Stars in the eyes, birth of a vocation ?

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Abstract:

It is generally difficult to interest people to sciences, especially physics. However, astronomy has a great power of fascination, and can thus be used to attract people into the scientific world. Here in Liège, we are trying to develop several different aspects of astro-education: they will be detailed in this paper. For example, we organize interactive activities for primary schools, and also help high school students to consider a scientific career. Our undergraduate students also benefit from our experience: for example, they have the possibility to observe at a *real* observatory, they can train at ESA facilities,... The general public is also invited to discover astronomy and, through it, physics, thanks to several specific events. Finally, media, the links between the public and the researchers, are not forgotten: our astro-news service was specifically created for this purpose.

1 Introduction

One may wonder why use astronomy to attract people into sciences. In fact, astronomy is an old physical science that has always fascinated the human being: it is therefore one of the best tools to interest people to sciences, especially for formal education purposes. Astronomy benefits from multiple advantages. First, it is a multidisciplinary domain: astronomy can help to increase people's awareness in physics, new technologies, history, biology, and even philosophy! In addition, it is by itself very attractive: apart from a deep fascination it has always exerted since ancient times, astronomy also presents beautiful pictures, new discoveries every day, big technological challenges (like building a 100m telescope) and human adventures (like landing on the Moon or going to Mars). Finally, it triggers easily the scientific curiosity since it is linked to timeless questions, e.g. is Earth the only planet?, how big is the Universe?, are we alone?, what will be the fate of the world?,...

So astronomy potentially interests everybody and we should therefore target *everybody* in our astronomical dissemination projects. We have then tried, here in Liège, to do so by organizing a wide range of activities regarding astronomy. I'll now present a few of them.

2 *De 7 à 77 ans*: Schools and General Public

All year long, there are many opportunities to attract people's attention towards sciences by means of astronomy. Here are a few examples.

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A first possibility is to join a science fair. In southern Belgium, the science network 'Scité' organizes each year such a science fair, called 'Printemps des sciences', lasting 7 days. Schools (primary and secondary alike) are invited during the week, while families come to visit during the week-end. Each year, a different theme is chosen. Since astronomy is multidisciplinary, it is rather easy to make an astronomical exhibition while strictly focusing on the chosen theme: for example, in 2005, the theme was 'the town', and we have then explained the problem of light pollution and talked about the links between astronomy and sustainable development, a very fashionable topic at the moment.

Events only related to astronomy are always a big success, especially since many different activities can be organized.

As you all know, *bigger is better*, i.e. big experiments always impress people a lot, and being impressed may then trigger a new interest for sciences. astronomy is the ideal laboratory for impressive experiments. For example, the Foucault pendulum. Regularly, the Liège astronomers, amateurs and professionals together, gather in a no longer active church in the city's center. There, they invite the schools and the general public to come during 2 weeks while trying to prove that the Earth is rotating. Another unforgetable experience linked to astronomy is a planetarium session. In the old Observatory of Cointe, astronomers from Liège are giving planetarium shows to primary and secondary school students. There, in agreement with the official learning program, the students learn about celestial motions from different points of view (e.g. as situated on Earth or from outer space). They discover by themselves how the Earth moves in space, and can then deduce what this motion induces: seasons, day and night alternance,... Finally, seeing the 'real sky' through a telescope keeps a lot of appeal even in a high-tech era. That's why we are offering a few observing sessions each year, either during the day (for the Sun) or at the beginning of the night (when children are not yet confined to their bed, so the whole family can come). Since the weather is not always good (especially in Belgium), the best thing to do is to organize such sessions as a complement to another (indoor) event like conferences or worskhops: the observations then constitute the 'cerise sur le gâteau'.

Each year, at least one 'hot topic' related to astronomy arises in the media like e.g. Venus transit in 2004 and Huygens landing in 2005. At that time, everybody, at school as well as at home, is talking about it: from our point of view, this is a perfect opportunity to organize an 'astro day'! Be assured that it will attract a lot of schools (teachers have to talk about current events but know little - if not nothing - about astronomy), the public at large, and also... the media.

If punctual events are interesting, one should not forget loger-term education. In this context, we have recently built in the woods surrounding the university an attraction called 'Piste des planètes' (Planet Walk): it is a one-km walk with a scaled Solar system along it. Contrary to what is usually done, we have decided to keep the same scale for sizes and distances. With this enjoyable walk, perfect for a sunday afternoon, people can therefore learn about the actual dimensions of the Universe, and see how small and fragile the Earth is.

For primary schools in particular, we also organize specific activities called 'astro lessons', with small conferences on the current 'hot topic', and/or astro workshops for e.g. building a mobile sky chart. Questions and answers sessions are always very much appreciated at that age, but be aware that it can be difficult to reply to apparently 'simple' questions (e.g. why is the Earth round?) in simple terms.

Finally, we also regularly welcome students from the last year of high school at the Institute, for one day to one week. According to the length of their stay, we propose different activities: discussions with professional astronomers to see the diversity of topics in astronomy and how real astronomers work (e.g. not with the eye glued to the eyepiece like in the nineteenth

century). They can even work with real data (like e.g. in the ESO/ESA exercise series), a first approach to actual research. We may also help them when making a final work oriented towards astronomy.

3 Undergraduate Students

Once students are doing university studies in sciences or applied sciences, the challenge of having them become real scientists is not yet won but astronomy can still be of help. In Liège, there are of course several possibilities to discover astronomy, from a few general astronomical courses for the bachelor degree to masters or PhD in astronomy or astronautics. But more importantly, undergraduate students can discover the real research world through astronomy. For example, they have the opportunity to go to the Haute-Provence Observatory in France, where they have to deal with a real telescope, with which they get real data that they have to interpret correctly. Students can also do internships at CSL or ESTEC (two ESA facilities), for discovering how European space missions are conceived and what can be done with the data. They may also participate to ESA parabolic flights or to the building of a microsatellite, called LEODIUM. These activities are very different from formal education, and they represent a first contact with real research: this can really trigger a career as a researcher, actually not always related to astronomy itself.

4 Media

Media are defintely important to consider in the context of science dissemination. Don't be mistaken: the first contact of people with sciences generally happens through a TV show, a radio program or a newspaper - not by an encounter with researchers. And since media professionals are the first ones who will explain science to the general public, it is certainly better that they have access to good information in the first place, so researchers should not be afraid to be key persons for the media. It should also not be forgotten that journalists prefer 'live actions' to images, so an astro day with hundreds of children talking of THE hot topic of the day should assure a reasonable media coverage.

In addition, since press releases are not always correctly decrypted, we have organized in Liège a news service: every day, two professional astronomers summarize in easily understandable French all the press releases related to astronomy and geophysics, and a computer assistant makes them available to the public through a web page[1] and a mailing list. Since 2000, we have issued more than one thousand news! Such a service can help to debunk bad astronomy concepts, and prevent the spreading of definitely non-news (the 25th announcement of planet #10, 'discovery' of a quark star,...).

5 Amateur Astronomers

For doing all these activities, we can always count in Liège on the local amateur astronomer society (the Société Astronomique de Liège). These amateurs are especially useful for organizing observing sessions (real or at the planetarium): they are skilled observers, possess many instruments, and know the sky very well. In exchange, mmost of the conferences that they are organizing are given by professional astronomers, and the science articles of their magazine are

[1] http://www.astro.ulg.ac.be/news/fran/nouvelles.html

often written by professionals. One should not be too afraid of amateurs: their help can really be precious in disseminating astronomy once they have created regular rendez-vous with the public since the latter feels closer to them than untouchable high-level university professors...

6 Conclusions

Because the night sky is mysterious and attractive, there exists everywhere a clear demand for astronomical activities. This desire can certainly be used to bring people into sciences. Astronomy being multidisciplnary, a lot of different activities can be organized, from workshops (building astronomical charts or rockets) to conferences with beautiful images, without forgetting observing through a real telescope. All these activities can easily be linked to other scientific fields, like biology (e.g. when talking of life in the Universe), chemistry (for the Universe's content), physics (for rocket propulsion) or sustainable development (light pollution, greenhouse effect in different planets, terraforming).

Since everybody is interested in astronomy, we should not restrict to a specific age: nobody forgets what he/she learned at a young age and a grandparent who just participated to one of your activities will probably share his/her newly gained knowledge with his/her grandchildren.

Of course, the media constitute a key for a winning dissemination program. The press reaches everybody and usually likes astronomical events. However, we should try to go even further and organize some specific activities for them, like a news service, in order to avoid as much as possible the usual scientific mistakes in the press. With the help of everybody (media, schools, amateurs), professional astronomers may really trigger the birth of a new generation of scientists.

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