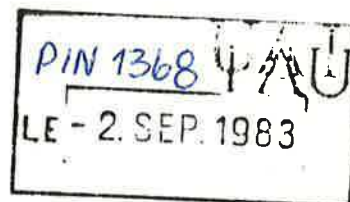


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INTERNATIONAL ASTRONOMICAL UNION
COMMISSION 46 — TEACHING OF ASTRONOMY
NEWSLETTER



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No. 14 - July 1983

EDITORIAL

There have been no contributions to the Newsletter. I am therefore soliciting contributions from the Commission and other readers. There must be many burning issues which need an airing and which would be of more than simply local interest.

The subject of this editorial is the standing of Astronomy. This issue was brought home to me rather forcibly recently. Two graduates of my University, each having several years postgraduate experience were said by a well known Local Education Authority (which shall remain nameless) to be inadequately qualified for induction courses in Physical Sciences and Mathematics. Both graduates had achieved good honours B.Sc.'s in Astronomy. In favour of the Local Education Authority be it said that in order to attract mature people into schoolteaching they have offered very attractive stipends while training on the induction course - the degree of oversubscription was horrendous.

As might be expected your editor got a trifle worked up. Strong representations, at first rejected by the said Local Education Authority, finally prevailed and as it happens the Local Education Authority abandoned its first judgement and invited the two graduates for interview. It is to everyone's credit that both were offered places on the induction courses. A happy ending but the message is clear - Astronomy may not mean the same thing to others as it does to you and me. Did the Local Education Authority read Astronomy as Astrology?; did someone think Astronomy was not a physical or mathematical science?; did someone simply apply an overliteral interpretation of the subject requirements simply under the pressure of the oversubscription? We will probably never know but we should be reminded that the standing of a minority subject will always need a stout defence. How many other cases of such prejudice may have gone undetected? Clearly, as astronomers we must have regard to the good name of our speciality.

Finally, it is examination time again - I was pleased to learn this summer that after waxing, the Moon begins to wail - after all that effort who can blame it!

D. McNally.

The Project

D. McNally, University of London Observatory, Mill Hill Park, London NW7 2QS.

Since the new enlightenment in university teaching began in the late 60s it is now gospel that projects are a good thing. Few question the value of the project. Those that do often seem to want to return to the halcyon days of yore when a three hour paper was a three hour paper and no monkey business. To keep up with the fashion, the Astronomy Degree at University College London now has a project representing some 3/16ths of the final year's work. Is it a success? I am not all that sure that it is.

Before you and my colleagues come around to silence me as good project supporters let me hasten to say that I too regard projects in a highly favourable way. But let us not in our enthusiasm overlook the realities of undergraduate life.

The project was instituted as a reaction to the criticism that university science courses were concerned with learning from books, theory with no opportunities to explore for oneself. If university work was seen as a preparation for research why were undergraduates denied an opportunity to research for themselves? That was a strong argument. Most university teachers do research in some form or another and it is fun. Yes it would be nice if the students could get a feeling for that aspect of science - it would inform and expand their other studies - indeed it would offer another dimension to university work. Both students and teachers alike took to projects in a big way. There were bonuses to be had too. It was true the students did enjoy themselves (they still do incidentally). The staff took more interest in the students - to pick the better ones to assist with their research and perhaps pick out a postgraduate student or two. And so it has continued. Now after about 15 years it is time to take a long hard look at the project.

Our project is set up as follows. In the long vacation prior to their final year, our students are supposed to think up a project topic, think about it and read around it. At the beginning of the academic year they discuss their ideas with the academic in charge of projects and seek supervisors. We make no restriction of topic within Astronomy except in so far as a supervisor can be found and that the cost of the project is not excessive. We regard it as valuable that the student decides the project for himself. We do not encourage the staff to advertise projects available in their research group. We expect the student to have sufficient maturity by the final year to know the research interests of the academics and to be able to make an initial start at defining topic. During early discussions, the project undergoes redefinition. A student may wish to measure stellar angular diameters using lunar occultation or he/she may wish to study stellar spectroscopy. The first case is easy; progress is simply getting out to observe every lunar occultation of the winter observing season. The second is more difficult - do they wish to obtain stellar spectra or just measure spectra; early type spectra or late type spectra?; in the UV or optical?; what is the purpose of the exercise?; and so on. It is comparatively rare for a student not to have some ideas for a project even if it is only an area of astrophysics. But in every year there are several students who have simply no idea of what sort of project they want to do. Usually a talk around current astronomy will evince some spark of interest somewhere but there is normally at least one student who just cannot think of anything that catches his interest. Since the project is such a good

thing, it is compulsory in Astronomy and the student is directed into a project. It is such students that cause concern. Is a student for whom one has to review Astronomy before he/she can find a project really suited to doing project work? Should they be relieved of project work? Here I find myself ambivalent. My first reaction is that they should not attempt project work but stick to the well known path of course work. But if the element of compulsion is removed would other students attempt to avoid the project? The answer is undoubtedly yes. It does not appeal to all to make a commitment to the unknown. Course work is known and the techniques for success are well defined - the work may be hard, unremitting and, yes, a little dull, but if adhered to quantifiable success can be achieved. There is the chance that the project could be an unmitigated flop even though it seemed to offer great rewards initially. Despite the intrinsic excitement of project work there is a price to be paid in uncertainty of outcome. The bulk of students, I suspect, would happily trade excitement coupled with uncertainty for the well known even if on the dull side. Therefore, but regrettably, there must be an element of compulsion in the project - all must be seen to be treated with equal uncertainty. It is interesting to note that students who need to be led to a project or who have one thrust upon them, often do quite well. The remainder usually under achieve.

Having got the student to a project there is sometimes a problem of a supervisor. This comes about in almost all cases from a student's enthusiasm for a specific topic. If store is set by student initiative in choosing a project, then one must tread warily indeed in rejecting the student's choice. If the project makes good astronomical sense, I believe it must be accepted and the effort turned to finding a supervisor. It is interesting to note how colleagues back away from an unusual project on the grounds of lack of knowledge. From a personal point of view, I have learnt a great deal from students with unusual projects. I have found it is not knowledge which is required - the student often has that - on the contrary it is simply common sense to supply the student with direction and alternative ideas at critical times. Such supervision is usually very light in touch since the student provides the knowledge, drive and enthusiasm. However, if students are expected to determine their own projects, one must expect to encounter supervisory problems. It is our view that the discipline of selecting and specifying a project carries more advantages and the occasional problem of finding a supervisor is well worth the trouble. Almost without exception, an unusual student selected project is well done, frequently excellently done, and the quality of the project bears little relation to the assessment of the student using other academic criteria.

Once student, supervisor and project are comfortably settled together, the student can spend a term slowly thinking out his strategy. If observations are to be made, these can be acquired. (Indeed if observations need to be made in the long duration prior to the final year this can be done.) In January the student must prepare a short summary of what he has done so far and an outline of what he proposes to do during the second term. In the second term one day a week is left clear of lecture classes so that attention may be given to the project. The relationship between student and supervisor is left variable. Some students require greater contact with their supervisor than others, some indeed, will wish for minimal contact. The balance is a delicate one since the supervisor must ensure that the student is not getting bogged down with technical or conceptual difficulties or that the student is not going up a dead end track. Again, it is all too easy to dampen a student's enthusiasm by a misplaced remark.

The essence of the project lies in the work the student does for himself/herself. Therein lies a difficulty. In some situations it is abundantly clear that the student is driving the project along, planning and executing what needs to be done. In such a situation the supervisor can keep to the background, only surfacing to give advice when asked. The students in this class cannot be identified by other measures of academic success - they are found in all ability classes. Other students require constant supervision. These are often the weaker students. One might have some concern in just how much the project report reflects energy on the part of the supervisor or effort on the part of the student. However, being weak students, a weak project report and talk usually result. Of more concern is that class of student who are reasonably able but who attach themselves to an active research group. They take on board a small part of the current activity of the group and are supervised by a member of the group. This in itself is not a bad thing. However, does taking someone else's results, analysing them according to someone else's scheme constitute original work on the part of the student? The same student is also likely to be actively supervised since the results he/she will obtain are essential to the parent research group. There is always ambiguity here and it seems to me that one can only sort the matter out if the project report and talk evinces unequivocal evidence that the student a) knew what he was doing, b) knew where his work fitted into the programme of the parent research group, c) knew where his work fitted into the astrophysics of the object being studied, and d) indicated some conception of future direction. Very often the evidence for b), c) and d) is missing. Despite favourable supervisor reports some marking down of such projects during moderation seems essential. This group of student is of particular concern since it often includes the better students, measured on examination criteria. It is just this form of project work that causes academic criticism of project concept. I feel that the criticism is strong - namely that the student is not showing his initiative but is riding on the back of an existing research group and it is the research group/supervisor that one is, in the last analysis, examining. On the other hand we could argue that the student has used initiative in seeking a project in an existing and growing area. While I tend to favour those students of independent outlook, I am willing to concede that this category of students do use initiative but rigorous search for evidence of knowledge of astrophysical context is essential before award of high marks. Again such students should be encouraged by their supervisors to make a contribution to the analysis even if that does upset the well oiled group machinery.

The effectiveness of an individual student in executing the project is assessed by means of a written report and a talk of some 20 minutes' duration given before an audience of examiners and peers. The report is marked by three examiners - the first is the project supervisor, the second is an independent marker relatively close to the topic of the project and the third is the project moderator who reads all the projects and listens to all the project talks. It amazes me both how close all markers can agree in their marking (within 5% is close for this purpose) and how disparate individual markers can be (a range of 30% can occur). It is up to the moderator to infuse a little order while giving the student the benefit of any impact made. Clearly a student should not receive excess/diminished credit where his project is no better or worse than several other candidates simply because that project makes a hit or a miss with a particular examiner. The moderator must use his judgement to keep a fair balance between all the project students. In some measure that judgement is subjective but the moderator has the advantage of reading all the reports and hearing all the talks. Clearly the moderator must also explain his actions to the Board of Examiners who finally approve the results.

The students usually find that doing the project is rewarding. They do not find writing a report so rewarding and many find the talk to be the biggest hurdle. Some are terrified by the prospect of the talk almost to paralysis. A few have been known to go absent and in one pathological case had to be fetched and oraled in private. A few students rise to the occasion and provide a clear concise well presented report and an equally effective talk. Many students in prosecuting their project fall into all the traps for which they have spent the previous three years berating their lecturers - writing too small on the blackboard, densely packed slides/transparencies, inaudibility, speaking too fast One warns beforehand but little notice is taken until it is too late.

The students like the question session after their talk least of all. Some field questions adroitly, even turning them to advantage. They are a very select band. Others try hard and a substantial proportion are left looking as though the project topic is new to them. However, close questioning is essential to find out how much the student appreciates of his project's astrophysical context. But I still remember with horror the collapse of a student under questioning - all the examiner wanted to know was that winds blew from regions of high pressure to regions of low pressure but the poor student thought something more erudite was being called for and failed to come up with an answer.

So back to the original question - are projects worth the popular support? I would give a guarded yes in answer. The project is clearly a great joy to some students. These students have something they want to do. These students may be drawn from any part of the ability range. While the project will cost the department something, such students are self-sustaining needing only discreet supervision. In this case only does the project truly represent a measure of the ability of the student. If all students were in this category then I would have no doubts at all about the value of projects.

On the other hand weak students do not perform well in projects. While they may get some fun from actually doing the work involved, that fun is tempered with the certainty that a report must be written and a talk must be given. Such students are demanding on supervisor time. They have got to be forced from one task to the next. The immediate task is all to these students and they never really get a great deal of science out of their project. However, by and large we never fail a student who has made a reasonable attempt at project work, so weak students end up with a course passed and a mark concomitant with others they have obtained. Again no academic complaint is justified.

The grey area lies with the competent/good student who works on a project which forms a part of on-going research. It is here where it is difficult to sort out the contribution of the student and the contribution of the supervisor/research group. The more organised the project group, the more difficult it is for the student to make a significant contribution. The student may gain a very thorough grasp of his problem but obscure that through using research group data and long established techniques. Since we set a great deal of weight on the individual student's contribution there is a serious problem. The problem is not insoluble but the project report needs to be very well written in order to give student contributions maximum weight.

The students' attitude towards project work seems to be ambivalent. Fundamentally, I think students prefer the dull old three hour written examination paper. At least they understand that route and know how to approach it. The student revolt of the late 60s and early 70s perhaps left their successors a legacy they could do without. For most students the project is something they could well live without. Yes it is fine to experiment with real research, it is nice to think one might get a publishable result (and some do) but there is this chore of having to set one's conclusions on the line and defend them. That is something undergraduates are not prepared for. It is new and has not sunk into the fabric of educational experience. It would be an overstatement to say that students actively dislike projects. Equally it would be an overstatement to say that they welcome them.

In summary, the project is a means of examining students which is expensive in examination time involving as it does three examiners for each project. In terms of cost, projects are certainly more expensive than lecture courses and can be more expensive than an experiment in a laboratory class - it may be that equipment built for a project may not find a use outside that project which of its nature it only undertakes once. Sometimes the cost may be offset by using elsewhere equipment built during a project, e.g. a photometer. The students' attitude to projects is at best ambivalent and in many cases assessment is not straightforward. There are students who may be seriously disadvantaged by the project situation - rather more, I suspect, than is the case with more standard examining techniques. But in spite of that, there is no doubt that a project makes a clear and unequivocal statement about the student. It distinguishes between the active scientist and the mere reader of books, it distinguishes between those who have academic ability and those that can use what academic ability they have got, it distinguishes between those who know how to communicate with others and those who do not think this important. Used with care and sensitively, the project has a useful role to play in the university examination process. It may be a blunter tool than its enthusiasts claim but a useful one nonetheless. No award of a degree class should be made on the basis of the project, yet any degree award which does not make use of a project has not looked at all the facets offered by the student. All this does not add up to an admission that projects are a success. I certainly favour their use but I am still left wondering if the price is not too high for the new insight that they offer an individual student. This price is not just the monetary cost, which while not negligible is minimal when compared with the time invested by both academics and students. Projects are not as cost effective as three hour written examinations. One could still hanker after projects as giving students more scope if one was sure that all students welcomed the project. But the research element is compulsive to an academic and in spite of the evidence against projects, I still favour them. I think that I would even argue that the joy of the minority is worth the pain of the majority. However, the case for "the project" needs more ventilation. This Newsletter would welcome Confessions from Project Lovers/Haters!

Commissions 38 and 46 : Visiting Lecturers' Programme

The Chairman of the VLP Subcommittee, Dr D.G. Wentzel, writes that this Programme is now about to be defined in detail :

The Visiting Lecturers' Programme approved by the IAU at Patras is to support several visiting lecturers for visits of typically 3 months each to an institution and country wishing to improve its astronomical activities significantly. After initial communication with a large number of countries, applications have now been received from Nigeria and Peru. If you are interested in acting as one of the visiting lecturers, please write before 1 September 1983 to Dr Donat G. Wentzel, Astronomy Program, University of Maryland, College Park MD 20742, USA. Interests are :

- Nigeria :** Department of Physics and Astronomy, University of Nigeria, Nsukka : existing program, largely theoretical ; help to make 10-meter radio dish (donated by Hatcreek Observatory, USA) operational for teaching and research, advise on practical instrumentation for local facilities ; teach courses (in English) in high-energy astrophysics, cosmology, etc.
- Peru :** Department of Physics, San Marcos University, Lima, Peru : the first astrophysics course has just begun ; teach courses (in Spanish) in astrophysics and astronomical optics ; research interest in solar physics ; opportunity to work with local teachers.

Occasional visitors are welcome in several institutions contacted while planning the above Program. If you are interested in arranging visits, please contact the astronomers mentioned directly.

- India :** lectures on various topics of astronomy, astrophysics, stellar evolution, solar-terrestrial physics ; Dr H.S. Gurm, Dept. of Astronomy and Space Sciences, Punjabi University, Patiala 147002.
- Indonesia :** established observatory, interests in galactic structure, binary stars, etc. Dr B. Hidayat, Bosscha Observatory, Lembang, Java.
- Libya :** Existing astronomy program, seek visitors to establish and develop laboratory work, others to teach astrophysics, radio astronomy, etc. ; Dr Saad Ben Hameid, University of Garyounis, PO Box 9480, Benghazi.
- Paraguay :** visits of a week to give lectures to keep astronomy interest alive ; Dr A.E. Troche-Boggino, Instituto de Ciencias Basicas, Universidad Nacional de Asuncion, San Lorenzo, Casilla de Correo 1039, Asuncion.
- Portugal :** astronomy degree program just starting ; observatory with 75-cm telescope, 5-meter (solar) radio telescope, etc. ; Professor J.P. Osorio, Observatorio Astronomico, Universidade do Porto, Monte de Virgem, 4400 Vila Nova de Gaia.
- Portugal :** interest in high-energy astrophysics and cosmology with emphasis on physics such as gauge theory, particle physics ; Dr P.G. Macedo, Departamento de Matematica, Universidade de Coimbra, 3000 Coimbra.
- Saudi Arabia :** courses such as radio astronomy, cosmology, astrophysics in established program, visits possibly by up to two years ; Professor M. Khairy Aly, Astronomy Dept., King Abdulaziz University, Jeddah.

Commission 46 : ISYA's, NewslettersInternational Schools for Young Astronomers

The XIIIth ISYA (Bandung, Indonesia) was held from 16 May to 2 June 1983. A report will follow in the next issue of the Information Bulletin.

Dr F.J. Fuenmayor, Universidad de los Andes, Mérida, Venezuela has informed the Secretary of IAU ISYA's, Dr J. Kleczek, that the Venezuelan Research Council is unable to give financial support to the ISYA, which was planned for September 1983 in Mérida. This School is therefore cancelled. Commission 46 is now looking for other possibilities to hold an ISYA in 1984. Please contact the President, Professor L.N. Houziaux, Institut d'Astrophysique, Université de Liège, avenue de Cointe 5, B-4200 Cointe-Ougrée, Belgium, if you have any proposals.

Newsletter

Commission 46 Newsletter no. 13 was published in January 1983. It contains articles by D. McNally, C. Iwaniszewska and J. Kleczek, as well as National Reports from Peru, Poland and Venezuela. The Editor is Dr D. McNally, University of London Observatory, Mill Hill Park, London NW7 2QS, UK.

Due to heavy demand, Newsletter no. 12 (Astronomy Education Materials) has been reprinted. Copies are available from the President of Commission 46, Professor L. Houziaux, at the above address.

Commission 38 : Exchange of AstronomersInternational Schemes of Support to (Young) Astronomers

At the instigation of the President of Commission 38, the General Secretary has written to Adhering Bodies and National Committees of Astronomy in all IAU Member countries in order to attempt to compile a list of existing schemes of support available to (mainly young) astronomers on a world-wide basis. It is the intention to publish the list in a forthcoming issue of the IAU Information Bulletin and to update it from time to time.

This list will be limited to international schemes, i.e. modes of support to astronomers who are not nationals of the country in which the support is given. Examples are bi- and multilateral agreements between Academies of Science, intergovernmental exchange schemes, private and/or university foundations, etc. The aim is to provide IAU members and their students, in particular those in countries where astronomy has not yet been fully established, with an overview of the existing possibilities for shorter or longer study stays at institutes where astronomy is pursued intensively at a high level.

In order to make this list as exhaustive as possible, IAU members with knowledge of such schemes are herewith invited to write to the General Secretary. If possible, they should kindly provide the following information :

1. Type of scheme (e.g. travel support, stipendium, etc.)
2. To whom is the scheme open (e.g. nationals of which countries, educational level, age limits, etc.)
3. Sponsoring Organisation (full address)
4. Deadline(s) for applications
5. Brief description of scheme (e.g. photocopy of statutes, statement of aims, priority criteria, etc.)
6. Other pertinent information

Thank you for your help.

Commissions 38 and 46 have distinct functions,
38 Exchange of Astronomers
46 Teaching of Astronomy

Nevertheless interests overlap concerning especially young astronomers. Therefore Commission 46 supports the General Secretary in compiling a list of existing international schemes to support (mainly young) astronomers, reproduced on the previous page, and we reproduce below the rules for Commission 38.

Exchange of Astronomers

Within limitation imposed by the budget of the Commission as approved by the Executive Committee of the International Astronomical Union, funds are available to Commission 38 to award grants to qualified individuals to enable them to visit Institutions abroad. It is intended, in particular, that the visitors should have ample time and opportunity to interact with the intellectual life of the host Institution so that benefit is derived on both sides. It is a specific objective of the program that astronomy in the home country be enriched after the applicant returns.

- (1) Candidates may be faculty/staff members, post-doctoral fellows, or graduate students at any recognized educational/research institution or observatory. All candidates must have excellent records and must have made permanent and professional commitments to astronomy. The program is designed to support both the work of young astronomers and established astronomers whose visits may benefit the country or Institution visited. It is emphasized that all recipients should return to their home Institutions or home countries upon the completion of their visits.
- (2) All visits must normally consist of a stay of at least 3 months at a single host Institution. In special cases, shorter visits can be considered; stop-overs at other Institutions en route may be permitted.
- (3) All visits must be formally agreed to by the Directors of the home and host Institutions involved. Such endorsements must confirm that the proposed plan of study is a reasonable one and will be of benefit to astronomy.
- (4) All applicants must give details of funds currently available to her/him to finance her/his proposed visit including supporting documents. In particular, s/he must state what other applications s/he has submitted in efforts to obtain support from other sources and the status of such applications. In the event that an applicant receives funds, which may be used, in whole or in part, for the same proposed purpose from another source, s/he is required to revise her/his application or make a refund to the IAU. If dependents are to accompany the applicant, details are to be given.
- (5) The amount of the grant will be governed by the cost of a single return economy air fare between the home and host Institutions and normally is to be used by the applicant for such travel. With prior approval, the funds can instead be used wholly or in part for subsistence costs during the visit.

Some grants may be awarded on the basis of one-way fare. An example is the case where highly qualified graduate students apply for funds to go abroad to begin graduate studies at an institution where they have been formally accepted.

- (6) Grants to attend symposia, summer schools, conferences, society meetings, etc. are outside the scope of the program.

Grants will not normally be made for the sole purpose of obtaining observational data.

An individual should normally not expect to receive an IAU award for a second visit.

- (7) Each recipient is required to submit a brief report to the President of Commission 38 after his return from the visit. Acknowledgement of support from the Exchange of Astronomers program of the IAU should be made in any published paper resulting from the visit.

Application Procedure

1. An individual who wishes to apply for a grant under the IAU Exchange of Astronomers program should read the rules carefully to ensure that the circumstances of her/his case conform to the conditions under which IAU grants can be made. S/He should then proceed by formally submitting her/his request for a grant in the form of a letter to the President of Commission 38 (see 4 below).

Each candidate must submit a curriculum vitae showing that s/he is professionally qualified, and must submit a viable plan of scholarly activity to be carried out during the visit.

The Information supplied in these documents should be complete and detailed as it will be used to judge whether the proposal is in conformity with the aims of the program, whether the minimum initial requirements are being met, and whether the guidelines will permit a favourable decision. Any special circumstances must be carefully set forth.

2. It is the applicant's responsibility to arrange for the two confidential letters of endorsement from senior officials of the home and host Institutions. These are to be sent without delay directly to the President of Commission 38. The letters from both Institutions should confirm that the applicant's proposed visit has the knowledge and support of the directors or senior academic/research officers of the institutions involved. Further they should state whether the applicant will be returning to a position at the home Institution at the conclusion of the visit. Finally, they should confirm to the President of Commission 38 that the senior officials themselves have made every effort to obtain the necessary travel funds from their own institutions and from other resources with the respective countries.

3. As noted above, care should be taken to make the application as complete as possible and to include detailed statements rather than generalities. Material should be typed single space. The application will be considered as quickly as possible, but it should be recognized that information and opinions must be exchanged among the President, Vice-President, and/or other member of the Organising Committee of Commission 38.

4. All correspondence, including the endorsements referred to above, should be directed to the President of Commission 38, International Astronomical Union, with copy to the Vice-President. For the period September 1982 - November 1985, the addresses are:

President:

Professor Frank Bradshaw Wood
Department of Astronomy
University of Florida
Gainesville, Florida 32611
USA

Vice-President:

Professor Edith A. Müller
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