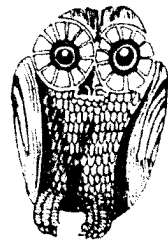


XVIIIth GENERAL ASSEMBLY



ASTROCOSMOS



August 21
Number 5



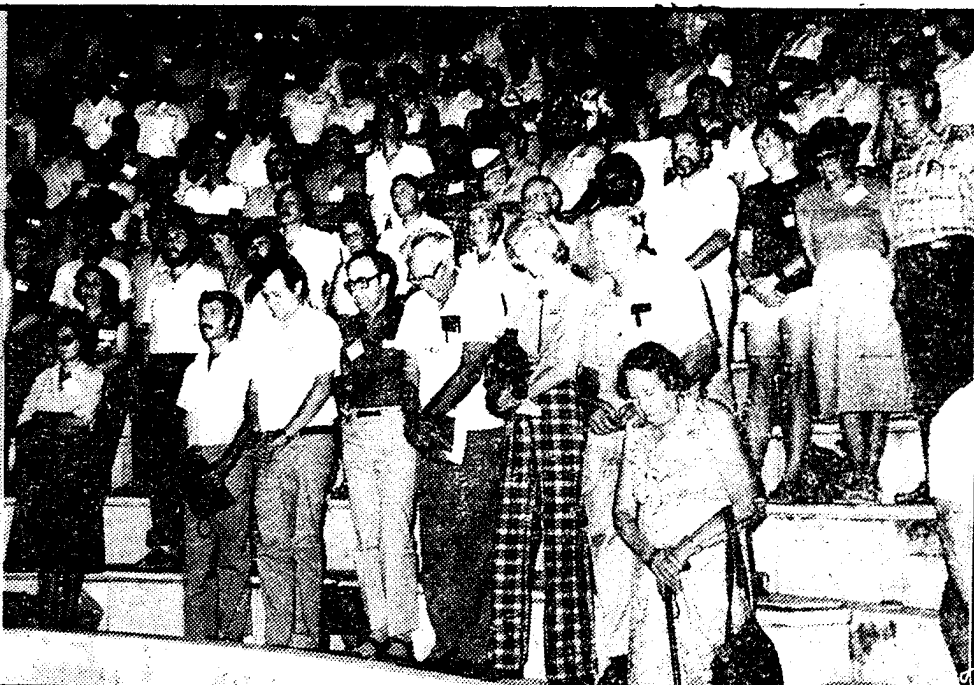
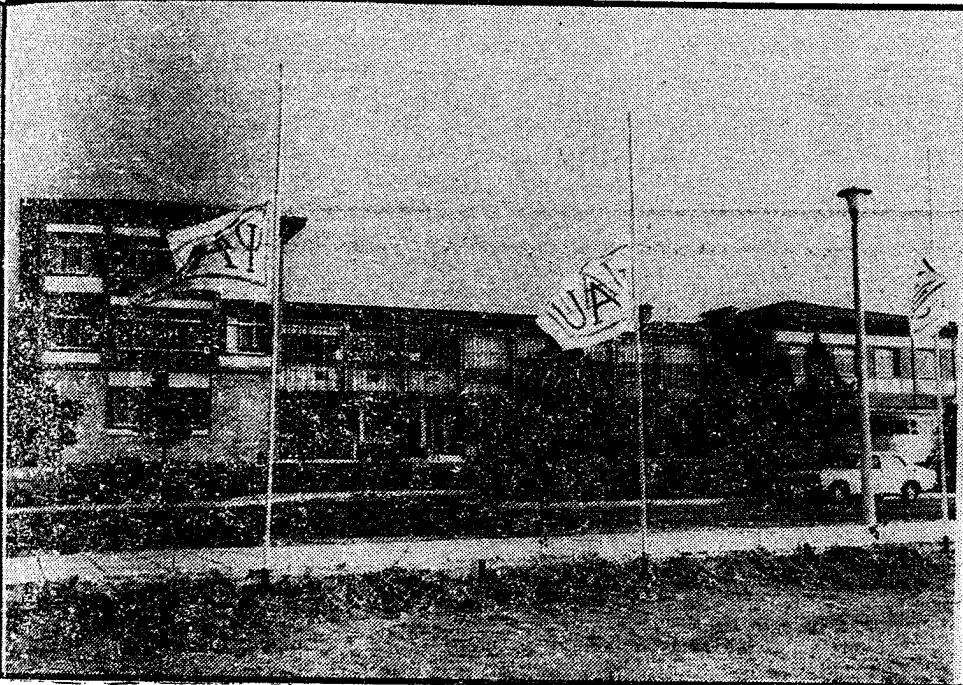
Patras: Greece 1982

Le 21 Août
Numéro 5

Editorial Office: T-block

Editor: ARCHIE E. ROY

Telephone: 991 465



The National Organizing Committee for Astronomy in Greece expresses its deepest condolences to the wife and family of Professor Bappu. As a mark of respect the flags of the IAU are being flown at half-mast.

Participants observe a minute's silence in the Ancient Odeon of Patras as a tribute to Professor M.K.V. Bappu.

Prof. M.K. Vainu Bappu (1927-1982)

Manali Kallat Vainu Bappu was the main architect of the revival of Astronomy in India in the present age. His life exemplified a total devotion to the cause of building up a sound base for astronomical research in the country.

Vainu Bappu was born on 10th August 1927 in Hyderabad, India. His father was an astronomer at the Nizamiah Observatory. Vainu's introduction to Astronomy was in his early childhood when he loved to accompany his father to the telescope dome. He showed his ingenuity in fabricating observational tools. His first scientific paper was published when he was sixteen — a paper describing the spectrum of the night airglow obtained by means of a spectrograph fabricated by himself. Through his bedroom window he had to expose the plate for six nights; he often jokingly mentioned that that was the longest exposure he had used in his experiments.

Bappu got his master's degree in Physics from Madras University in 1948. His heart was set on studying Astronomy but no facilities existed in India at that time. Circumstances however provided the chance; Harlow Shapley was visiting India. Young Vainu met him in Hyderabad. He was admitted to Harvard University by his efforts.

Vainu was delighted; that was all he wanted — modern telescopes reaching far into the wide expanse of the heavens. In January 1949 came his first success-discovery of the comet «Bappu-Bok-Newkirk». It was Bappu who first pointed out the unknown object on the plate taken on the previous night; his colleagues Gordon Newkirk and Professor Bart J. Bok helped him determine the orbit.

In 1952 he completed his Ph. D. on studies of stellar spectra and immediately received an offer of a fellowship at the Hale Observatories, the first Indian to receive a Carnegie

Fellowship there. Two years later came his monumental achievement, the discovery of the «Wilson Bappu Effect».

Bappu returned to India in 1955. He was chosen by the U.P. State Government as the first director of a new observatory. The venture was planned to revive astronomical studies at the old 18th Century Observatory at Varanasi. It was transformed by his magic touch. He selected the new site Naini Tal, up in the Himalayas, and started a modern observatory, and a school of young astronomers. Four years later he handed over charge of the new observatory to them, and came to Kodaikanal, the largest astronomical unit in the country.

Kodaikanal Observatory was originally established at Madras in 1792 and had scientists like Norman Pogson and John Evershed among its former Directors. Activities had been at a low ebb until the independence of India and then the tempo speeded up. The enthusiasm and dynamic touch of Bappu transformed the entire set-up. Old telescopes were taken out of storage and put into regular use; a new one metre telescope from Carl Zeiss was ordered. Bappu convinced the authorities that he was capable of creating a new modern school which could match its performance to any other organization in the world.

His life-long dream was that of a large telescope for India; considering financial restrictions, he had approached his goal cautiously and patiently. He had undertaken a project of building up a 2.34 metre telescope completely in India; the telescope will see the first light in late 1983 and it is a great pity that it will be a posthumous event.

Bappu received many national and international recognitions. Besides those mentioned above he was elected a Foreign Fellow of

the Belgian Academy of Astronomers and an Associate Fellow of the Royal Astronomical Society. He had received the prestigious Bhatnagan Award of India in 1971 and was decorated by the National Award of Padmabhusan by the President of India in 1981. He has been recently awarded the S.N. Bose medal of the Indian National Academy for his achievements in physical sciences which is due to be formally presented in January next year.

Bappu was elected Vice-President of the IAU for 1967-73 and elected as its President for the triennial 1979-82. In his sad and unexpected departure the Astronomical Community has lost one of its most charming and vivacious personalities.

TODAY'S EVENTS: LES EVENEMENTS DU JOUR:

In Building B, Drafting Room:

15.00-16.30: Meeting of Finance Committee,
16.30-18.00: Meeting of Official Representatives.

In Building A, IAU Secretariat:

18.00-19.00: Meeting of Resolutions Committee.

At EOT Swimming Resort, Aya, Patras:

WINE FESTIVAL: 20.00-24.00

ASTROCOSMOS

Back issues of this potential collector's item (!) may be obtained at the press office, second floor, Building T as long as stocks last.

PROFESSOR M.K.V. BAPPU PRESIDENT IAU, 1979 - 82

A brief meeting will be held in the CONCOURSE AUDITORIUM (CA)

at 13.00 on Monday, 23rd August 1982, in order to pay a tribute to the memory of our esteemed colleague, friend and President, Vainu Bappu.

The speakers will be:

Professor E.K. Kharadze — on behalf of the IAU

Dr. J.C. Bhattacharyya — on behalf of the Indian National Science Academy

Academician J. Xanthakis — on behalf of the Greek National Committee for Astronomy

Professor C.L. Goudas — on behalf of the Local Organizing Committee

Professor A. Blaauw — as Past President of the IAU.

Dr. H.J. Smith — as a close friend.

Patrick A. Wayman
IAU General Secretary
(0370 IRELAND)

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Books Going Cheap

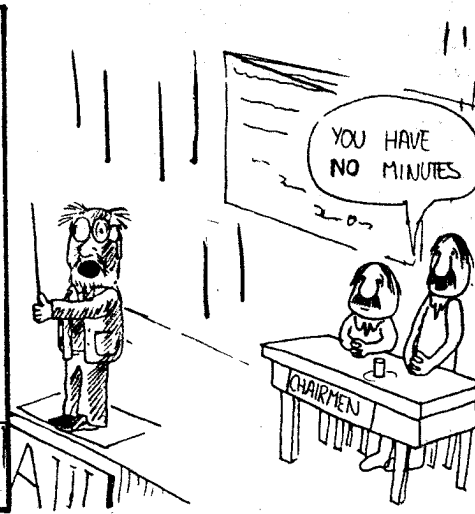
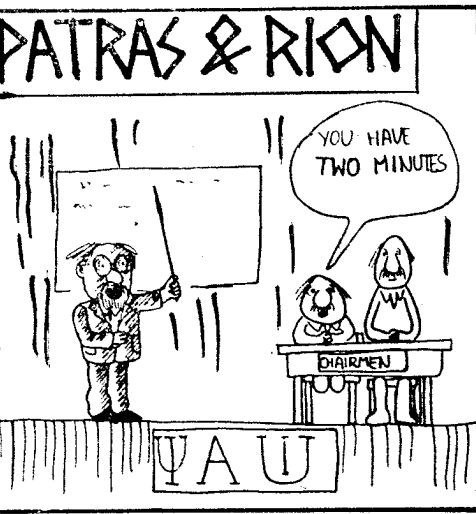
Simon Mitton, selling books from the Cambridge University Press, tells ASTROCOSMOS that he will be selling off his remaining stock at special cheap rates to IAU delegates on Saturday — reductions of 20 per cent were mentioned. But if you are interested, get there early. Simon warns us that the stock is not likely to last long!

THE AUSTRALIA TELESCOPE

Paul Wild, Chairman, C.S.I.R.O., Australia

The Australian Government announced last Tuesday that it will supply \$25M for the construction of a synthesis radio telescope. The telescope will be known as the Australian Telescope. It will be completed in 1988 and be associated with Australia's bicentenary celebrations to be held in that year.

The telescope will be officially a national facility but in practice, surely, an international facility. It will be constructed and operated by the Commonwealth Scientific and Industrial Research Organization (CSIRO) which currently operates the Parkes 64 r



MORE ON THE IDENTITY CRISIS

Q: What is the maximum number of different names that the same star may have?
 A: No limitation.

ex.: 22 names for HD115968 (Griffin, 1981 J. Astrop. Astron. 2, 309-313). You may select the star by any criterion and assign a new number.

For a nonstellar object, it is even worse since you do not see the same thing at different wavelengths, sensitivity or spatial resolution.

There once was an astronomer named McPhee who sent a student to observe NGC 6334 B. Coordinates for water source B were dialed in where continuum source B should have been. A sad state of affairs, don't you agree?

Dr. Hélène Dickel coordinates the working group on interstellar nomenclature for Commission 34. She reports the following items which appeared in correspondence on ISM nomenclature (italics is hers).

Re «the current situation»: The following was excerpted from the description of designation practices for infrared sources.

«When spatial resolution is greater than can be handled by galactic coordinates, the common practice is to denote individual components by IRS (Infrared Source), then sequential numbering, e.g. W 3 IRS 1, 2... Unfortunately often the numbering does not appear in any sensible order such as increasing right ascension, but is rather determined by random sequences for reasons known only to the authors (!)».

The reaction of a member of the working group when asked for «humorous papers» on ISM nomenclature for ASTROCOSMOS:

«As for humor, considering the total mess about names, I'm more to a crying stage. A great example is the molecular flows of Orion. Try explaining all that nomenclature with a straight face».

On «a more hopeful sign»: «How delightful to find out that some people have taken upon themselves to sort out nomenclature to the Interstellar Medium. I just made up ORI MCI as a logical alternative to OMCI (ugh!) and happily my co-authors acquiesced without comment. Let me know what the working group decides. I'll happily go along with any rational scheme».

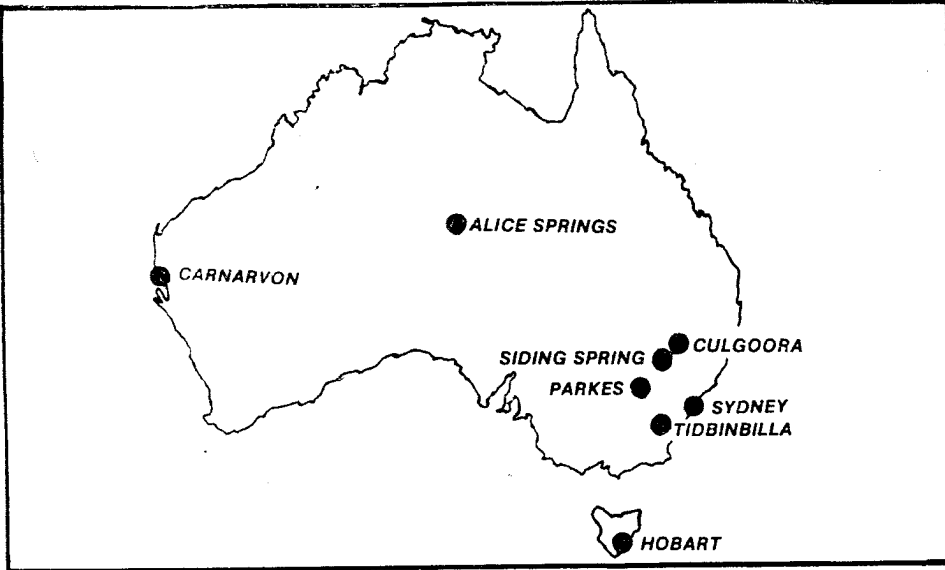
POSTSCRIPT:

Encouraging Activity re ISM Nomenclature
 There are two excellent catalogues which include references for the various acronyms used and another is in the works.

«Index of Discovery Lists of True, Probable, and Possible Planetary Nebulae» by A. Acker and J. Marcout, Observatoire de Strasbourg 1982.

«Catalog of Infrared Observations» by D.Y. Gezari, M. Schmitz and J.M. Mead NASA Tech. Memorandum 83819, April 1982.

«Catalog of Molecular Clouds» — L. Snyder at U. of Illinois.



radio telescope and the Culgoora 3 km diameter radioheliograph.

The telescope will probably be an array of five variably spaced dishes of 22 m diameter on a 6 km east-west base line to be located at the Culgoora Observatory (500 km NW from Sydney). This array will operate as a conventional synthesis telescope. A further dish will be installed at Siding Spring Observatory about 100 km south of Culgoora. This and other dishes already existing at Parkes and Canberra (the Tidbinbilla NASA dish) will combine to form a VLBI synthesis instrument with base lines up to some 600 km. The VLBI system may be further extended to

(jointly with the Cambridge group, in the late 1940's and following the pioneering discoveries of Jansky and Hey). The Australian Government is convinced that the proposed telescope is necessary to retain the country's position in the forefront of radio astronomical discovery.

On the night of Wednesday last the Australian contingent at the IAU (augmented by some international friends) celebrated this event, unique in Australia's history of government-funded basic research. But what has been most moving is the obvious delight displayed by all our international colleagues who greeted the news as though it applied to their own country.

Paul Wild
 Chairman, C.S.I.R.O., Australia

Karamouzis Ant. (optician)

Prescription glasses, sun glasses, contact lenses.
 112, Maizonos str. Patras.
 Tel.: 274.728, 221.989.

SCANDIA RESTAURANT

Agiou Andreou 6.

In our menu you will find the succulent specialities of the Greek cuisine. The original moussaka and the ever popular Greek souvlaki served with rice. Both are gourmet's delight. Your choice of wide variety of our tasty pizzas and sea food is also available. Open to serve you from 17.00 to 02.00.

Our catering service is also operating the Wine Festival of the International Astronomical Union

Evagelatos Spyros Restaurant
 A GASTRONOMICAL TREAT!!!

In the center of down town Patras conveniently located on Agiou Nikolaou str. 7, you will find the best restaurant in town.

For the last fifty years now S. Evagelatos has been catering for international connoisseurs of fine food exquisitely prepared and served by the continental chef and his fifteen experienced waiters. Open all day until midnight. We are waiting to serve you.

BIRTHDAY PARTY BEING PLANNED

Frank K. Edmondson

The Association of Universities for Research in Astronomy Inc. (AURA) was incorporated on October 28, 1957; Kitt Peak was chosen on March 1, 1958, and Cerro Tololo was chosen on November 23, 1962. The pair of 25th birthdays (AURA and KPNO) and the 20th birthday (CT10) will be celebrated at a special AURA meeting in Tucson, Arizona on February 14-16, 1983. The Space Telescope Science Institute, also operated by AURA, will be only two years old at this time. The Sacramento Peak Observatory is also operated by AURA.

The plans for the celebration are being

made by a small AURA Board Committee: Albert B. Weaver (University of Arizona), W.A. Hiltner (University of Michigan) and F.K. Edmondson (Indiana University) Chairman, with assistance from D.F. Welch and M. Fultz of the AURA Corporate Office.

Invited guests will include early and present members of the National Science Foundation staff, members of the original AURA Board, participants in the Kitt Peak site survey, KPNO employees with more than 20 years of service, members of Congress and other government officials.

Frank K. Edmondson

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 EVERY DAY EXCEPT SUNDAY

GASTRONOMY CORNER

VOYAGER SATURN
pictures NASA did not dare publish. Number 2.



GREEK COFFEE

To make this properly, you should use a «high-waisted» long-handled Greek coffee pot, usually in copper. This is called here in Greece «Briki».

For 1 serving allow 1 1/2 demitasse cups of water, 2-4 level teaspoonfulls of sugar and 1 1/2 level teaspoonfull of coffee, ground to fine powder.

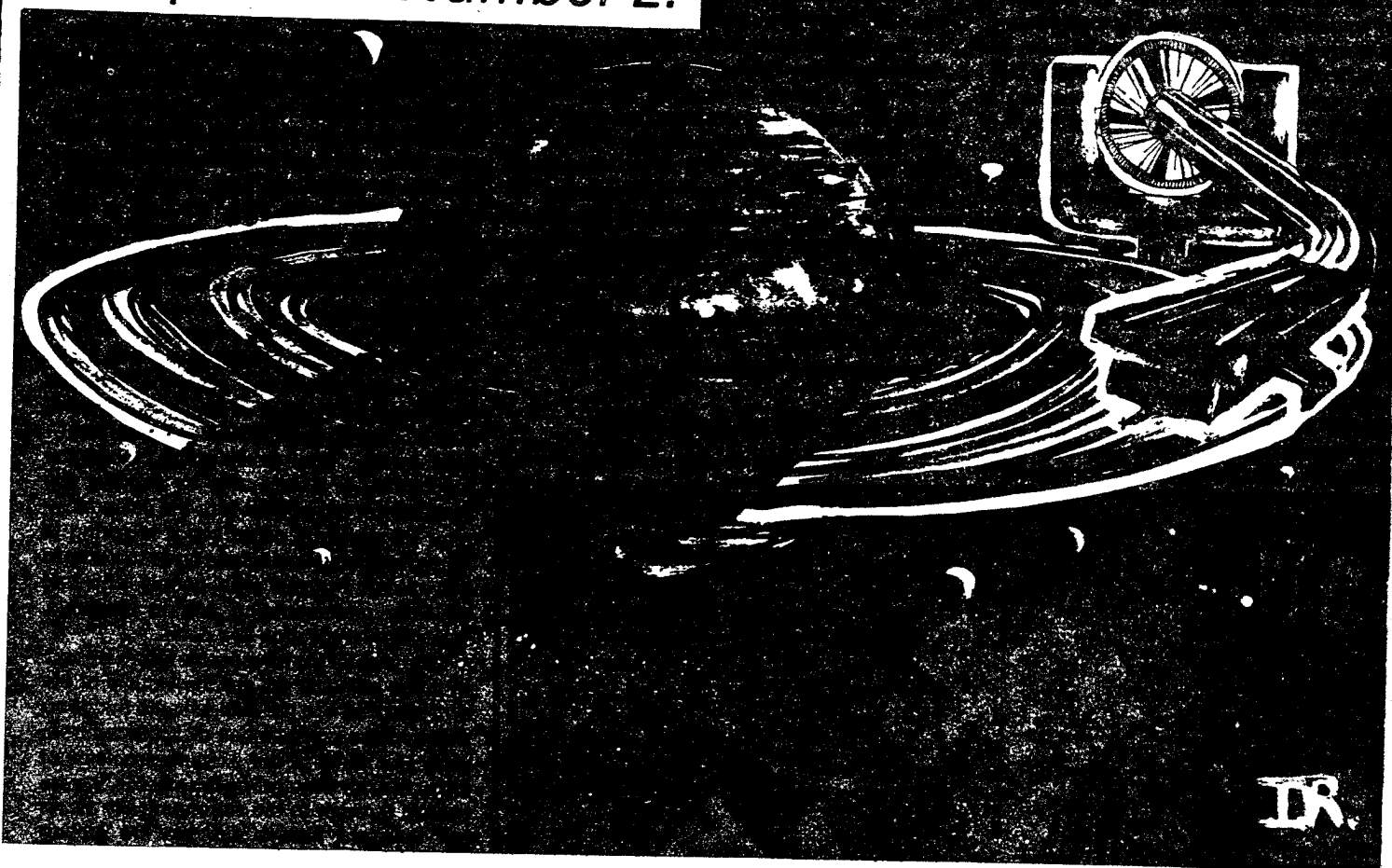
Place the water into the pot (or pan). Add sugar. Bring to the boil. Pour some of the water into the demitasse cup, half-filling it. Leave on one side. Add coffee to the rest of the water and sugar, stir round and bring to the boil. Take off the heat, pour back the water from the cup then cover the pot for some seconds. Pour into the demitasse cup and serve.

Greek coffee is usually drunk sweet, but those who dislike sweet coffee or are on a diet can use less or no sugar.

NOTE:

You can buy pots and bags of ground coffee in the grocer's or supermarkets here in Patras.

Helen Markellos



DR

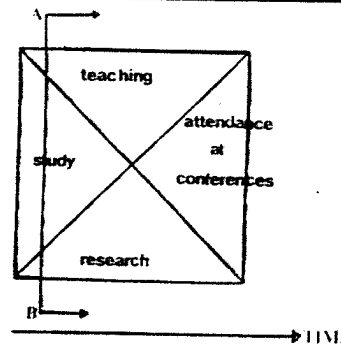
THE STAR DIAGRAM

Perhaps the three most significant relationships discovered in astronomy in the twentieth century were the mass-luminosity relation, the cepheid period-luminosity law and the Hertzsprung-Russell diagram. The product of much observation and study, they summarise an enormous number of astrophysical properties, making sense of stellar evolution and behaviour.

ASTROCOSMOS is now proud to present the fourth important relationship — the STAR diagram, recently discovered by much obser-

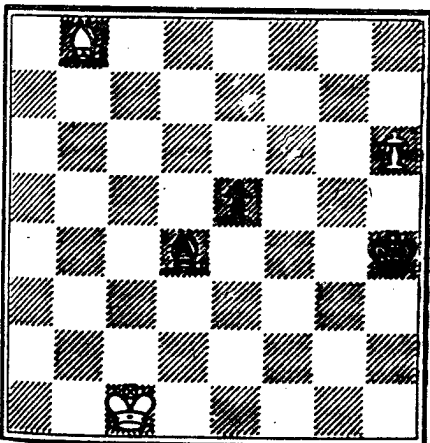
vation and study of the careers of astronomers. It demonstrates the natural evolution of an astronomer in his activities of Study, Teaching, Attendance at conferences and Research.

The proportion of his life devoted to these activities is given by the intersections line AB makes with the appropriate activity regions in the diagram. As his career progresses, line AB moves in the direction of the well-known



THE STAR DIAGRAM

Chess Position 4



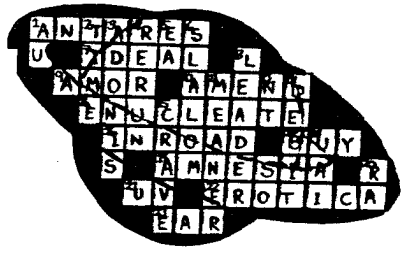
White to play and win

White can promote his pawn by a fine series of preliminary moves.

Correction: In solution to Chess Position 2 for «black» read «white».

Solution to Chess Position 3:

- 1. B-Kt8, R X B 2. K-B7, R X Q 3. P X R etc. V.V.M.



ASTROCROSSWORD

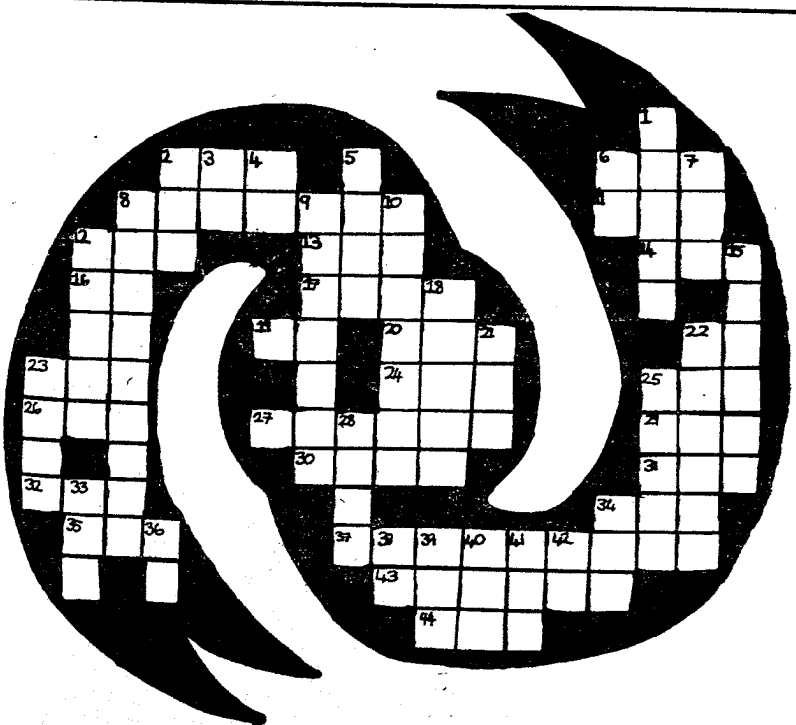
ACROSS

- 2. Wager.
- 6. Famous TV doctor.
- 8. Bicycle used once every 19 years?
- 11. Italian 'my'.
- 12. Staff.
- 13. She quits the vehicle again.
- 14. Returning from 4D.
- 16. Italian Moon taken personally.
- 17. We try to get rid of it.
- 19. Ephemeris Time.
- 20. Chop bits off 'a circle'.
- 22. It chills me if I add to it.
- 23. A catch clue.
- 24. Wash in it or grow plants in it.
- 25. Name & classify.
- 26. Refreshing drink but too much of it will spin your head.
- 27. Another drink when properly prepared in this way is just as refreshing but not so inebriating.
- 29. Anger.
- 30. Better go this way than the opposite.
- 31. Add a 'Rin' to it and another one and you've got a star as famous as Sirius.
- 32. Shortened form of Thomas.
- 34. Some dancers wouldn't be seen without it.
- 35. If added to 'bar' does it mean a contour through all serving the same number of drinks.
- 37. Jaws.
- 43. Spectacular in its passing if close enough.

- 33. Add 'tea' to provide power.

DOWN

- 1. Velocity and the Doppler effect produce it.
- 2. Hope you got a comfortable one.
- 3. Alien or Gallic 'and'.
- 4. An approach.
- 5. Not recorded.
- 6. Two letters back-to-back.
- 7. Needed to take a dinghy out and back.
- 8. Serene smiles?
- 9. The ringless one of the four?
- 10. A remarkably deep lunar crater.
- 12. β Orionis.
- 15. Atomic weight 16.
- 18. Essential among humans & nations.
- 21. British decoration.
- 22. Also essential among humans & nations.
- 23. They also serve who only stand and...
- 25. Kept its face concealed from the Voyagers.
- 28. Hesiod spent much of his life on one.
- 33. Black gold.
- 34. A tall tree.
- 36. Alternatively.
- 38. The Sun has not reached the meridian yet.
- 39. No second-hand car salesman would have them in stock.
- 40. When will it arrive?
- 41. In England it's turned around so that everything can stop for it.
- 42. Another approach.



THE LOST ONES — AND THE LOSERS

by D. Mc Nally, University of London Observatory, Mill Hill Park, London NW72 QS, United Kingdom.

«Some drink of the waters of the fountain of knowledge; others merely gargle!»

Let me raise the question — are we making any impact at all in advancing awareness of astronomy in the public at large? I raise this question in the light of some experience that I have become aware of in the teaching of Astronomy and Space at a UK College of Further Education

(A College of Further Education provides for continuing education. On a formal basis it provides education to overlap secondary and tertiary education and to supplement the educational experience in certain forms of professional training. It also provides cultural evening classes from flower arranging to navigation for small boat sailors. They are valuable centres of community education).

Because of the dreadful state of unemployment among school leavers (at 16) a particular College of Further Education decided to mount a course for school leavers to

prepare them for the world of work. A major component of the course is to identify and rectify deficiencies in basic education such as mathematics and literacy. A further component was a study of science to make the students aware of the world around them both industrially and environmentally. As part of this, there was a contribution on Astronomy and Space. By and large the response to science was poor. To set the scene very few of the students knew what fuel heated their own homes. The problem is just not astronomy alone but seems to confront the whole of science education. It should be pointed out that the students on this course already have some academic qualification.

A lack of knowledge

The knowledge of astronomy among the

students on the course was abysmal. There was a glaring lack of fundamental knowledge but what was worse, no interest whatsoever. One might have thought that with the emphasis on space in the media some of it would rub off. These students had little or no interest in serious science on TV or in the newspapers. A slide show of the usual colourful astronomical slides evidenced little interest either scientific or artistic. The students simply could not see where astronomy might impinge on their everyday lives. There were exceptions. Holidays in Florida produced a mild response to Zone Time and complete surprise to learn that the same time did not pertain worldwide. Great interest was aroused by the revelation that the Romans regarded months with 31 days as lucky and with 30 days as unlucky. But as for the rest — utter apathy. Why worry about calendrical regulation — it was silly to suggest the seasons got out of step with the calendar — after all everyone could see it is spring in April (Northern Hemisphere types to a man in this class). Perhaps with people who had difficulty understanding a train timetable, calendrical regulation is a detail.

The task for the foreseeable future is great. In some respects we are the victims of our own success. We have done some things so well that the problem has disappeared from view. But some of our exciting problems of today are not penetrating the masses. We are getting through to the astronomically aware but then we always did. We are getting through to those with wide general interest. We are not getting through to the masses but that is not possible. It should however be possible to get through to students accepted for courses at a College of Further Education. It is clear that we are not.

The education desert

The problem is not one that is confined to astronomy — it is a consequence of the state of education in the UK. In the first place, these particular students should not be at a College of Further Education. The College is reme-

dying the deficiencies of school. What the students are being taught they should have learnt at school — much of it at primary school. To some extent we are not concentrating on fundamentals. It is easy to dilute teaching with new matter since it is both topical and exciting. Education has to serve several purposes. One is basic skills in communication, literacy and arithmetic (I nearly wrote mathematics). High on our priorities should be some basic understanding of science. Clearly in the UK, and I suspect elsewhere, we have not provided sufficient attention to these basic requirements.

But we, as astronomers, have also failed. We have not taken a sufficiently strong stance to ensure that astronomy forms some part of basic science. For a young person with some academic qualification to be unaware at 16 of latitude and longitude, the reasons for night and day, the seasons and the calendar is, in my view, unacceptable. What point is there in going further to discuss phases of the Moon, the planetary system, and the nature of the Sun — again topics of which a tolerably educated 16 year old should be aware.

For us in Commission 46 there is no cause for complacency. We have not yet even won a battle in this war — in fact we have not truly seen the enemy. Yet we know that education must face philistinism and barbarism. That philistinism and barbarism does not begin with politicians and administrators — it starts in our own Union with our colleagues who see no point in promoting astronomy in education and even worse, those few colleagues who believe that astronomy should be vigorously ejected from education. Do we really want education which leaves those in its higher reaches unaware of basic astronomical science.

While we take stock of past achievements — and there are many which should encourage us, let us also remember those school leavers at a College of Further Education somewhere in the UK and remember the vast amount which remains to be done.



The Chairman of the Local Organizing Committee (prof. C.L. Goudas; right) and the Chairman of the Registration Sub-Committee (prof. C. Makris; left) try to convince themselves that registration has been successfully completed.

PROPOSAL FOR AN INTERACTIVE EXPERIMENT WITH A COMETARY MASER

R.P. Norris and J.E.B. Ponsonby

The University of Manchester
Nuffield Radio Astronomy Laboratories
Jodrell Bank - Macclesfield - Cheshire SK11 9DL

Introduction

Maser action has been observed in the 18 cm lines of hydroxyl in the coma of comets. The lines are characteristically of order 15 KHz wide, the amplification is low and the masers are unsaturated. The total power emitted by a comet in one of these lines is typically only 30 W, so that the total isotropic cometary emission in each line is ~ 3 mW Hz.

In principle, any maser can be significantly perturbed by an external signal suitably injected into it with a power comparable to its own emitted power. The possibility therefore arises of perturbing the OH masers in comets by means of signals transmitted to them from the Earth. In such an experiment, a portion of the maser emission would be switched off by means of radio waves transmitted from Earth, and then the subsequent recovery time ($\sim 10^3$ s) of the maser could be studied. This experiment would provide a direct measurement of the pumping rate, and a stringent test of the proposed pumping mechanisms for comets (Braud et al. 1974; Mies, 1974; Despois et al. 1981; Elitzur, 1981). In addition, it allows an accurate (~ 5 Hz) measurement of the test frequency of the OH molecule.

The Proposal

We propose to transmit an 18 cm signal with a bandwidth ~ 5 Hz, which will saturate the maser in a direction away from the Earth, causing the natural cometary maser directed at the Earth to switch off. Only those molecules lying in the narrow velocity range corresponding to our transmitted signal are affected, so that only a small portion (~ 5 Hz)

of the wider (~ 15 KHz) cometary signal will be perturbed.

The choice of power, bandwidth, and telescope are inter-dependent. Here we describe a suitable combination.

10 kW of power in a 5 Hz bandwidth transmitted from the Jodrell Bank Mk IA telescope will stimulate a transition in each OH molecule at a distance of 1 au on a timescale of 1000s, which is comparable to the natural pump rate in a comet. Assuming that the unperturbed cometary maser has a flux density of 0.5 Jy at the Earth, the perturbation of the maser could then be detected at the 3σ level using the Mk IA telescope after an integration time of 2.10^4 s. In order to study the shape of the response, divided into \sim bins, at a 5σ level and assuming a 50% transmitter duty cycle, an estimated observing time of ~ 4 weeks is required.

There are several comets every year which are potential candidates for this experiment, but we do note the imminent return of Halley's comet which we consider admirably suited to this form of investigation.

Objectives

The primary objective of this experiment is to investigate the recovery time of the natural emission. An approximate solution of the time dependent equation of radiative transfer through the comet is easily obtained, and indicates that the emission should recover on the time scale of the interval between $^2\pi-^2\Sigma$ transitions ($\sim 10^3$ s; Despois et al. 1981). However, the exact form of the recovery (which we have not yet calculated) will

depend on the pump and collision rate, and so the experiment will enable a measurement of these as well as a test of the pump mechanism.

A secondary objective is to measure the natural rest frequencies of the OH molecule. The frequency of the narrow (~ 5 Hz) perturbed portion of the cometary signal, which is determined by the frequency of the external signal, is of course doppler shifted on reaching the comet. In addition the observed perturbation is also doppler shifted so that the geometric mean of the frequencies, which is the rest frequency of the OH line, can be measured to an accuracy of ~ 5 Hz. Since this frequency is at present known only to an accuracy of ~ 200 Hz, this will represent a considerable improvement which will be of value to other OH observers.

Effects of the experiment on the comet

The experiment will affect the 18 cm cometary OH radiation, and so clearly can only be done with the agreement and support of other cometary and OH observers. However, it is probable that **only** the 18 cm radiation will be affected, and there should be no observable effect on the comet in either the

visual, infrared, or ultraviolet wavebands.

In addition, we note a natural safeguard. Cometary OH molecules have a lifetime of $\sim 2.10^5$ s (Despois et al. 1981). Consequently, this experiment can have no effect lasting longer than a few days.

Legality

A possible obstacle to this experiment is that it requires the freedom to transmit at frequencies dictated by nature in the 18 cm protected radio astronomy band. This requires the consent and support of other astronomers in order that we may obtain permission from the radio regulatory authorities. Simple calculations of the level of scattered radiation show that there is unlikely to be any interference problem to any other radio astronomer observing at 18 cm, even if making narrow band spectral line observations.

References

- Braud, F., Bourgois, G., Crovisier, J., Fillit, R., Gerard, E., Kazes, I., 1974. *Astron. Astrophys* 34, 163.
Mies, F.H., 1974. *Astrophys. J.* 191, L145.
Despois, D., Gerard, K., Crovisier, J. and Kazes, I., 1981. *Astron. Astrophys.* 97, 320.
Elitzur, M., 1981. *Astrophys. J.* 246, 354.

SIMOS PHOTOGRAPHY

Photos of the functions and activities of the I.A.U. are on display for sale in the concourse bldg. Next to the news stand.

Rodopoulos Michalis
Cavo d'oro
Cafeteria - Spaggeteria
Iroon Polytehniou, Glyfada

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