambitious new observatory consists of the 2.5 metre and 1 metre telescopes. The 2.5 metre is the refurbished Isaac Newton Telescope (INT), that worked at the Royal Greenwich Observatory (RGO) in Sussex until 1979, while the 1 metre (now named the Kapteyn telescope) is a completely new instrument.

The work of building and commissioning these telescopes and all the associated instruments has been carried out by the RGO at Herstmonceux and working there, my own role has been the production, installing and testing of the computer software for the instruments used to acquire the data.

By April of this year the pressure for a fully working INT was growing daily: the previously announced start of scheduled observing had been March 1st but this had had to be postponed to May 29th and this later date was a target that it was vital to achieve. I was scheduled to visit the new observatory for a couple of weeks around Easter: little did I know that while I was there the "First Light" (first real observations) would occur on the INT.

The travelling to La Palma had become almost routine, after all it was my fourth visit to the island. The flights often differ in detail, however, and on this occasion it was a plane to Tenerife with a short stop at Bilbao in Northern Spain. After an overnight stay at the quiet resort of El Medino at Tenerife we embarked on the last leg of the flight: a short 15 minute hop over to La Palma. As the aircraft gained height we had breath-taking views of Mount Teide in Tenerife with the summits of La Palma visible ahead of us, poking through the ocean of clouds.

The airport on La Palma is small and intimate with a garden in front of the terminal and luggage delivered to you by hand. The rugged part of our journey was ahead of us as we loaded our bags on to a taxi which was to take us up the mountain to the observatory perched 7,600 feet up in the summit of an extinct volcano.

The wide straight road from the airport and to the island's capital, Santa Cruz, soon gives way to a rougher, winding track as we left the metalled roads to start the real mountain climb. Driving through the clouds and the cool forests of Canary Pines we were above the clouds in brilliant sunshine and views extending

On arriving at the imposing new INT building that is the centre of the new observatory we met some rather disconsolate astronomers who had travelled to La Palma with high hopes of observing - "No, the telescope was still not operational." However, it was clear that things were getting close to working. Having settled in the rather spartan Portakabins which act as the accommodation on the mountain-top, I was ready to get stuck into my work using the computers on the telescopes. Whilst I was busy testing and debugging some computer software the visiting astronomers were set to work doing a bit of roadmending around the observatory. As one commented, "Taking a leaf out of Hitler's book, the unemployed have been set to work on the roads!" However, their disappointment was soon to evaporate. The weather was slightly unsettled during the daytime with some clouds blowing across the mountain-top. Soon the clouds were settling down to a level below the observatory and were set for yet another clear night. As we sat drinking afternoon tea in the rest room, a voice unexpectedly boomed out over the Tannoy: "The telescope is now operating under computer control!" Cups of tea were practically hurled aside in the dash to leave the room and hurry upstairs to the telescope control room.

The console room is an oddly-shaped narrow room which curves around the outer wall of the telescope area below the dome itself. It is packed with electronic equipment of various kinds including a daunting array of video monitors, VDUs and graphic display untis. Sure enough the telescope seemed to be tracking at the right rate, but there were still problems in actually locating the absolute position (RA and Dec) that the telescope was pointing to. The position of the telescope is determined by devices on the drives called encoders and to determine exactly where the telescope is in relation to the celestial pole and the local meridian a marker or "datum" is used. These electrical markers were not working and so the only way to set up the telescope was to point it at the zenith and simply set the encoders to the known position. How to point the telescope at the zenith was the problem; the simple answer was to use a spirit-level.

So by a painstaking process of holding the spirit-level at two mutually perpendicular positions at the base of the telescope tube the telescope was manually positioned to point to what we reckoned was the zenith. The drive encoders were then set and we could, in theory, find our way to any object at a known RA and Dec. Or so went the theory. To check our bearings we selected 5th or 6th magnitude stars from the Yale Bright Star Catalogue that were close to the zenith at the time. This position would minimise errors due to atmospheric refraction and slightly simplify our positioning problems.

Sadly it was not as easy as it was hoped. Each time we were pointed at a star we thought we knew, we were rapidly disillusioned as we found that offsetting by the expected amount did not find us on familiar to any amateur with a badly aligned finder scope! Our field of view on the TV monitor was about 20 minutes of arc and so was not large enough easily to recognize patterns of stars despite resorting to Norton's and then Atlas Coeli!

Eventually the only way to make progress was to find a star whose identity was beyond doubt. The brightest star around in that part of the sky was Regulus and so soon I found myself in a rather bizarre situation standing in the dark, cold observing floor with a walkie-talkie radio in my hand trying visually to point the telescope at Regulus. By a process of trial and error to the astronomer using manual drive controls the giant telescope tube eventually appeared to be pointing exactly at Regulus. A shout from the control room summoned me back in time to see the dazzling blaze of light as the star drifted into the field of view. Grabbing the TV controls to prevent a burn-out, we soon had the star in the centre. At last a fixed point and the drive offset errors could be calculated. Our crude spirit-level set-up was shown to be nearly a degree out!

The observations on this first night were to be of spectra of various distant galaxies using the new spectrograph and the new electronic detector called the Image Photon Counting System (IPCS), built at University College, London. In this system, every photon ("particle" of light) that hits an intensifier is recorded by a TV camera and the picture is then electronically cleaned up by special computer hardware. This system is so fast that each element, or pixel, of the picture is processed in one fifth of a millionth of a second (200 nanoseconds). Other electronic circuits correct for distortion in the intensifier tube and also reject blobs of noise in the picture caused by ion particles. The spectrograph itself was built at the RGO and has proved itself an excellent instrument. Two cameras are available along with the usual panoply of slides, shutters and gratings that make up a modern spectrograph. It is perhaps not always appreciated just how much skill in optical and precision engineering goes into such an instrument: its success is as vital to the observatory as the telescope itself.

A long period of settling in and adjustment of the instruments had preceeded this night of "first light" at the INT and so it was no surprise that these instruments performed almost flawlessly.

The sky remained clear throughout the night, with excellent seeing of about an arc second and so by the end of that memorable observing session good spectra had been obtained of the active galaxies NGC 4151 and 3C 390.3. Remarkably for the very first night, these observations have resulted in a scientific paper which is to be published in the Monthly Notices of the Royal Astronomical Society. This paper, by the astronomers on that night, Mike Penston and Enrique Perez, shows that the active galaxies observed have faded over the years since they were last observed and their spectra have also changed in ways which suggest something about the mechanisms within the galaxies.

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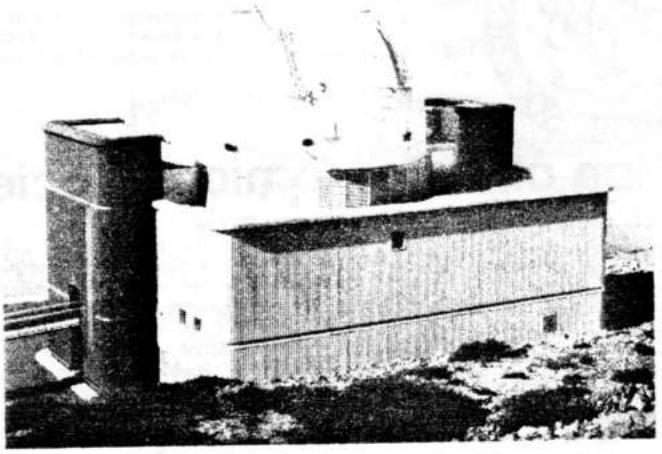
There was only one "first light" on La Palma, but the succeeding nights have proved every bit as successful as the first and the observing site has more than fulfilled the expectations with clear skies almost every night and excellent atmospheric seeing. The work of commissioning the telescope system on La Palma continues with many improvements and corrections to the original string and sealing-wax approach of the First Light night.





THE I.N.T. BUILDING AND DOME - La Palma
Photo: D. A. Calvert (R.G.O.)

## OBSERVATIONS OF PLUTO

D. Payne
Orwell A.S. (Ipswich)

Pluto the outermost (known) planet of the solar system, was at opposition on Friday 20th April. The apparent magnitude was 13.7 and should therefore have been visible in the 10-inch Orwell Park refractor. During the Easter week following the opposition of Pluto, we were blessed with excellent weather and clear evening skies, making it an opportune time for searching for this mysterious world.

Those of you who purchase the magazine "Astronomer", or who come up to the Observatory and read the Society's copy, will have seen the excellent star chart showing the predicted position of Pluto against the stellar background. With the aid of this chart the Nebulae and Faint Objects Section of the Society decided to attempt a search for the planet on Wednesday 25th April, using the 10-inch Orwell refractor.

We started searching about 21.30 UT, first identifying the brighter star patterns with binorculars. Having found the brighter stars in the vicinity of Pluto, we used the 2.5-inch finder to position the 10-inch telescope close ot the predicted position of Pluto. The 10-inch was now used with a x70 eyepiece giving a field of view of around 1/2 degree. The initial difficulty was identifying the stars visible in the 10-inch field with the stars shown on the chart in the "Astronomy" magazine.

The chart shown below is the region around the predicted position of Pluto on Wednesday 25th April. It is drawn to a scale five times larger than the chart in "Astronomy". The triangle of stars in the square box was identified first and then "star hopping" used to position the 10-inch field over the predicted position of Pluto. The magnification was now increased to x150 in order to darken the sky background. The circle on the chart below shows the field of view in the 10-inch telescope with this magnification. The seeing was quite clear and steady (although there was a fairly considerable glow from Felixstowe Dock lights). The star I have numbered 1 on the chart was the most easily seen. The star numbered 2 was next most easily seen together with the star marked A. This latter star was not shown on the "Astronomy" chart, so had we found Pluto? Careful observation of the 10-inch field revealed the star numbered 3 but we were unable to see the star marked

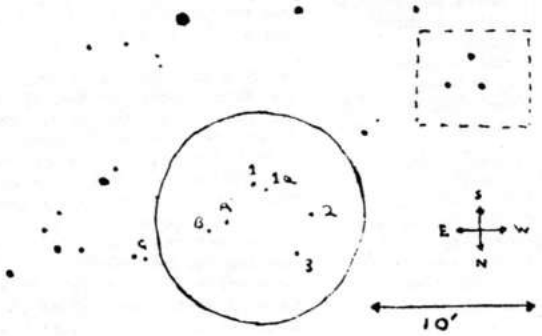
Although we were fairly certain that the star marked A (it was also observed by Stewart Dedman and Darren Payne) was Pluto, it could only be confirmed by further observations on successive evenings, to see if it moved. Luckily the clear weather held and Thursday night (26th April) was clear. This enabled a further observation with my 10-inch reflector at Wickham Market. I found the area of sky quickly, easily recognising the patterns from the previous evening. The stars numbered 1, 2, and 3 were easily seen and I could also see the star numbered 1a. The star at A on the previous night had moved to the position B, confirming that it was indeed Pluto!

I was unable to observe again until Sunday night (29th April). Pluto had moved a considerable distance to the position C on the chart and now formed a faint, close pair with another star. Unfortunately the weather deteriorated on the evening of Monday 30th April (and seems to have been poor ever since) and I was unable to confirm which of the two stars at position C was Pluto. I believe it to tbe the one nearest to the A and B positions, but cannot be certain because of the inaccuracies in the estimates of position.

If there were any others observing Pluto during April, I would be interested in hearing from them. It was clearly visible with direct viewing using my 10-inch reflector on the Thursday evening and would probably have been visible in an 8-inch with averted vision.








OBSERVATIONS OF PLUTO:
A = Wed. 25.4.84, 22.40 UT, Orwell Park, 10-inch refractor, x150.
B = Thur. 26.4.84, 22.30 UT, 10-inch reflector, x150.
C = Sun. 29.4.84, 23.15 UT, 10-inch reflector, x280.

## Society News Round-Up

STUART LONSDALE

ems for the next "Round-Up" should be nt to: 16 Joan Lane, Hooton Levitt, Rot' rham, South Yorkshire, S66 8PH.

LESBURY AS: An observing session with th -inch reflector proved the optics to be ay but the mount quite inadequate. embers were being asked to offer to make more stable one.

bservatory work includes preparing new utters before the onset of winter, and eneral painting.

visit was to be made to Cdr Hatfield's olar observatory at Sevenoaks.

RAYFORD MANOR HOUSE AS: With the 24-inch n use, members are showing an interest n photography and some decent results ave been obtained.

ariable star observing (visual) is going ell with some ten observers making over ,000 estimates in the year.

lans are already being drawn up for exhib tions during National Astronomy Week in 985. You are not alone!

AST NE AS: August Bank Holiday sees a ubl bserving session on the sea-front. he last one in May was clouded out.

he recent visit to Cdr Hatfield's observ tory was rounded off with tea and cakes nd as a token of their appreciation, a ottle of sherry was presented to dr Hatfield.

HUDDERSFIELD AS: Firstly apologies for an error in the last Round-Up when I said there was only one member at a recent meeting. It should have read, "There was only one member present, David Vincent, who was not directly involved with the competition, either as a competitor or a judge."

The open day was highly successful with over 90 people attending. The Jumble Sale was not so successful with a profit of only £8.

Plans are in hand for electricity to be laid on to the observatory. Quotations from the YEB will determine to go ahead.

Philip Heppenstall is constructing a scale model for the proposed off axis guiding syst or the 16-inch reflector.

NORTH EAST LONDON AS: Some collaboration with the local Radio Society seems possible after they loaned NELAS a couple of films on Radio Astronomy.

The 5-year vacancy of Secretary has been filled at last by Leslie Needleman.

When I mentioned that John Larard was a speaker at NELAS, I should also have pointed out that he is in fact a member.

Bernard Beeston and Stephen Merry have produced a computer program which they say gives accurate Julian Day numbers for all dates between 1582 and AD 4,000.

ORWELL AS: An open weekend is to be held from September 28th to October 1st. The observatory will be open to the public each evening.

The society "All Sky" camera recorded a magnificent fireball on the night of April 23/24. Estimated to be -14 magnitude, it was the first time that a fireball capt by the camera was photographed by a second station. This station being the Hewitt Camera group at Herstmonceux.

A visit was made to the Cambridge Institute of Astronomy.

the moment after the recent activity with the 50th Anniversary.

The August meeting will be the annual open meeting. Last year we had 83 people turn up and several new members.

New eyepieces are to be purchased for the 8½-inch "Voyager" reflector. Our most enthusiastic observer, Darren Swindells, has worn the others out with his marathon observing sessions! The "Voyager" is a telescope loaned out to members.

The Annual Sponsored Meteor Watch is to be held again for the Geminids despite two years of "foul" weather.

SCOTTISH ASTRONOMICAL GROUP (SAG):
AS of EDINBURGH - much observational work on noctilucent clouds, meteors and aurorae has been carried out.
RENFREW & DISTRICT AS - the Coats Observatory this year celebrated its Centenary. The Society has had an active year. Observational work includes variable stars, photography and meteors.
AS of GLASGOW - regular monthly meetings continue.
ASTRA - this year marks the 20th Anniversary of ASTRA. Unfortunately, premises in Hamilton have been lost, but monthly meetings continue at Airdrie and Largs. The Waverider "shuttle" project may see rocket tests in 1984.

It is interesting to note that out of the 72 member societies of the FAS, only two, Edinburgh AS and SAG, are Scottish. Room for improvement from you Scots.

SAGAS: The SAGAS Meridian Centenary Walk took place on August 17th to 20th. Total distance estimated to be 70 miles. The route had been chosen to stay as close as possible to the Meridian, while remaining almost entirely on Public Rights-of-Way. The walk is from the South Coast at Peacehaven to the Old Royal Observatory at Greenwich.

A cricket match, SAGAS v RGO, will take place on Sunday September 23rd at Herstmonceux.

The Pro-Am Quiz held at Herstmonceux was won by the amateur team. Final score being 75 to 51.

September 29th is the date for Southampton AS 60th Anniversary meeting.

SOUTH WEST HERTS AS: A "bring and buy" sale after the AGM raised about £20 for society funds.

A barbecue was held on July 7th.

Each member has been sent a questionnaire to determine their interests or otherwise on Astronomy and the running of the society.

Suggestions of a budding Horace Dall in the society were prompted by a talk given by Tom Walsh on the design and construction of his 4-inch off-axis (Herschelian?) reflector. Photographs included some stunning shots of the Foucault test and some excellent pictures of the lunar surface taken with the instrument.

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### FREE SMALL-ADS

Any private individual belonging to a member society of the FAS can place a classified advertisement free of charge. Please keep the wording reasonably short and send the copy to me. I will do my best to include the ads in the next following issue but I cannot guarantee anything.

EDITOR

## Review

ASTRONOMY TODAY (PLANETS, STARS, SPACE EXPLORATION) by Dinah Moché. Kingfisher Library of Knowledge (Kingfisher Books Ltd) pub May 25th 1984, pp 96. £5.95 hardback.

"This exciting, beautifully illustrated, full-colour book gives a clear presentation of the most up-to-date information on the latest discoveries and speculations about our solar system, our galaxy, and what lies beyond."

That is the opening paragraph of the publisher's descriptive which accompanied this book. Such descriptives are often over-eulogistic, but not so in this case for every word of the above is true and I could not sum up Dinah Moché's book any better than that.

With its rather hackneyed title, you could be excused for thinking that ASTRONOMY TODAY is yet another rehash of updated popular astronomy, but in fact, with its excitingly yet accurately written style, it is refreshingly new and truly does give a most clear presentation of the astronomer's present understanding of the subject. I haven't read a better presentation in its class.

With only 96 pages, though of fairly large format, its depth, unlike its scope, is necessarily limited, but every page is a source of wonder at the incredible amount of data they marshal. The data is set out in a way making it easily accessible as a source of reference for those who "know it all", whilst the accompanying script and explanatory material of the host of illustrations make it an exciting treasure trove for the young enquirer eager to "know all about it" without fear of getting bogged down with incomprehensibles.

There are none of the usual photographic lollipops but instead all the realistic, almost animated illustrations are dynamically presented by an original artist, Harry McNaught, who clearly has a natural bent for displaying anything associated with space missions, including both details of the various craft and their mode of operation, down to space travellers' views of planetary features as dictated by the recently acquired data.

Readers who are aware of the reviewer's tendency to criticism in previous reviews will wonder when it's coming. It isn't. One thing that has always riled me in books popularising astronomy is the tendency to dogmatise on the purely speculative. Instead, it was a joy to read of the "speculations about our solar system, our galaxy, and what lies beyond" (the paragraph quoted above) presented so modestly by the author. As far as I can see there is only one mistake: "The Great Red Spot of Jupiter ... Every six days it travels completely around the planet." (It's really the material in the Spot that rotates around inside it about every six days.)

This is an English edition of a book published in America in 1982 and nearly all the acknowledgements by the author are due to the various NASA organizations. which accounts for the book's modern space-oriented outlook. Under the British Library Cataloguing system, it is listed as "Astronomy - Juvenile Literature", which I suppose is what it is, as it would make a first-rate present for any boy (almost guaranteeing to "switch on" those that aren't, I would guess), but I can admit to allocating a place for it in the "very useful" section of my own bookshelf!


# Herstmonceux '84

HERSTMONCEUX 1984

The annual convention at Herstmonceux will take place on Saturday October 6th. As in previous years, this will be an all-day event with lectures, visits to the RGO facilities, trade stands, displays by national societies, competitions (see June issue of the Newsletter), special scheme for 1984 "Computers in Astronomy", RGO exhibition and shop, bar, evening buffet. Speakers will include Professor G. H. A. Cole, Heather Couper, Dr. John Gribben, plus Ian Ridpath's "Call My (Astro) Bluff". Tickets for admission will be - Member societies £2.50 per person, Non-members £3.50. Luncheons £1.70 and £2. Evening buffet £3.50. Numbers for admission are restricted - evening buffet is restricted to 150, so book early! Societies' treasurers are reminded that subscriptions are due on August 31st and should be paid to enable their members to take advantage of the reduced admission charges.



## Letters

Derek Hufton, Chairman of West Yorkshire AS, writes:

Dear George

Thank you for the parcel of Issue 1 of the new FAS Newsletter. I feel this is a very useful addition to the Federation's services as the majority of local society members are remote from the impact of the Federation. The FAS has long been regarded by many as an organization for officials of local astronomical societies, but this kind of initiative should help to change that.

I would suggest that the Society News Round-up is a mandatory feature of the Newsletter, as the Journal does not get such a wide circulation within societies as the Newsletter obviously will. I also like the idea of a regular "practical" section, for example, the making of the nocturnal in Issue 1. In fact, the overall format and content were very well balanced.

I sincerely hope the new format Newsletter can be maintained. It is bound to widen the appeal and awareness of the Federation to the "ordinary" society member.

Yours sincerely

Derek Hufton

SYMPOSIUM ON PHOTOELECTRIC PHOTOMETRY
7th/8th/9th September 1984

This weekend event is being organised by the IAPP (International Amateur-Professional Photoelectric-Photometry) and will be hosted by the BAA and RGO at Herstmonceux Castle from 1400 hours on Friday 7th September to late pm on Sunday 9th September. The programme of formal talks covers basics, instrumentation, observing, data reduction, case studies and results and the informal periods will give ample opportunity for discussion, questions and short papers from those attending.

Registration fees range from £4 to £19 and, in view of the short time to the date of the event it is suggested that anyone interested should contact Norman Walker at the RGO, Herstmonceux Castle, Hailsham, East Sussex by telephone on (0323)833171.

DICK CHAMBERS
(Crayford Manor House A.S.)

I have received several letters supporting this new format newsletter, and I would like to thank Ray Williams, Michael Purser, Frank Phillips, Aubrey Handford and Rob Moseley for taking the trouble to write in with their comments.

Any letters on any Astronomical subject would be most welcome. Please send them to me at the address given at the top of page one.

George Bolland

## Book Review

A new paper back published by the Ordnance Survey is called topically enough, "The Greenwich Meridian" and explains why this line through the centre of a London telescope was chosen as the starting point for all the world's maps and the basis for all the world's time zones. The story involves a king's mistress, American railways, the man who weighed the Earth and the road to Timbuktu. As well as relating the history of the meridian, this book traces its path through England (with the aid of Ordnance Survey extracts) and around the world, and explains the principles of the subjects associated with the meridian - navigation, mapmaking and the measurement of time. This is a clear, informative and well-illustrated book and at £1.95 is well worth buying.

DAVID GODFREY
(Eastbourne A.S.)

The 1984/5 ASTROCALENDAR should be available at Herstmonceux '84. We are trying to keep the price down to last year's level (50p) but this is subject to printing costs and postage, etc. The new issue will include details of Halley's Comet for its return in late 1985.

NEXT ISSUE

The next newsletter will be sent out late November with a deadline for articles and adverts of 3rd November. All items should be sent to the Editor.