

XVIIIth GENERAL ASSEMBLY

ASTROKOSMOS



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Telephone: 991465

INVITED DISCOURSE AT THE ANCIENT ODEON OF PATRAS

«Astronomy In Ancient Greece»

In his discourse the speaker drew attention to the mistake of certain classical scholars who thought that Greek culture ended with the deaths of Alexander and Aristotle. This was not so. Long after their deaths the great Greek thinkers such as Ptolemy, Hipparchus, Apollonius and Aristarchus were active. He pointed out that it was a mistake also to try to interpret their thoughts according to today's views and he drew attention to the fact that almost no original material has come down to us. A good synthesis tends to destroy previous material and so what we have is for the most part derived material and not original documents.

The speaker remarked how recently our western scientific methods have been created. Prior to Galileo and Kepler we have nothing of the body of scientific societies that existed in the seventeenth century nor do we have any wide acceptance of what a scientist is or how he works.

In discussing Copernicus's work *De Revolutionibus*... the speaker pointed out how essentially Greek it was in plan and content, being obviously modelled on Ptolemy's *Almagest*. He described in detail how brilliant the Ancient Greeks were at designing models of the cosmos, based for the most part on the acceptance of a spherical Earth at the centre. This series of models culminated in the tour de force of Eudoxus where he constructed an essentially geometric model of the universe involving spheres interlocked one with another. This model, though brilliant, was unfortunately on the wrong track. Professor Hoskin also described the contrasting brilliant pragmatic approach of those other watchers of the skies, the Babylonians, in solving their astronomical problems.

In a passage in which he considered the work of Hipparchus, possibly one of the most outstandingly capable Greek astronomers and mathematicians of ancient times, the

speaker went on to describe the *Almagest* of Ptolemy, an achievement that became the definitive work in astronomy for fourteen hundred years. Copernicus saw in the *Almagest* an extraordinary mathematical achievement that was capable of revision to an acceptable standard of accuracy but was defective in certain ways.

The speaker concluded by saying that *De Revolutionibus* is clearly in the tradition of the *Almagest*. It offers a heliocentric cosmology and even some hints on the physics of the Earth's motion. It was, he said, about as far as Greek astronomy could go. Within two generations, the obsessional search for accuracy of Tycho Brahe, the telescope of Galileo, the dynamical laws of Kepler arrived to change the scene. Greek astronomy, culminating in Ptolemy and Copernicus, was not a sufficient condition for the development of modern science, but perhaps it was a necessary one.

IAU delegates once again packed the Ancient Odeon in Patras last night for the first of the four specially invited discourses: Professor Michael Hoskin speaking on astronomy in ancient Greece.

Introducing Professor Hoskin, the President of IAU Commission 41, Vice-President Professor Kharadze spoke of the history of astronomy and science. And he added a personal note that as a citizen of the province of Georgia, he cherished a long-abiding shared culture with the Greek people, for his homeland was the eventual destination of the Argonauts.

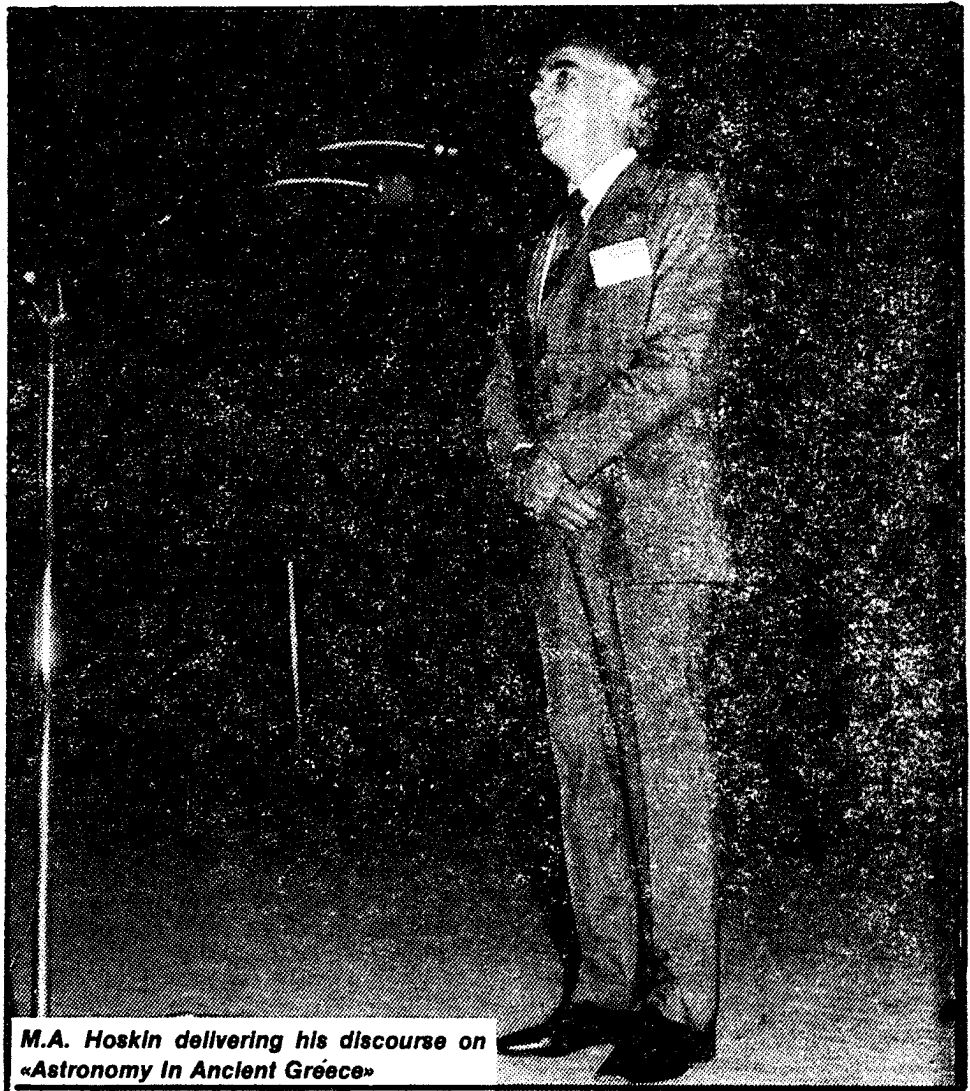
Beginning his discourse, Professor Hoskin noted that this was almost certainly the first time that such a lecture had been held in the Ancient Odeon. In the presence of the planets Mars, Jupiter and Saturn themselves, he entertainingly described the story of planetary motions, making Copernicus «for the purposes of tonight, an honorary Greek citizen», and «proving» that the Earth does not rotate by dropping—and catching—his twentieth-century clock.

A sincere regret

The members of the Transportation Subcommittee have received and accepted complaints about the inconvenience and the upset for which we accept responsibility.

Please believe that we have done our best concerning your transportation to the University, hotels and Odeon. We apologize sincerely and we will be grateful to you if you can suggest any changes that can possibly be done. We truly believe that your life will be easier from now on. Thank you for your understanding and have a good time in our country.

S. Kaplanis



M.A. Hoskin delivering his discourse on «Astronomy In Ancient Greece»

NEW PROBLEMS FOR CELESTIAL MECHANICS

Y. Kozai (Tokyo Astronomical Observatory)

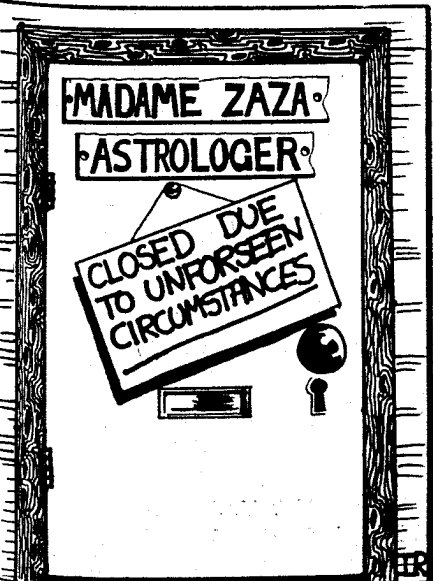
Everybody studying celestial mechanics and interested in its findings is fascinated by harmonic configurations of orbits of celestial objects in the solar system, by means of which major bodies including planets, asteroids and satellites can avoid close approaches with each other. In this sense the solar system is now in an equilibrium condition. One problem is how such a condition has been realized. In fact we know that there are many so-called commensurable relations not only among orbital motions but also between orbital and rotational ones in the solar system. Many papers have now been published trying to find mechanisms responsible for realizing such configurations by investigating qualitative properties of solutions of dynamical systems and by finding periodic solutions and studying their stabilities. However, most of the dynamical systems which have been investigated by this way are those of conservative forces.

Recent Voyager spacecraft observations have revealed several other commensurable relations hitherto unknown to us and such new findings have stimulated many people to study why such systems exist. A number of investigators are convinced now that the orbital and rotational configurations with commensurable relations have been brought

about by non-conservative forces due to tidal dissipations in planets and satellites. Several authors discuss that tidal dissipations are responsible for volcanic activities in Io, one of the Galilean satellites and also for some of the Saturnian satellites. It is very interesting to know that whereas in former days celestial bodies were treated as point masses for most of the cases in celestial mechanics without knowing any physical conditions about them, now celestial mechanics can tell us how the interiors of some of the satellites have been heated.

Nevertheless point-mass dynamical systems with conservative forces are still very stimulating targets in celestial mechanics. In the past five years or so several new theories for planetary and lunar motions have been published. Most of them have been developed by utilizing computers and by correcting errors which existed in older theories and by including many more terms of higher degrees and orders in the formulae expressing their motions. In this way the position prediction accuracies have been improved very much.

During this General Assembly several experts will be invited to give us review talks at Commission 7 meetings on some of these very interesting subjects.



35 ans d'activité de la Commission 38

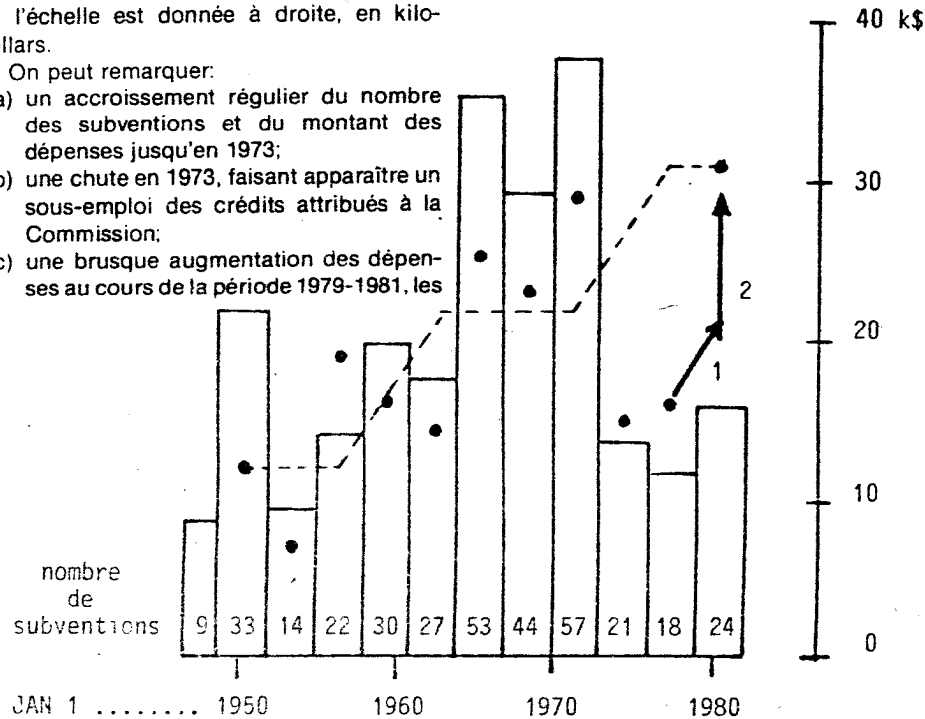
J. Delhaye, Observatoire de Paris, France

Le programme d'échanges d'astronomes gère par la Commission 38 de l'UAI peut sembler modeste si l'on mesure son importance par le montant des crédits qui lui sont affectés dans le budget de l'Union: 58.000 francs suisses pour la période 1979-1981. Il constitue cependant une contribution significative de l'UAI aux échanges entre observatoires, bien souvent au bénéfice de jeunes astronomes.

Depuis l'origine du programme, en 1947, 352 subventions ont été distribuées. La figure ci-contre en montre la répartition chronologique. La courbe en pointillé montre l'évolution du budget triennal de la Commission 38; les points représentent le montant total des «dépenses» par période de trois ans; pour celles-ci, comme pour l'information budgétaire, l'échelle est donnée à droite, en kilodollars.

On peut remarquer:

- a) un accroissement régulier du nombre des subventions et du montant des dépenses jusqu'en 1973;
- b) une chute en 1973, faisant apparaître un sous-emploi des crédits attribués à la Commission;
- c) une brusque augmentation des dépenses au cours de la période 1979-1981, les



Stellar populations joint discussion

On Thursday, August 19th, in hall CA (the Auditorium), there will be a joint discussion about evolution in old stellar populations in galaxies. Nine commissions support the meeting, reflecting the wide interest of the subject. The commissions of photometry, spectral classification and stellar spectroscopy use new techniques to get much more reliable information about brightnesses, colours, temperatures and element abundances of the stars. The detection of Lithium in old stars and the possibility of globular clusters being survivors from early epochs of the universe hold special interest for cosmologists. Naturally the day's programme is of profound interest to the commissions for galaxies, for galactic structure and for stellar constitution. Also, much of the evolution of stars is reflected in the enrichment of the interstellar matter.

While the topic for Thursday's joint discussion is of wide interest, we can also expect that it will illuminate some specific questions where a lot of research activity is currently taking place. One of these is the abundance scale of the globular clusters. While several results indicate that some globular clusters have metallicity values not much lower than those of stars in galactic disks, there are new spectral analyses that indicate a metal abundance lower by a factor 10. The abundance question as well as new models for stellar evolution are important prerequisites for determination of cluster ages. More reliable ages may in turn give the time scale for the evolution of the universe.

Another subject that will be discussed is the population characteristics of galactic nuclei. Do spectra of the nuclei of spiral galaxies tell us something about their ages or

dépenses au cours de cette période étant cette fois égales aux prévisions budgétaires

Cette augmentation n'est pas anormale, ainsi que j'ai essayé de le montrer sur la figure: la flèche 1 correspond à l'augmentation des tarifs aériens entre 1977 et 1981 en supposant qu'on n'ait attribué que 18 subventions en 1979-1981; la flèche 2 correspond à l'accroissement du nombre des subventions d'une période à l'autre (de 18 à 24).

Si la situation économique ne se stabilise pas, des mesures seront évidemment à prendre pour que la Commission 38 puisse poursuivre son activité

are differences between such spectra due to abundance differences?

Thursday's final session will be about galactic disks and their evolution. A number of recent abundance determinations concern interstellar matter as well as stars in the disks. Several theoreticians have used observations to study models for the evolution of these disks.

The various topics of the day's discussion will be presented by ten invited specialists who will review their own achievements as well as those of their colleagues. There will also be three open discussions in which it is hoped that some of the controversial questions will be aired.

Gösta Lynga, Institutionen för Astronomi, Lunds Universitet

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Editorial

NO APOLOGY

I am appalled by the number of astronomers who seem to spend their time apologising for the fact that they have chosen to be astronomers. Of course they are sometimes driven to it by those people who point out that if some selective disease swept away every doctor of medicine or every farmer, the world would immediately notice and be in danger whereas if the disease killed every astronomer it might be months before the world at large noticed their absence! This attitude — I have met it myself — is basically understandable and to some extent true. But consider the following...

Suppose that the human race had begun on a planet like Venus where the sky is never seen. Even if civilisation had developed in the way that it did, in the scientific and technological sense, the human race up until the advent of radio, rockets and highflying aircraft would have had no evidence that the Earth was a tiny part of the universe. The discovery of the universe at large would have had a traumatic effect on Man.

But in fact a little thought is sufficient to show that our scientific and technological civilisation would not have developed in the way that it has if the heavens had been absent from Man's view.

The discoveries of astronomers from the earliest ages have influenced and shaped

Man's deepest thoughts concerning his place in nature. Astronomy has played its part not only in pragmatic subjects such as timekeeping, navigation, dynamics and pure science but has influenced in fundamental ways religious concepts, philosophical and cosmological models. The development of Man's education as a thinking creature has been his developing relationship with the universe. Today, more than ever before, that relationship is being enriched by space age astronomy with its unprecedented and powerful technological aids.

We need not only food for the body but also nourishment for the mind. As astronomers we are in a singularly privileged position to provide that mental nourishment without which our race cannot come to maturity and surmount its adolescent and destructive misconceptions about itself and its planet. Think again about that hypothetical human race that began on a planet like Venus where the universe stops at the cloud-base and try to imagine its world outlook. And stop apologising about choosing to be an astronomer.

In any case, if there hadn't been a sky there would have been no International Astronomical Union and we would not have gathered here in international companionship in Greece where millennia ago our science began because Man saw the sky.

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.

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.

TODAY'S EVENTS:

LES EVENEMENTS DU JOUR JOINT DISCUSSION II:

«Evolution in Old Stellar Populations in Galaxies»

(IAU Commissions 25, 28, 29, 33, 34, 35, 37, 45, 47)

08.30-10.30, 11.00-12.30, 15.00-17.30, Room CA, 19th August)

SOC Commission(s)

* G. Lynga (Sweden), Chairman	37
J. Audouze (France)	35, 47
R. Bell (USA)	45
G. Cayrel de Strobel (France)	29
R. Fenkart (Switzerland)	33
* J. Hesser (Canada)	37
I. Iben (USA)	35, 37
M. McCarthy (Vatican)	25
M. Peimbert (Mexico)	28
S. van den Bergh (Canada)	37
B. Westerlund (Sweden)	28
* Editors	

Programme
G. Lynga: Introduction: «The Concept of Old Stellar Populations».

Session I — Chairman M. McCarthy — 08.30-10.30 (Populations in the Halos of Galaxies).

B. Gustafsson: «Abundance Determinations in Globular Clusters — Difficulties and possibilities».

R.D. Cannon: «Ages of Galactic and Extra-galactic Clusters of various Abundances».

F. Spite: «Chemical Composition of Halo Field Stars and Chemical Evolution of the Halo».

R.P. Kraft: «Do Halo Field Stars and Globular Clusters belong to the same population?».

Discussion
Session II — Chairman J. Graham — 11.00-12.30 (Populations in the Nuclei of Galaxies).

R.W. O'Connell: «Population Types in Nuclei of Spiral Galaxies».

D. Crampton: «Alternative Views on Population Types in Nuclei of Spiral Galaxies».

S. Faber: «Nuclei in Elliptical Galaxies».

Discussion
Session III — Chairman B.E. Westerlund — 15.00-17.15 (Populations in the Disks of Galaxies).

J. Mould: «Star-formation history of Dwarf Galaxies».

S. van den Bergh: «Stellar Population as a function of Hubble type».

R. Larson: «History of Star Formation in Disks».

Discussion
SUMMARY — K.C. Freeman

In Building A, IAU Secretariat: 17.30-18.30: Meeting of Finance Subcommittee.

In the Ancient Odeon of Patras: 20.30-22.00: Main Musical Event.

At EOT Swimming Resort, Aya, Patras:

WINE FESTIVAL 20.00-24.00

GASTRONOMY CORNER



Στην υγεία σας!

The Greek Way

«Wine, oh Menelaus, was made by the gods...» wrote an epic greek poet. And, indeed, the art of wine-making is as old and legendary as Greek gods are.

Dionysus, the god, brought all sorts of celebrations which took the form of rowdy processions, accompanied by music and dancing and usually ending in an orgy of wine-drinking.

Greek Drama originates from these festivities.

The «Symposia» held by ancient Greeks were social gatherings where food and wine was consumed in large quantities. These poets and musicians entertained the «symptotes» and great philosophers discussed and debated their immortal ideas.

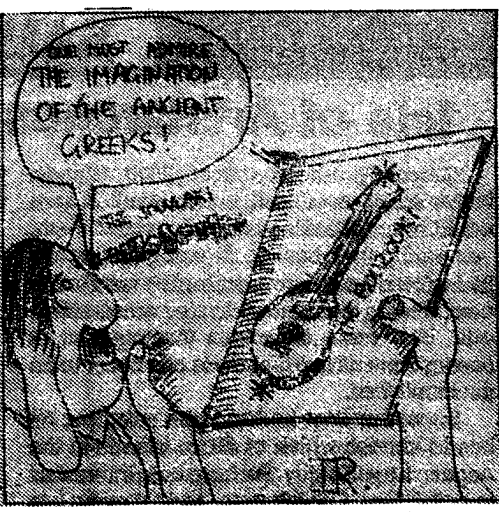
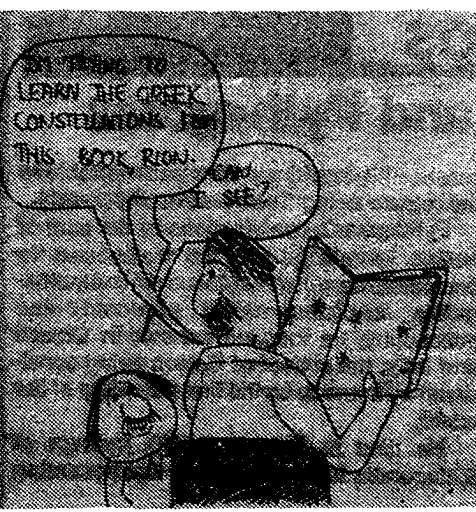
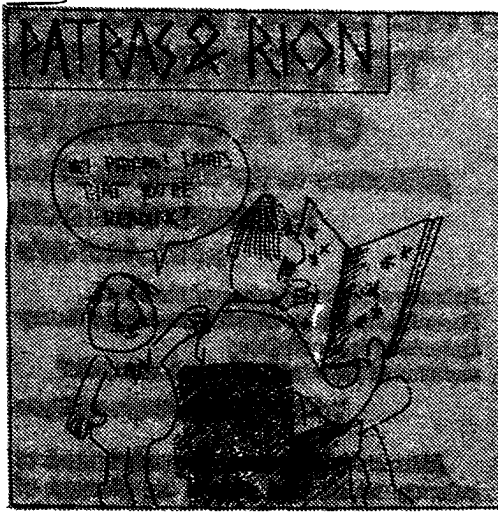
Ancient Greeks used to drink wine diluted with water, and for this purpose special ceramic pots called craters (κρατήρες) were used.

Ancient Greek wines were generally sweet. To preserve and improve them, several substances were added which seem strange by modern standards: potter's earth, powdered marble, salt and even sea water. Aromatic wines were popular. Many writers believe that the finest vintages were amongst the best wines ever produced.

In modern Greece the wine industry has grown to become a significant section of the economy. Today Greek wines travel all over the world. There is a large variety of wines to satisfy every taste.

First of all, you can drink retsina accompanied by a meze in the picturesque tavernas.

Retsina enthusiasts regard Attica as the finest source of this wine. Properly made it should be a decent light, dry white or pale red wine, to which one percent resin is added during fermentation and later removed. This originated in antiquity, as a means of preserving it, but today's wines should be drunk young. «Red» retsina or «Kokkinelli» may surprise wine snobs even more than the white variety. I have heard that it is a popular



wine in some of the livelier Rive Gauche bistros. in Paris. Andrew Cambas' firm produces one of the best retsinas.

For those who reject retsina here is a selection of wines to put to the test.

Outside Patras in the mountain foothills some kilometres from the city is the Achaia Clauss winery. The vineyards, which now cover 150 acres, were bought and the house founded in 1861 by a Bavarian, Gustav Clauss. He was the innovator of the luscious dessert wine, **Mavrodaphne**, one of their specialities today.

Like many Victorians, Clauss admired the Gothic, and his turreted «medieval» castle is a splendid sight, now housing some of the winery's workers. The view down to the distant city and sea is breathtaking, and it is not surprising that 50.000 people from all over the world visit the winery annually. Many of them have heard of Achaia Clauss' best-selling **Demestica** but a more subtle wine is the silky golden dry white **Santa Helena**.

Robola, has always been recognized by Greek connoisseurs as one of the finest white wines. Recently, it has become one of the most fashionable wines in smarter Athenian restaurants. Snob appeal, too often, is not commensurate with a wine's quality; happily, this is an exception.

Robola comes from Cephalonia, largest of the Ionian islands. It is a refreshing place to visit even in the great heat of high summer for its marvellous, unspoilt beaches, its green hills and forests.

From the vines of the slopes of Mount Aenos, Cephalonia's highest mountain range, come the Robola grapes. «They are unique in Greece, may be only grown here, for the wine is one of the 25 which our law has classified with an appellation of origin». So John Calligas, one of the winery's directors, explains to the winery's visitors.

They make it in limited amounts, only from their own grapes. Robola is equally good as an aperitif or to serve with fish, chicken or veal. It is a pale greeny-gold wine exquisitely light and very dry. It goes through several careful filtering processes to ensure its quality, is stored in specially cooled tanks and is ready to bottle after 3 months. Calligas make a notable dry rosé and have recently marketed **Monte Nero**. This is a deep crimson dry, fruity wine which matures gracefully. They also make good sparkling wine unusually delicate for that part of the world and their best is **Champ Heurreux** which is extremely dry and light.

Another is **Castel Daniels**, a fragrant, rather

grapey, dry red, whose legendary first producer was a certain Lady Danielis, a rich Patras widow in the ninth century. According to local history, she took a soldier lover, Basil of Macedonia, and «trained him in noble manners, befitting his rank» (and which it appears he was somewhat lacking!).

Basil was a good pupil; he later became Emperor of all Byzantium. His mistress's coronation presents to him, a chronicle records, included 500 slaves, one hundred maidens skilled in embroidery, one hundred silken sheets of royal purple, and « princely quantities of Danielis wine».

For some years, Achaia Clauss have been vinifying a limited quantity of red wine for a special reserve, from Mavroutis, a grape grown in the mountains.

The result is **Chateau Clauss**. The 1971 is deep garnet, dry and smooth.

Another famous Greek wine firm is Andrew Cambas. He was its founder in 1882, buying vineyards from two monasteries at Kautra, in Attica, now about half an hour's drive from the centre of Athens.

Apart from the **retsina Mesoghia**, one of their most notable products is an extraordinary ten-years-old wine, **Cava Cambas**. Clear gold in colour, it is very lively, smooth and flowery.

Much younger best-seller is **Hymettus**, which comes from the slopes of the neighbouring mountain, also renowned for its honey. Pale greeny gold, dry and very drinkable, with a hint of the famous honey, it achieved the distinction of being chosen as «house wine» by the Grande Bretagne, the oldest luxury hotel in Athens. It is now served by the glass in the very dignified bar there as an aperitif.

By the bottle, it also appears on an extensive wine list in their lively and informal restaurant, the «GB Corner».

Another wine treasure is **Grande Reserve Boutari**, a fine well-balanced and mature dry red from Macedonia, made by a century-old family firm in Salonica. Salonica is a fascinating city, with its elegant waterfront, wealth of Byzantine churches, and colourful market, and with a very good choice of restaurants and tavernas.

The vineyard region where the Boutari firm has its splendid wineries is in Naoussa, about 70 miles west of Salonica on the lower slopes of the Mount Vermion range. In winter, Vermion attracts skiers and many visitors come to the archaeological site at Vergina to see the spectacular treasures exhibited there.

Naoussa 1971, a deep ruby red, dry and satiny is a most satisfying wine and Mr. Boutari's favourite.

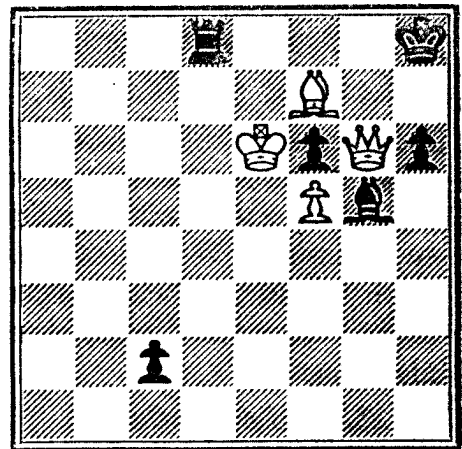
Rotonda is an agreeable very quaffable light red wine. «Easy for lunchtime and should appeal to the Coca-Cola generation», says Mr. Boutari, sipping his Naoussa. Finally the author strongly recommends **Nemea Olivapi** (Parparoussis), a fruity dry red table wine. For those who may wish to purchase their own wine to taste privately or to take back home, we give below a price list for most of the wines mentioned above. These are supermarket prices. You may expect to pay more at smaller shops.

- Robola 185 Drh and 235 Drh.
- Mesoghia Retsina Cambas 73 Drh.
- Monte Nero 205 Drh.
- Demestica 86 Drh and 72 Drh.
- Castel Daniels 122 Drh.
- Cava Cambas (10 years old) 250 Drh.
- Grande Reserve Boutari 234 Drh.
- Naoussa 144 Drh.
- Rotonda 68 Drh.
- Chateau Clauss 254 Drh.
- Santa Helena 122 Drh.
- Wine of Moreas (Achaia Clauss) 32 Drh.
- Calligas Rosé 205 Drh.
- Nemea Olivapi 155 Drh.

We recommend participants of the IAU General Assembly to avoid tasting all these wines in any single day, although we see no reason why their guests should not do so!

Helen Markellos

Chess Position 3



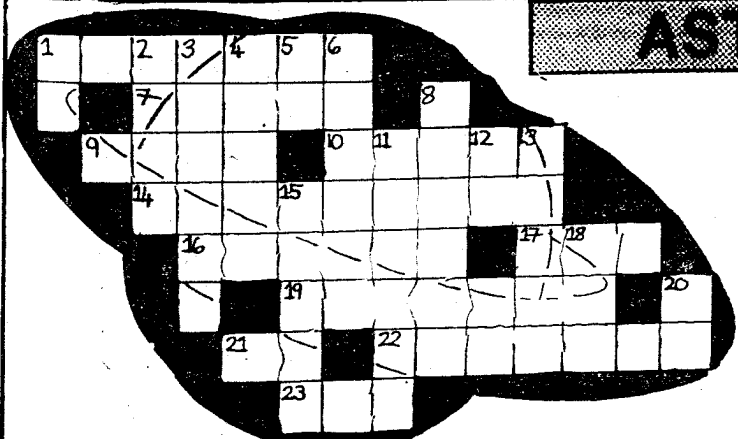
White to play and win

Solution to Chess Position 2:

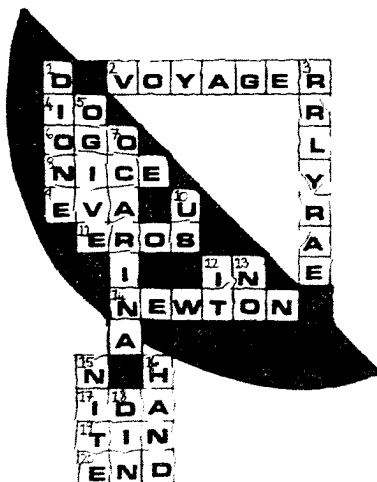
1. R-Kt6, Q X R 2. Q X Q, Kt X Q 3. B-B6 and black mates in one.

V.V.M.

ASTROCROSSWORD



12. Add a 'T' to make it explosive.
13. Charge.
15. Desire to excess.
18. A mixed up International Astronomical Union.
20. With Dec. you can fix its position.



ACROSS

- 1 a Scorpii
7. Could not be better.
9. An asteroid that conquers all.
10. To finish before noon.
- 14 Take out the centre.
16. Add an 'S' and you can make progress.
17. Purchase
19. I've forgotten the clue here
- 21 Shorter than indigo, longer than gamma
- 22 Collection of heavenly bodies.
- 23 Add an 'H' and it describes what it does

DOWN

1. A parsec contains 206265 of them.
2. A parsec contains 206265 of them.
2. That which man kills and ends up by killing him.
3. Small but handsome asteroid.
- 4 Replay
- 5 A 'T' before or after relates it to gastronomy
- 6 Skilled skiers excel at it.
- 8 Traditional goal of visiting extra-terrestrial
- 11 He's tight with money but that one's even more miserly

Rodopoulos Michalis

Cavo d'oro

Cafeteria - Spaggeteria
Iroon Polytechniou, Glyfada

Restaurant «AKTI»

Charcoal broiled fish is our speciality. We are located a short distance from town by the sea at Vrahnaika, in breezy and cool surroundings. Other Greek dishes available. Open to serve you at: 12.00-16.30 and 19.00-24.00.

SAMOS

Isle of Aristarchus and Pythagoras

Greece possesses over 2000 islands, large, small, inhabited, uninhabited. A man could spend a lifetime wandering round them, comparing their beauty, lingering on one isle just a few days before catching the ferry to the next, finding it necessary to stay weeks at this one. Ever more conscious that his task of seeing them all in a lifetime is one never to be accomplished.

Sooner or later he has to be selective, he has to choose which of those islands in the Aegean he will enjoy. Perhaps he is interested in prehistory. Foolish man. Almost every isle has its legends to be pursued and collected, again a never-ending task. Or, less intellectually, he wishes to compare the various wines produced almost village by village, from the ultra-sweet syrupy wine of Samos to the characteristic retzina of Santorini created from the grapes of vines grown in the volcanic soil of that turbulent island.

One isle that is surely worthy of an extended stay is Samos, famed not only for its lush greenery, its ancient ruins, modern picturesque villages and towns but also for its two world-famous citizens, Aristarchus and Pythagoras.

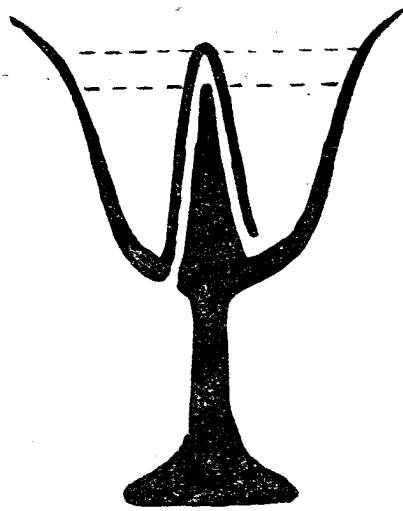
With that intellectual courage and originality characteristic of the Greek mind in its ability to detach itself from common-sense conclusions, Aristarchus accepted the Earth as a planet rotating on its axis and revolving about the Sun, a heliocentric model that not unnaturally was unpopular with most of his contemporaries. Judging by the bloody, tyrannical and egotistical history of the island with rulers such as Amphikrates, Polykrates and Sylosson, the idea that the stage on which they acted was a minor part of the universe was too bitter a pill for them to swallow. It still is, of course, 2500 years after Aristarchus.

Pythagoras was born in Samos around the year 580 BC. He became a student in Lesbos and later was a student of Thales and of Anaxandrides of Miletus. He settled in Samos but was forced ultimately to quit the island

because his teachings were unacceptable to the regime ruling Samos under Polykrates.

Pythagoras's contributions to the sum of human knowledge are too well-known to enumerate here in detail. He advanced mathematics, medicine, music, astronomy and philosophy; he founded schools in Greece and Italy, the school of Croton being considered by some to be the first university of the world.

He died at the age of 80, perhaps at Metapontia in Southern Italy but according



The Pythagorean Cup, Samos

to other authorities at Croton, killed during the attack on his school by his opponents.

The island of Samos is well worth an extended visit. And as you walk there amid sunshine and scenic beauty, think about the island's two great sons who were also there so long ago and amid those same scenes formulated their great thoughts on Man and his nature.

The Pythagorean Cup

A souvenir sold on the Isle of Samos, home of Pythagoras, the great mathematician, philosopher and founder of a religious political movement, is a cup designed by him to circumvent greed. When the cup is filled to a reasonable level with wine, nothing happens. But if the greedy - or ultra - thirsty - insist that it is topped up beyond that level, the wine begins to flow from the cup and continues to do so until the cup is empty. Very disconcerting.

The cup seems to be a normal one except for a seemingly solid pillar in the middle. The pillar contains a channel with an entrance within the cup and exit at the bottom of the cup bowl. When wine is added so that the level rises beyond the channel top, a siphon is formed which operates until the cup is empty.

THE CONTRIBUTION OF ASTRONOMY TO CONTINUING FORMULATION OF A COSMIC PHILOSOPHY

(Welcome to the members of the XVIII General Assembly of the IAU)

By **CHRISTOS GOUDIS, Professor of Astronomy at St. Andrew's University of Patras**

*Ephemeral is the envelope of the Earth...
Eternal is the golden-blue brilliance of the Galaxy
Ephemeral is the Nothing
and eternal the world, the small, the Great!*

TO AXION ESTI, Odysseas Elytis

Astronomy is perhaps the only branch of science which has always an element of modernism, from the appearance of the human civilization till the present time. It is no exaggeration to say that man's interest in the stars is intimately associated with his own nature as a differentiated intelligent being who «looks above» (ὀψρρεῖ ἄνω). This peculiar tendency of his (which is also the exact meaning of the Greek word «anthropos», man: the one who looks above) is perhaps the most determining property of his whole evolutionary path. It is the property that forces him to look at himself from a broader point of view, with respect to a point of reference in time and space which always changes. The continuous reevaluation of man's place in the cosmos, which comes as the outcome of his astronomical investigations, has played an influential role in shaping his broader philosophy.

The man of the era of the Ptolemaic Universe, of a small geocentric World, is the man-conqueror, the man filled up with his magnificence, the egocentric overlord of the Earth. The man of the Copernican era begins to crumble; the Earth is no more the centre of the Universe but a body revolving around something more important (perhaps more alive), the Sun. At this point we should stress that the broader acceptance of revolutionary concepts which change the established way of thinking is the result of a certain collective maturity of the human society, which in order to be reached requires long periods of time. Otherwise we could not explain how the ideas of the Greek Aristarchos of Samos, who lived four hundred years before Ptolemy, were literally ignored by his contemporaries, to be eventually accepted after eighteen hundred years with their reappearance through Copernicus (who himself knew and admired the Aristarchian System).

The man of the twentieth century has literally been shrunk to his cosmically insignificant dimensions. The Sun is no more than a common type of star among an inconceivable number of stars of our Galaxy, a star within a hundred or so billions of stars. And the Galaxy itself is no more than a cosmic grain within the hundred or so billion galaxies of the Universe. In such a vast space the

concept of the meaning of man starts to become complicated. The dethroned contemporary man, deprived of his mythologies, is forced to look at himself under the new cosmic data and wonder about the meaning of his existence. The World around him has changed dramatically; from the first cosmic neighborhood of Ptolemy and the small static, provincial universe of Copernicus to the vast, impersonal Universe of our days. The well-constructed, monotonous mechanical clock has vacated its place to the evolving, organic Universe, the Universe which once was born and therefore must sometime die.

The stars of the Galaxy, huge masses of hydrogen, consume themselves, transforming their hydrogen to helium and the helium to heavier elements. Many stars die a violent death, throwing away in a powerful explosion a part of their gaseous mass and leaving behind exotic stellar corpses: white dwarfs, neutron stars, black holes. From the gaseous remnants of the explosion, enriched with heavier elements, new, more complicated stars are born. And around them new planets. And on them? Life? Intelligence? For what? And the galaxies? These recede from each other, the residue from an old cosmic explosion, the explosion of the archetypal, primeval atom, the breaking of the modern Orphic egg. Contemporary Mythology? Perhaps. But the facts are here to stay.

Contemplation of such a discovery may help the man not only to create a modern World-view (Weltanschauung) but also to transcend his own Self through the formulation of a new way of life. Conscious tolerance towards our fellow-man, who travels for a while on this world hardly comprehending his purpose and destination, may be the message conveyed through the findings of contemporary Astronomy.

With such thoughts in mind we warmly welcome all members of the International Astronomical Community who have arrived at Patras to debate the difficult, perhaps unsolvable problems of a science well founded in Greek thought and traditionally associated with the Greek search for truth.

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.

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