WHAT IS THE ZODIAC?

by Harry Brierley

(Northants Natural History Society - Astronomy Section)

The nursery mnemonic which begins with "The Ram, the Bull, the Heavenly Twins" reminds us that the earliest Zodiac was simply a great circle of constellations through which Sun, Moon and planets moved, and a Babylonian statement that "the Sun follows the Moon's path" was studied first and considered more important.

By 1,000 BC, carvings of bulls, lions, female figures wearing horned ears, scorpions, centaur-archers, sea-goats and water-pourers could all be found in the Euphrates area, and though much later in time than the probable origin of the constellations, the iconography is the same: carvings and constellations must both have begun in the same country.

When? May we not speculate that the symbolism of the four cardinal figures is too appropriate to be coincidence? Look at the seasonal points (equinoxes and solstices) for the period 3,000–2,000 BC, with the Bull, symbol of Partility and new life, marking the Spring. The Lion in Summer with the Sun in royal power and majesty, the hot dry Autumn Scorpion, and the Water-bearer pouring out the Winter rains. The Lion was still a mid-east beast then, of course.

This Zodiac was used "for times and for seasons", the calendar had twelve months, each beginning with the first observation of the new Moon. But as this only gives a year of 365 1/4 days, an extra month was inserted by royal decree every two or three years as so to keep new year roughly in line with the Spring equinox. At first this was probably done by looking at the state of the crops, then by an ancient, but much more accurate, the Sun's position in the Zodiac - such were sometimes five days out — and finally they discovered that 19 years is very nearly equal to 235 lunations, and another introduced to Greece by Meton, who had been to Babylon. The use of this cycle to correct the calendar regularly without observations probably cost the Babylonians the discovery of precession.

Despite the Moon, by 700 BC, the ecliptic was recognized as central to the zodiacal belt, it being virtually constant relative to its starry background, unlike the paths of Moon and planets. From then on lunar and planetary positional astronomy, and the prediction of eclipses, were much more accurate, and we can date historic events almost to the day. It is not that the Babylonians made frequent observations, but they had been at it a long time, and were able to erect an enormous superstructure using their sexagesimal arithmetic. We still use this today in trigonometry and the division of the hour.

To produce a precise and (they thought) permanent reference-grid on which to hang their calculations, the Zodiac was remodeled at the latest by 419 BC into twelve Signs, each of 30 degrees. Ideally, the constellations would have been all of the same length, but the star-patterns did not call for, so they wiggled the Signs round the ecliptic until they fitted the existing constellations to best advantage. Their starting-point was 26 degrees celestial longitude, (1950), which they made 0 degrees. The point is near Eta Piscium. If you now follow through on Norton's Atlas in 30-degree steps eastward from this point, you will see who gained and who lost in "territory". It was a good compromise, but Virgo lost her legs to Libra. The new system was sidereal, tied to stars not seasons.

In our own century, controversy has raged as to whether or not the Babylonians discovered precession, but after reading the arguments it seems most likely that they may have adjusted things to fit the facts without bothering too much about causes — a pragmatic approach. For a long time two Spring points were in use side by side, first Aries 10 degrees (our 36 degrees) and later Aries 8 (our 34), which came in without replacing the former, just as we use tables and atlases geared to 1950 and 2,000 epochs. We know what we are doing — did they? There is no direct evidence, but a detective would be suspicious.

One "adjustment" had been made long before: so called "the insertion of Libra". In the beginning, that constellation was simply "the Claws" of the Scorpion, and so it remained in the west down to Roman times. But in Babylon, the Claws became the Balance as early as 1,000 BC and probably much earlier. The Autumn point had shifted from the Scorpion's head to his Claws by 1,400 BC, Alpha and Beta Lyrae now marked the equinox — equal (balanced) day and night. There could hardly be any other reason for introducing a non-living member into the Zodiac. Both names were then used as the twin took them.

Eventually their astronomers had fine work to their credit — particularly on lunar and planetary positions and on eclipses — but for our final transformation we turn to the remarkable and irreverent people who make the mathematical Zodiac their own, and named it the Zodiacos Kiklos, the Circle of Zodies or little animal figures, thus reducing the majestic sky-gods to something like their version of china dogs.

The Greeks were not so much arithmeticians as geometricians. And they observed the equinoxes because they wanted to establish exactly the points where equator and ecliptic cross each other. These points, and many observed star positions, they hung on the sidereal Zodiac, thus making the discovery of precession inevitable.

Thanks to that great encyclopaedist of ancient astronomy, Ptolemy, we know who and how.

Comparing his own observations with those of earlier Greeks, Hipparchus found that all the stars had moved relative to the equinoxes, and that the Spring point of his own time was 0 degrees Aries (it is near 30 degrees 1950), and that point, carrying the whole ecliptic, continued on next page ...
Papers consulted:

and much helpful correspondence from:
Jean Meeus (Belgium)
Ronny Martens (Belgium)
Christopher Walker (British Museum)

FEDERATION NEWS

HERSTONCON '84 - COMPETITION RESULTS

Magazines:
Brantree, Halstead and District AS won the prize of a £25 voucher donated by Ron Hebb. The judge was Ian Kipps.

Instruments:
Peter Montgomery of Worthing AS won a book entitled "Telescopes" for his 15" Dobsonian telescope. The prize was donated by Norman Fisher who also judged the items.

Photographic:
was divided into three sections; all were judged by Robin Scagell.

(a) Slides
1st prize John Ellis of Mid-Sussex AS who won a book donated by Wylie & Sons.
The 2nd prize was awarded to Ray Ratt, also of Mid-Sussex AS, who won a small Planisphere donated by Astro-Instruments.

(b) Black and White prints
Alex Vincent of Worthing AS won a large Planisphere donated by Astro-Instruments.

(c) Colour prints

Art:
1st prize to Peter Fisher (Brighton AS) for his magnificent mural. The prize was a book donated by Brookhirst-Clorence Fuller.

2nd prize of a Spaceprints calendar was awarded to June Nelson-Tomson. The judge was Bob Marriott.

SUBSCRIPTIONS 1984/85

The current subscription year started on September 1st. Please check with your treasurer/committee that your subscription has been paid. If not, renew at the long standing rate of £7.50, to give a total of £20.00. The next newsletter will be limited to those holding full membership. Please note the new address:

Earth and Sky
27a East End, HEBDEN BRIDGE, West Yorkshire HD7 8BG
Tel: Hebden Bridge (0422) 846443

ROSEMARY NAYLOR is now in Yorkshire selling astronomical material at "EARTH AND SKY".

(Changing Information Centre)

Please call on your way to the Amateur Astronomy Centre to buy FOCUSERS, MARS MAPS, SLIDES, SHUTTLE PHOTOGRAPHS, FILM, etc., etc.

Shop: Hebden Bridge 845445
Home: Todmorden 7767

FEDERATION NEWS

ASTRO-CALANDAR 1986

This year's popular publication can be obtained from Rosemary Naylor, 256 Bacup Road, Todmorden, Lancashire, OL14 7HA. The price is £1,00 per subscription, or £2.00 for a 10-year subscription, by Bob Owens of the Cardiff AS and contains monthly charts of stars and planets, with descriptive notes on observing them. It is very good value at 10p each, £1.00 for 10 post paid. Please write in bulk and make cheques payable to the Federation of Astronomical Societies.

FAS HANDBOOK 1984/85

These are now available and paid up members will receive a copy. Extra copies will be available to members of FAS Society can be obtained from the secretary, the treasurer, or from Brian Jones, the Handbook editor. (Non-members of the FAS society will please send £1.00 per copy.) Make cheques payable to the FAS Society.

The Handbook has been extensively revised, listing addresses of officers, (p.22) societies and other organizations, suppliers of equipment, magazines etc., and places of visit. In addition there are articles on observing telescopes, observatories and domes.

SECRETARIAL CHANGE OF ADDRESS

Rosemary Naylor now lives at 256 Bacup Road, Todmorden, Lancashire, OL14 7HA. Please add the telephone number to the entry in the new Handbook:

Todmorden 070 6818 7757

Reaction to this newsletter is still active and seems to be increasing, but that means you can all go back to sleep! Please keep the items flowing in — long or short it matters little, although I would say that I prefer articles to be based upon the author’s personal experiences or observations rather than paraphrased from books or magazines.

Does anyone have a suitable name for this newsletter? Your sagacious council has searched its collective brain for a name and come up with absolutely nothing (not surprising). If anyone has any ideas I’d like to hear them.

Finally, although this may be a little early, I would like to wish all astronomers everywhere a very merry Christmas.

George Bolland (Editor)

Clive Purchase, Secretary of Plymouth AS, writes:

"I should like to thank the advice of any member in the Federation how to make good black and white transparencies for projection from black and white negatives. Also I would like to hear from anybody who is involved with visual or photographic supernova patrol work.

Yours sincerely ..."

(Any readers having advice or information about Clive’s questions should please send their reply to me so that useful information can be published in the next newsletter - Ed.)

Dear George

I am writing to draw your readers’ attention to a very important forthcoming event. On February 2nd, 1985, the Brantree, Halstead and District Astronomical Society will be holding the 2nd East Anglian Astronomical Societies Convention. The first was held in February 1984 in Clacton.

This convention will be held at The Ramsey School, School Lane, Halstead, Essex, and will open at 9:00am. The lectures will begin at 2:00pm, and this will give those who want to, the opportunity to have a look at the display tables and displays on exhibits. We do, of course, realize that some people will have some distance to travel and we are trying to cater for this. We have a very full day and this is why we are opening so early in the morning — the day ends at 5:30pm.

Our speakers will include Nigel Hambett, Iain Nicholson, Heather Cooper, and of course Patrick Moore. Competitions are being organized and further details will be available shortly.

Admission will be £1.50 for adults and 75p for under 18s. Food and refreshments will be available and we will be conveniently situated near private houses.

If you would like more information about this event please send a SAE to me at 19 Belle Vue Terrace, Halstead, Essex, CO9 2BD.

Yours sincerely

Andrew Gower (Chairman, Brantree, Halstead and District AS)

ASTRONOMY CAMP 1985 - 9th-16th AUGUST

A camp for those interested in participating in a week of active astronomical work at various levels will be held on the above dates at the Preston Montford Field Centre in Shropshire.

The price will be £75 for the week, accommodation and meals included. A deposit of £15 is payable on booking, and cheques made payable to Astro-Camp. If you are interested and would like further information and a copy of the brochure, please contact, enclosing SAE:

Miss A Barrowcliffe,
111 Millhouses Lane,
Sheffield, S Yorks, S 2ND.

RATES FOR DISPLAY ADVERTISEMENTS

Full page £65
Half page £35
Quarter page £19

Smallers ads are £1 per single column cm with a minimum charge of £8.

Copy should be sent to the Editor.
Society News Round-Up

STUART LONSDALE

Items for the next "Round-Up" should be sent to: Joan Lane, Neoton Levitt, Mr Knatchbull, South Yorkshire, S68 7PH.

AYLESBURY AS: Tony Balfour tells me that they now have their very own badge making machine and that they are in business.

Problems with the observatory. With difficulties encountered in finding replacement material for the "A" section of the structure, it looks as if a new design is called for. Roller blinds have been suggested. Tarpaulin will have to be used to cover the slit as a temporary measure.

Peter Le Masurier has provided new pictures and photographs for the walls of the meeting room and they have greatly improved its appearance.

BOSTON ASTRONOMERS: Welcome to the FAS and your first round-up. A very well produced and presented magazine called Nova contains extensive coverage of major astronomical events including the Moon, the Sun, and the AAVSO, with many diagrams and illustrations.

There is a great deal of enthusiasm for all members and new members have made regular visits.

Member Robert Ranson built a telescope in 1981 which is used in turn from time to time by the other members for "Star Watching". It has a 6" Refractor and is in use at the monthly meetings.

COTSWOLD AS: Writes Anthony Ireland: "As a relatively new society member of the FAS I thought you would like to know more about the recent events of the Cotswold AS, which we have 20 members in our group ... we have been actively involved in deep sky and planetary work and in experimenting with the new large CATs. Two members have already left the group and have moved to a new galaxy. Brigade leaders ... we still have the daunting prospect of facing nearly 40 ladies of varying ages! On 20th October we joined with the Star Gaze Club and the University of Bristol University. It was a great success. A branch of our society has just been opened in Gloucester which means that we now have two fold meetings alternating between there and Cheltenham."

Contact for Cotswold AS is Anthony Ireland, Hon Treasurer and Membership Secretary, 6 Meadowhayes Drive, Cheltenham, GL52 2SS.

COVENTRY & WARWICKSHIRE AS: The Goodacre Medal and Gift, the highest award of the BA, was presented to the society's Vice-President, Howard Miles.

Their quarterly bulletin "Mirar" contains some excellent sketches of Aristarchus and surrounding area by Tim Gouldstone, Rob Moseley and Bob Marriot.

Subscriptions have had to be increased but will be partly offset by the introduction of a subscription to Astronomy magazine.

Regular Thursday evening observing sessions are held at the observatory of Coventry Technical College, which houses a Cooke 61-inch refractor.

CREWE AS: Members have a successful time at the annual Astro-Camp in the Ashdown Forest. The highlight being the four-day Grand Meridian Walk in which five members took part. Alan Drummond says that the last night was memorable!

but it was worthwhile especially as they raised money for the Chalvey Heritage Charity for handicapped children.

During July, a visit was made to Herchel's House in Bath, the organisation being done by Brighton.

A very interesting class on Astronomy was started in Crawley by Kenneth Hardy of the RGO.

HULDSDEN AS: The latest open week at the observatory produced around 200 visitors, who looked at the Moon, paid £20 in donations and increased membership by four.

It would seem that membership is somewhat low at the moment but I think most societies are suffering.

The annual grant from Kittredge Council this year has a slight twist to it. They will get £200 if Huddersfield match this with £150 of their own and if they spend it on instruments! £300 worth of telescopes is a bit much according to Philip Hepplewhite, but it will take some thinking out what to do.

The observatory has been well used and has undertaken some new projects. It is now in "tip-top" condition ready for the winter.

Publicity wise, they are hoping for regular slots in the Huddersfield Examiner.

OREWELL AS: The 2nd East Anglian Astronomical Societies Convention is to be held on 2nd February 1995. For more information contact: R Gooding, 66 Ashcroft Road, Ipswich, tel: Ipswich 462977.

The open weekend during September contributed about £170 to society funds.

Customer cash discount cards are available for members wishing to support a local retail outlet.

PLYMOUTH AS: The first report for the Newsletter! Writes Clive Purchase, "We are a small society of about 18 members. However, we do have some excellent observatories and equipment. We are involved in Deep Sky, Meteor and Solar observations and Astrophotography. Instruments include a 10" Reflecter driven by a kid machine motor, 10" Dobsonian telescope, various clock and Scott mount drives and extensive darkroom facilities."

At the moment they are constructing an altazimuth 24" reflector of an experimental design. Using a 8-foot tube with the 24" mirror at one end, a 1.75-inch flat is the other. The telescope is mounted in a modified motorscope and is a light to observe faint galaxies and nebulae. Of course, some would be very interesting and the system should work. Our maths show that this is a very feasible project."

Well, what do you think of it? Will it work? Keep us informed please, Plymouth.

SCOTTISH ASTRONOMICAL GROUP (SAG): Neil Bone writes, "Weather over the summer nocuitl reddit, cloud 'season' was generally quite poor, many nights having been lost to fog and low cloud. One very large display was viewed by several observers. Not just in Scotland - on the night of 08th August, and several members of SAG societies apparently obtained spectacular photographs."

Now that the darker nights are back, Neil hopes that it's back to work for their many observers up there in the North, Aurora, meteors, variables stars or whatever else proves observable.

SHEFFIELD AS: The commencement of regular observing sessions meant of course a complete change in the weather. Rain and clouds were the worst results to the observatory by the competition winners of our 50th Anniversary Competition.

A new duplicator has been purchased after the old one could only produce invisible ink.

The August open evening was very poorly attended. What a job we all have trying to convince the public we are not bespectacled old gentlemen sitting behind closed doors. (A comment once made by a local radio station.)

Slides are to be purchased for use by members at the Junior and Informal meetings.

The library is now so heavily stocked that it is falling apart at the seams. If we were to book the whole night there would be plenty of light to light a few - some members note.

SOUTHAMPTON AS: Chairman Peter Stanley has been featured in the Daily Mail praising the introduction of new and none powerful sodium lighting near his home. Mid-Sussex AS - Several members have been working at the society's observatory building and telescope. Meetings are now being held in premises they used to occupy several years ago. The new venue is expected to be used frequently. Slides were very popular and nearly £12 was raised from the 'Black Hole' fabricated by member Bob Porter.

SOUTH WEST HERTS AS: The attendance of members at the High Top Observatory has been very good, though as usual work has meant an increase in possible accidental damage. The RA drive of the Cooke refractor was damaged by being aimed at the clamping screws being slackened off.

At the retirement of member Joan Wroniska, on the teaching staff of the Royal Masonic School for Girls. She is returning to England with a beautifully home-constructed planisphere.

Ronald Dall, at the October meeting, reminded us of his early life in London and the time he took the Royal Observatory. His famous serious telescope was an 8-inch Caliber on an equatorial mount which he bought for £125 in 1845. When his first mirror, a 6-inch flat, was a remarkable man.

WEST OF LONDON AS: A team of WOLS members are preparing for a trip to Scotland and Croydon AS in December. They will also have to face up to someone else, Heather Cooper, who will be presenting it! By the way, Heather has been made President of the BA.

West of London AS: Visiting societies have been welcomed by the committee.

WEST MIDLAND AS: The link with Spain continues and the group send regular news. Although it's all in Spanish they say a lot of useful ideas can be taken from their publications.

Chairman Alan Wells has been trying to improve his astrophotography techniques, which he admits to being "not very good at it but I have decided to have another go". Anything must be going on his plans to build a wide field sky brightness detector which he hopes will enable him to work out correct exposures to reduce sky fogging.

Good coverage of the recent partial eclipse was given by the local radio station, BBC Radio, and Alan Wells gave a last-minute live broadcast during the event. The short notice proved worthwhile and a good general interest was shown by the broadcast. He says that he is planning to advise on the safety of this event.
ASTROCAM 1984

by Nazim Rajan
(Mid-Kent AS)

Once again, the Southern Area Group of Astronomical Societies (SAGAS) enjoyed its annual Astro-camp. This event, organized by Grendon AS, was held in August, on the 11th to the 25th to coincide with the Perseid meteor shower, the maximum being on the evening of 12th/13th.

The Moon was not particularly favourable for the first week, waxing over the trees and the mist and fog did not help matters. The unfortunate result was that the enthusiasm of the campers was not as high as we would have liked. Other scopes present included two beautiful Dobsonians made by Peter Montgomery from Worthing AS, a Meade 8 from Mid-Kent member Tony Smith, Norman Fisher's excellent 160mm reflector by Takahashi, a Fullscope-12 from Orpington member Simon Giddon and other scopes, ranging from the Brighton AS 4-inch Irving refractor to an 8-inch reflector.

The days were very good and sunny and campers spent the time indulging in the many activities in and around the camp. These included interest expeditions into the unknown depths of a forest near the campsite, visits to the shops, cinema and pubs of Forest Row and East Grinstead, a trip to Greenwich or Herstmonceux.

The head games of Frisbee, croquet and rounders were among the many pursuits, but the highlight of the event was the nightly meeting on almost every evening, the campfire would become the focal point of interest, where potatoes, toast or anything else you could think of could be cooked.

The CAMP FIRE - Astrocamp

A competition was held to make a spectroscopic update of bits and pieces as well as a paper aeroplane competition, which Norman Fisher won - he also organized the event! Also, an Astrocamp took place which (again) Norman Fisher and his team won by ten points.

One of the main spectacles of the Astrocamp this year, however, was the Peacehaven to Greenwich Meridian Walk, in which some of the campers took part; the camp site was used as a base and stopover point and each evening as the walkers arrived back to the camp they were applauded by the other campers, creating a wonderful atmosphere and sense of achievement for them. They carried on their journey a copper painted wooden symbol, which was burnt on the last day at Greenwich and the ashes were collected as a prize for the winners of the SAGAS v RGO Cricket match. (RGO won, incidentally.)

During the second week, the Astrocamps enjoyed very good skies, especially on the night of the 23rd, when the sky was clear. There was a fine show of the planets, and the 12th/13th was particularly spectacular, with the Moon providing an interesting view. The Celestron-14 produced remarkable clarity and many saw the best view of M13 that they had ever witnessed. Meteor watching was not too good however, and the alternative artificial satellite count placed many sights but none were of the calibre that had been marvelled at the 1983 Astrocamp.

The Astrocamp is one of the great events of the year and makes a wonderful and very enjoyable cheap holiday for those that participate. There are many good reasons for the Astrocamp: these include dark skies, use of other instruments, chatting with interested astronomers, camping, flora and fauna, a swimming pool and a wonderful social event. I am sure that all who went this year will not hesitate to go again next year.

The plans for the winter Astrocamp are less clear, but I am sure that this year's event will be enjoyed to the fullest. The next summer Astrocamp will take place from 10th to 24th August 1985. I hope to see you there.

Norman Fisher arrives at the site of the 1984 Astro-Camp with his hastily-constructed multi-mirror telescope.

PRO-AM CRICKET AT HERSTMONCEUX

by Our Man in the Long Room

Ian Ridpath

It was a very wet and windy day on September 23 when a party of SAGAS stalwarts visited Herstmonceux to play the Great Equinoxial Pro-Am Cricket Match against the RGO team for the Meridian Ashes. Such was the enthusiasm of the opposition for this historic event that eleven members of the RGO team turned up, all wearing a cap in the team, so the game became an unusual 11-a-side fixture.

The amateurs, ably captained by Brian van de Peer of Mid-Kent AS, won the toss and batted on a damp wicket. After breaking through the RGO attack of Mervyn "Whirlwind" White and Ron "Bonecrusher" Argyle who dismissed the amateurs cheaply (won't mention the duck, Greg), the visitors grabbed their way to a total of 63, thanks largely to a top score of 28 by batsman/wicketkeeper Barry Hopper of Brighton AS, the only visitor to outscore Extras.

In the field the SAGAS side proved nimble but unable to contain the superior batting of the home team. At one stage, when the heavens opened, the prospects looked like the amateurs might get away with a weather-induced draw, but the RGO team unerringly insisted on batting through a rainstorm to knock off the winning runs. How unfair!

At the end of the month, on October 30, the victorious RGO team were presented with their trophy, the Meridian Ashes. These ashes are the remains of a sculpture carried by SAGAS representatives from Peacehaven to Greenwich on the Meridian Walk. The sculpture was burnt with full honours at the end of the walk and the ashes were stored in a glass coffee jar. It is now up to the RGO team to retain them before the return match next year.