Traditions of Science Mediatization in Russia in a Global Context

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Cambridge
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Publishing

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This book first published 2019

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN (10): 1-5275-3029-9
ISBN (13): 978-1-5275-3029-4

Dedicated to my parents, who celebrate their diamond anniversary together

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ACKNOWLEDGEMENTS

First of all, I deeply share the ideas of Russian philosophy regarding the openness and fullness of the Russian soul, its mission as the unifier of mankind.

I believe that I was lucky, because life forced me to go beyond the basic philological specialty. However, philology turned out to be an excellent basis for the transition to a broader interdisciplinary sphere. In this book, I try to combine social science and the humanities. As an internal environment that has shaped me, I must single out my native home, Saint Petersburg State University. At the same time, and this is really important, I happened to get a good international experience.

The author gratefully appreciates the support of the Russian Foundation for Basic Research (RFBR); project No.16-03-50128.

INTRODUCTION

At the present time, an interest in the scientific problem has increased in the Russian media. Scientific subjects are being actively developed in the printed press and electronic media, and new popular science journals have been created. For the first time in a long time, the media in Russia has taken an interest in scientific issues; but modern science is capable of successfully developing only in a global context. The globalization of scientific knowledge contributes to awareness not only of the common threats but also of the desire to bring science closer to the interests of society. But along with this global trend, "science with and for society," a persistent negative phenomenon, such as the rejection of science, or a resistance to science, has clearly manifested itself.

> Yet the science of our day is more powerful than ever before. Computers are good for criminals and hackers as well as scientists and students. Science and technology can be abused as easily as they can be used for our common good. We need good scientists, but we also need good citizens who will ensure that our science will make the world a better place for us all to live in (Bynum 2013, p. 256).

In the conditions of the traditional reduction of constructive social and political discourses in Russian society, modern Russia is gradually entering (as the "creative class" positions it) an "era of enlightenment" and "the time of art". Throughout the Russian cultural existence, the literary model of the world replaced the social, while today popular science has acquired the qualities of such a constituent element. However, it must be borne in mind that Russian history is cyclical, and the revival of foundational elements of national identity, to which science belongs in its social expression, inevitably revises time-tested models. In general, the idea of cyclic development is one of the most important for 20th century science; for example, the economic cycles of Nikolay Kondratiev (K-cycles), or the socio-cultural dynamics in the interpretation of Pitirim Sorokin.

For the first time in the post-Soviet period, the state government has started supporting and initiating projects related to science popularization. This is extremely important because, unlike in developed Western countries, traditionally in Russia the state, and those affiliated with state

institutions, play the primary role in scientific development. As a consequence, the media are beginning to pay more attention to scientific education.

Knowledge at all times is a value. The problem of science popularization exists as much as the problems of science itself. Historically, considerable experience of promoting science has been accumulated in Russia, a country with a rich history. Traditionally, science held a high position in Russian society and has been included in the public sphere. But, at the same time, it is important to take into account the differences between Russian and Western traditions and mindsets. The traditional forms of science mediatization include scientific societies, museums, libraries, educational films and lectures, the sphere of non-formal education, and general enlightenment. These communicative channels are extremely significant for the performance of science, especially if the agenda is the dissemination of knowledge about reality and the struggle against pseudoscience. Popular science magazines in Russia should, therefore, focus on the integration of science, and the synthesis of science and human knowledge. In order to master scientific knowledge, a mass audience requires a mediator. In the science communication process, the communicator is even more important than in politics, as politicians themselves must be able to act in the public sphere, including their contact with the press. In terms of communication theory, it is difficult to find any other field of public life where the communicant plays such a significant role. The reduction of communication with the public can have catastrophic implications for science itself as well as for society.

> Because government scientists essentially work for the American public, government communicators have an obligation to engage proactively with the media and encourage scientists to talk to reporters. Scientists are often thrust into the public spotlight unintentionally and may be unprepared and unsure of how to respond to media inquiries. It is our responsibility to help them learn how best to interact with reporters and tell their stories of discovery in plain language (Blum, Knudson and Henig 2006, p. 282).

To date, there is a clear global trend to distrust the traditional media. However, in Russia the bulk of the population still follow the custom of significant media consumption, something formed back in Soviet times. Accordingly, the new creative class that has appeared in Russia receives information mainly from the Internet. The new Russian system of science popularization is, thus, oriented towards this creative class. Moreover, Russian people traditionally have a huge latent interest in science, which is confirmed by Russian history. Therefore, traditional media such as socio-

political television and newspapers are also trying to pay more attention to popular science issues.

There is a general transition in populist science education to more fully understand and utilize new media, which often turn out to be the "forgotten old". This trans-media or combined media can be divided into two conditional groups: various network resources, where absolute natural science subjects dominate; and cultural/leisure institutions, where the voice of humanitarian enlightenment and the game element are acquired. The infrastructure of cultural and educational clusters, intellectual clubs, salons, and cafes is expanding. In the development of these forms, there is undoubtedly a connection, both with Western practice and the elitist "pan aestheticism" of Art Nouveau. At the same time, bypassing the middle of the 19th century—with the scientific societies, public lectures and readings, and flourishing scientific congresses—this practice refers to the initial stages of the formation of the European scientific enlightenment, marked by the dominance of oral and visual forms (scientific societies, public lectures, and museums). Popular science, located on the cultural and educational portals (such as the Russian *Arzamas*), in the format of intellectual battles (as popular worldwide *Science Slams*), or in various educational clusters (*Ohta Lab* in Saint Petersburg). In many ways, these projects continue the central idea, typical of the whole Russian science mediatization tradition, of a commonwealth of different sciences.

But we are not at all inclined to hide or conceal the problems. In fact, they are fully reflected in the discussions on popular science in the Russian public sphere. The public discussion of science in Russia did not go the way it went in the leading Anglo-Saxon countries. Therefore, in the case of this discussion's latest resumption, a kind of return to the starting point takes place. The crucial issue is the old Darwinism/creationism polemic, which acquires the meaning of opposing science and religion. Religion begins to be identified with pseudoscience, which avoids or rejects any discussion of this issue, at least in the Soviet era. In the modern West, beneath the ruling concepts of tolerance and multiculturalism, the science/religion dichotomy loses much of its force. For example, it is believed that religion does not contain anything that would deny scientific knowledge, and vice versa. At the same time, the famous science popularizer Richard Dawkins, instead of the "illusion of God", seems to be proposing something resembling a new cult of rational knowledge. This latter approach was adopted by a new generation of Russian scientific popularizers and provoked justified criticism. It should be also borne in mind that in Russia the aspiration of scientists to counter-pose science and religion is further conditioned by a protest against the growing

clericalization of all aspects of society. At once, we should not forget that throughout the Soviet era it was science that replaced Soviet atheists with a repressed religious consciousness. Even earlier, at the turn of the 19th and 20th centuries, the real flowering of popular science was directly caused by the positivist worldview crisis. In the designated sense, the opposition of science and religion is especially destructive. It is known that the Dalai Lama repeatedly spoke at the Congress of the Society of Neurophysiologists, and in every way tried to establish a connection with the world scientific community (which is not accepted by all scientists).

Media discussion about public science in modern Russia is not simply unfolding on the model of network communication, but in a meaningful way it forms a hermeneutic circle. Based on the well-known position that the level of science communication directly reflects the level of public sphere development, the low level of public discussion about popular science at the moment inevitably corresponds to the unsettled relationship between science and society in Russia today. Thus, the condemnation of humanistic knowledge, absolutely impossible in a normally functioning society, becomes a key feature of the Russian popular science field. Public reputation, as the only real principle of a modern scientist, giving, among other things, a basis for the monetization of scientific activity, ceases to be a socially significant phenomenon. The other side of this negative phenomenon is exaggerated adherence to scientific ethics. Something that helps to explain Grigory Perelman's (the famous Russian mathematician who proved The Poincare Conjecture) fight against the global scientific bureaucracy. The very personality of the scientific popularizer (communicator) is problematic. Since in Russia at present this area has received some money, various fake scientists and journalists, who just pretend to be scientific activists, have rushed in. Hence, a natural question arises that is relevant to the Russian scientific community: is it possible for non-experts or journalists to popularize science?[1] The answer to this question is well known: yes, of course, it is absolutely possible and even recommended. However, this self-evident response has to be, first of all, convincing to Russian science itself. The modern global media world is usually described in terms of "post-truth", which is fully applicable to the sphere of public science. However, the most important role of science popularization is precisely in overcoming scientific castes and sectarianism. Science itself is elitist and gravitates toward isolation and away from amateurs. But in this case, the rupture of the celestial scientists

[1] See Balashova, Yu.B. 2017. Debate about Scientific Popularization in Russian Public Sphere (Based on Grey Literature Material). In: *The Grey Journal: An International Journal on Grey Literature,* vol. 18, n. 1, pp. 179–181.

and the ordinary people is only intensifying, and mankind is at risk of being left in a stone jungle. This situation is often presented in Sci-Fi movies, which gives a futurological forecast of the final degradation of most of the world's population.

If John Horgan's views on the "end of science" (Horgan 1996) sometimes menacingly resemble reality, then the enlightenment, the cultural break, begins to experience its revival as a specifically Russian project of salvation. In such a syncretistic country as Russia, science popularization invariably turns out to be a kind of broad enlightenment within the conditions of a non-modernized society. At the same time, science and science communication clearly demonstrate how global the world is.

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PART I

THE MEDIATIZATION OF SCIENCE: HISTORICAL PHENOMENON AND SOCIAL PRACTICE

CHAPTER ONE

HISTORICAL AND THEORETICAL APPROACHES TO SCIENCE MEDIATIZATION INTERPRETATION (METHODOLOGY, CHRONOLOGY, FORMS OF SCIENCE MEDIATIZATION)

One of the greatest scientists and science popularizers in the contemporary world, Stephen Hawking (who passed recently and was buried in Westminster Abbey near the graves of Newton and Darwin) repeatedly said that in the modern world there was no single theory explaining everything. As is known, science originated in the philosophy of nature and its viewpoint. Throughout Antiquity and the Middle Ages, scientific knowledge existed as a complex, connecting the physical and anthropological aspects of the world. The craft of a scientist was conceived as universal, and this type of scientist was exemplified in encyclopedic figures, from Aristotle and Leonardo da Vinci to Lomonosov. Philosophical rationalism proposed strict logical boundaries between objects and phenomena; and later, within the conditions of the development of industrial society, the task was to create a comprehensive positivist system of sciences. Quite recently, in the second half of the 20th century, the universal scientific methodology of semiotics was developed and successfully applied, within the framework of which it was possible to consider different systems (social, humanitarian, and technical) from the unified position of a doctrine of signs. In 1980, the famous futurist Alvin Toffler in his "classic study of tomorrow" predicted:

> Today I believe we stand on the edge of a new age of synthesis. In all intellectual fields, from the hard sciences to sociology, psychology, and economics—especially economics—we are likely to see a return to large-scale thinking, to general theory, to the putting of the pieces back together again. For it is beginning to dawn on us that our obsessive emphasis on quantified detail without context, on progressively finer and finer measurement of smaller and smaller problems, leaves us knowing more and more about less and less. Our approach in what follows, therefore, will

> be to look for those streams of change that are shaking our lives, to reveal the underground connection among them <…> Our job here will be to think like generalists, not specialists (Toffler 1990, p. 130).

In the modern scientific environment, a constant talk about "new evolutionary synthesis" takes place:

> Many believe that the development of biology is constrained by the lack of an adequate theoretical basis, a comprehensive new theory that could make the search for new knowledge more meaningful and constructive (Markov 2015, pp. 18–19).

Richard Dawkins extrapolates biological processes to the dissemination of cultural information (dichotomy: "gene/meme"), and has defined science as the "magic of reality" (Dawkins 2011). These noted positions, based on the idea of knowledge convergence, are conceptually fundamental to the present study. The model of knowledge in the West is based on the separation of science/art. The ideologue of capitalist society, sociologist Max Weber, made a distinction between universal and narrowly specialized knowledge in the definitions: "science as a vocation and profession" (Weber 1946). In a logocentric and metaphysical country such as Russia, these dichotomies are not entirely justified. Science communication existed in Russia at the beginning of the 18th century (all European processes took place in Russia with a certain delay; a similar lag in general was overcome by the beginning of the 19th century) basically as popular science communication. Typically, the Russian national consciousness tends toward traditionalism and syncretism. In addition, Russia has not had the historical preconditions for the formation of narrow specialization. One of the most significant cultural reasons for this, as compared with Western Europe, is the less consistent development of a classic Russian hierarchy (Kondakov, Sokolov, and Hrenov 2011). However, at the same time, the fundamental scientific works of Western scholars in the humanities (such as Marshall McLuhan, Alvin Toffler, Francis Fukuyama, and others) are not recognized in Russia as actual scientific discourse, but, rather, as a form of essayistic scientific journalism.

In the West, Russia is considered to be a country with an archaic socio-political system, while at the same time having an avant-garde: advanced science and progressive art. In a country gravitating toward syncretism, such as Russia, science and art are closely connected. Science popularization in Russia has consistently turned out to be a form of general enlightenment, a cultural activity. This is the most fundamental difference from those countries that lead the way in science popularization in Anglo-Saxon countries. Thus, the definition of "science communication" in

Russia is wider than in the West, organically including a humanities component (while the definition itself around the globe is only applicable to different branches of science).[2] This is why in Russia such cultural forms as travel or adventure literature enter the semantic field of the SciCom concept. In 19th century Russia, popular science works were published on a regular basis first in encyclopedias and then in classic large-volume magazines. The idea of the commonwealth of sciences was central to the whole tradition of popular national science journalism. In the classic Russian 19th century "thick", encyclopedic magazines: *Sovremennik (Contemporary)*, and *Otechestvennyie zapiski (Fatherland Papers)*, the departments of politics, science and literature were mixed. The first issue of the most famous Russian popular science magazine was published in 1890. We refer to *Nauka i zhizn' (Science and Life)*, which positioned itself as a "literary, artistic, social and popular science magazine". All subject areas were represented as forms of knowledge and cognition. The subsequent rise of the magazine's popularity during the Soviet era was determined by the fact that its audience was formed from the Soviet intelligentsia, who wanted to learn how things were developing in other areas of knowledge. In this popular science magazine, science was presented as knowledge of the whole world. The approach to the understanding of scientific knowledge as universal knowledge was typical of classical Russian popular science magazines and the entire tradition of science mediatization.

So, the first methodological criterion of this study is the syncretism of Russian popular science. This thesis is an original projection of Karl Jaspers's ideas in *The Origin and Goal of History* (Jaspers 2010) on modern scientific universalism.

Another important thesis: Russian science has never been separated from public life. The Russian system of secondary and higher education was based on the German model of education, named the "Humboldt model".[3] However, unlike their Western European counterparts, Russian universities were never "states within states"; in other words, they were never separated from the public.

In respect of the interaction: science vs. society, the biography of Dmitry Mendeleev is representative. A recognized scientist, influencing

[2] A broad cultural approach to science communication is presented in the book: *Communicating Science: Professional, Popular, Literary* by Nicholas Russell.

[3] The German system was also made into the basis of the university scientific staff training in the United States. The transition to the independent system took place in the 1900–1930s. See *Nauka po-amerikanski: Ocherki istorii* [Science in America: Essays on History]. 2014. Moscow: NLO.

the minds of young people studying in the 1880s, Mendeleev also acted as a public person. He was the author of the scientific and journalistic book "To the Knowledge of Russia: Treasured Thoughts"; he was also an active member of various societies. In 1890, he retired from St. Petersburg Imperial University after trying to defend students' rights. The story was that Mendeleev agreed to transfer to the Minister of Education the students petition demanding university autonomy (which once again was canceled). The Minister refused to accept the petition, and in response, Mendeleev did not consider it possible to continue serving in the Ministry of Education. He left the university, despite the fact that the Council of the university turned to him with a request not to leave.

We could give another example. In Russia, even methodological schools maintained themselves through the use of journalistic discourses. The Russian formalist school laid the foundation of valid literary criticism in the 1920s, yet also tended toward various forms of publicity. It is also significant that in Russia a unique socio-cultural type, such as the "intelligentsia" was formed. The basic quality of the Russian "intelligentsia" is the realization of a moral obligation to society. The implementation of this moral debt resulted in widespread enlightenment (the organization of schools, educational societies, and so on). At the turn of the 19th—20th centuries, enlightenment initiatives targeted at various social strata became common. At that time, the main organizers of cultural and enlightenment activities were patrons who, having a different social status, established worker's enlightenment societies, people's universities, and people's houses. Many Russian intellectuals (professors, pedagogues, lawyers, doctors, etc.) took an active part in the different enlightenment activities, thus realizing the moral and ethical concept of "the 'intelligentsia's' duty to the people". A somewhat different approach to enlightenment and the popularization of science was established in the Soviet era (more precisely, in the second half of the 20th century), when outstanding Soviet scientists (not just enlighteners or the "intelligentsia") participated in the work of an extensive network of various scientific societies and associations.

Traditionally, Russian science was public and society-oriented; and such a special role still belongs to popular science journalism.

At the same time, it is necessary to take into account that traditionally in Russia the state has played and continues to play a huge role in the various spheres of social life. This is a fundamental fact that distinguishes the Russian system from the Anglo-Saxon model (where private initiative and business are prioritized). In Russia, without any support from the state, no major technological project could take place (such as *Skolkovo*). This is also true in the popular science sphere. So, the famous Russian travel

magazine, *Vokrug Sveta* (*Around the World*), which has been published since 1861, is disseminated today by means of a mandatory subscription arranged with Russian schools. This decision was directly taken by President Vladimir Putin as an honorary trustee of the *Russian Geographical Society* which publishes the magazine. In this context, the fate of non-state projects is very problematic (such as, for example, Dmitry Zimin's *Dynasty Foundation* with a wide range of educational initiatives).

In terms of the development of civil society, science coverage represented an ideological niche. In certain epochs, it was precisely in popular science journalism that political polemics were concentrated (under the typical Russian conditions of the prevalent reduction of political discourse); in others (as in Soviet times), this sphere was less loaded with the inevitable propaganda. Traditionally, the scientific and popular science media were censored much more mildly than socio-political ones. During the Soviet era, the presenter of the famous television program *Ochevidnoe—Neveroyatnoe* (*The Obvious—The Unbelievable*) often allowed a polemical style of discussion. This was not typical of the dogmatic Soviet press as a whole. The Soviet press paid much attention to scientific life, but during the periods of liberalization (Khrushchev's "thaw", Gorbachev's "perestroika" (reconstruction)) the problems and shortcomings of scientific life were also discussed. Even in Soviet times, the Academy of Sciences often independently made decisions that contradicted Communist party directives.

The question of periodization also has a clearly expressed methodological nature. In this regard, in Soviet times, an ideological manuscript by Eleonora Lazarevich, *Populyarizatsiya nauki v Rossii* (*Science popularization in Russia*, 1981) was typical, while more recently, a journalistic book by science journalist Andrey Vaganov, *Spiral' zhanra: Ot "narodnoj nauk"' do razvlekatel'nogo biznesa: Istoriya i perspektivy populyarizacii nauki v Rossii* (*Spiral of the genre: From "folk science" to the entertainment business: History and prospects of the popularization of science in Russia*, 2014) demonstrates the changing trend. Andrey Vaganov's popular book is the first holistic attempt at a popular scientific historical construction undertaken in the post-Soviet period. The central idea of Vaganov's book is that "public interest in science depends little on the circulation of popular science literature. It is precisely industrial development that leads to the development of popular science periodicals and a literary system. Not vice versa" (Vaganov 2014, p. 151). In other words, science popularization is a direct consequence of the industrial development of society. In accordance with the stated proposition, the author builds a certain genre evolution and typology of the popular science genre "... as a

concrete historical phenomenon. It passed several stages in its development and continues to change" (Vaganov 2014, p. 23). Vaganov suggests the following scheme of genre development, highlighting four main stages. The first stage is connected with the scientific revolution in Europe and covers the 17th—early 18th centuries. Vaganov calls this period: "Popular Science, but ... without the popularization of science proper" (Vaganov 2014, p. 23). The problem is that the given examples do not fully support the thesis put forth by the author. Thus, emblematic for the epoch, *Mesyachnyie istoricheskie, genealogicheskie i geograficheskie primechaniya v vedomostyah (Monthly historical, genealogical and geographical notes in the Gazette*) (1728—1742), published by the Academy of Sciences and Arts in St. Petersburg, is correctly characterized by the author as "... designed for a narrow circle of readers, first of all—for the academicians themselves, and not intended for the general public" (Vaganov 2014, p. 28). One gets the impression that if we use the conventional concept of "folk science" then it would be better to characterize various late Medieval texts, and those transitioning to the New Time period miscellanies, as "herbalists" or medical books. In the second period of the popular science genre development proposed by Vaganov, he devotes his attention to very specific time limits: 1750—1850. And as regards his basic definition of this period as "industrial enlightenment", caused by the industrial revolution in Europe, it is probably worth agreeing. But it's difficult to agree with the dominant "historical form of the popular science genre"—"booklets on technical amateurs support" (Vaganov 2014, p. 24). Although by no means a genre, the main type of publication at that time was the encyclopedic journal if we are to understand the textual channel for the dissemination of information within the category of science popularization. And here one more question arises: what are we talking about: a genre or a super-genre? Apparently, at first, historical types of science popularization (collections magazines, almanacs) were developed, and then (rather later, at the turn of the 19th—20th centuries) —a popular science genre as such. The third period of the proposed genre evolution is determined by Vaganov in a temporary relationship, from the mid-19th to the mid-20th centuries, and fits into the "entertaining science" formula. Such a description does indeed seem justified, as it was formed by positivistic ideas regarding the value of knowledge, this period—at least in Soviet Russia—lasted until the end of World War II, due to the powerful influence (personal, paradigmatic, and institutional) of pre-revolutionary science. Finally, the fourth period, according to Vaganov's classification, covers the middle of the 20th—beginning of the 21st centuries and is defined as "Popular Science 0.2", as part of the entertainment business.

Andrey Vaganov insists on "the bad genre genetics in Russia" (Vaganov 2014, p. 38). If we approach this genre interpretation from a technical point of view, then the Russian tradition really does not compare with German history, as proposed in the book. If, on the other hand, we include the very typical Russian humanistic component in our genre interpretation, then the picture turns out to be quite different. Thus, we need to link the history of science mediatization in Russia with the socio-cultural tradition and the phenomenon of "folk science". A truly mass audience, ready for scientific knowledge, appeared in Russia only in the 1930s. In the late 1930s, physics Nobel laureate Pyotr (Peter) Kapitsa wrote a letter to the "folk leader" Stalin. The genre of "writing to the tsar" is very characteristic of the Russian tradition, indicating the limited channels of communication with the authorities. From 1921 to 1934, Peter Kapitsa worked in Cambridge under the leadership of Ernest Rutherford. He was a full member of *The Royal Society of London for the Improvement of Natural Knowledge.* Kapitsa considered the system of science organization in England to be exemplary. So, in his letter to Stalin, Kapitsa directly related the level of scientific development to scientific propaganda, emphasizing that "the masses have a great natural interest" in science:

> Comrade Stalin,
> Our situation with science is adverse. All the usual public statements that claim that the Soviet Union offers the best conditions for science are untrue. These statements are not only bad because they are lies, but they are even worse because they do not allow us to get the scientific life in the country up and running <…> In my opinion, the goal is straightforward: we need to foster mass interest in science and show its significance for progress. I do not think this is too difficult since the masses have great natural interest <…> Capitalist countries pay much attention to scientific propaganda. Such work is especially widespread in England, which, in my opinion, largely explains <…> its exceptionally high level of science. England established special societies to popularize science—the Royal Institution and the British Science Association—one hundred years ago. Its museums—the British Museum and the Kensington Museum—are the biggest in the world; its press pays more attention to science and scientific life than any other country does… In the Soviet Union, the popularization of science is botched. England's example is quite illuminating <…> I am certain that if we manage to interest the masses in science, then the scientific workers will become enthusiastic. They will become the pride of the country, they will be proud of Soviet science, they will organize it themselves <…> (quote: Akopov, 2012, pp. 116–117).

In this letter, Peter Kapitsa also identified five main directions of scientific propaganda: scientific museums, movies, popular literature and lectures on scientific subjects, scientific journalism, and the propagation of science in schools. Conservatism, which is typical of a system for disseminating scientific knowledge that is intent on protecting the elitist essence of science, made it so that the main means of popularizing science had remained virtually unchanged since the beginning of the modern era. These include 1) the press; 2) scientific debates; demonstrations, public lectures, defenses of theses; 3) scientific societies (the least accessible form); 4) museums; 5) the educational system.

In Russia, as we have noted, the printed channel for the spread of scientific knowledge was very important. However, in a global context the oral tradition of knowledge dissemination, which is extremely relevant today, remained primary right up until the end of the 19th century. The most closed elite form is indeed the scientific community. The development of science communication is, however, closely connected with the growth and complexity of the public sphere. However, in Russia, due to the significant role of the state, we see a model of cooperation between civil society and the authorities. The American historian Joseph Bradley has written one of the most comprehensive books, one that also discusses the scientific societies in Tsarist Russia. In the editorial introduction to the book's translation into Russian, the following thesis is proposed:

> Considering the vital activity of societies in the sphere of science and education, Bradley calls for the consideration of them as a model of self-organization, within the framework of which a public sphere of civil society was formed and an appropriate political and legal culture, civil consent was attainable. <...> Joe Bradley considers the basis of civil society voluntary associations, sharing the opinion of the leading theoretician of the public sphere, J. Habermas. <...> Meanwhile, Bradley refutes the widespread view of the political culture of the Russian Empire as completely confrontational, based on the confrontation between a strong state and its weak and politically immature subjects <...> (Bradley 2012, pp. 6,7).

The golden age of museums was the 19th century when most of Britain's great museums were founded; e.g., "… museums <…> private and public <…> built for entertainment, for education, and for research.<…> amorphousness of the now-familiar categories in the 19th century and <…> the then-undetermined meaning of 'museum' <…> sites of miscellaneity" (Science Museums 2017, p. 10). The leadership in the creation of science museums really belongs to England, with the first

science museum originating in Oxford in the late 17th century—*Museum of the History of Science*. In 1714, in St. Petersburg—the newly emerged capital of the Russian Empire, *Kunstkamera* was opened, a museum of rarities (now anthropology and ethnography). It was also the first public state museum in Russia. All developed countries in the contemporary world have scientific museums (London, Amsterdam, Chicago, etc.), and, one thing that defines them all: they must be interactive. For instance, the *Franklin Institute* in the US was founded in 1824 "for the promotion of the Mechanic Arts". On this base, known today to the whole globe, the Franklin Institute Museum opened during the Depression in 1934, and was called the "Wonderland of Science". A hands-on approach to science learning was established at that time. Today, at the Franklin Institute Museum in Philadelphia are presented "live-learning" programs and a large gallery for traveling exhibitions. Science museums are now expected to form a creative urban environment.

Traditionally, the main channel of science popularization (a position it still retains) was considered to be certain segments of the press, such as, for example, popular science magazines. Special editions of Journals also appeared in a scientific format. In 1665, in Europe, the first two journals were published within a few weeks of each other: first in Paris, the *Journal des Scavans* was printed; and then in London, *Philosophical Transactions: Giving Some Accompt of the Present Undertaking, Studies, and Labours of the Ingenious in Many Considerable Parts of the World* (Vol. I. For Anno 1665, and 1666), initiated by the *Royal Society of London for Improving Natural Knowledge*. The Royal Society of London is one of the world's oldest scientific organizations. Members reported their results in lectures and publications, establishing conventions that are still followed today in the communication of scientific knowledge. Specialist journals appeared in succession: from the ten publications that comprised the first issue of the London Journal, three were reprinted from the French *Journal of Scientists*. One popular format of knowledge exchange had been provided by the genre of letters, as well as polemics, and literary and critical writings. In 1668, the first Italian journal appeared in Rome and was conceived by its editor on the model of the French, and later served itself as a model for Italian literary magazines. *Il Giornale de'Letterati (Literary Magazine),* which housed works of a literary, linguistic, and philosophical nature, existed until 1679; whereas the French *Journal of Scientists* lasted until 1828, and the history of *Phil. Trans.* continues to this day. Pitirim Sorokin's student and a follower of Max Weber, the famous American sociologist Robert K. Merton, established the origin of modern science in

England by rooting it in the dominance of the Protestant work ethic (Merton 1973).

The appearance of three important European magazines at the same time is due to a change in forms of social life and the nature of the philosophy of science in modern history. A leading position in the process of knowledge production began to be assigned to the scientific environment, in contrast to an orientation toward the sacred personality of the Teacher and timeless knowledge in the Medieval period. Nevertheless, it was medieval proto-science that became the foundation of modern science; and it is well known that the search for "the philosopher's stone" contributed to the development of chemistry. In this study, we are not interested in the history of science as such, but in the mechanisms of its interaction with society. In addition to the main oral channels of "popular science" spread during the middle ages, there were also handwritten analogs. Indeed, the most common channel for the spread of popular science over the centuries has been certain types of miscellany, such as, for instance, the almanac.

The transitional form of the almanac (located on the boundary between periodical and non-periodical publications) operates in different ways in different national traditions. However, regardless of the type of culture and civilization, the almanacs, due to cultural marginality, clearly preserved the closest correlation with their historical ancestor: almanacs originated in the Middle Ages in the East.

> Almanacs are one of the most ancient surviving forms of literature in the Western world. One of the earliest surviving copies dates from the period of Ramses II (1304—1168 B.C.E.) on papyrus held at the British Library. The origin of the word itself appears to be much later, possibly linked to the Arabic word for calendar <…> (Curth 2005, p. 258).

Almanacs appeared in Western Europe as a result of the Crusades. The very Arabic word *al-mana* means "time", "measure", and "calendar". The calendar, as the oldest instrument for physical time measuring, is the core of any cultural tradition (along with language, customs, and rituals). The inviolability of chronology is designed to ensure the stability of the world order: the ancient Egyptian pharaohs, when entering the throne, promised that nothing would change in the calendar. An almanac-calendar of the 14th—15th centuries was an astronomical ephemeris or a calendar table. It contained not only a list of days of the year, including holidays and weekdays, individual components of The Priests but also information about astronomical phenomena: the rising and setting of the moon and the sun, solar eclipses, the time of warm and cold weather, etc. To such

forms of information, which were mostly household and agricultural recommendations, favorable days, and also astrological predictions were usually added.[4]

The medieval craving for astrology is due to the attitude to eschatology in the Middle Ages because calendars helped to orient the people regarding prophecies concerning the end of the world. The first printed almanac was compiled by the Austrian astronomer and mathematician *Georg von Peuerbach*, and was called *Pro annis pluribus (For Many Years)*.[5] For a long time almanacs developed into a platform for the convergence of folk science, mythological views, and church dogmas (see, for example, the famous astrologer William Lilly's[6] almanac of 1647, named *Christian Astrology*). However, the special popularity of the astrological predictions contained within such almanacs eventually provoked defensive actions on the part of the state and the church in both Western Europe and Russia, which contributed to their gradual (from the second half of the 16th century) repression. Thus, in France in the 1560s, the government issued a series of prohibitive decrees on almanac-calendars. However, the sacramental almanacs continued to enjoy influence even during the transition to modern times.

From the standpoint of modern concepts, the designated content of almanacs refers to pseudoscience, but here there were the roots of general scientific (astronomical, medical, historical, and philological) views. In a universal, encyclopedic type of proto-publishing—the almanac-calendar—a kind of universal proto-science was presented. "The almanac-makers of early modern England boldly took as there subject the whole of Creation", with this phrase the fundamental book on English almanacs by Bernard Capp begins (Capp 1979, p. 13). This book includes special sections, devoted to the almanacs' "Astrology, Science and Medicine", "History and Literature":

> Almanacs were cheap, popular annuals, and so by their very nature unsuited for an extended investigation of scientific problems. They contained, however, far more than the mere repetition of traditional ideas which might be expected. Many compilations showed a marked awareness

[4] About almanacs' general history see Almanac. In: *Encyclopædia Britannica*: in 24 vols. 1964. Chicago: Encyclopædia Britannica, Inc. Vol. 1, pp. 655–656; Almanac. In: *The Encyclopedia Americana*: in 36 vols. 1946. New York; Chicago: Americana Corp. Vol. 1, pp. 430–431.

[5] Magic symbolism is strong in modern almanacs as well. See *The Witches' Almanac.* 1974—1978. New York: Publishers Grosset & Dunlap.

[6] William Lilly lived in 17th century England and published annual almanacs with predictions.

> of scientific advances and were active in reporting them. The almanacs had an important role, especially in the seventeenth century, in the popularization of the new science. <…> They could play a valuable role, as in astronomy, in publicizing innovations. <…> one of the most common features of the Stuart almanac was the 'chronology' or the brief history of the world. <…> much of the humor was, in fact, less than savory in character and was based on racial, religious and sexual prejudices. <…> the astrologers' limited interested in literature and the other arts reflects partly the fact that the majority were self-taught men. <…> mediaeval astrology developed with little regard to national boundaries, and the history of almanacs too has international ramifications (Capp 1979, pp. 180, 200, 215, 234, 235, 270).

The traditional almanac's medical content was analyzed by Louise Hill Curth—

> …"the golden age" of English almanacs was between 1640 and 1700, because of their involvement with "political, social and religious controversies". These parameters also work well for the study of medical history, because this period begins with a burgeoning of medical and astrological books, made possible by the abolition of government censorship in a country moving ever closer to civil war. <…> This article is based on 1,673 almanacs that are known to have survived between 1640 and 1700, of which 1,392 (83.2 percent), have been examined. Almost three-quarters of these almanacs contain either preventive or remedial medical advice and/or advertisements for medical products or services. In general, this material focused on "popular" medicine, or traditional Galenic principles and practices, with barely a nod to the great scientific discoveries of the seventeenth century, such as circulation of blood within the body (Curth 2005, pp. 257, 258).

At the beginning of the 19th century, following France and Germany, a literary variety of almanacs was established in Russia as the dominant form (accordingly—*Almanach des Muses, Musen-Almanach, The Calendar of Muses*). In a number of European countries and also in Russia (which culturally, of course, was a part of European civilization), almanacs had become a communication channel for the promotion of national literature. In England, the historical development of almanacs was associated with their specialization (for instance, almanacs of the various societies, including scientific, etc.).

Let us give an example of the typical English almanac of the mid-19th century, which does not refer to a specialized, but a general type. In the preface it was stated: