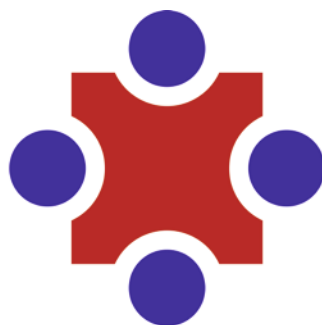


“ALEXANDRU IOAN CUZA” UNIVERSITY, IASI, ROMANIA  
CommScie School of Postdoctoral Research & Studies



CommScie

# International Journal of Science Communication

A STUDY OF SCIENCE POPULARIZATION THROUGH SCHOOL JOURNALS AND PHOTOGRAPHY EXHIBITIONS  
❖ ON HOW JUDICIAL RELEVANCE HAS BEEN GIVEN TO LEGAL CULTURE (A NOTE ON *LAUTSI AND OTHERS V. ITALY*) ❖ THE NINETEENTH CENTURY TRANSYLVANIAN JOURNALS AS DOCUMENTARY SOURCES FOR WOMEN'S HISTORY ❖ THE SOCIAL CONSTRUCTION OF SCIENTIFIC CULTURE. ROMANIAN POPULAR SCIENCE BOOKS ❖ CHITOSAN ELECTROSPRAYED ONTO POLYETHYLENE FILMS  
❖ CU (II)-SELECTIVE SENSOR RESPONSE TO IONS DIFFUSION IN CROWDED MEDIA

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### Abstract

Science and technology are fundamental to the society for its growth and development, but sadly there is a considerable gap between science community and society. An important role of science popularization is played by the media, which is a key shaper of public opinion. For the scientific community, an effective communication to the public is mandatory to be developed. Thus, new tendencies in scientific education are to stimulate creativity and to engage pupils in instructive - educative processes of personal development.

This paper is focused on study of science popularization through school journals, photography exhibitions and poster sessions in high schools and workshops/conferences at university. The journal plays a vital role in spreading information and a photography exhibition contributes to the stimulation and understanding of science in a pleasant manner, by all unspecialized persons.

**Keywords:** *science communication, school journal, photography exhibition, communication techniques.*

# A STUDY OF SCIENCE POPULARIZATION TROUGH SCHOOL JOURNALS AND PHOTOGRAPHY EXHIBITIONS

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## 1. Introduction

Nowadays, it is worrying that the number of students who choose scientific or technical fields encountered a dramatic decrease. Generally, sciences are difficult to be understood by all peoples because they involve a significant mathematical, physical, chemistry and biological knowledge's base, a logical thinking and study time.

Attracting students to study the real sciences can be done by changing the traditionalist way of teaching - learning science by involving emerging teaching methods that avoid automated knowledge store. It is necessary to consider the methods used for science communication by controlling the directions and age groups of children in order to discover the necessary information through playing, reading, using experiments, through direct interaction and specialized softwares [1]. The direct involvement of pupils in the process of science communication, leads to an increased interest in the presenting subjects, bringing their personal contribution and creativity in the presentation and understanding of this.

The introduction of new emerging methods of science communication is a necessity in the present context of classical education in Romania due to:

- the low number of hours dedicated to the science and fundamental phenomena applications of existing technologies, in the school curriculum;
- a crowded program which doesn't offer the students the time and the opportunity to discover in detail all the things that they are interested in and passionate about;
- the scientific and technological developments are at a high level and even if there many applications in our daily lives, there is no clear correlation between theoretical information from textbooks and scientific phenomena underlying current technologies;
- the new teaching techniques used for science communication give pupils/students the possibility to find themselves the answers at the questions about things with which they interact daily (phone, computer, internet).

Based on these assumptions and what Prof. Constantin Cucos said: "*There are times when not all of which can give a person can be show or exhibit. Blessed are those who encounter occasions (and they exploit) to say! Thank those times that give people the chance to say as they are, by their powers for the good of all*" [2], we have tried to give opportunities to the young people to be actively involved and to assert in the process of the science communication.

In the present proposed work, we studied the participation of a large number of pupils eager to read, to work on a chosen subject and to communicate to their colleagues their responses of the proposed themes. They had the opportunity to communicate and work in frame of a team, to develop their skills of team-player interaction, of communicators and presenters, along with ability to search, understand and present the scientific information to the public in an attractive manner.

Earlier stages and prior to this study have followed the emerging methods of science communication through optional courses in high school [3], by involving the pupils from XI grade at "Ioan Mincu" Industrial School Group Vaslui. These investigations were used in making a program with optional scientific courses with a curriculum expected to improve science communication and teaching methods in order to achieve an easier assimilation of scientific information. Also, it was studied the impact of the science communication through Science Learning Circle on students [4]. In this learning process, three different groups of participants were involved: the students from middle school, from high school and researchers from the Dielectric Physics Group, Alexandru Ioan Cuza University, who worked on joint science communication adapted to their level of training.

Scientific popularization through the scholar newspaper/magazine, photography exhibitions and scientific circles give students the opportunity to express freely on the methods of understanding, the form of presentation and communication of scientific information of interest to them. The freedom to choose topics of study gives them the opportunity to clarify the scientific phenomena and technologies which arouse interest and passions, beyond fixed-themed curriculum. Freely chosen methods of presenting information allow them to stimulate their creativity and originality. The media has the power to present and influence the existing forms of communication [5] and therefore it is very important that pupils or students to get involved and to know the process of preparation and presentation of information in printed media.

Scientific photo exhibitions with a choice or fix topic can stimulate the students to be attentive in daily life at the fundamental physical phenomena. Interaction with the environment is no longer strictly indifferent, but an increased desire for knowledge is observed, which leads to an easier understanding of fundamental physical phenomena and technology. In an attempt to capture some special images of physical phenomena, students have to pay attention to detail and to use their imagination.

Science through scientific communication circles helps the students to develop their communication skills. Alternative methods to provide unidirectional scientific information teacher-students are now different: the student can be the teacher and in this way he is forced to develop his

creativity in order to attract public attention. Thus, the pupils succeed to understand and to appreciate more the presentation and teaching efforts.

## 2. Methodology

Main objective of science communication activities follow: *Growing interest in science and technology of the students, by participating in a series of school and extracurricular activities that take place in scientific and technical communication, to discover their connection to life, to increase the motivation to study and not least to lead to an improvement of their school performance and a better social integration.*

Taking into account the emergent science communication methods, the following activities were proposed:

1.- editing academic journals every semester in frame of educational institutions in which main authors are the pupils and their teachers. The journal content depends on the age group that we refer the different interests and to the level of understanding.

The impact of Journals of Science Communication in frame of 3 different Institution was analysed. The journals are “Pe urmele inaintasilor” (edited by the pupils from „Elena Cuza” School, Solesti, Vaslui), „Interferente”, „Stiinta si Viata” (edited by the pupils from „Ioan Mincu” HighSchool, Vaslui) and „V. Adamachi” Scientific Journal (edited by Faculty of Physics from Alexandru Ioan Cuza Univeristy of Iasi).

2. - preparation of semestrial photographic exhibitions with fundamental physics phenomena encountered in everyday life. The photography’s made by pupils illustrating physics phenomena were presented to the public on the main corridors of both schools from Vaslui. The title of the exhibition from „Elena Cuza” School, Solesti, Vaslui was „As I see the world” (“Asa vad eu lumea”), and it took place during the celebration of the school days (June 2012). The other exhibition from “Ion Mincu” High school Vaslui, with the title “ Science in images” enabled all students to express their creativity and imagination. Tradition of photographic exhibitions in high school is older, being initiated at the Open Days in 2011. With a longer tradition, high school pupils are more creative and passionate about photography, involve themselves more and more in capturing phenomena, unusual and spectacular shots from nature that surprise physical, chemical or biological phenomena. The specific themes proposed were: "Free Fall", "Interference", "Motion", "Flight".



3. - Scientific presentations and some demonstrations / original scientific experiments open to the public in the frame of open school days.

In frame of "Ion Mincu" Technologic High School monthly scientific circles are running, each discipline choosing a theme of presentation. The pupils are encouraged to participate in the circles at the objects they are passionate about. Also, these scientific gatherings prepare the pupils if they plan to follow a further education step in the area. For physical discipline in the scientific circle "Young researcher" were discussed the following topics: Alternative energy sources, High-speed trains, CERN project, ELI project, Wireless Communication, Screen touch. At these meetings, pupils were encouraged to submit oral presentation as power point presentation or posters.

### 3. Study results

#### 3.1. Identification of cognitive needs

The first step of the evaluation process was the identification of the pupils' need for scientific knowledge. Thus, a structured questionnaire regarding the cognitive need has been enforced on 47 middle school pupils within the eighth grades A and B from "Elena Cuza" School, and 70 pupils from "Ion Mincu" Highschool ( 18 pupils from ninth grade A, 16 pupils from tenth grade C, 17 pupils from eleventh grade A, and 19 pupils from twelfth grade A). The fact that came forth was that middle school and first highschool years pupils are much more interested in the communication of science and the cognitive needs than late highschool years pupils. 68% of the pupils in the eighth grade from Solesti School (15 out of 22), 66% of the pupils coming from the ninth grade (12 out of 18), 63% of the pupils in the tenth grade (10 out of 16) conveyed their interest and actively involved themselves in the extracurricular activities which imply ways of communicating science.

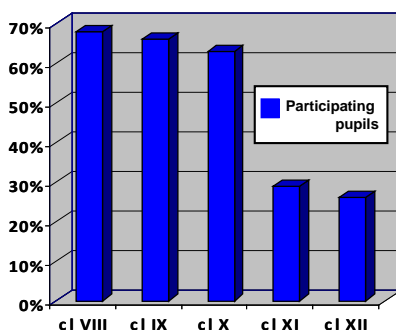


Figure 1. Number of pupils involved in the scientific communication activities.

The degree of interest towards science drops dramatically, concerning the older high school pupils. Thus, only 29% of the pupils in the eleventh grade and 26% of the pupils in the twelfth grade agreed and actively involved themselves in the suggested extracurricular activities on communicating science. The decrease in interest towards actively participating in the communication of science can be explained by the fact that the pupils have already been actively involved in such activities in their lower grades. Presenting an article or taking part in a scientific gathering is no longer a challenge for them. Also, older high school pupils have already found new ways of obtaining answers to the questions and scientific curiosities on their minds. Their priorities have already changed: preparing themselves for their finals, focusing on the subjects demanded and taking part in supplementary studying, preparing for their professional certificate exam, and university entry exams.

Of course, the tendency of low interest towards science in older high school pupils is generalized within the Romanian educational system. The pupils are becoming less and less interested in achieving the minimal scientific knowledge. Also, the curriculum and the content of high school Physics are beyond the capacities of a mediocre pupil (for example, Ondulatory Optics in the eleventh grade, or Nuclear and Atom Physics in the twelfth grade), which can lead to a negative attitude towards science.

### 3.2. Science communication Journals

“Pe urmele inaintasilor” journal, edited by the pupils at “Elena Cuza” School in Solesti, Vaslui, offers pupils the possibility to show their colleagues their creative sides. Through the literary headings, the children can express their feelings and emotions. It also gives science teachers a good opportunity to encourage the creativity of talented pupils. For example, eight grade pupils presented different natural phenomena, in the shape of small compositions or even poems.

The “Stiati ca...” heading encourages pupils to uncover little scientific mysteries that occur daily. The most relevant photos have been submitted for publication in the journal, with a detailed scientific explanation of the phenomenon. Headings like “Cine a fost...” offers pupils the possibility to read about the prominent names in Romanian science that had international impact (Emil Racovita, Stefan Procopiu).

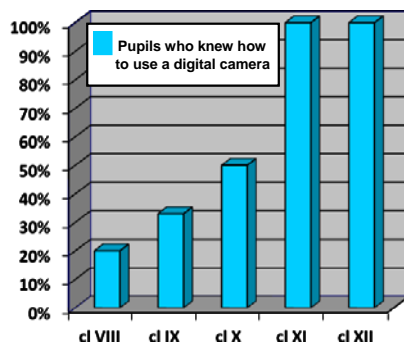
More complex is the 2 journals edited by pupils at “Ion Mincu” Technological High school in Vaslui. In them, we find specific headings: Physical phenomena in nature (cause and effect processes, like

Pollution or Vulcanoos), Chemistry Heading (spectacular chemical reactions, like fireworks, ph evaluation), Plants species (exotic plants, like carnivorous plants), Health and Medicinal plants (plants used for natural treatments, like camomile or rosemary), Birds and Animals (animals from our region), Modern Technology (understanding the fundamental processes based on which modern devices like the remote control, wifi communication or the internet work), Notable Scientific events (Nobel Prize, the Oscar Awards), Problem Solvers (subjects and answers for the physics, chemistry and biology final exam), and the Photography Heading (the most relevant scientific images).

The editing of such journals, both in middle school and high school is done under the close supervision of the teachers. The pupils gather the materials, take the pictures and the teacher evaluates them. Once evaluated, the materials are ready for editing.

### 3.3. Photography Exhibitions with a scientific purpose

Another issue addressed in this study was that of a Photography Exhibition with a scientific purpose. Therefore, before the beginning of this activity, the pupils that chose to participate at this extracurricular task have been questioned about the digital photography techniques that should be mastered to be able to obtain a satisfactory image from an artistic point of view (Figure 2). The questions regarded the following digital photography techniques, available for professional cameras: adjustment of the objective lens, framing the image in the landscape and image stabilization. From the eighth grade pupils only 47% (22 of 47) knew how to use correctly a professional camera (digital) before this activity, from the ninth grade pupils only 33% (4 of 12), from the tenth grade pupils only 50% (5 of 10) and from the eleventh and twelfth grades pupils, 100% (5 of 5).



**Figure 2. Percentage of pupils who knew how to correctly use a digital camera before the activity.**

Pupils in middle schools usually have little access to professional digital cameras. Most often, they take pictures using the mobile phone camera. Even so, they lack the patience to read and understand all the defaults at hand for taking a quality picture (autozoom, autofocus, layout and move). High school students are already familiar with technology, knowing perfectly well the defaults of their cameras. They adopt much easier the modern technology with all its advanced defaults. High school pupils are much more patient and attentive when it comes to details and phenomenon, capturing and framing the photography. In comparison, the pictures taken by middle school pupils are, even though imaginative, inferior in artistic quality.

### 3.4. The need for knowledge

Eight grade pupils' preferences regarding science have been analyzed throughout the activities involving science communication in journals, photo presentation or taking part in the science communication gatherings (Figure 3). The study showed that Physics is the preferred subject with 43% (20 out of 47), followed by Chemistry, with 26% (12 out of 47), then Biology, with 19% (9 out of 47), Informatics, with 8% (4 out of 47), and Technologies with 4% (2 out of 47).

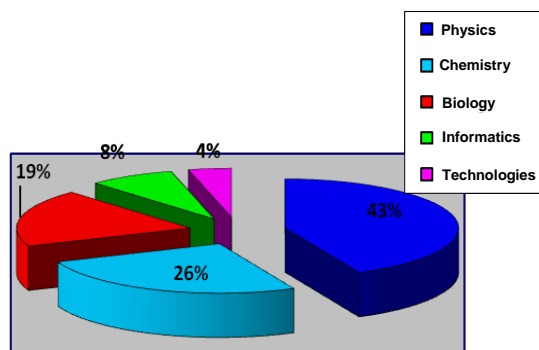
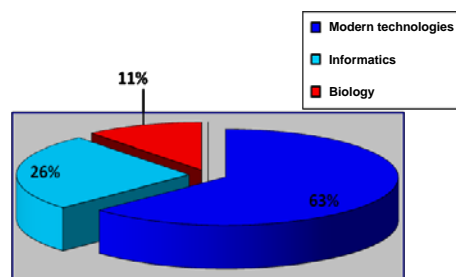


Figure 3. Scientific preferences of eight grade pupils.

The same analysis has been issued on twelfth grade pupils (19 pupils from the twelfth grade A from "Ion Mincu" High school in Vaslui). The main interest among this age group is the study of modern technologies, with 63% (12 out of 19), followed by Informatics, with 26% (5 out of 19), then Biology, with 10% (2 out of 19) (Figure 4).



**Figure 4. Scientific preferences of twelfth grade pupils.**

Actually, Physics and Chemistry are included by pupils in the generally area called Technology. The fundamental phenomena in this field no longer interest the pupils. They prefer to inform themselves, understand and present technologies that occur in daily life. This tendency of low interest for fundamental phenomena and increased interest for direct application is expected as the “Ion Mincu” high school is a technological one. Thus, most of the pupils that choose to further their studies prefer the engineering area.

#### **4. Conclusions**

The present study analyses the different scientific communication techniques and their impact on the pupils, impact which was evaluated by observing the pupils’ reactions and involvement. We can conclude that the scientific journals edited in schools offer the opportunity for emotional and creative growth obtained through scientific communication. The pupils have the freedom to choose any theme they like and also to present it how they see fit to their colleagues and teachers, those who read the journal.

Another conclusion we can draw is that photography exhibitions with scientific purpose was by far the most successful form of scientific communication with an enthusiastic involvement from the pupils. Another communication technique with remarkable results is represented by scientific meetings, where the subjects chosen for debate offer pupils the opportunity to be at the same time listeners and presenters, to be criticized and to criticize.

In conclusion extracurricular activities led to:

1. Assimilation of basic information about celebrated personalities from science;

2. Communication of novelties in modern science and technology to the unspecialized public using accessible language but at the same time scientifically correct;
3. Changes in the perception of the unspecialized public towards science and technology in general;
4. Growth in the interest of young men for science and technology;
5. Development by the pupils of certain skills required for scientific team work activities;
6. Growth in the number of pupils that choose the technological domain.

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# ON HOW JUDICIAL RELEVANCE HAS BEEN GIVEN TO LEGAL CULTURE (A NOTE ON *LAUTSI AND OTHERS V. ITALY*)

## Abstract

Given the newly discovered interest for the concept of *legal culture*, the European Court of Human Rights has been required to reinterpret the conventional text in light of the evolution of the national legal traditions and, especially, to consider within its own judgements the cultural background as part of the national legal identity of the Member States.

**Keywords:** *legal culture, national legal identity, European judge of human rights, European Court of Human Rights.*

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1. One author summarizes as follows the shift that the concept of *legal culture* has brought about in the field of legal studies: „the fundamental controversy is about how law should reflect, express or even control an aspect of culture. The issue attracts intense popular passions, no less than scholarly analysis. 'Law and culture' makes people angry. It has become prominent, in the cases just mentioned, because of a recognition that culture can no longer be taken for granted by law, or ignored by law; it can no longer be treated legally as uniform and unproblematic but must be seen as a plurality of not necessarily harmoniously co-existing forms” (Cotterrell 2008:24).

Indeed, legal theory and legal practice should take legal culture into consideration not only systematically, but also explicitly, making it abandon its status of law’s “silent language” (Hall 1959). Otherwise, culture will always be but the law’s implicit (provided, of course, that the latter gives up the presumption of cultural uniformity and of cultural indifference for lawyers, be they national or European legislators, judges or lawyers).

2. However, quite rare – but even more worthy of appreciation – judgments would bring (national) culture(s) to law’s front stage.

In such a key should be read the judgment rendered in March 2011 in the Case of *Lautsi and others v. Italy* (30814/06) by the Grand Chamber of the European Court of Human Rights.

Incontestably, the cultural element has of late become of outmost important for the European judge. Thus, the evolution of social relations in Europe has again brought forth the content of some of the fundamental rights, as enshrined in the instruments belonging to the Council of Europe or in the European Union texts. The existence of divergent standards established by such international instruments becomes problematic for the national judge, forced to also observe their own Constitution.

Under the circumstances, the European Court of Human Rights has been required to reinterpret the conventional text in light of the evolution of national legal traditions, whose analysis requires a culturalist comparative law approach (Bercea 2013:121-128).

3. In 2011, the European Court of Human Rights judges in Grand Chamber the complaint of a mother, an Italian resident, acting in her own name and on behalf of her children, attending an Italian public school on the walls of which was fixed a crucifix. The mother alleged the violation of Article 9 of ECHR (freedom of thought, conscience and religion) and Article 2 Protocol 1 to ECHR (right to education)

4. As for the interest of such judgement, it should be noted that not only it is for the first time that the European Court of Human Rights examines whether the crucifix represents only a religious



symbol, but also that the presence of religious symbols in public schools seems to be an intricate topic. During the written or oral proceedings, will intervene, supporting various points of view, members of the European Parliament, non-governmental organizations, the Governments of Armenia, Bulgaria, Cyprus, the Russian Federation, Greece, Lithuania, Malta, and the Republic of San Marino. The national Italian courts have themselves manifested irreducible positions on the matter. Finally, the European Court of Human Rights in its various formations will tend to solve the complaint differently: the Court's Second Chamber's Judgement finds in 2009 that there has been a violation of Article 2 of Protocol no. 1 taken together with Article 9 of ECHR, while the Grand Chamber, in 2011, reverses the solution. It should be mentioned that in this final judgement, however, out of 16 judges, 6 formulate separate opinions of which 4 concurring and 2 dissenting.

Such a different judicial treatment and variety of legal positions translate the variety of treatments that religious symbols get within the European states. As the Court will find out, "in the great majority of member States of the Council of Europe the question of the presence of religious symbols in State schools is not governed by any specific regulations. The presence of religious symbols in State schools is expressly forbidden only in a small number of member States: the Former Yugoslav Republic of Macedonia, France (except in Alsace and the département of Moselle) and Georgia. It is only expressly prescribed – in addition to Italy – in a few member States, namely: Austria, certain administrative regions of Germany (Länder) and Switzerland (communes), and Poland. Nevertheless, such symbols are found in the State schools of some member States where the question is not specifically regulated, such as Spain, Greece, Ireland, Malta, San Marino and Romania. The question has been brought before the supreme courts of a number of member States. In Switzerland the Federal Court has held a communal ordinance prescribing the presence of crucifixes in primary school classrooms to be incompatible with the requirements of confessional neutrality enshrined in the Federal Constitution, but without criticising such a presence in other parts of the school premises (26 September 1990; ATF 116 1a 252). In Germany the Federal Constitutional Court has ruled that a similar Bavarian ordinance was contrary to the principle of the State's neutrality and difficult to reconcile with the freedom of religion of children who were not Catholics (16 May 1995; BVerfGE 93,1). The Bavarian parliament then issued a new ordinance maintaining the previous measure, but enabling parents to cite their religious or secular convictions in challenging the presence of crucifixes in the classrooms attended by their children and introducing a mechanism whereby, if necessary, a compromise or a personalised solution could be reached. In Poland

the Ombudsman referred to the Constitutional Court an ordinance of 14 April 1992 issued by the Minister of Education prescribing in particular the possibility of displaying crucifixes in State-school classrooms. The Constitutional Court ruled that the measure was compatible with the freedom of conscience and religion and the principle of the separation of Church and State guaranteed by Article 82 of the Constitution, given that it did not make such display compulsory (20 April 1993; no. U 12/32). In Romania the Supreme Court set aside a decision of the National Council for the Prevention of Discrimination of 21 November 2006 recommending to the Ministry of Education that it should regulate the question of the presence of religious symbols in publicly run educational establishments and, in particular, authorise the display of such symbols only during religious studies lessons or in rooms used for religious instruction. The Supreme Court held in particular that the decision to display such symbols in educational establishments should be a matter for the community formed by teachers, pupils and pupils' parents (11 June 2008; no. 2393). In Spain the High Court of Justice of Castile and Leon, ruling in a case brought by an association militating in favour of secular schooling which had unsuccessfully requested the removal of religious symbols from schools, held that the schools concerned should remove them if they received an explicit request from the parents of a pupil (14 December 2009; no. 3250)".

5. The recourse to the comparative law analysis undertaken in a culturalist key seems therefore unavoidable. In fact, while criticizing the first judgement rendered by the European Court of Human Rights, the Italian government regrets "that the Chamber had not had available to it a comparative law study of relations between the State and religions and on the question of the display of religious symbols in State schools". They asserts that "the Chamber had thus deprived itself of an essential element, since such a study would have shown that there was no common approach in Europe in these fields, and would accordingly have led it to the finding that the member States had a particularly wide margin of appreciation". Consequently, the governments appreciates that "the Chamber, in its judgment, ignored one fundamental aspect of the problem".

Furthermore, in a clear culturalist note, the Government concludes that "the presence of the crucifix in the Italian schools is the expression of a *national particularity*, characterised notably by close relations between the State, the people and Catholicism attributable to the historical, cultural and territorial development of Italy and to a deeply rooted and long-standing attachment to the values of Catholicism. Keeping crucifixes in schools is therefore a matter of preserving a centuries-old tradition". The government notices that "the sign of the cross could be perceived not only as a religious symbol, but

also as a cultural and identity-linked symbol, the symbol of the principles and values which formed the basis of democracy and western civilisation”.

In conclusion, the Italian government’s position is that the presence of crucifixes in State-school classrooms, being the result of Italy’s historical development, a fact which gave it not only a religious connotation but also an identity-linked one, nowadays corresponds to a tradition which they considered it important to perpetuate. They added that, beyond its religious meaning, the crucifix symbolised the principles and values which formed the foundation of democracy and western civilisation, and that its presence in classrooms was justifiable on that account. The reference to the national tradition is, obviously, of outmost importance, if one is to assess the relevance of the national legal culture in establishing the content of fundamental human rights within the international context of the European Convention.

6. In the Case of *Lautsi and others v. Italy*, the Court itself takes the view that the decision whether or not to perpetuate a tradition falls in principle within the margin of appreciation of the respondent State. Also, the Court states that it must moreover take into account the fact that Europe is marked by a great diversity between the States of which it is composed, particularly in the sphere of cultural and historical development. It emphasises, however, that the reference to a tradition cannot relieve a Contracting State of its obligation to respect the rights and freedoms enshrined in the Convention and its Protocols.

7. The consequence will be, in such a situation, the withdrawal of the European Court in favour of the national judge. And the explanation of such conduct is beautifully rendered by judge Bonello’s concurring opinion: “A court of human rights cannot allow itself to suffer from historical Alzheimer’s. It has no right to disregard the cultural continuum of a nation’s flow through time, nor to ignore what, over the centuries, has served to mould and define the profile of a people. No supranational court has any business substituting its own ethical mock-ups for those qualities that history has imprinted on the national identity. On a human rights court falls the function of protecting fundamental rights, but never ignoring that customs are not passing whims. They evolve over time, harden over history into cultural cement. They become defining, all-important badges of identity for nations, tribes, religions, individuals”.

8. The Case of *Lautsi and others v. Italy* constitutes an example of the European judge taking into consideration the legal culture in as much as it constitutes the very part of the national identity of a Member States (and of the Member States in general). In such approach, the Court uses the comparative

law tools, expressing its preference for the culturalist reading key. It is interesting to note that the European Court of Human Rights is not merely enumerating various legal traditions belonging to the Member States of the Council of Europe, as it was the case in various judgements at the beginning of its functioning. On the contrary, it is obvious the judges' concern to explain the circumstances in which such differences can be deemed relevant (sensitive cultural issues linked to national identity and tradition), as well as the consequences thereof as far as the Member States are concerned (an increased margin of appreciation) and as far as the Court itself is (the court is better to withdraw; however, the mere reference to a tradition cannot relieve a Contracting State of its obligation to respect the rights and freedoms enshrined in the Convention and its Protocols).

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### Abstract

The present article aims at revealing the great importance that XIXth century Romanian journals had in shaping the image of what scholars may call “the modern woman”. The journals can indeed be considered as primary historical sources due mostly to the historical background through which Romanian had to build and defend their nation: that was in the context of the Habsburgs Empire and, beginning with 1867, in the dual Austro-Hungarian State. This explains why the press was used as a fighting weapon against the aggressive politics of Buda-Pesta. Moreover, the journals represented also the major media used by women so we cannot ignore probably their first public statements sustaining their sex’s cause. It is also our intention to give the international academic community a more detailed image of the Romanian women and their long way to run up to the point they had been perceived as the nation’s citizens.

# THE NINETEENTH CENTURY TRANSYLVANIAN JOURNALS AS DOCUMENTARY SOURCES FOR WOMEN’S HISTORY

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In what the Romanian historiography is concerned there is any doubt that women's history is still at its beginnings. Indeed, a significant change in researching women's history happened with the beginnings of the 1990s after history was freed from communism's imperatives. Especially the young historians were fascinated by this research domain, which led to the editing of several valuable studies upon women's history from the Middle Ages up to the contemporary era, recovering a bit from the gap between the Romanian and European historiography. Works like: Sorina Paula Bolovan, Ioan Bolovan, *From tradition to Modernisation. The Romanian Family in Transylvania in the Modern Era (1850-1918)*, in „Transylvanian Review”, vol. XVIII, Supplement *Demographic Changes in the Time of Industrialization (1750-1918). The Example of the Habsburg Monarchy*, No. 1, 2009, pp. 147-157; Sorina Paula Bolovan, Ioan Bolovan, *Familie și comportament matrimonial în Transilvania, între 1850 și 1914 (între tradiție și modernizare)*” in Sorina Paula Bolovan, Ioan Bolovan, Corneliu Pădurean (eds. ), *Omagiu profesorului Nicolae Boșșan la împlinirea vârstei de 60 de ani. Om și societate. Studii de istoria populației României (sec. XVII-XXI)*, Cluj-Napoca, Presa Universitară Clujeană, 2007; Ioan Bolovan, Diana Covaci, Daniela Deteșan, Marius Eppel, Elena Crinela Holom (eds.), *În căutarea fericirii. Viața familială în spațiul românesc în sec. XVIII-XX*, Cluj-Napoca, Presa Universitară Clujeană, 2010, Ionela Băluță, Ioana Cârstocea, (eds.)  *Direcții și teme de cercetare în studiile de gen din România. Atelier*, București, Colegiul Noua Europă, 2002 etc. insist upon the women in the private space of the family. But there are not enough studies to stress the ways through which women turned, not only at an ideological level but also to a pragmatic one, into being social players.

Also, despite the progress the domain made due to these works, there still are several aspects to be researched, we still have a long way to run until we can give Romanian historiography the synthesis on women's history as Duby and Perrot did for the European one. The blame for this low interest in the history of the Romanian woman is partly due to the documentary material an historian has at his disposal while approaching such a research subject, and especially for the medieval and the beginning of the modern Romanian society. On a critical approach on the Romanian historical resources upon women's history it stands obviously that there are few records, few writers interested in women's lives and stories. More difficult stands the effort of identifying the society's attitudes towards women. This reality will significantly change with the beginnings of the written Romanian press, in the XIXth century, as it becomes the major media used both by men and women for debating around the role and position women should have in the society.

The present article's intention is that of stressing the journals' real importance for studying women's history. We consider that any objective approach on the Romanian women's history cannot

omit their research, as the press does not represent a secondary source; on the contrary. We can indeed consider the Romanian journals such as “*Gazeta Transilvaniei*” (The Transylvanian Gazette); “*Familia*” (The Family); “*Amiculu Familiei*” (The Family Friend) as primary historical sources as they were used for shaping not only the women’s new image but also as a tool for educating and rising above ignorance the Romanian nation. Besides these, we must stress the fact that the same journals, in different levels of interest, of course, and depending on the kind of the journal, were used by women too so we cannot ignore probably their first public statements sustaining their sex’s cause.

But we cannot exaggerate facts: Romanian women’s issue in the XIXth century Transylvania was not the major debate of the nation. Romanians from Transylvania had other more important issues to fight for. Thus we consider as necessary some historical references of the period.

### **The historical context**

The XIXth century Transylvania stays under the modernization signs but all the same it is marked by the Romanian’ struggle to define and, afterwards, defend their national identity. Altogether, the XIXth century is under the signs of the great intellectual debates. Among these, gaining more and more importance, we must take into discussion the one concerning the women’s role and place in the society. This debate develops mainly at the intellectual level, as the majority of people “the mass”, as we call it, were not considered being part of the nation yet. Steadily, as a result of a double process, the lower social groups and the women at the same time will be integrated in the Romanian nation. This is due both to the fact that the elites become aware that a nation needs all its members (in consequence women too) in this effort to affirmation. The other reason can be found in all the great upheavals the XIXth century brought into being. And, over all, the journals previously mentioned, represented indeed probably the best witness of all these transformations. They become the main media used for disseminating the great ideas of the Romanian people. As well, the Romanian intellectual elites will find in the press the perfect media for fulfilling the main goal of the century that was the nation’s awakening.

Also, for a better understanding of the journals’ importance as a documentary source few hints upon the Romanian women’s evolution in the society must be said. The Medieval and Modern Romanian women’s statute was essentially defined by the legal codes deeply influenced by the religious morale. The Orthodox Church was the one to place women under the men’s power and control. For instance, according to the XVIIth century legal codes, *Pravile*, (elaborated in the two Romanian Principalities but found in Transylvania too) women were considered as being worse and easier to fall into sin. All the

same, the Transylvanian official laws considered women as being weaker not only physically but also spiritually thus they had to be protected by men. These definitions which women got during the XIVth-XVIIth centuries restricted their activities to the private space of the family. They could hardly step outside the family's areal and never could speak out loud in the public life. From this point of view, women were assimilated to the lower straights of life, being social, juridical and political "discriminated".

The XIXth century will change although not radically this state of facts. From now on, women will step outside the limited family circle becoming social players. They will no longer be, as one said, objects but subjects of history. This major change will be magnificently represented by the press. There is an entire "literature" debating around women and, as we have already said, the major Romanian Transylvanian journals will get involved in this debate.

### **The journals and their significance for the debate on women and their role in society**

The Romanian journals of the XIXth century had a significant role in shaping the modern Romanian nation. Due to the historical context, Romanians used the press as a major media for disseminating and defending the national identity. As historians declared, it had as a main goal of affirming the nation's consciousness and the unification in a single united state [1]. Overall the fight led through the media was fought into four main directions: the creation of a unified literary language; the creation of a synchronic development of the Romanian literature in all the three Romanian provinces; saving and promoting the folklore; and the political activism [2].

In what the debate around women is concerned, for the time being, four were the journals we chose to analyze because they are the most representative for the XIXth century Romanian Transylvanian society and because they are the most interested in the debate around woman. These four are as follows:

"*Gazeta Transilvaniei*" (The Transylvanian Gazette), that is the political voice of the Romanians; the first and the most important political journal. In fact it represents the first political newspaper Romanians had; the first journal which started to be published on a daily basis since 1884 [3]. The first number was issued in 1838, in Brasov edited by one of the most important leaders of the national movement, George Barit.

"*Familia*" (The Family), published in Pesta, but for the Romanians in Transylvania, also a journal with a social and cultural interest. It was first issued in 1865 by another Romanian leader, Iosif Vulcan who was the chief editor of the journal for 42 years.



“*Amiculu Familiei?*” (The Family Friend) it is a journal which could be considered of social and cultural interest. Issued in 1878, the journal was deeply influenced by *Familia*. It publishes the same kind of articles. It represents in fact one of the journals that publishes most frequent women related topics.

“*Transilvania?*” (Transylvania) which is the official voice of the most important Romanian cultural association called *Astra*, the association the Romanians formed with the purpose of educating the people, the most important organization Romanians had for defending their nation against the aggressive politics promoted by Pesta.

They all begun their editorial activity around the half of the XIXth century, thus our review had been centered upon the second half of the century which is in fact the period of time while women’s profile starts to be shaped by the press published in large quantity. This is one of the main reasons which argue the necessity of considering the press as a major documentary resource for women’s history. Moreover, there are two other motives which give reason for our research. First of all, because the press somehow represents an intermediary documentary support, a place where the official and the real meet and secondly, because it is the main tool the researcher has for identifying a reality which is otherwise very difficult to see: that is the society’s attitude towards women [4]. While earlier centuries [5] seldom allowed us to have a glimpse of the way in which women were perceived by society and the voices, when they existed, were exclusively masculine, written press radically changed this reality, making possible for us to become part in the real intellectual “debates” over women’s condition and role. This debate represents one of the features of the XIXth century and the press gets involved in. While for instance in the Middle Ages women could not make themselves heard and then, the early Modern Ages ( the XVIth century) allowed their voice become ‘whispering’ [6], it is the beginnings of the contemporary times that significantly changed women’s role in society, allowing them to make themselves heard in public life too [7]. This slow progress made by the women’s condition is partially due to the preeminence the Orthodox Church had in the Romanian society, as we well know that the church is an institution that strongly opposed to changes especially in family matters. In the Romanian Transylvanian case for instance up to the very end of the XIXth century, when the dual monarchy introduced the civil marriage, only the church was the one to judge all the legal matters concerning the family.

As for the press, there is a plenty of topics referring to women published in the four journals mentioned above. Resuming, five are the major subjects the editors deal with when women come into discussion, although, sometimes these five can scarcely be separated: first there is the question of enlarging the women’s access to education; then there is the marriage question, the reason for, the bad

influence the modernity has on women and family; the third subject is related to the morality of both men and women; the fourth deals with Romanian women personalities and the last but not the least subject describes the women's reunions and the activities they organized. These subjects will be analyzed in the following pages.

### **The education [8]**

As the journals' analysis testified both men and women argued the need for education; the necessity of opening schools for girls. This represented indeed the most discussed women related issue of the XIXth century Romanian Transylvanian society. Women, but mostly men intellectuals sign articles concerning this problem. It is of great interest due to the new perspective the men have on the other sex: women are no longer weak from an intellectual point of view, which is one of the Enlightenment's victories, thus they are able to learn. Thus the discussion initiated in the Romanian society in the second half of the XIXth century reminds of the similar debates back to Renaissance and Reforms period, when women were granted the right to education but only in order to increase the prestige of their husbands [9]. But some facts are significantly changed. In the XIXth century Romanian Transylvanian society the women's education problem is perfectly understood by connecting it with the national problem the Romanian intellectuals were struggling with. *Transilvania*, the official journal of *Astra*, perfectly mirrors this effort of the elites for raising the Romanian women above ignorance. *Astra* had in fact an entire program for this purpose perfectly mirrored in their official journal. We had analyzed the issues from 1868 (this is the first year of publish) up to 1911 when the society had celebrated its 50 years of activity. This is the context in which the most important scholars sum up the progress made by their efforts for giving women access to educational system. The magazine's first issue mainly insists upon the reasons for educating Romanian women. In fact the necessity of educating them it somehow could be considered as a side effect of the necessity of educating the entire nation, illiteracy was high not only at women but at men too and the elites were struggling to change this state of facts. This could be done also by educating women as the education, the intellectuals said, started with the family and mainly with the women as they were the first to educate the children. This optics is perfectly seen in *Transilvania* journal. For instance, in a speech given at one of the *Astra's* reunions by the headmasters of a Romanian school, Ioan Dima Patrascu, the education's levels were organized as follows [10]: at the first level was the education that all Romanians had to have: that was the maternal one and then the primary one (between the age of six and

twelve); then it was the private and public education. At the private level, once again, mothers were the ones to set the basis.

Of great relevance is the fact that the educational system was organized respecting somehow the social strata of life. For instance the primary level of education was for peasants (meaning for the majority of the Romanian people); the secondary was for the bourgeoisie while the university was only for “scholars” [11]. Significant are also the agents who had to organize and construct this educational system. They were the State; the Church; the Nation and the last but not least the family. Respecting this typology, women are placed at the first levels of education: as mothers they were called to set the basis of a child’s education. The importance that women should have for making children acquainted with school is a novelty of the debate concerning women’s role in the society. This fact is also proven by examples from the same speech mentioned above: these are the recommendations a mother made to the teacher in the first day of the school: “Good morning dear teacher! This is my son and I brought him to the school for he is a bit lazy, stubborn and liar. I kindly ask not to be gentle while educating him as I do know anymore what else to do with him” [12].

And these are the recommendation the same mother made after the teacher tried to respect the mother’s initial recommendations: “Good morning dear teacher! But what on earth have you done with my child because he no longer wants to go to school because you are too severe. I kindly ask you to leave him alone, stop punishing him when he does not do his homework as he is weak and feeble minded” [13].

This is only one of the many examples found in the journal that makes reference to the importance that a mother plays in shaping the children’s attitudes towards school and education. This perspective also explains the reasons for the intellectuals’ interest in educating the women. The subject, might be said, has a privileged place in the journals issued during the XIXth century Transylvania. As a consequence of this debate, a new perspective on women will be formed. If the previous generations had seen women only as daughters, wives, mothers or widows from now on they will be also considered one of the most important educators a nation needed for a bright future. We must also stress the fact that this debate had two significant side effects: first, it will somehow force the Romanian elites to fight for creating an institutional system where girls could be educated and second, women also will become aware, and act in consequence, of this significant role as the nation’s teachers. They will no longer be afraid to express themselves in public life and for that purpose they use the press which becomes a major media of women’s voices. For instance, Mrs. Emilia Lungu [14] wrote: “how can anyone forget that women with

no rational education, just in the primitive state similar to her ancestors, cannot forget to influence by cultivating and ennobling? How can anyone pretend that women should stay outside everything but household activities but still influence her family to conquer sciences...? What could she offer when her mind looks like a board with nothing written on it?" [15]. Yet, the present debate reports a real progress, as education does not only serve the family, but the whole nation, too: the author's answer to the question in the title of the article (what are women): "it is the model which generations and peoples take after" is representative for this idea; the woman is half the nation and the girls' schools shall be able to model women "in respect of the blessing of her own, her family and the whole nation" [16].

The message that the journals transmit to the public is that women as mothers must be educated in order to contribute to the Romanian nation's progress. This is the key idea of all the articles discussing the women's condition and role in the society. We must also stress that the debate around women's education is centered not only on its necessity but also on the kind of education the women should receive. A new educational model is affirmed due to the press and this model will be put into practice in the girls' schools. It somehow could be considered a compromise between past and present, between the tradition and modernity, as curricula proves, as the intellectual elites try to find a balance between the knowledge a wife and mother needed and those previously reserved to men (with reference to the higher forms of education). The reasons for this compromise are easily explained through the general perception the Romanian society had on women. They were the ones called to keep and pass on the traditional values of the people but, at the same time, they had to answer all the imperatives of a society in progress this meaning that they had to be educated. So, on one hand there was the education necessary to serve the families' necessity, an education based on religion and morality, and, on the other hand, there was the school education for learning basic knowledge a woman needed in order to become a "social player". George Barit had in 1869 *Astra's* reunion a speech which could be taken as a landmark for the debate around women and their access to education. Although he is a bit cautious in his statements, as he is not a feminist *avant la lettre*, Barit considers that the education should start by avoiding the extremes: at one edge there was the Eastern woman raised and kept in slavery, it is a direct attack against the schools that were educating women as trophies of their husbands', and at the other edge there was the "philosopher woman": "I doubt that you want to make our women philosophers, philologists or mathematicians, in short, blue stocking shoes as Englishmen mock them? God save Romanians from the philosopher woman who could discuss on *Ich und Nicht ich*, on *Weltall und Nichts*, and afterwards to lay on the table an unsalted soup, a burned steak and an unwashed salad" [17]. But he is not the only one to consider that

women do not need higher forms of education. Doctor G. Crainicean in “The Nine Commandments of a Healthy Life and their Explanation” insists that women should not go to universities as this was the men’s job. Women should stay at home and take care of their children: “studying in universities is too tiring for women. Don’t you have enough advocates, diplomats that you want to increase in number with women too?” [18]

This does not mean that we do not have Romanian women who had attended the course of universities. But we must reckon that they are only a few. According to the dates of the Hungarian historian, Szögi László, we had identified 28 Romanian women that went for classes at foreign schools [19]. The number proves that these women were exception to the rule as the majority remained at home and, in a fortunate case, attending the local schools gaining an education according to the model the elites tried to disseminate.

Summing up: what should women be educated? Besides the basic knowledge a wife and mother must have, the journals stress again the national component. Ladislau Vajda, another patriot, was stressing, in a speech dated in 1868, the importance that historical books should play in the women’s education. In his optics, but he expresses a more general view, these books were compulsory for “a greater inclination of Romanian women through patriotism and nationalism” [20]. The author also makes a comparison between the patriotic education of the Hungarians and that of the Romanians. He considers that this kind of education is the perfect way of avoiding the danger of losing the national identity.

The same educational issue explains way the press publishes real summaries of educational models for women. The journals we studied frequently publish, under different forms, this type of articles: either as feminine examples to follow or as thematic articles [21]. Images are also used in order to stress a point and also due to the fact that few were the women who could read. For instance, *Familia* from 1886 published the image of a young mother reading to her daughters [22]:



HAID SA 'NVEȚAM CARȚEI!

As we previously mentioned, women also consider that their mission is that of educating children in the national spirit. Besides Emilia Lungu there are other women to declare the same. For instance Alexandrina Matei one of the members of the Women's Reunion from Sibiu, in a speech given at the opening the girls' school from Sibiu, stresses the same idea: "a real Romanian woman takes as sacred her duty of raising her girls in the national spirit in order to become good wives and mothers ... the woman of our generation is to become a human being in its complete sense: a human being among the human beings, a delight maybe, but not a toy, being modest but thoughtful, a woman subject to her husband but not a slave" [23].

### **The marriage question and the bad influence of the Modern Age**

The marriage question, its reasons; the bad influence which modernity has upon the matrimonial relations represents another topic preferred by the Romanian journalists. The journals analyzed, although the topic is mostly debated in the magazines having a religious orientation, make an interesting connection between the so called bad influences the modernity has upon the family's construction. The journalists, mostly priests or having at the basis a religious education, consider that the marriage does not respect the traditional values anymore being in fact corrupted by the new, revolutionary ideas the youth brings from the Western civilizations. They were considering that the Romanians, both men and women, are no longer interested in building a traditional family being more attracted by luxury, social events etc. This perspective explains in fact the great number of the journal articles which make reference to the "perfect" marriage. This debate centers again on women and upon the education they should be given. A significant progress is to be registered in what the age of marriage is concerned as some journalists consider that for a good, long lasting marriage to be formed girls should be allowed to educate them, to experience the youth's temptations and only afterwards should they be married [24].

### **The morality [25]**

The morality of both men and women and the impact modernity has upon the morale of people. This subject can scarcely be separated by the previous one as the journalists consider that marriage and morality are the two sides of the same issue as everything starts in the family. It is at the basis of a society and a weak marriage; a low morality will in the end have a negative influence on the entire society. Moreover it is also of great concern for a society that was crossing through a deep process, a difficult one, of finding the perfect path between tradition and modernity. The Romanian intellectuality thinks that if the women's education is not rightly managed, the entire nation will be in danger as women are those called to preserve a nation's features. For instance, the journals deeply criticize the concubinage, considered as one of the greatest moral offenses. This is the optics mostly seen in the journal of religious orientations such as *Fói'a basericésca*. The journalists consider being a moral duty to find ways to correct this practice by stressing the dangers that it brings about. The article we make reference to centers upon these bad effects the concubinage had for both the family and the nation. The modernity is also to be blamed as the journalist considers that although this practice is not a new one; the modern ages had turned it into a dangerous phenomenon [26]. He strongly believes that if the practice was not corrected it will threaten even the nation's existence. The concubinage is thus criticized as it attacks the family's moral

values. Moreover, the concubinage is understood as a social gangrene. It contaminates both the moral virtues, corrupts chastity, sexual moderation, and, at the social level, it causes violence, abuses, and gives birth to uneducated children. And beyond all this negative effects upon family and society, and from a religious point of view, the concubinage damages the sacred marriage [27].

In the same optics, journalists try to correct some of the bad habits of the people. Some of these are not necessary caused by the modernity but it is also to be blamed for turning them into disturbing ones. Literary works are also published for this purpose of correcting the bad habits like alcoholism and, which is more important; women will also get involved in this effort. For instance, Emilia Lungu previously mentioned will publish literary works but with an educational value against such bad habits like alcoholism.

### **Women personalities**

Women personalities are profiled in the four journals analyzed. The journalists are not interested only in discussing the best methods in order to give the Romanian nation educated women. They also try to find examples of how an educated woman can bring her contribution to the nation's prosperity and progress. We must also mention that this topic has a double historical value: first because it offers the historians a hint of the attitude of men towards women who had managed to step outside the family life and secondly because it also gives us a detailed description of how women had assumed this role of citizen of a nation, how they understood to act in order to contribute to the nation's awakening.

There is also to be mentioned that the articles of this kind are not extremely numerous and that few are the women personalities that became subject of journal articles. But this situation has a reasonable explication: due to the educational perspectives Romanian women had in the XIXth century Transylvania which offered few opportunities for the women's intellectual development. This also explains why the journalists look for examples in the Romanian Kingdom. There are plenty of topics on Carmen Sylva that was the literary name of Queen Elisabeth I of the Romanian Kingdom, with which the Romanians from Transylvania had great affinities with. Another Romanian woman but also not from Transylvania who became a frequent article topic was Princess Elena Ghica who gained a European prestige due to her works but also under a pseudonym: Dora D'Istria. For a better understanding of the journals 'perspective on this topic we have studied in a comparative manner the articles referring to Dora D'Istria [28] and another Romanian woman this time of Transylvanian origin, that was Constantia de



Dunca also known under a pseudonym: Camilla D'Alba (we cannot eliminate the possibility that when choosing this pseudonym Constantia had been influenced by the example of Dora D'Istria).

With reference to Dora D'Istria two are the perspectives the journals' analysis revealed: first she is analyzed from a literary point of view this meaning that journalists write about her activities as a writer. But it is also significant to add that the gender perspective exists in this case too as the most frequent discussed works of Dora are in fact valuable histories of women she wrote in French: *Les femmes en Orient*, Zurich, Meyer & Zeller Editeurs, 1859 which is subject of review in *Transilvania*; and *Des femmes par une femme*, Paris, Librairie Internationale A. Lacroix, Verboeckhoven et C<sup>ie</sup>, Editeurs, 1865, reviewed in *Familia*.

*Familia* will publish in issue 18 from 1865 as headlines a biographical article on Dora D'Istria (followed in 1866 by the reviews of her book). This fact is also of great interest as the first page of the journal was usually reserved for the great men personalities of the Romanian nation. For instance we have studied *Familia's* issues from 1865 up to 1886 and in this period only four were the women personalities as headlines of the journal: Elisa Circa (a musician); Dora D'Istria, both in 1865; Constantia Dunca, in 1867 and Maria Sofia, Queen of Napoli in 1868. All four articles have great historical value as they offer us a glimpse on the perspective men had upon women, on the values that the new modern woman should have. Dora D'Istria is given as a role model: it represents a praise of her great contribution to the well prestige of the Romanian nation. She is considered a genius, "a shining star rising from the darkness of the East" [29]. No doubt that Dora D'Istria was very appreciated by Romanians from Transylvania as she was perceived as one of the ambassadors Romanians needed in order to fulfill their national aspirations and ideals. The conclusion is argued by another series of articles published thirteen years later. In 1878 while Dora D'Istria was celebrating her 50<sup>th</sup> anniversary *Transilvania* journal published a series of biographical articles on her. They are very similar with the ones from *Familia*: a tribute for this "brilliant" woman of the Romanian nation [30]. This is the conclusion we can have while paying attention to the spirit the articles were written in: she is again considered as a genius of the nation; she has proven herself a most valuable citizen of the Romanian nation; she tried to make the Romanian people well known in Europe. These patriotic feelings are proven, as the journalist wrote, by the articles Dora published in magazines like the Italian *Il Diritto* or *Revue des deux mondes* where she assumed the role of defending her nation in particular and those from East in general [31]. In fact, as her entire work proves, her intention, which is sometimes even clearly stated in the preface of her books, was that of correcting and giving to the civilized countries from the West a real image of the East and its peoples,

Romanians included. It is also obvious that the journalists signing the articles from *Familia* and *Transilvania* are quite proud of Dora D'Istria and mainly of her accomplishments and of her international success. For this purpose in the articles from *Transilvania* the author made a selection of quotes from different international journals such as *La Librairie* (15<sup>th</sup> August 1856); *Le Siècle* (14<sup>th</sup> December 1856); *L'Illustration* (10<sup>th</sup> January 1857); *Indépendance Belge* (11<sup>th</sup> April 1857); *La Presse* (22<sup>nd</sup> April 1857); *Revue de Paris*, (May 1857) [32]. As this articles conclude: her success should be in fact understood as the nation's success.

The articles mentioned above also give a review to her book: *Les femmes en Orient*. The author, who remains anonymous, but it must have been one of the *Astra's* leaders, is also one of Dora D'Istria defenders against a point of view seen in other journals of the time. For instance, in *Familia* from 1867 a negative comment referring to Dora D'Istria was published. This is in fact one small commentary which represents the only blame she could be accused of: that she did not write in the native language which in an age of powerful nationalism was seen as a great offence: "Dora D'Istria, the well-known writer who had enriched the European literature with so many famous books ... is now interested in studying the Hungarian literature. At least this is stated in a Hungarian journal, that the erudite lady asked a Hungarian scholar to send her an excerpt on the history of Hungarian literature as she was interested in it. I wonder if Dora D'Istria has the same interest in the Romanian literature. It would be indeed too sad for us to find out that this honest woman has no interest in her nation's culture, it hurts seeing that in all her books, written in different foreign languages, she did not embrace the fight of her country and nation as a Romanian woman was expected to do" [33]. But the author signing the articles from *Transilvania* journal does not agree as he considers that by using the international language of the moment Dora D'Istria managed to make herself and her people known in Western Europe thus "working abroad for her country and nation" [34]. But this is the context which the journalist uses in order to stress the fact that besides Dora there were other valuable Romanian women who worked also for the nation's sake but in the country. Among them is mentioned Constantia de Dunca who, as I have already mentioned, is one of the other women profiled in the Romanian press. For instance, Constantia de Dunca which is known as Camilla D'Alba is one of the women personalities' subjects of the Romanian journals. In the issue from 19 December 1862 *Gazeta Transilvaniei* was writing about her visit in Brasov where she was very welcomed by the Romanian community. She had met the Romanian teachers, the representatives of the Romanian priests as well the representatives of the women's reunions from the town [35]. The journal describes the literary abilities of Constantia but the stress is once again on the contribution this woman, through her

activity, brings to the Romanian nation. Of great significance are also the speeches addressed by the representatives of the intellectuality. It stands obviously that the Romanian elites value women as keys to the nation's progress. In their optics, she must be taken as an example for how educated women can bring their contribution to the nation's prosperity. In the speech given by the priests the stress is once again on the educative role women play in a society and this education must be based on Religiosity, Morality and Nationality. The three elements are a sort of "key words" as we find them again at the end of the article: she is a "sun among the stars", she is a role model of religiosity, morality and patriotic feelings.

These types of journal articles prove that a new feminine profile is emerging beginning with the second half of the XIXth century. It is not a violent brake from the past. Women are still considered as daughters, wives and mothers but they will from now on be seen from a national perspective: they will still be daughters, but the nation's ones; they will still be wives, but the patriots' ones; they will still be mothers but of the future nation's sons.

### **Women's reunions**

The journals also have a particular interest upon these organizations. Again they are analyzed from a national perspective; everything they do is seen as a contribution for the nation's prosperity. The Romanian women reunions had defined as their primary objective the charity [36]. For most women the involvement in this kind of activities for the poor and the oppressed had turned into the forerunner stage and the media for their commitment to the cause of their sex [37]. Indeed, the charity had been the most "gentle" way women had for entering in the public space [38]. It also represented the best tool for their efforts of improving the women's condition [39]. On the other hand, this philanthropic goal was imposed by the Romanian's statue in the dual monarchy. In order to get the legal approval for the reunions women had to assume this main goal whereas their primary objective was the national one [40]. Three are the women's reunions whose presence in the print media we have studied so far. It is the women's association from Brasov [41], the one of the women from Sălaj and the third is that of women from Lugoj. Over the whole, the information from media is linked to three main subjects: reunions' establishment; their statutes and the activities organized by these reunions [42]. There is in the press even a clear statement regarding the necessity of making public the information concerning these reunions as they are a valuable contribution to raising above ignorance not only the women but the nation too [43].

We must also stress that each of the five subjects we analyzed so far has as the basis of reasoning one of the basic feature women had: that is the Maternity. Indeed, over the centuries women were defined as being only mothers. Their single “utility” was that of giving birth and raising children only for the prosperity and prestige of the family. But from now on, Maternity will be reconsidered: it will gain a national perspective. Women are mothers by definition, but now they are the nation’s mother too. This new perspective on women, seen as the Mother Nation, does represent a real progress on women’s condition and not only at a theoretical level but at a real one too. Indeed, we can talk about a positive assessment of women in general, and that is a first (except Virgin Mary) in history. In consequence, women are now seen as the mothers who grow up the men/the Romanian citizens. That is why; they have first of all to be educated in order to raise their children in the national spirit.

Closely related to Maternity, the other basic element which influences mainly the perspectives on which women are now seen is the national one. No matter the educational question, the profiling or the activity of the women’s organizations [44] come into discussion the national element is omnipresent. Everything concerning women is now concerning the nation. Even women became aware of this new perspective. Emilia Lungu for instance in one of her newspaper articles defined women as being half of the nation and in consequence, they should be treated as like [45]. She also argued that women are the models which generations and peoples take after.

Out of the journals we had analyzed so far, there isn’t a “women’s only” one. Indeed, *Amiculu Familiei* and *Familia* are more interested in the subject. As well, they also published literary works signed by women. *Gazeta Transilvaniei* publishes also subjects that are women related too but not so often. This fact has yet a logic explanation. As openly declared a journalist, while talking about women’s organizations, he insists that these should be better advertised but in journals like *Familia* as *Gazeta Transilvaniei* is too busy dealing with more important - mainly political matters.

On considering the XIXth century Romanian journals as a documentary resource for women’s history we must take into consideration the gender of those who sign the articles. Have they a gender perspective on the women’s question? Do they write from a gender’s optics? At the extent of the present research there does seem to be a gender approach on the women’s matter. And it is as reasonable as it seem may seem: man dominated the society, and, on the other hand, women let themselves dominated but not in a negative, discriminatory point of view. But which is more significant is the fact that sometimes, and quite often, as the journals prove, both men and women have a similar perspective on what women’s role in society should be. Moreover, they use the same arguments when the subject

comes into discussion: the Maternity stays in the center of it. We also have to underline that, at this point in history; the Romanian women are not involved in the struggle for political rights. They have not reached that level of consciousness yet. What women wanted, first of all, was the right to be educated. In no circumstance did they intend to break the boundaries between sexes, there isn't a single female voice asking for an equal statute with men. They only ask for equal rights to an intellectual emancipation. Emilia Lungu, previously mentioned, is the best example for proving this. One of her articles asks a basic question: "*What are women and what would their mission be?*" This actually synthesizes the essence of the women's debate of the XIX<sup>th</sup> century [46]. The article *per se* should not be considered a manifesto of the Romanian feminist movement, as the author is far from protesting or "rioting" against the dominant masculine reality, this is obvious even in the motto: "*Give the woman the awareness of herself and soon she will learn how she should be!*" [47] Quotes from J. J. Rousseau and Aimé Martin come to emphasize the importance that women play in the society: "*Beware... the ideas that are born in the woman's mind while taking care of her home are further brought by the man in the public arena, the Parliament and everywhere else!*" [48].

We must also emphasize that once again the Western Europe is taken for a model. Much information in the journals makes references to the situation and social role played by women in some of the most civilized nations and countries. We find it interesting that lots of information is taken from the United Kingdom or the United States (*America* as it appears in the journals), somehow the English and the American societies are considered to be the pioneers in this field too. This also proves that Romanian journalists were aware of the progresses made by women from these countries and were constantly comparing them with the Romanian case. For instance, the journals like *Familia* and *Amiculu Familiei* mention the activities of the women from these countries and especially the progress made by them in the social and educational domains. They mention for instance the Haring Club from London or the classes opened for women at Cambridge University [49]. Of extremely interest appears to be also the initiative from United States of founding a university for women. This is subject of a short article published in *Familia* in 1867. But the tone of the journalist proves that he is not that favorable to this initiative. Indeed he marks the progress made by the women from this country saying that in the United States there was no surprise "if a woman chose a scientific career". He ends his article with an irony, which is also relevant for the perspective men from Romanian Transylvanian society had on their women: "Probably that America will soon have women in politics and consequently there is much more confusion in politics than in our country where only men deal with such matters" [50].

This is a short perspective on the importance that the Romanian journals had on shaping the image on the women during the XIXth century. Each of the subjects we analyzed in this study could be treated in a distinctive approach. But even this overview is enough for proving that the press represented a valuable documentary source for women's history. It indeed could reveal the manners through which women crossed over these boundaries of the family life for stepping in the social space. Moreover, it real shows the society's reactions to their intrusion in the public life of the community. It is indeed the witness of the great transformations that women went through along the XIXth century.

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- [2] Ibid., 254.
- [3] Ibid., 115.
- [4] As the press is in fact an echo of the preferences and tastes a society has.
- [5] Reference is being made to the period between XVth and XVIIth centuries. See the work: *Destine comune: Viața femeilor între public și privat Țara Românească, Moldova și Transilvania Secolele XV-XVII*, Cluj-Napoca, Argonaut Publishing House, 2011.
- [6] Madeleine Lazard, *Eva în oglindă. Viața femeii în Renaștere* (Bucharest, Saeculum I. O. Publishing House, 2007), 30.
- [7] Georgeta Fodor, "Women as Topic of Intellectual Debate Case Study: *AMICULU FAMILIEI*" in *Studia Universitatis Petru Maior. Series Historia*, 11 (2011): 89-98, quotation on 7.
- [8] This part of the study has already been published in the volume: *Itineraries beyond Borders of Cultures, Identities and Disciplines*, Carmen Andras, Cornel Sigmirean, Corina Teodor (Eds), Sibiu, Astra Museum Publishing House, 2012: 197-208.

[9] Ibid.

[10] *Transilvania*, no.4 (1911):410-456.

[11] Ibid.

[12] Ibid., no. 22 (1871): 257-259, quotation on 10.

[13] Ibid.

[14] Emilia Lungu Puhallo (1853-1932) was a writer and a journalist. She is the founder of the first women's organizations from Banat (1872). She opened the first school for the Romanian girls from Banat in Izvin near Timisoara, in 1874.

[15] *Transilvania*, no. 22 (1871): 71, quotation on page 11.

[16] Ibid.

[17] *Transilvania*, no. 17 (1869): 199-202, quotation on page 12.

[18] *Familia*, no. 16, (1886): 187-190, quotation on page 12.

[19] Szögi László, *Studenti romani din Transilvania la Universitatile din Europa, secolele XVI-XX*, Tirgu Mures ("Petru Maior" University Publishig House), 2011 [book citation].

[20] *Transilvania*, no. 16 (1870): 194, quotation on page 12.

[21] These thematic articles are the most frequent ones. We mention some: "Abecedarul de aurul al fetelor" in *Familia* no. 43 (1866); "Despre crescerea fetelor", in *Familia*, no. 9 (1867); "Ceva interesantu pentru mame", in *Familia*, no. 28 (1867); "Elementul national in educatiune", in *Familia*, no. 12 (1886); "Forma si fond in cultura. IV. Educatiunea fetelor" in *Familia*, no. 39, 43 (1886); "Cateva cuvinte asupra cestiunei femiloru", in *Amiculu Familiei*, no. 33 (1886); "Crescerea copileloru nostre", in *Amiculu Familiei*, no. 33 (1880); "Cestiunea educatiunei femeie?" in *Amiculu Familiei*, no. 23, 24 (1888); "Din scrierile lui Simion Barnutiu. Cu privire la crescerea si detorintele femeiei romané", *Amiculu Familiei*, no. 13 (1890); "Avantul femeii catre invatatura", *Amiculu Familiei*, no. 16 (1890).

[22] *Familia*, no. 33(1886).

[23] *Transilvania*, no. 4, (1911): 410-456, quotation on 14.

[24] *Amiculu Familiei*, no. 1 (1880): 3-4. The journal publishes an article on marriage: "The marriage – a social study".

- [25] This is the subject of a study being under print in Transylvanian Review.
- [26] *Vitiulu concubinatlui in poporulu nostru*, in „Fó’ a bisericeasca”, 13, (1883): 207.
- [27] Ibid.
- [28] This personality has already raised the historians’ interest. A valuable work is signed by Antonio D’Alessnadri, *Il pensiero di Dora D’Istria fra Oriente Europeo e Italia*, (Roma, Gangemi Editore, 2007).
- [29] *Familia*, no. 18 (1865): 213-215, quotation on 17. This is an excerpt from the article: “*a scrisu neobositu in limb’a natiunilor culte inadinsu ca sé atraga atentiunea lumei civilisate asupra orientului decadiutu, si cu destingere se cascige simpati’a Europei pentru tier’a sã*”; „*la urcarea pe muntele Miunich, ... ea se sui pe culmea cea mai nalta si acolo implantà tricoloru Romaniei, ca un semnu de suvenire pentru iubit’a sa patria si natiune, carora li-a cascigatu atâta gloria prin faptele stralucitului seu talentu*”.
- [30] *Transilvania*, no. 5(1878): 49-51, no.6 (1878): 62-65, no. 7 (1878): 73-76, no. 8 (1878): 85-88, no. 9 (1878): 97-100.
- [31] Ibid., no. 9 (1878): 99.
- [32] Ibid.
- [33] *Familia*, no. 21 (1867): 255.
- [34] Ibid., quotation on 19.
- [35] *Gazeta Transilvaniei*, no. 99 (1862).
- [36] Georgeta Fodor, “Following the Charity Line: Echoes upon the Activity Developed by the Women’s Reunions from Transylvania Reflected in the Romanian Transylvanian Press (the second half of the XIXth century)”, in *Culture, Elites and the European Integration, Culture, Elites et Intégration européenne*, 3<sup>rd</sup> Volume, History, (Editor Cornel Sigmirean, Paris, 2011), 18-30, quotation on page 20.
- [37] *Gazeta Transilvaniei*, no. 99 (1862): 144.
- [38] “Following the charity line”, 18.
- [39] Ibid.
- [40] Ștefania Mihăilescu, *Din istoria feminismului românesc: antologie de texte: 1838-1929*, (Iași, Polirom Publishing House, 2002), 22-23.



- [41] It must be mentioned that the reunion from Brasov was a model followed by other women's reunions. The phenomenon has gained momentum mainly after *Astra* (The Transylvanian Association for Romanian literature and the culture of the Romanian people) was founded in 1861. Ș. Mihăilescu, *Din istoria feminismului românesc*, 23.
- [42] "Following the Charity Line", 18.
- [43] *Gazeta Transilvaniei*, no. 98, (1870).
- [44] They are called Women Reunions (*Reuniuni*).
- [45] *Amiculu Familiei*, no. 8, (1879): 69-72.
- [46] "Following the charity line", 19.
- [47] *Amiculu Familiei*, no. 8 (1879): 69, quotation on 22.
- [48] Ibid., quotation on 22.
- [49] *Familia*, no. 24, (1866): 282 and *Amiculu Familiei*, no 12 (1879): 106, quotation on 23.
- [50] *Familia*, no. 35 (1867): 424, quotation on 23.

# THE SOCIAL CONSTRUCTION OF SCIENTIFIC CULTURE. ROMANIAN POPULAR SCIENCE BOOKS\*

## Abstract

Science and society are tightly bound and have a reciprocal influence. Formal science communication lives along with popular science communication and each one is differently constructed and transmitted. This article aims to explain how popular science is transmitted in Romania. Such an inquiry is stimulated by an in depth assessment of both science's role in contemporary society and the role of society in building a social meaning of science.

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### **Popular scientific culture**

There are two different approaches on how scientific culture spreads in the society: for scientists, it is connected with the rationalistic thinking and it is transmitted through education (Bachelard, 1934); for those who are interested in popular science, scientific culture is an activity carried outside the formal framework of traditional education. These two approaches could be explained using Bourdieu's (1975) *field theory*. This theory claims that there are two distinct fields: the scientific one and the popular science one. Each one configures itself using different education forms, interests and means. Consequently, the two fields develop their own representations of science and scientific culture (Baril, 1996).

Nonetheless, recent research shows that new media are reconfiguring the way in which science is communicated and the two above mentioned fields become a continuum.

The dynamics of this new space of knowledge may be represented as a *spiral of scientific culture* (Vogt, 2012). The author considers that the starting point is science production and dissemination among the scientists. The next level implies knowledge transmission from professors and researchers to the students, in order for it to become public through museums and science centres. Finally, journalists and other communicators make science popular.

Therefore, the analysis of the scientific culture of a society could be focused on the *formal culture* which is characteristic to educational institutions and laboratories or on the *popular culture* which is acquired outside the educational environment.

Mass culture plays a central role in the construction of a certain scientific competence of the public by broadcasting many types of discourses: popular science books, anticipation literature and SF novels, movies, edutainment TV programs (especially documentaries), scientific journalism and different multimedia platforms.

### **Popular science books**

Erickson (2005:147) defines this type of science communication as being made of texts written for the public and produced by scientists or writers with a solid background in this area.

The evolution of cultural consumerism in the last years encouraged the development of certain writings which are related to *pseudoscience* produced by authors without sufficient training, who create scientific subjects that are superficially and often wrongfully treated. They place the accent on exaggerations or they even exploit sensationalism.

The same Erickson (2005) considers that, depending on the purpose, popular science books either look to familiarize the general public with science or to “save” the uninformed public from the dangers of pseudoscience, quackery and false scientific analysis.

The purpose of these texts is to strengthen the dominant position that science holds as a form of knowledge in society. This helps people have a scientific vision on the world in order to be able to understand the rules that govern work, the natural laws and give them the possibility to rationally analyse problems. Science is represented as one unit which, even though it has multiple branches, appears as a whole. Behind this approach lays the ideology called *scientism* which suggests that the explanations of the world should rather be based on scientific principles, than on religion, superstitions and assumptions. According to Shermer (2002:25), scientism is “*a vision on the world that includes natural explanations of all phenomena, avoids supernatural or paranormal explanations and it is based on empiricism and rationality as two life philosophies adequate to the Scientific Era*”.

The public of the popular science books wants to, on the one hand, be informed but, on the other hand, also seeks entertainment and thus the texts in this category take diverse forms. Depending on the theme and style, popular science books can be divided in three categories (*apud* Mellor, 2003): *narrative* texts which make an account of an episode from the history of science or the life of a scientist; *expository* books that concentrate on presenting a certain discipline; *investigative* texts which are more journalistic-like and have specific or controversial topics.

A short historical overview on the evolution of scientific literature and, implicitly, of popular science books allows a better understanding of the phenomenon.

The popular science books did not appear simultaneously with the production of scientific books addressed to the educated audience. For example, the work of Isaac Newton, *Philosophiæ Naturalis Principia Mathematica (Principia)* which appeared in 1687 was practically inaccessible, not because it was written in Latin, but because it was ultra-specialized in mathematics. After Newton’s cult grew, in the next century, certain popular science texts appeared signed by other authors like Voltaire and Tom Telescope (the pseudonym of an author whose identity is not certain). The publication of Charles Darwin’s *The origin of the species* (1885) which was still accessible to the general educated public represented a turning point in science communication (Turney, 2008:7).

A major change took place as public literacy and the level of education grew after the Second World War. But the real explosion of popular science literature started in the 70s in the United States. Carl Sagan, astronomer, astrophysicist and cosmologist was one of the most famous scientists of the 20<sup>th</sup>

century. He wrote numerous articles, books [1] and TV scenarios [2] aimed to popularize science. Sagan proposed a vision of science as organized scepticism which attracted a lot of attention on the increasing detrimental influence of pseudo-science, New Age mysticism and lack of respect for true science.

### Popular science books in Romania

The dynamic of this type of literature had different trajectories in the Western States in comparison to communist Romania. Censorship carefully selected foreign titles that were translated and also the Romanian content. Still, one can see that before 1989, the popularization of science took place in a pragmatic way as there were specific editorial collections dedicated to this (e.g. *Știința pentru toți – Eng. Science for all*).

A series of names in the scientific domain also became known in the popular science books: microbiologist/virologist Nicolae Cajal [3], chemist Axente Sever Banciu [4], mathematician Solomon Marcus [5]. Encyclopaedic personalities with writing skills and scientists succeeded to provide a series of papers that promoted microbiology, chemistry and mathematics.

After 1989 the number of books aimed at popularizing science dramatically dropped due to the influence of many social, economic and sometimes even political factors. We can mention the impact of television and afterwards, of the Internet without ignoring economic aspects which directed the publishing houses' policies towards other types of texts. Often, editorial policies headed towards pseudo-science, proselytism and mysticism, discourses which replaced rational scientific explanations. Practically, we can talk about a *tabloidization* of the popular science books under the influence of the media.

An overview of this kind of literature after 2000 is symptomatic for the way in which the communication of science to the audience takes place in Romania. This research concentrates on the thematic distribution the popular science books printed by the best known Romanian publishing houses, which appeared between 2005 and 2012. A first observation emerged from making an inventory of the titles: quantitatively, this literature is weakly represented in relation to other editorial fields (fiction for adults and children, social sciences, personal development guidebooks, etc.). 84 titles that appeared in 13 publishing houses from Romania were identified. More than half of the studied sample (53%) appeared under *Humanitas* publishing house which has an entire collection dedicated to the area called *Science*. This collection proposes titles that focus on biology, cosmology, ecology, physics, history of science, mathematics and neurology. Without exception, the authors are all foreign. Amongst the best known

international popular science books authors translated in Romanian and promoted by *Humanitas*, we can mention: Stephen Hawking, Richard Feynman, George Gamow, Brian Greene and Simon Singh.

Out of these authors, we shall focus on the author who demonstrated his ability to make science understandable by the non-specialized public even with his first published book: *O scurtă istorie a timpului. De la Big bang la găurile negre* [6] (Eng. *A Brief History of Time. From Big Bang to Black Holes*) (1988), its indisputable success being demonstrated by sales of over 10 million copies in 40 languages. In the last years, *Humanitas* published more books by Hawking: *Universul într-o coajă de nucă* (Eng. *The Universe In A Nutshell*) (2011), *O mai scurtă istorie a timpului* (Eng. *A Briefer History of Time*) (2010), but also books that promoted science for children like the series *George și* (Eng. *George and...*): *George și cheia secretă a Universului* (Eng. *George's Secret Key To The Universe*) (2009) and *George în căutare de comori prin Cosmos* (Eng. *George's Cosmic Treasure Hunt*) (2010).

As a celebrity in the scientific communication area, the physicist was evangelizing the privileged status of science as a way of knowledge in society. The author rarely admitted that science cannot explain everything and systematically refused to answer any questions related to God, considering that science is the way through which those questions will be answered in the future.

An interesting editorial policy is reflected in the existence of the following collections: *Știință și religie* and *Știință, Spiritualitate, Societate* (Eng. *Science and religion* and *Science, Spirituality and Society*) proposed by *Curtea Veche* publishing house which selects the titles which support the opposite of Hawking's position: *O dezbateră Templeton. Oare din cauza științei a ajuns desuetă credința în Dumnezeu?* (Eng. *A Templeton Conversation Does science make belief in God obsolete?*) (2010); *Creație sau evoluție. Trebuie să alegem?* (Eng. *Creation or Evolution. Do we have to Choose?*) (2010); *Diversitatea experienței științifice - O viziune personală asupra căutării lui Dumnezeu* (Eng. *The Varieties of Scientific Experience: A Personal View of the Search for God*) (2009); *Limbajul lui Dumnezeu - Un om de știință aduce dovezi în sprijinul credinței* (Eng. *The Language of God: A Scientist Presents Evidence for Belief*) (2009).

The editorial policy that *Curtea Veche* follows can be easily noticed, just like it is easy to see Lifestyle's direction towards titles that have as extra-terrestrial civilizations, unknown flying objects (UFOs), unsolved mysteries or intelligence themes: *Știința și misterele OZN* (Eng. *Science and UFO mysteries*) (2011); *Amintiri despre viitor* (Eng. *Memories about the future*) (2011); *OZN, armata și serviciile secrete* (Eng. *Need to Know: UFOs, the Military and Intelligence*) (2011); *Conspirațiile NASA* (Eng. *NASA conspiracies*) (2012). In this case, the popularization of science goes from the serious zone towards a kind of pseudo-science that produces a speculative literature regarding tabloid themes from mass-media and, thus, is sold.

An overview on the areas covered by popular science books published in Romania during the last 8 years shows that physics and physical cosmology are the most popular ones (together they reach 29% of all titles analysed), alongside biology and ecology (together, 18%) and mathematics (12%). At the same time, science history is a very popular area (15%): Albert Einstein, *Teoria relativității pe înțelesul tuturor* (Eng. Theory of relativity for everybody), Humanitas, Bucharest, 2011; Albert Einstein, *Cum văd eu lumea* (Eng. How I see the world), Humanitas, Bucharest, 2010; Loup Verlet, *Cufărul lui Newton* (Fr. La malle de Newton), Nemira, Bucharest, 2007.

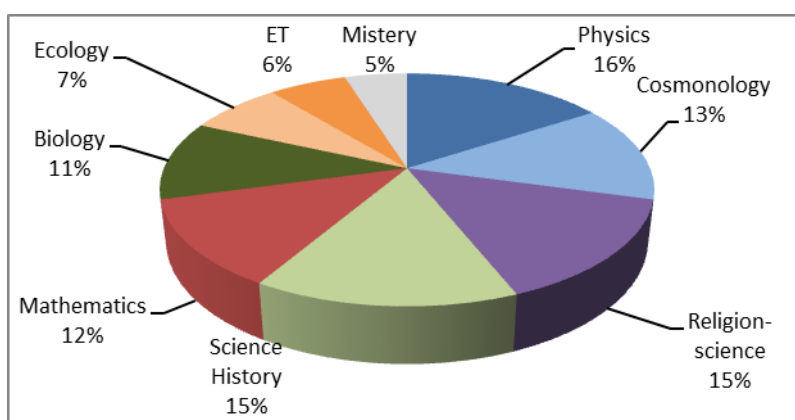


Fig 1- Thematic distribution of the popular science books in Romania

The books on ecological themes show the increasing concern regarding an impending ecological disaster as suggested by the following titles: Lawrence E. Joseph, *Apocalipsa 2012. Ce va fi după ?* (Eng. *Apocalypse 2012. What will there be after?*), Nemira, Bucharest, 2012; Lester Brown, *Cum să prevenim colapsul ecologic și economic* (Eng. *World on the Edge: How to Prevent Environmental and Economic Collapse*), Editura Tehnică, Bucharest, 2011; Hubert Reeves, *Pământul e bolnav*, (Fr. *Mal de terre*), Humanitas, Bucharest, 2005; Rebeca Olsen, *Ultimul avertisment* (Eng. *The Last Warning*), Trei, Bucharest, 2012; Paul Davies, *Ultimele trei minute* (Eng. *The Last Three Minutes*), Humanitas, Bucharest, 2009.

Popular science books are a way through which images and ideas about formal science reach the popular imaginary even though it is often a process that is used to consolidate frontiers between science and non-science. This is because the popular science discourse can serve as a consolidation of the idea that science is separate from and superior to other knowledge systems. Sometimes these texts are written by people who have been involved in formal science (Stephen

Hawking, Richard Dawkins, Richard Feynman, George Gamow, Brian Greene, Carl Sagan, Simon Singh and others) and sometimes by writers who have no research experience.

The fact that the public consumes popular science books suggests that there is a desire to be informed. At the same time, the public wants entertainment and science becomes just that under the form of *science fiction*. Thematically speaking, some of the textual or visual SF productions deal with science itself, but all of them describe social attitudes in relation to science, scientists or scientific institutions.

### Conclusions

The scientific culture is a multidimensional concept which includes not only the products of formal scientific communication (scientific articles and books) but also the forms of the popular science (books, feature films, press). It is extremely interesting to investigate the latter ones from a cultural perspective because they simultaneously show how the social representations of science are constructed, what their meanings are and how society relates to the scientific field. Present scientific themes (organisms genetically modified, nanotechnology and excessive computerization) are included in popular productions and they are reflected in the popular culture discourse. People live with science: it surrounds them, it invades their lives and alters their perspective on the world.

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### Abstract

Electrospinning can be a cost-effective, highly productive method, applicable for a wide range of polymers, by which fibers with high surface area to volume ratio can be obtained. When microparticles or nanoparticles are obtained on the collector instead of polymeric fibers, the process which is often called electrospaying. Chitosan is a polysaccharide copolymer usually obtained from crustacean shells by a chemical process involving deacetylation. Chitosan is used in fields as food, biomedicine, biotechnology, cosmetics. This paper deals with investigation of the morphology of the chitosan electrospayed on polyethylene substrates in order to obtain functionalized surface with antimicrobial properties. The chitosan used was medium molecular weight grade from Aldrich (viscosity 200000 cps). The electrospayed chitosan layer deposited on surface was analysed by Atomic Force Microscopy (AFM) and Attenuated Total Reflectance Fourier Transform Infrared spectroscopy (ATR-FTIR).

**Keywords:** *chitosan, electrospinning, electrospaying, fibers.*

# CHITOSAN ELECTROSPRAYED ONTO POLYETHYLENE FILMS

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Electrospinning is a process during which an electrostatically charged polymer jet flows due to electrostatic forces to a metallic collector (Figure 1). Usually randomly distributed polymeric fibers are obtained on the collector. The polymer jet flow is determined by the balance between the electrostatic forces acting on the charged polymer and the surface tension of the polymeric solution. Electrospinning can be a cost-effective, highly productive method, applicable for a wide range of polymers, by which fibers with high surface area to volume ratio can be obtained.

For low polymer concentrations, usually microparticles or nanoparticles can be obtained on the collector instead of polymeric fibers, process which is called electrospraying. The parameters controlling the morphology of the electrosprayed (fibers)/electrospound (particles) obtained on the collector plate are: polymer solution flow rate, distance between the needle tip and the collector plate, the voltage applied between the needle and the collector.

Chitosan is a polysaccharide copolymer containing  $\beta$ -(1,4)-linked D-glucosamine (deacetylated) and N-Acetyl-D-glucosamine (acetylated) randomly distributed along the macromolecular linear chain. It is usually obtained from crustacean shells by a chemical process involving deacetylation. The deacetylation consists in the removal of acetyl groups ( $\text{COCH}_3$ ) from the macromolecular chain of the chitin. After this process amino groups ( $-\text{NH}_2$ ) are obtained on the macromolecular chain of chitosan.

The chitosan properties depend highly on the degree of deacetylation because of the high reactivity of the amino groups. Chitosan is soluble in acidic solutions due to the free protonable amino groups present in the D-glucosamine units so there are important experimental variables that must be taken into account for the preparation of chitosan solutions among which are the degree of deacetylation, the molecular weight of the chitosan, the solution pH.

Due to its natural origin chitosan cannot be considered as a unique chemical structure but as a family of polymers with different chemical and physical properties

Chitosan is used in fields as food, biomedicine, biotechnology, cosmetics.

This paper deals with investigation of the morphology of the chitosan electrospayed on polyethylene substrates in order to obtain functionalized surface with antimicrobial properties. The chitosan solution contained 7 wt% Chitosan in a mixture of 70% Acid Acetic / 30 % Water. The chitosan used was medium molecular weight grade from Aldrich (viscosity 200000 cps). The electrospayed chitosan layer deposited on surface was analysed by Atomic Force Microscopy (AFM) and Attenuated Total Reflectance Fourier Transform Infrared spectroscopy (ATR-FTIR).

The ATR-FTIR spectra were recorded by means of a spectrometer Bruker VERTEX 70, in transmittance mode. Background and the sample spectra were obtained in the 600 to 4000  $\text{cm}^{-1}$  wave number range.

AFM investigation was done by means of a Solver-Pro-M type instrument under ambient conditions, using standard tips of  $\text{Si}_3\text{N}_4$  with small curvature radius of 10nm. The AFM images were obtained in the tapping (non-contact) mode which is nondestructive for surface and the biological layer is not damaged. Various ranges of the surface have been scanned. Images have been recorded on different zones in order to be representative for the total sample surface state.

A laboratory made device - Figure 1 - was used for the electrospinning/electrospraying treatment. It consists mainly of a high-voltage power supply (up to 30 kV), a metal collector, in this case a rotating flat disk, and a syringe perpendicularly positioned to the collector as many such devices reported in literature [1,2].

To study the morphology of the chitosan layer polyethylene surface under electric field, some parameters were varied with the aim to establish the optimal electrospinning/electrospraying conditions (distance between syringe needle tip and sample collector  $d$ , the voltage between needle and collector  $V$ , and deposition time  $t$  and optima conditions for uniform deposition were established.

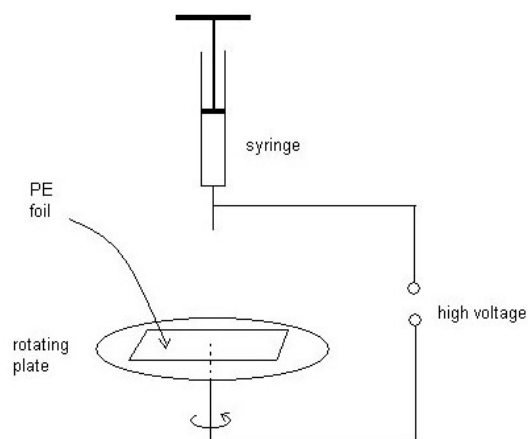


Figure 1: laboratory made electrospinning/electrospraying apparatus

The FTIR-ATR spectra –Figure 2 - confirm the chitosan deposition on the PE films. In the spectra we can find the absorption bands assigned to chitosan: 3000  $\text{cm}^{-1}$  to 3700  $\text{cm}^{-1}$  (OH group stretching vibration) corresponding to the stretching of OH groups (this band is broad because of the hydrogen bonds); 1000  $\text{cm}^{-1}$  to 1200 $\text{cm}^{-1}$  (1076  $\text{cm}^{-1}$  symmetric stretching of C-O-C , 1155  $\text{cm}^{-1}$  asymmetric stretching of C-O-C). From the FTIR spectra results, the best electrospinning/electrospraying conditions were established to be, in this case, deposition time higher than 10 min, optimal distance 8 cm and voltages higher than 25 kV.

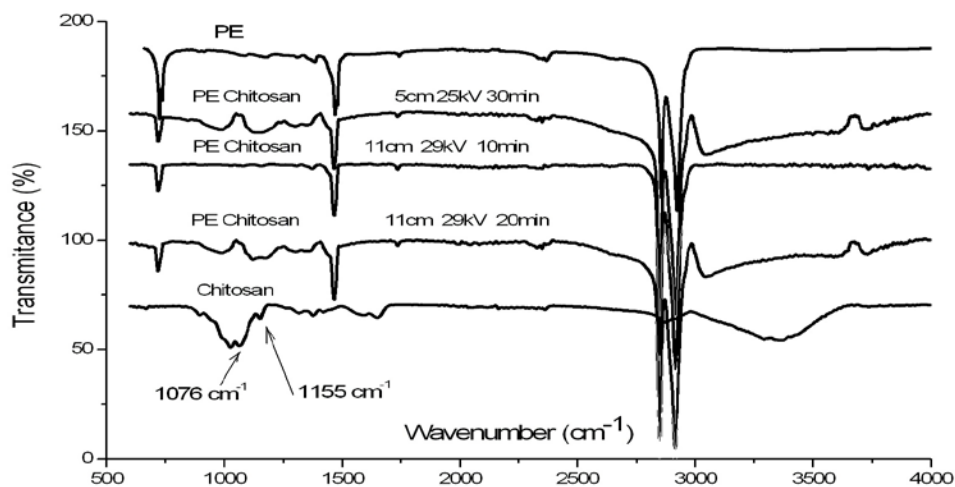


Figure 2: ATR-FTIR spectra of the polyethylene films covered with chitosan, for various electrospaying conditions

From both “height” and “phase” AFM images it can be concluded that the PE film is covered with chitosan (brighter colors in phase images). On the chitosan covered PE films AFM images show the presence of thin fibers of chitosan mixed with chitosan particles. During the electrospinning process a part of the chitosan fibers are fragmented in small microparticles. This effect can be attributed to the intermediate molecular weight of the chitosan used in these experiments.

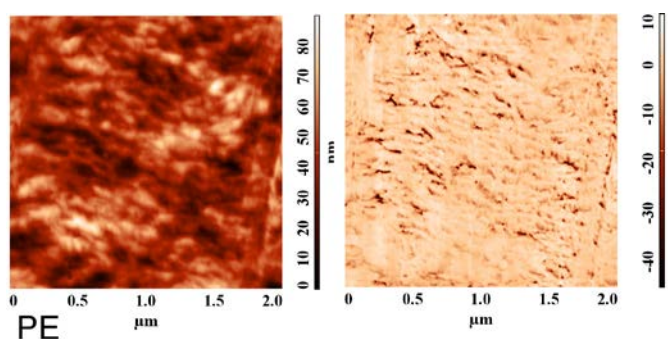


Figure 3: AFM height (left) and phase (right) images of the uncovered polyethylene film

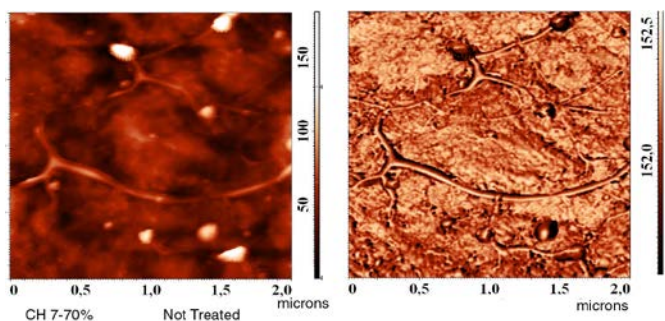


Figure 4: AFM height (left) and phase (right) images of the polyethylene film electrospayed with chitosan

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# Cu (II)-SELECTIVE SENSOR RESPONSE TO IONS DIFFUSION IN CROWDED MEDIA\*

## Abstract

This study proposes the analysis of Cu (II) ions diffusion in a crowded media using a potentiometric method. The experimental potentiometric measurements are acquired at speeds of micro-seconds constituting an advantage when compared against the accuracy of data sampling presented in other studies. The crowded sensor environment is mimicked using different concentrations of one type of Dextran. The results indicate that the sensor response is influenced by the crowder presence, as Cu (II) ions diffusion to the electrode membrane is impeded.

**Keywords:** *diffusion, crowded media, Dextran, Cu (II)-selective sensor, Virtual Instrumentation.*

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## Introduction

Many functions of living cells involve complex biochemical reactions of which rates must be as fast as possible to allow a wide range of processes to take place. Cellular media are not homogenous but highly compartmented being characterized by a high total macromolecular content known as macromolecular crowding [1-3]. This has a great influence on the kinetics and thermodynamics of possible reactions occurring in these systems [4-11]. It also affects molecular diffusion, reducing the diffusion coefficient when compared with aqueous solutions [12-20]. Subsequently, the rates of biochemical reactions are determined by the diffusive processes leading to the necessary encounter of the reactants. Therefore, the study of diffusion in crowded media presents a remarkable scientific importance contributing to discerning some biological mechanisms regarding the diffusion controlled processes. The present study proposes an analysis of Cu (II) ions diffusion process taking place in a crowded environment. A potentiometric experimental approach will be tested in order to determine the response characteristics of specific electrodes to the tested conditions.

## Materials and methods

All chemicals used in this study were of analytical reagent grade. The Cu (II) solutions were obtained by dissolving the adequate quantity of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , weighed by analytic balance with an accuracy of  $\pm 0.0001\text{mg}$  in deionized water, in a volumetric flask. Dextran (from *Leuconostoc mesenteroides*) of molecular weight 5kDa was purchased from Fluka (Buchs, Switzerland).

The operations were carried out at room temperature ( $25 \pm 1 \text{ }^\circ\text{C}$ ), without adjusting the pH of the working solutions (pH=5.1-5.2). The concentration of Cu (II) in the samples was potentiometrically determined using a copper-sensitive electrode ELIT 8227 – NICO 2000 and a double junction reference electrode ELIT 003N – NICO 2000. The measurement process was performed with the help of a customizable Virtual Instrumentation [22, 23]. The hardware component consisted of the NI USB 9215A data acquisition device, produced by National Instruments. This device is capable of performing ADC on 16 bits, it provides 4 analog input channels and accepts a maximum of  $\pm 10 \text{ Vpp}$  for the input signal. Signal conditioning was implemented using the MCP 601 Single Supply Amplifier. This was necessary since noise reduction/removal is an important issue in data acquisition.

## Results and discussion

Within this paper we have tried to identify if the sensor response is influenced by the composition of the media. In all studied cases the sampling frequency was 20 kHz with a sampling period of 50  $\mu$ s. First, we have obtained the sensor signal by immersing it in Cu (II) aqueous solutions of four different concentrations:  $10^{-3}$ ,  $10^{-4}$ ,  $10^{-5}$  and  $10^{-6}$  M. It can be seen in Figure 1 that sensor has a rapid kinetics of response due to a normal diffusion of Cu (II) ions at its surface. Also, it seems that after 100 voltage samples, so a time period of 5 ms from the immersion, the stabilization time is reached.

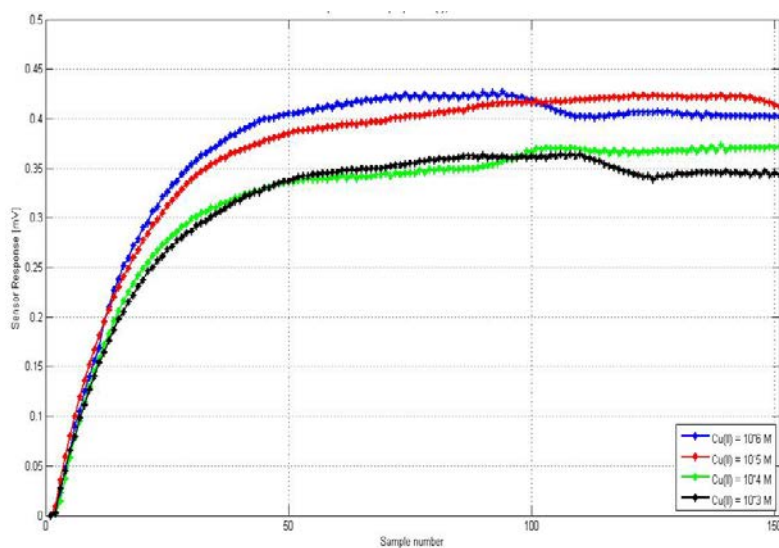


Fig.1 Sensor response for different Cu (II) concentrations without crowder

Regarding the crowding system chosen, we have investigated the effect brought by different concentrations of the crowding agent (Dextran) on the sensor signal. The Cu (II) size is very small compared to that of Dextran. As a result, the effect of macromolecular crowding on Cu (II) diffusion may be interpreted mainly in terms of the presence of crowding agents. In all studied cases, we observed that the sensor signal rises along with the increase of crowder concentration. An example of the obtained sensor response is shown in Figure 2.

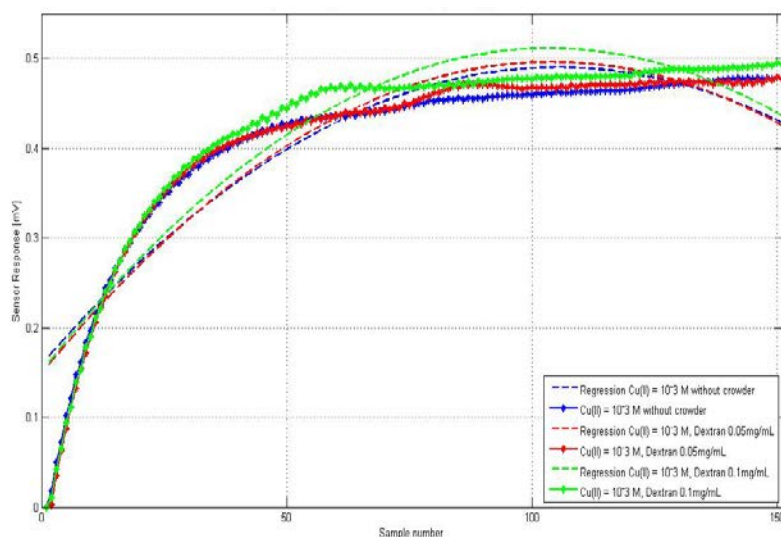


Fig.2 Sensor response and regression curves for Cu (II) solutions without and with crowder

The polynomial regression curves [24] were automatically calculated using MATLAB programming. One can use this type of representation in order to predict the evolution of the sensor response. In the present paper, the regression curves clearly display the differences in voltage levels for the chosen signal portion. A higher Dextran influence translates to higher voltage levels. In the absence of Dextran, one notices that the sensor provides lower voltages. This idea is consistent with the author's conclusions.

## Conclusion

In this work we have shown the possibilities of using a potentiometric method in the study of diffusion phenomena in molecular crowding situations. Preliminary experimental results indicate that the concentration of the crowder agent generates an impeded diffusion of the Cu (II) ions to the sensor surface. This condition is reflected in the different voltage levels recorded by the measurement system, given the same Cu (II) concentration.

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