

Visit in Iran from August 23 to September 6, 2003

by

Michel Waldschmidt

Introduction.

In August 2002, as a member of the french delegation, I attended the General Assembly of IMU (*International Mathematical Union*) which met in Shanghai just before the Beijing 2002 ICM (*International Congress of Mathematicians*). There I met the representatives of Iran, Dr Mehdi Behzad, President of the *Iranian Mathematical Society* (IMS), and Dr Ali A. Iranmanesh. They invited me to participate to the 34th *Annual Conference of the Iranian Mathematical Society* which was going to take place in Shahrood one year later.

Early March 2003, I attended a school in Les Houches where I met Cécile de Witt, who told me she visited the *Institute for Advanced Study in Basic Science* (IASBS) of Zanjan, and who recommended me to take profit of my visit to Iran to go there. She helped me to contact the Director of this institute, Professor Youssef Sobuti, as well as Ramin Golestanian, Physicist at IASBS, and Abolhassan Vafai, in charge of international affairs at Sharif University of Technology (Tehran).

Later, when I told Michel Jambu, director of CIMPA (*Centre International de Mathématiques Pures et Appliquées*) that I was going to visit Iran, he asked me to spread the information on the two CIMPA schools which will take place in Middle East in 2004, namely *Theoretical and applied aspects of some PDEs coming from geometry or physics*, May 2004, Damascus, and *Algebraic geometry and arithmetic of curves*, July 2004, Beirut. He also suggested that I consider the opportunity that a CIMPA school be organized in Iran in 2005.

Finally Christian Duhamel sent me a correspondence he had with the Scientific Attaché at the French Embassy in Tehran, Bernard Paquetteau, who was looking for a scientific advice for a project from IASBS of creating an Institute of Mathematics in Zanjan.

This is the framework in which my visit to Iran took place. At an early stage when my goal was only to participate to the annual conference of IMS I planned to stay for only one week, but later when I accepted the invitation from IASBS I decided to come one week earlier.

The first part of my stay (Zanjan and then Isfahan) was supported by IASBS; Rashid Zaare Nahandi, director of the department of mathematics in IASBS, organized everything in this respect. The second week (Shahrood and Tehran) was supported by IMS whose president Mehdi Behzad took care of everything. Thanks a lot, Rashid and Mehdi. I am pleased also to acknowledge the superb organization and the marvelous kindness of my iranian hosts; the way everything was planned is remarkable. The Shahrood Conference requested the work of a huge number of people, under the leadership of the head of the mathematics department, Mir Hassani. I wish to thank them, as well as so many colleagues I met during these two weeks. Thanks to them my stay has been extremely enjoyable.

1. Schedule

I arrived at Tehran on August 23, early morning. I visited IASBS Zanjan from 23 to 25. On 23 we had a meeting with Youssef Sobouti, Mohamad Khajeh Pour, Mehdi Behzad, Rashid and Rahim Zareh Nahandi, mainly to discuss the project of CIMPA School in July 2005, and on 24 the discussion was about the project of an Institute of Mathematics in Zanjan. Also on 23 I visited the buildings (under construction) of the House of Mathematics and on 24 I had a meeting with the members of the mathematics department, Rashid Zaare-Nahandi (algebraic geometry, commutative algebra, combinatorics), Hamid Mousavi (group theory), Amir Rahnamy Barg (group theory), Mohamad Reza Razvan (topological methods in dynamical systems, PDE), Saad Varsaie (complex differential geometry). On August 25 I gave a lecture on *Combinatorics related to multiple zeta values*.

On Tuesday August 26 morning I met the members of the mathematics department of Sharif University of Technology: Ebadollah S. Mahmoodian (combinatorics), director of the department, Kambiz Mahmoudian (number theory), Arash Rastegar, (number theory), Siavash Shahshahani (geometry, dynamical systems - he is also responsible for all the domain .ir) and Amir Daneshgar (coding theory, fuzzy logic, graph theory).

I gave a lecture at Sharif University of Technology *Some Classical Problems in Number Theory*. Following a suggestion of Siavash Shahshahani a translation will appear in *Nashr-e Riyazi*. Further, Mehdi Behzad suggested that an expanded version of my talk appears in the IMS publication *Farhang Va Andishe-ye Riazi*,

The same day (Tuesday August 26) I met Bernard Paquetteau, scientific attaché at the French Embassy in Tehran. After that I came back to Sharif University and met again the same colleagues there, together with Bijan Z. Zangeneh. Then I flew to Isfahan with Mohamad Reza Razvan.

We had a very interesting touristic visit of Isfahan on August 27 guided by two very competent students girls from Isfahan Technological University. We also went to the Math House where we met the director Dr Rejhalli and Reha Jamshidian. We came back to Tehran on August 28, and left for Shahrood on 29.

From Saturday, August 30 to Tuesday, September 2, I participated to the Annual Conference of the Iranian Mathematical Society **IMC34**. I delivered a plenary lecture on Sunday, August 31, on *Transcendental numbers and functions of several variables*.

On September 1st I was invited to visit a high school opposite the University, and the next day I went back there to give a lecture on *error correcting codes*. On the evening of September 1st I enjoyed visiting a Zourkhane, and then attending a concert of traditional Iranian music.

I came back to Tehran on September 2. On September 3rd with Rashid Zaare I visited Tehran (especially the National Museum), and later in the afternoon the *Institute for Studies in Theoretical Physics and Mathematics* (IPM). We had a discussion with the Director of the

Department of Mathematics, Gholamreza Khosrovshahi (but I could not meet the President Mohammad Javad Laridjani). Samad Edayat and Pedram Safari also took part to our discussions.

On thursday, september 4, with Rashid Zaare we came back to Sharif University of Technology to meet Ebadollah S. Mahmoodian and Siavash Shahshahani.

On friday september 5 I attended a superb concert of persian music by Hossein Alizadeh and Jivan Gasparyan, just before leaving Iran for France.

2. Projects

CIMPA

A proposal to organize a regional summer school on *Gröbner bases and applications* will be submitted to the scientific council of CIMPA. It should take place at IASBS (Zanjan) during the two or three last weeks of july 2005. Rashid Zaare Nahandi would be a member of the scientific committee. This school may attract some 40 to 50 students (mathematicians with a recent PhD or preparing a PhD) from Iran as well as neighboring countries.

Another regional workshop (on combinatorics and/or geometry) interesting mathematicians and research students from West and Central Asia may be proposed to CIMPA for 2006 at Sharif University of Technology.

Exchanges SMF/IMS

* A farsi translation of the booklet "Explosion des Mathématiques" edited by SMF and SMAI is planned.

* A reciprocity agreement between Société Mathématique de France and Iranian Mathematical Society should be signed soon. Later we plan to consider an exchange of publications.

* A scientific committee in charge of coordinating the joint activities in mathematics between iranian and french mathematicians will be selected by our two national societies (see below).

* An exchange of information for members of the two societies is going to take place. As the president of SMF I already submitted a text introducing the Société Mathématique de France to the Newsletter de l'IMS, and conversely I welcome a text of introduction of the Iranian Mathematical Society by its president for the Gazette of SMF.

Creation of a mathematical research institute at IASBS

During my visit at Zanjan we had a discussion on the creation of an institute depending of IASBS which would support mathematicians who are active in research. Such a center would certainly be extremely useful for the development of research in mathematics in Iran. I

certainly support this project and I am willing to contribute to help developing an international cooperation with it.

Scientific committee in charge of the coordination of cooperation in mathematics between Iran and France

During the discussions I had with Iranian colleagues we agreed to create a scientific committee which will coordinate the joint mathematical activities between Iran and France. It would be composed of four mathematicians, two of them working in France, and the two others working in Iran. This committee would coordinate such activities of cooperation. We certainly welcome all individual initiatives, and it is only if the participants like it that we shall distribute the information relevant to their activities. We wish that all information related to this cooperation is widely distributed, so that interested people know what is going on and which are the possibilities. A web site should be created for that purpose. On this site will be quoted all information related to this cooperation, like the project of CIMPA school at IASBS in 2005 and maybe the project of CIMPA workshop at Sharif in 2006.

The creation of this committee will be announced by information published by the Gazette of SMF in France, by the Newsletter of IMS and of IMP in Iran.

The committee will be in a position to ask experts to evaluate (by means of the usual referee process) all applications for financial supports related to this cooperation, including grants, postdoc fellowships and supports for preparing cotutelle theses (also called sandwich program). The same committee will also answer when the Embassy or any other body (like Minister of Foreign Affairs, Minister of Education, École Normale Supérieure, École Polytechnique,...) asks an evaluation assessment for applications either by individuals or by organisms.

Not later than middle of October 2003, this committee will send a file to the French Embassy where the different aspects of this program are described and where an extra support is required, in particular for one or two cotutelles theses, as well as for visits of a French mathematician in Iran and of an Iranian mathematician in France. The international travel will be supported by the country where the mathematician is working while the local expenses will be supported by the country which the mathematician is visiting.

The committee will also be in charge of collecting information on all possible financial supports which can be used for this cooperation. Further support will also be solicited. For instance a specific support will be required from ENS for the visit of one or two among the best students in the national graduate exam which is organized each year by IMS. The travel expenses should be supported by the Iranian part, and this would enable the laureates to know the prestigious École Normale Supérieure rue d'Ulm in Paris.

The committee has been selected by the board of SMF and the Executive Council of IMS in September 2003. The two members selected by SMF are Rama Cont and myself, the two members elected by IMS are Dr Mahmoodian (new president of IMS as for September 2003) and Dr Behzad. Rama Cont will be the secretary of this committee.

3. Further comments

A very strong point of Iranian mathematics is the existence of a dynamical mathematical society, namely IMS, in which good mathematicians do not hesitate to be active. As far as I can see this society includes a fairly high percentage of Iranian mathematicians and seems to be representative of the Iranian Mathematical Society. This may be part of an explanation from the fact that mathematics is strongly supported by official authorities. Indeed I find it interesting to see the support given in Iran to science in general, and mathematics in particular, by official bodies. The message from President Khatami (see the reference below) at the occasion of the 31st national conference of mathematics in 2000 is quite explicit on this matter.

Another very important positive aspect of Iranian science is the fact that research is considered as important, for instance by academic authorities. The teaching load is heavy, but research activity is supported and relevant for being promoted. This is true not only in the best academic centers like IASBS, IPM, Sharif University of Technology, but also in a university like Shahrood under its President A.A. Rajabi.

The *Mathematics Houses* deserve some comments. In France we have two scientific museums in Paris (*Palais de la Découverte*, the older one, and *Musée des Sciences de la Villette*, a more recent one) but there is nothing like the Math Houses outside Paris. I believe that these houses will contribute to attract young schoolboys and schoolgirls to pursue scientific studies. This is extremely important for the future of a country, including technological development, and Iran may avoid the rather bad situation that many developed countries are facing, where not enough young students are attracted by science.

I have the feeling that international relations are not the strongest point of Iranian mathematics. IPM hosts a number of international meetings and workshops, but otherwise it does not seem that international contacts are developed as it should, given the high level of mathematical research in Iran. The annual conference of IMS is not an international one (we were only two foreigners at Shahrood, among more than 500 participants). That may be a choice of IMS which has its own value, let alone for the language point of view. But the number of foreign visitors at the center I visited (apart from IPM) might be increased. I wish to make two comments concerning international relations.

- A large number of Iranian mathematicians have emigrated, but not so many of them contribute to the scientific life of Iran. This is unfortunate, since they could for instance take part to teaching at graduate level, and contribute to inform the advanced students of the most recent advances in mathematical research they are aware of.

- If foreign post-doc students could be supported for staying, say, six months in Iran (not only in IPM, but also in places like IASBS), I am confident that a number of applicants from many countries, including France, would be interested.

Reference

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Twas 12th General Meeting, 21-26 October 2000 Tehran Iran
Ministry of Science, Research and Technology, Islamic Republic of Iran
see also <http://www.ictp.trieste.it/~twas/TehranProg.html>

URL

CIMPA: <http://www-mathdoc.ujf-grenoble.fr/CIMPA/>
SMF: <http://smf.emath.fr/>
IASBS: <http://www.iasbs.ac.ir>
Sharif University of Technology: <http://www.sharif.ac.ir/>
Sharif University of Technology, Department of Mathematical Sciences:
<http://mathsci.sharif.ac.ir/>
IPM: <http://www.ipm.ac.ir> - see also <http://www.ipm.ac.ir/IPM/drum.jsp>
Math Houses: <http://www.mathouse.com/>
Ambassade de France en Iran: <http://www.ambafrance-ir.org/>

Abbreviations:

CIMPA: *Centre International de Mathématiques Pures et Appliquées*, Nice (Director Michel Jambu)
SMF: *Société Mathématique de France (French Mathematical Society)*
IMS: *Iranian Mathematical Society*
IASBS: *Institute for Advanced Study in Basic Science*, Zanjan.
IMU=UMI: *International Mathematical Union* = Union Mathématique Internationale
IPM: *Institute for Studies in Theoretical Studies in Physics and Mathematics*, Téhéran.
MAE: *Ministère des Affaires Étrangères* = Ministry of Foreign Affairs
MENRT *Ministère de l'Éducation Nationale, de la Recherche et de la Technologie* =
Ministry of Education
ENS: *École Normale Supérieure*
X: *Ecole Polytechnique*