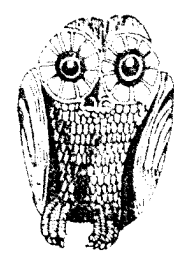


# XVIII<sup>th</sup> GENERAL ASSEMBLY

# ASTROKOSMOS



August 24  
Number 8

Patras: Greece 1982

Le 24 Août  
Numéro 8

Editorial Office: T-block

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## Tributes to Professor M.K. Vainu Bappu

Members of the IAU, collaborators and the friends of the late Professor M.K. Vainu Bappu paid tribute to his memory during a short meeting convened in the Concourse Auditorium at lunchtime yesterday. Professor D.S. Heesbrunn introduced six speakers who delivered speeches of remembrance. Speaking on behalf of the IAU, Professor E.K. Kharadze remembered Bappu's devotion to the Union and his continuous activities in strengthening activities over our planet. Professor's Bappu's own personal kindness and benevolence greatly assisted in furthering pleasant collaboration. The IAU, and indeed the whole world, had suffered a great loss, and on behalf of the USSR Delegation, Professor Kharadze wished to convey sincere condolences to the Indian Delegation.

Professor J.C. Bhattacharyya, on behalf of the Indian National Academy of Sciences, said that Indian astronomy had lost its main guiding star; it was like a nightmare of sailors waking up in a dark stormy sea to find their captain missing. This was followed by Academician J. Xanthakis of the Greek National Committee for Astronomy, who spoke of the profound loss they were suffering. On behalf of the Local Organising Committee, Professor C.L. Goudas pointed out that although we were present on this sad occasion to mourn a great scientist and a noble man, Professor Bappu had died at the peak of his life. And Professor A. Blaauw, past President of the IAU, spoke of Bappu's joy and gratitude when he took on the mantle of President at the time of the IAU General Assembly in Montréal, and how much he had been looking forward to the General Assembly in Patras. At least, he reminded us, we have with us his final thoughts, contained in the Presidential Address which was unable to deliver himself.

In a very moving final tribute, Professor H.J. van den Kerkhof recalled his near-lifelong friendship with Professor Bappu. Speaking of their early 1950s, Professor Smith provided many insights into Bappu's warm, non-cynical and enthusiastic personality; and of his ultimate dream to leave an assuredly brilliant future in the USA to build up astronomy completely from scratch in his native India. Despite an initial lack of ministerial cooperation, which would have totally discouraged the majority of people, Bappu brilliantly succeeded: three thriving institutes, an astronomical society and an astronomical journal are testimony to his drive and enthusiasm. Professor Smith remarked that there were many inspirations which guided Bappu's life, among them an abiding love of nature, and the words of Kipling's poem «If». As a tribute to Bappu, and by way of words of comfort for his mother, Smith concluded with Kipling's lines:

Once you ran the course against all odds, and won,

He did indeed become a man, my son». It is hoped that the full texts of all the speeches will appear in Wednesday's ASTROKOSMOS.

## THE MAIN MUSICAL EVENT AN APPRECIATION

De nombreux membres de la communauté astronomique francophone ont été très sensibles à la délicate intention de Mr. J. P. Paoannou de présenter la soirée musicale le jeudi 19 Août en français, l'autre langue officielle de l'IAU.

Many members of the French speaking astronomical community have been very appreciative of the kind attention of Mr. J. P. Paoannou, who had the intent to introduce the «main musical event», of August the 19th, in French, one of the two official languages of the IAU.

## ASTRONOMICAL PUZZLE

Two favorite astronomical «puzzles» — objects whose nature we are trying to elucidate observationally and understand theoretically — are both extragalactic, both radio sources, and both involve at least one quasar. They go by their catalogue names, 3C 303 and AO 0235+164. There is space to describe only one of these here.

3C 303 is a strong radio source, in the original 3C Cambridge catalogue. It is a good example of an object whose study requires international cooperation and both radio and optical observations at several major observatories.

The radio contours are roughly dumbbell shaped in outline and, as revealed recently by the VLA radio telescope, have fascinating and complicated structural details. The optical field contains an N-type radio galaxy, a faint quasar 20 arcsec west of the galaxy, two UV-excess very faint optical objects a few arcsec from the quasar, a luminous arc between the galaxy and one of the UV-excess objects, and a number of faint knots scattered around and in an extended spiral structure extending past the UV objects to the other side of the galaxy; also there are several galaxies fainter than the radio galaxy.

The original optical observations were made by Sandage, who measured the redshift of the N-type galaxy,  $z=0.141$ , and by the French astronomers, Véron, Lelièvre and Wlérick, who measured the positions, magnitudes, and colors of the group of three UV objects 20 arcsec west, and who pointed out that they might be the true identification of the radio source.

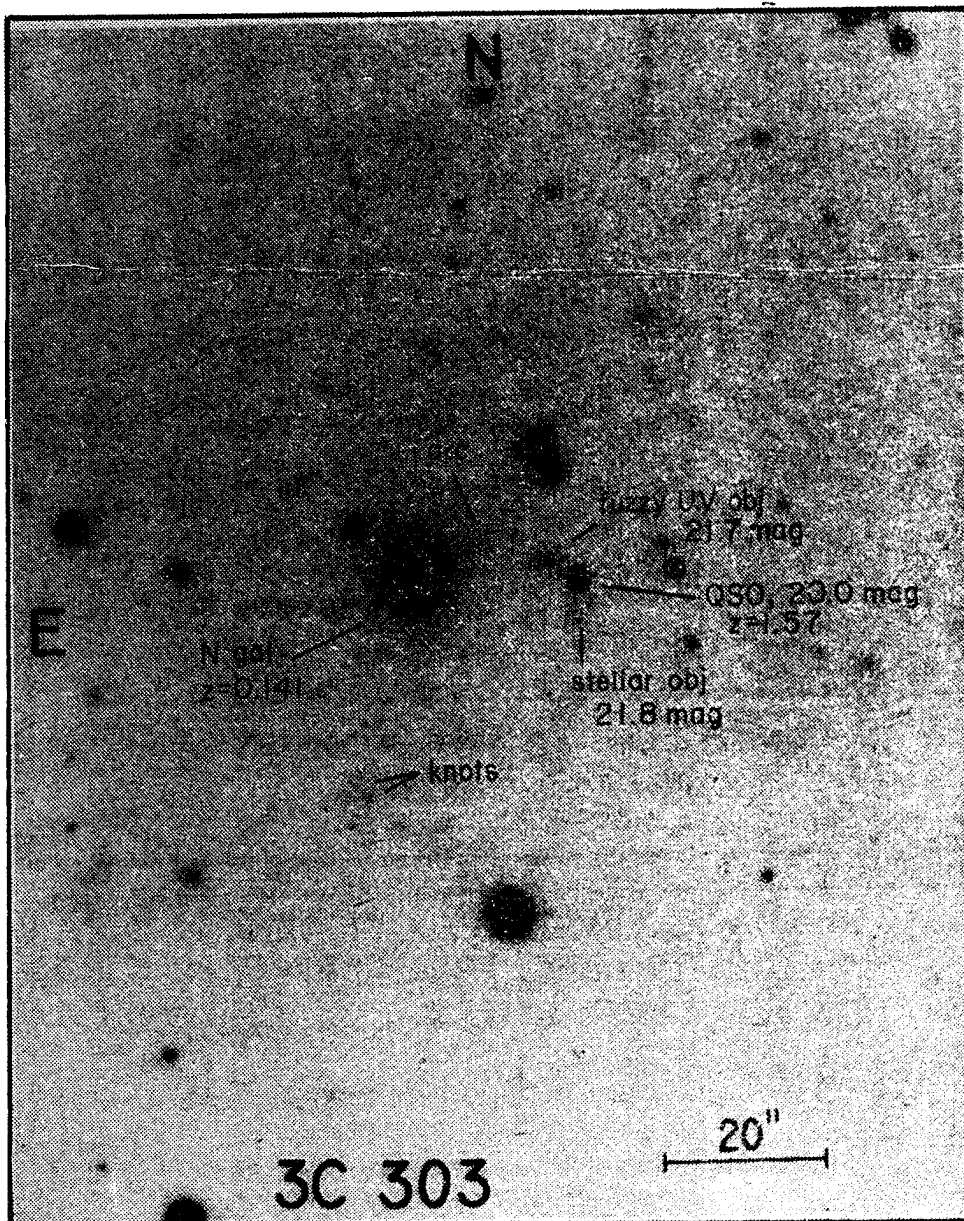
The next observations were by Philipp Kronberg of the University of Toronto and Max Planck Institute, Bonn, and Richard Strom of the Netherlands Foundation for Radio Astronomy, Dwingeloo, who mapped the radio structure at NRAO and Westerbork and by Harding E. Smith and Margaret Burbidge, who obtained the spectrum of the brightest of the three faint UV objects at Lick Observatory with the 3-m telescope. We showed it to be a quasar with redshift  $z = 1.57$ . The radio structure, apparently one single composite source, had two main lobes, the eastern centered on the radio galaxy and the western on one of the fainter of the three UV objects.

The most recent observations have been carried out by Philipp Kronberg and Louis Noreau (U. Toronto) with the VLA radio telescope, and by Vesa Junkkarinen and Harvey Butcher (Kitt Peak National Observatory) and the UCSD group, using mainly the KPNO 4-m telescope.

The radio observations by Kronberg and Noreau show fantastic detailed structure at 20 cm, 6 cm and 2 cm. At 20 cm, the eastern half divides into a compact source at the N-galaxy nucleus and a fainter extended lobe, and the strong western lobe around the UV objects also has a fainter extension further west. Most fascinating, here is a linear jet of unresolved radio blobs between the radio galaxy and the strong western lobe —resembling a much enhanced and larger - scale version of the

by  
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Center for Astrophysics and Space  
Sciences University of California,  
San Diego - La Jolla,  
California 92093

Philipp Kronberg  
University of Toronto  
Scarborough College  
Toronto (West Hill) MIC 1A4  
Canada



Print of 3C 303 made from a KPNO 4-m plate

blobs in the well-known jet in the nearby radio galaxy M87; not quite coincident, however, with the optically luminous arc. As for the strong central source in the western radio lobe, centered around the northern of the three UV objects, the 6-cm VLA observations show it to break up into many components.

Optically, this northernmost UV object is seen to be slightly extended, with a core asymmetrically placed in the fuzz. The quasar and the other UV objects are star-like. The spectrum of the quasar was relatively easy to obtain with the Lick IDS spectrograph, but the other two objects are about a factor 5 fainter, and we have been working on them with the KPNO 4-m and the Lick 3-m telescopes. Both appear to have at least one spectral emission

feature, at different wavelengths, and not corresponding in either object to any emission lines in the quasar or in the radio galaxy nucleus.

We are still working on the reductions of the most recent optical spectrographic observations, obtained with the Kitt Peak multi-aperture CCD spectrometer, so this account is very much of a progress report. It seemed worthwhile to share our preliminary, multi-authored, internationally obtained, results with our astronomical colleagues, because this object may throw light on the nature of radio galaxies and quasars, the relation between them, and the physical processes at work in them.

## Editorial

The other person's job is always easier than your own - until you try it. This fact of life has been brought home to me with fresh conviction during my stint as editor of this journal. I have this past ten days acquired a tremendous admiration for the capabilities of newspaper editors who day by day, week by week, month by month, year by year, cope with their three-ring circus task of producing a newspaper. It is a job that is infinite in its ability to produce a wide variety of problems, all urgent and all requiring attention NOW!

Rather than engendering a feeling of power and the image of a person sitting at the centre of affairs controlling minions who scurry hither and thither at one's calm, reasoned bidding, the impression forced on one is of being a victim cowering in the centre of a circle of people shouting for attention, bombarding their victim with pieces of paper, scribbled, typed, telegraphed while the telephone shrills incessantly as the printer, long-suffering man, calls for the day's plan for the paper so that he can start on it.

I must take the opportunity of apologising

to my friends who, dropping into my office to very kindly greet me, have found me distraught to the point of rudeness. It is nothing personal. It is just the ever-present awareness of Time's winged chariot speeding past, bringing the deadline ever closer. And the thought, always lurking in the background like a dull toothache, that I still have not written the editorial.

Each night after I return from the printing office, I sit in my customary chair under the trees at the front of the Rion Beach Hotel and gradually unwind. As I do so I muse over the qualities one must have to be a newspaper editor and survive. And occasionally, as I sip my drink and listen in the darkness to the soothing sound of waves breaking on the shore I reflect on the factors in one's make-up that conspire to persuade one to take on the job of editor of ASTROCOSMOS. Some I know already. Dedication, a sense of challenge, a sense of obligation and... now, I'm sure there must be something else. Ah yes! I have it. Simplemindedness.

## TODAY'S EVENTS: LES EVENEMENTS DU JOUR

### JOINT DISCUSSION VII:

«Mass-Loss Phenomena»

(IAU Commissions 29, 35, 36, 37, 45)

09.00-10.30, 11.00-12.30, 15.15-17.45, Room AA, 24th August

#### SOC

A G Hearn (Netherlands),  
Chairman  
J P Casinelli (USA)  
C S Chiosi (Italy)  
K C Freeman (Australia)  
G A Gurzadyan (USSR)  
M Hack (Italy)  
D C Morton (Australia)  
D Reimers (GFR)  
T P Snow (USA)  
J P Swings (Belgium)  
\* Puk-sin The (Netherlands)  
A V Tutukov (USSR)  
\* Editor

#### Commission

36  
36  
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37  
45  
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35

#### Programme

##### Session I

\* R J Taylor «Evaluation of the work of A.S. Eddington».

L B Lucy «Hot Stars — recent observations and theoretical implications».

L. Hartmann: «Cool Stars — recent observations and theoretical implications».

##### Session II

R. McCray: «The effect of Mass-Loss from Stars on the Interstellar Medium».

M. Friedjung: «Mass-Loss from Novae and Supernovae».

##### Session III

J.E. Dyson: «Quasars».

##### SUMMARY

\* Joint Discussion VII marks the centenary of the birth of A.S. Eddington (1882-1944).

#### In the Averof Grand Hotel:

15.00-18.00: Executive Committee 49th Meeting.

### INVITED DISCOURSE

#### In the Ancient Odeon of Patras:

at 20.30 «Origin and Development of Solar Flares» by E. de Jager.

At EOT Swimming Resort, Aya, Patras:

WINE FESTIVAL: 20.00-24.00

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## Sir Arthur Stanley Eddington: centenary

by W.H. McCrea

A.S. Eddington was President of the IAU 1938-1944; this year sees the centenary of his birth on 1882 December 28. As a scientist he was clearly one of the most distinguished ever to hold the office of President. Although he held it longer than anyone else, it was under tragic circumstances and he never presided at a General Assembly. He died on 1944 November 22, and the war of 1939-1945 made it impossible to hold a General Assembly between Eddington's election as President in 1938 at the meeting in Stockholm and the meeting of 1948 in Zurich.

Eddington's work in astronomy was under five main heads: 1) he pioneered modern work on stellar movements; some very recent work on «triaxial» configurations of certain galaxies is along the general lines that he explored.

2) Eddington's name will be for ever attached to the observational check (1919) of Einstein's prediction of the «bending» of light in the gravitational field of the Sun — although he would be the first to wish to share the credit with another great astronomer, F.W. Dyson, Astronomer Royal, 1912-1935. It was Eddington's unique combination of mathematical and physical insight that made Einstein's theory generally accessible in the years after World War 1.

3) To most astronomers, Eddington is best known as the creator of the theory of the internal constitution of the stars. When only a little was known about the physics of the opacity of the material and nothing about the physics of energy-generation, his astonishing intuition led him to a remarkably valid picture of conditions inside a star which enabled him and other physicists to define what they were looking for in sources of opacity and energy-generation. This work then led Eddington to a pioneering assessment of the problems of interstellar matter.

4) It is impossible to say anything about Eddington's science without repeating the word «pioneer» or «pioneering». He was also a leading pioneer of the theory of the expansion

of the universe, particular after the great observational discoveries by Hubble.

5) «Fundamental theory» is the name that E.T. Whittaker gave to Eddington's last book when he edited it for publication after Eddington's death. Eddington believed that the dimensionless constants of physics must have a purely mathematical significance that could be discovered when the operations of an observer or experimentalist are expressed mathematically. Almost certainly, his ideas were the most daring of any modern scientist, but no one else has been able to follow them or evaluate them with any reassurance.

A scientist of such adventurous thinking was bound to have chinks in his armour — that is not too dreadful a mixture of metaphors! He was almost certainly mistaken in his attitude to relativistic degeneracy, and he was certainly too naive in his acceptance of Hubble's numerical results.

But the shape of a very great deal of what is being discussed this week in Patras is traceable to Eddington's inspired thinking in his comparatively short but wholly dedicated life. One makes bold to claim that there is no other single individual for whom such a claim could be sustained.

In sitting through some of the discussions at the 1982 IAU, when we have been hearing about work in regions of the electromagnetic spectrum that were completely inaccessible in Eddington's time on types of objects about which he had never heard, I tried to imagine what Eddington would have made of it all. He would be intensely interested, but scarcely surprised, since he himself spoke of «so simple a thing as a star», leaving room for lots of things not so simple. But I think too that he could quietly call attention to the fact that we are not using much that could really be called «new physics» since his day.

To end on a lighter note that might appeal to Eddington himself, on a terribly hot afternoon at the Paris meeting of the IAU in 1935, Eddington gave a talk on the problem of energy-generation in the central region of a star and he put limits upon the temperature in such a region. «And if you want a hotter place», he said, looking out of the window, «go and find it». Nearly half a century later, we have found a hotter place — Patras in August.

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Editor: A.E. Roy  
Both at the University of Patras

Phototypesetting and Printing: P. Constantinopoulos, 115 Maizonos Str. - Patras

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**Keffethes**

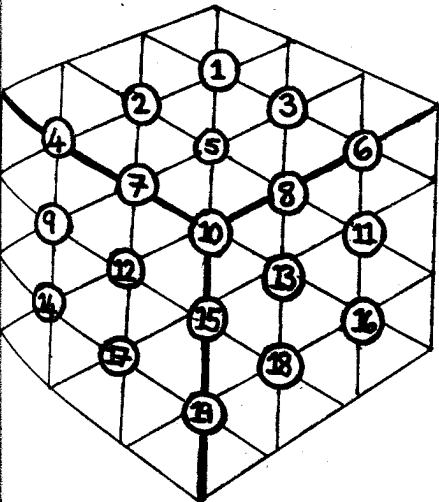
1/2 kilo chopped beef  
 2 onions  
 1 egg  
 1 tablespoon wine vinegar  
 2 tablespoons olive oil  
 Salt and pepper  
 1 slice of bread soaked in water or milk  
 Chopped parsley and mint well grated.  
 Put the meat, grated onions and bread into a mixing bowl and knead well with hands.  
 Add all other ingredients and continue to knead. Allow to set about two hours. Shape into balls, roll in flour, dusting off excess flour, and fry in hot olive oil.

Wanda Goudas

**RUBIK CUBE CROSSWORD**

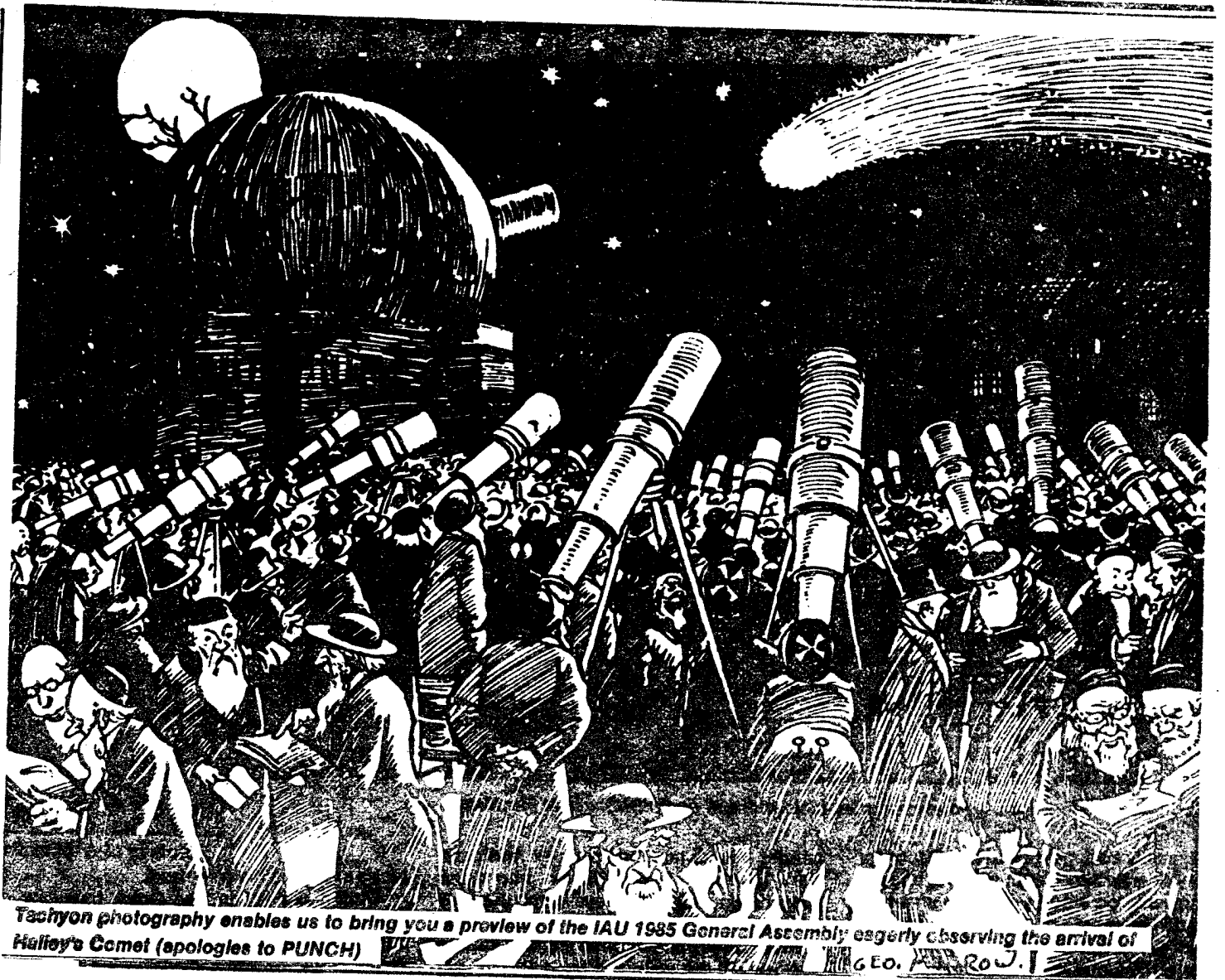
Doubtless you remember the simple instructions for solving this type of crossword inspired by Mr. Rubik's famous cube.

Each clue answer is a six-letter word (or it may be two three-letter words) placed in the six places surrounding the clue number in the Rubik Cube. But although the word's or words' letters retain their correct order, it or they may be spelled out clockwise or anticlockwise and the first letter may begin in any one of the appropriate six spaces. Thus, the answer to clue 16 is PEWITS and to fit it in with the answers to 11, 13 and 18, it is spelled out in an anticlockwise manner, the letter P being placed in the middle left-hand space.  
 Have fun!



**Clues**

- 1. As far away from the edge as possible.
- 2. A monarch occupies it.
- 3. The Greek gods drank it.
- 4. A Greek teacher of the art of speaking.
- 5. Sherlock Holmes was good at this.
- 6. Traditionally the object best suited to infuriate the bull (two words).
- 7. English nonconformist chapel.
- 8. The last scrap (two words hyphenated).
- 9. Cross out.
- 10. When found out by Holmes, the villain was....
- 11. Some Scottish shields (plural).
- 12. Fish do it at a baited hook.
- 13. Collection of aircraft (plural).
- 14. A lovely thing, God wot.
- 15. Unstable, liable to change.
- 16. Some lapwings and their cries (plural).
- 17. Mischievous ugly demon.
- 18. Promise with security.
- 19. Twin or multiply by two.



Tachyon photography enables us to bring you a preview of the IAU 1985 General Assembly eagerly observing the arrival of Halley's Comet (apologies to PUNCH) GEO. PROJ. I

**NEXT SLIDE PLEASE**

The following item appeared in NATURE in 27 April 1978 and stuck in your Editor's mind, perhaps because it is not wildly different from some presentations he has endured at conferences he has attended in the past. He is indebted to Macmillan Journals for permission to reprint it.  
**ACKNOWLEDGEMENT:**  
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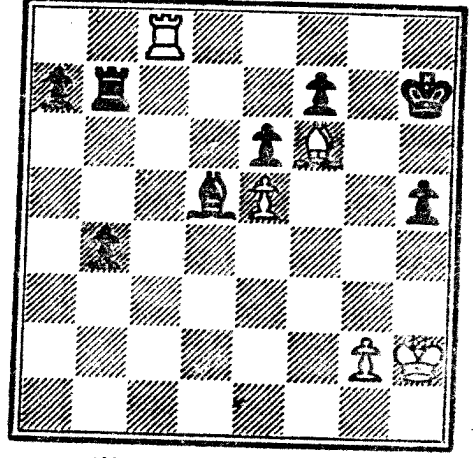
"I thought that in the eight minutes I've got I'd bring you up to date on what our group has been doing in the last year; in a sense this is a progress report and updates the paper we gave here last year; I won't go over the nomenclature again; could I have the first slide please — oh, I think you must have someone else's box — mine is the grey one with my name on the top, no wait a minute, not my name, whose name was it now? ah yes,

you've found it; there's a red spot on the top right hand side of each slide that is the side that becomes the bottom left when you project it, OK, you've got it now, let's have a look, no, that's the last slide not the first, yes, now you've got the right one but it's on the side, what about the red dot? There are two? Well, anyway turn it through ninety degrees, no, the other way, yes now we're there, perhaps we could have the lights off, well I'm sorry there are probably too many words on this slide, and the printing is a bit thin; can you read it at the back? you can't; well, I'd better read it out; no I won't, it's all in the paper which should be published within a month or so, and anyone who wants I'll give a preprint to afterwards, anyway, for those who can read it, this slide is a block diagram of the purification process we used and before I go any further I should mention that there are a couple of misprints: on the third row, fourth box from the left, well, of course that's the second box from the right, if you can read it, it says alkaline, now that should be acidic; also you can perhaps see the word membrane, that should of course be membrane; now if I can have a look at the next slide — now which one is this? ah, yes, it's the scatter diagram. I haven't marked the quantities but we are plotting concentration against particle size; if I remember rightly this has been normalised: perhaps I could have the lights for a moment to check in the text, yes, here we are, well it doesn't actually say — we could work it out but it's probably not worth the time, so if I could have the lights off, let's have a look at the plot; well I think you can see a sort of linear relationship — there's a fair bit of scatter, of course, but I think the data are at least suggestive; perhaps if I held up a pointer you could see the relationship more clearly — I expect there's a pointer around somewhere, no I won't need the lights, yes here it is, now you can see the trend and there's just the hint of another trend running subparallel to it through this other cluster of points, you may see that more clearly if I slide the pointer across to the other — no, I wasn't saying next slide, just that I would slide the pointer; anyway now the next slide is up let's keep it on the screen, now this is the sort of evidence on which the data in the last slide were based;

this is a thin section — it could take just a bit of focusing — yes, that's better, it's difficult to get the whole slide in focus at once, now the scale is, well that bar is one micron long, hang on what am I saying? it's ten microns long — oh dear, the chairman is giving me the two minute warning, it's difficult to give you a clear picture of this work in only eight minutes, but let's plough on, what was I saying? ah yes, that bar is ten microns long, now if we turn to the next slide, please, this is the result of a chemical analysis of the dark region that is near the centre of that thin section, is it possible to go back a slide? well not to worry, you can see in the analysis how dominant — sorry what was that? oh yes, the errors are plus or minus a per cent or so — that's the standard deviation, no it can't be, it must be the standard error of the mean — oh dear, the chairman says my time is up, can I beg half a minute — are there any more slides? really? well let's skip the next two, now this one is pretty important, it brings together several of the threads that you've probably been able to discern running through this talk, but rather than go through it in detail perhaps I should have the lights and just put up one or two key numbers on the blackboard — the chairman says there's no chalk, well it's all in the paper I was mentioning anyway perhaps I've been able to give you the gist of what we've been doing, I guess that's all I've got time for.



**Chess Position 8**



White to play and draw  
**Solution to Chess Position 7:**  
 1. Q-Kt3!, Q X Pch 2. Q-R3!, Q-Q3 3. K-R1! and black is lost.  
 V.V.M.

## FINE PERFORMANCE OF EURIPIDES' TRAGEDY «ANDROMACHE»



*Peleus rescuing Molossus and Andromache from Menelaus*



*Note of high dramatic tension as Hermione decides on suicide*

A capacity audience packed the Odeon for Sunday's performance of Euripides's tragedy **Andromache**, on a sultry evening under an unusually overcast sky. Even those unfamiliar with the Greek language were enthralled by the continuous action and moments of intense drama, and helped by the comprehensive program notes which guided us surely through the action in English and French.

From Andromache's sudden appearance, chased by armed guides, to the final bow by her son Molossus, the action was fast, colourful and emotionally intense.

Andromache (Elsa Verghi) displayed dignified courage as she was hounded by her husband's wife Hermione (Youta Gavala) and Hermione's father Menelaus (Christos Frangos). The doleful execution procession for Andromache and Molossus was dramatically interrupted by the shaggy figure of wise King Peleus (Grigoris Vafias). In this intense central section of the play, a remorseful Hermione next appeared, bent on suicide, ripping open her costume and attempting to impale herself on the soldiers' swords. But an ex-suitor, Orestes (Yorgos Grammatikos), arrived to rescue her: they left for Delphi to

murder Hermione's husband — Andromache's lover (the key character, who never appears on stage!). Peleus wept over his grandson's death, but his goddess wife «appeared» as a shining altar stone to declare that all will be well: the aged Peleus will become immortal, and Andromache will marry Hector's brother Helenus, and her son Molossus will become King — symbolised by the last action where Molossus placed Pe-

leus's crown on his own head.

During the action, the Greek tragedy's chorus of women milled about the stage, dancing, gesticulating and singing their comments — and occasionally delivering messages to the main actors — their multicoloured but subdued dresses forming a background to the vivid costumes of the principals: Andromache (and Molossus) at times in

white, her rival Hermione in wine-red, Menelaus in royal purple and blue and Orestes in white and scarlet.

Continued applause at the end showed just how much the large audience had appreciated this vivid and compulsive entertainment, listening to words which predated even the ancient Odeon in which we sat spellbound.

### ANNOUNCEMENT: Meeting number 285

Giant H II complexes outside our Galaxy  
August 24, room AB, 15.30-18.00

1 Observational results and their primary interpretations in the following domains:

Radio D S HEESCHEN (15 mn)  
X-rays L van SPEYBROECK (15 mn)  
Visible M ROSA (20 mn)  
UV P BENVENUTI (15 mn)  
IR C M TELESKO (15 mn)

2 Confrontation with related investigations in our Galaxy and general interpretations F P ISRAEL (20 mn)  
Chairman J HEIDMANN

Two new catalogues are available at the observatoire de Strasbourg

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• Publication spéciale du C.D.S No 3: CATALOGUE OF THE CENTRAL STARS OF TRUE AND POSSIBLE PLANETARY NEBULAE A Acken, F Gleizes, H Chopinet, J. Marcont, F Ochsenbein, J M Roques. Contains observational data, bibliographic references and finding charts, for 460 stars.

• Publication spéciale du C.D.S No 4: CATALOGUE OF STELLAR GROUPS — PART ONE. THE EARLIER GROUPS. M. Jaschek, D Egret. Contains positions and bibliographic references for about 6000 peculiar stars belonging to 17 special groups.

### The Asteroid 2628 KOPAL 1979 MS<sub>5</sub>

Discovered 1979 June 25 by E. Helin and S.J. Bus at Siding Spring, this small piece of sidereal real estate has been named in honor of Zdenek Kopal, astronomer, and Chairman of the Astronomy Department of the Victoria University of Manchester, England, 1951-81. Kopal, a leading world authority on the moon and the terrestrial planets played an active role in the exploration of the moon in a NASA sponsored program. It was therefore only fitting that one of the objects that makes up the planetary system be named in his honor and at a party held in Stamac Hotel, Zdenek and friends met to celebrate the occasion. There are as yet no plans for him to visit 2628 Kopal but knowing Zdenek's capacity for travel the possibility should not be ignored.

### BULLETIN Photometric Survey for Variability from Space

An informal discussion of the advantages of space for photometry will take place over beer at the taverna of the Averof at 5:30 this evening (August 24). Those interested but unable to attend may contact Hugh Hudson (1401) or Bob Noyes (0652) for further information.

Space offers an excellent site for a photometric survey dedicated to monitoring variability in stars, extragalactic objects, and transient phenomena (such as the expected optical counterparts of high-energy transients). One scheme for carrying out such a survey would involve a set of CCD cameras in a (relatively) inexpensive spinstabilized spacecraft. For bright stars one main goal would be to obtain a relative photometric precision adequate to measure the global non-radial oscillations of stars even on the main sequence, and thus to probe their internal structures. For fainter objects the photometry will be progressively worse, but one may confidently expect to do much better (orders of magnitude?) than at ground-based observatories.

### SECOND INVITED DISCOURSE BY PROFESSOR HERBIG

The Origin and Early History of the Sun and the Planetary System in the Context of Stellar Evolution.

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At the Ancient Odeon of Patras on Friday evening, the second invited discourse was preceded by the sad announcement of the tragic death of the President of the IAU, Professor M.K.V. Bappu. Delegates stood in silence in his memory.

Introducing the speaker, Professor Feast explained the special pleasure the duty held for him. Outlining Professor Herbig's pioneering work in many fields, Feast pointed out that Herbig had never been a man for bandwagons, and he advised the audience that «if you must jump on a Bandwagon, choose one that G.H. has started rolling».

In his lecture Professor Herbig stated that a plausible scenario for the early history of the sun can be constructed by combining the results of stellar astronomy with lunar and meteoritic chronologies. The meteorites apparently contain material exposed to two nucleosynthetic events, one about  $10^8$  yr and another a few  $10^6$  yr before solidification. Following H. Reeves, these are associated with supernovae occurring in star clusters in molecular clouds that formed during passage through successive galactic arm shocks. The Orion Trapezium Cluster may be a modern example; its density is such that encounters between members would have been close enough and frequent enough to have had major effects upon their circumstellar solar nebulae, as would recurrent FU ORI-like eruptions of the stars themselves. The lunar bombardment continued for  $7 \times 10^8$  yr following formation of our sun. If this represented disk cleanup, disks must persist for that long, and hence circumstellar activity may still be in progress around some young stars in the solar vicinity. The observed time decay of axial rotation and surface activity in solar-type stars can be extended back-wards, and indicates that the ultraviolet radiation of the young sun would have had major photo-

chemical consequences upon the primitive earth.

In conclusion, Professor Herbig sounded a cautionary note:

«Yet it would be unrealistic to claim that this scenario can be in any sense firm of final, on account of the rapid and inexorable advance of knowledge. In explanation of having even attempted such a synthesis, may I simply repeat the words of a famous Athenian of the Fifth Century B.C. who, in comment upon a historical record just as flawed and incomplete and arguable as is the astronomical, said: "We can rest satisfied with having proceeded upon the clearest data, and having arrived at conclusions as exact as can be expected in matters of such antiquity..."».

### Lost and found

The most distinguished scientist can be so totally absorbed in his deep thoughts that he can forget anything, even his most precious possessions. At least, that's his excuse for his absent-mindedness.

This happened to one unfortunate IAU participant who wishes to remain anonymous. After having looked everywhere, desperately and without any success, he inquired at the Information Desk and his belongings were immediately handed back to him with the most gracious smile. None of his papers was missing nor the contents of his wallet which had been carefully checked in case of some unfair complaint.

**Conclusion:** Try not to lose your belongings or your smile. But if you do, do not despair, for the chances are that everything will be returned to you with a smile thanks to the efficient network of the «Lost and Found» service set up by the Local Organizing Committee.

The particular scientist who found this out was so impressed by the service that he felt he had to draw the attention of ASTROCOSMOS to it as an expression of his gratitude.