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KNOWLEDGE ON THE MARKET: THE DILEMMA OF SCIENCE POPULARIZATION

Modern science is complicated and redundant for ordinary people. In the rapidly evolving landscape of modern science, the intricacies of research and discovery often find themselves distilled into digestible forms for the general public. This simplification, however, may not be sufficient in a world where science competes for attention in a marketplace flooded with information. The article delves into the shifting dynamics of science popularization, transcending traditional educational roles and venturing into the realm of marketing. In this era, science is not merely a body of knowledge; it is a brand, and its promotion necessitates a blend of credibility and emotional appeal.

The narrative explores how the popularization of science is undergoing a transformative shift, moving beyond the educational sphere and embracing marketing strategies. The article contends that, in order to gain public trust, science is increasingly presented as a marketable "product" with the tagline "Confirmed by science". This phenomenon reflects a departure from conventional educational approaches, as science seeks to inspire confidence in consumers akin to commercial products.

Moreover, the article examines the role of pop culture in reinforcing trust in rational knowledge through emotional connections. It explores how honorable names, ethical considerations, and the self-evident nature of scientific findings contribute to the creation of a new mythology around science. In this context, science becomes more than a set of facts; it transforms into a narrative that resonates with individuals on a deeper, emotional level.

The discussion within the article is framed around the ambivalence inherent in these modern methods of science popularization. While the blending of science and marketing may enhance accessibility and engagement, it also raises questions about the potential distortion of scientific information and the ethical implications of turning knowledge into a marketable commodity. The article aims to stimulate reflection on the evolving relationship between science, marketing, and popular culture in shaping public perceptions of scientific endeavors. It turns scientific knowledge into new mythology. This article is devoted to ambivalent modern methods of science popularizing.

Keywords: **science, myth, popularization of science, popculture,.**

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The problem statement. Social relations are increasingly showing a market nature while moving to the so-called "market field". Science did not escape this fate either, i.e. the scientific community gradually shifted from the idea of education to the idea of being in demand by the market. The change in understanding the results of science is related to this matter.

Francis Bacon once singled out two types of experiments. The former are fruitful, which are practical (technology), and the latter can spark a light in nature that actually provide scientific knowledge which helps to discover new and make knowledge “grow”. Scientific knowledge is verifiable, systematic but it is not at all in demand in a market context. The market is not interested in scientific knowledge, but in its specific use. That is why the concept of “scientific progress”, which is focused on the intensity and speed of science development, is actively used. Although if we pay attention to the terms, we will find out that there are no such concepts as “religious progress” or “mythological progress”.

Analysis of publications, novelty, and relevance of the topic. One of the foundational works in this field is “Learning science in informal environments: people, places, and pursuits” by Bell, Phillip et al. [Bell et al, 2009]. This study explores the dynamics of informal science learning, shedding light on how individuals engage with scientific concepts outside the traditional confines of formal education. It emphasizes the significance of recognizing diverse settings as potential arenas for science understanding.

Shifting our focus to institutional efforts, “An analysis of actions taken by Fundacao Oswaldo Cruz for the communication and popularization of science” [Bevilaqua DV et al., 2021] offers a critical examination of the strategies employed by Fundacao Oswaldo Cruz in communicating scientific knowledge to the public. This research provides insights into the practical implementation of science popularization initiatives within a scientific institution. In the context of contemporary challenges, “Innovative and Exploration of Science and Education Activities in Science Popularization Venues under the Background of “Double Reduction” [Dayu, C. H. E. N., 2023] explores innovative approaches to science education activities. The study addresses the current educational landscape and proposes novel methods for engaging the public in science-related activities. A significant question arises in “Higher education and science popularization: Can they achieve coordinated growth?” [Geng, Y., & Yan, Y., 2021], which investigates the potential synergy between higher education and science popularization. The research contemplates the coordinated growth of these two entities, exploring avenues for mutual benefit and collaboration. “Popularizing science—Analyzing the presenter's multimodal orchestration in a TED Talk” Jiang, J., & Lim, F. V., 2022] takes a closer look at the communication strategies employed in popular science presentations. This article delves into the intricate multimodal orchestration used in TED Talks, providing insights into effective communication strategies in science popularization. John Waller's “Fabulous Science: Fact and Fiction in the History of Scientific Discovery” [Waller, 2002] offers a historical perspective on the interplay between fact and fiction in the realm of scientific exploration. This work serves as a reminder of the nuanced nature of scientific narratives throughout history. As digital platforms gain prominence, “Ups and downs on ‘r/science’— exploring the dynamics of science communication on Reddit” [Kaiser, J., Fähnrich, B., & Heintz, L., 2023] explores the dynamics of science communication within the Reddit community. This investigation sheds light on the unique challenges and opportunities presented by online platforms.

Examining the diffusion of knowledge trends, “The diffusion of management fads: A popularization perspective” [Pollach, I., 2022] investigates the spread of management trends from a popularization standpoint. This work contributes to the understanding of how certain concepts gain traction and popularity. “Theoretical Considerations: Recontextualization and Reformulation in Popularization Discourse” [Sterk, F. M., & van Goch, M. M., 2023] provides insights into the underlying theories guiding popularization discourse, emphasizing the importance of effective communication strategies. Lastly, “Public Understanding of Science and Technology” [Yingprayoon, J., 2023] delves into contemporary issues in science and technology education, emphasizing the public's role in shaping and understanding scientific advancements.

Formulation of the research purpose and tasks. The task of this research is to critically examine the evolving dynamics of science popularization. The focus is on understanding the challenges and implications of simplifying scientific information, considering the competitive nature of science in a saturated information market. The research will delve into the changing role of science popularization, exploring how it has transcended traditional educational boundaries and entered the domain of marketing. It seeks to analyze the driving forces behind this shift and understand the strategies employed in presenting science as not just a body of knowledge but as a brand. The investigation will emphasize the need for a delicate balance between credibility and emotional appeal in promoting science as a marketable “product”.

Presentation of the main material and obtained scientific results of the research. The problem is that when using the concept “scientific progress”, one can observe significant misunderstanding of the principles and criteria of science, which are in no way associated with such a parameter as speed. Science requires thoroughness, evidence, regularity and unlimited time, while the market expects from science not just the immediate result, but its mandatory positive view and concrete practical value.

In addition, any negative result is also a result for science, because it verifies the reliability of the knowledge sought, but it is completely unacceptable for the market. It is impossible to obtain financing in the absence of a practical result within market laws. It allows us to conclude that the market itself is not interested in science itself, but in technology, the very “fruitful” part spoken about by Francis Bacon. A substitution of concepts occurs when a product is presented in the market area. As a result, the consumer perceives the technology precisely as a science, identifying them. This seemingly insignificant replacement leads to very serious consequences in the future.

Umberto Eco [Eco, 2016] pointed out the differences between technology and science in his work “Science, Technology and Magic”. Here he argues that technology by its principles is identical to magic rather than science. The point is that people tend to prefer speed to reliability, i.e. they are more interested in a quick and simple result than the essence of the process, its true content. This is similar to the desire to magically resolve all problems, a kind of a leap “from reason to result” in which the truth, i.e. the scientific content, is completely unimportant.

Umberto Eco provides an interesting example of the transition “from reason to result”. The first computer programs required from the user to have a certain level of knowledge and skills in BASIC, one of the first programming languages. Over time, the Windows system appeared which magically transformed everything for the user. It appeared enough for him to log into and then only press the buttons that are already assigned command lines. From this moment, the user does not know what is happening and how, i.e. the link connecting the cause and the result has virtually disappeared for him and computer technology has turned into magic.

If science is the essence of scientific knowledge and methods by which people can achieve results, then technology is the result itself. Science is in a constant search for new knowledge and methods and technology is only engaged in the reproduction of the necessary result, one and the same result. Moreover, the presence of a repeating result indicates the level of manufacturability. Technology in this context is understood as a set of specific knowledge about the methods and means of carrying out technological processes where there is a qualitative change in the processed object. Technology is closer to myth than to science in this respect.

We can conclude that the differences between technology and science are logical. They appeared during the formation and development of both technology and science. You can also highlight some significant features of technology that show its similarity mostly with myth but not with science:

- technology is essentially practical and characterized by a pragmatic approach to solving any problems;
- the success of technology is determined exclusively by positive effectiveness when applied in practice;
- technology reproduces itself;
- the level of technology is related to the speed with which it gives a positive result.

In fact, we returned to the concept of magic and myth, although, in addition to all of the above characteristics, the myth is different in purpose. The task of the myth is to explain the whole universe, give answers to all questions. If technology simply guarantees that the milk that you left in a warm place will go off, the myth in its turn should explain why this happened. Science is interested in the question of “how”, which refers particularly to understanding the scientific essence of the ongoing process, the question of *method*. It is not limited to one answer to the question; it is always looking for new options: whether the same thing will happen if the milk is boiled? Will the same thing happen if you put milk in the cold place? How can we change this process? And, finally, science is able to find and justify the reasons, i.e. it does not just explain, it *proves*.

Science is qualitatively different from both myth and technology, but “technological thinking is compatible with mythological thinking. Both types of thinking are equally universal, i.e. just as there are no wrong tasks for technology, there are no inexplicable questions for myths. That is why technology is always able to find its justification in the myth (and many modern myths perfectly prove this), but the myth is able to assimilate any technological achievements. Consequently, any

technological progress, even moving away from its mythological basis, does not destroy it”.

The difference between science and technology is directly seen in the methodological aspect. One of the main characteristics of science is constant screening of proven options. Everything we have learned and verified is post-knowledge, subsequently science is looking for new ways. On the contrary, technology accumulates proven options and acts in accordance with them. Thus, although science and technology are closely related, but there is no transition from technology to scientific knowledge, while science certainly affects the development of technology.

Thus, in the conditions of the modern market, in fact, that is not science as such that is in demand, but only its result in the form of technology. At the same time, the essence of the ongoing processes, the logic of their development and all other details are put on the back foot. The market is ready to buy the result but the problem is that science, in general, cannot guarantee a clean score to be positive and moreover practical. However, it needs significant funding.

Science has ceased to be a matter of brilliant individuals, it requires global cooperation and by its nature cannot be “secret” or “mystical” knowledge. Modern scientific research is carried out by large international research teams, made using expensive materials and sophisticated equipment. The whole industry that provides this scientific search with everything needed for its implementation has emerged. Such an “industrialization” of science is a necessary and inevitable phenomenon, just like the formation of research teams and the successful struggle for grants.

The combined results of modern scientific research by far cover all the costs of their implementation and bring fabulous profits. However, no one can know in advance what kind of research will finally lead to the product (technology) that the market is willing to pay for. The market does not want to take risks, paying for scientific research that does not guarantee the necessary profit. Science is dramatically poorly financed. Moreover, there is complete misunderstanding, which areas, taking into account the real needs of society, are of priority. The current situation in the world shows what problems may arise because of this. For instance, the global Corona virus epidemic that has spread to different countries confirms that in many states the market and/or power consequently acted its part. When financing for the development of weapons is easier to get than that for the development of vaccines, humanity faces a real threat to its survival.

In this case, one can clearly observe the negative role of assimilation of science to technology. As we have already noted, science cannot be characterized by the speed of knowledge discovery. It takes time because it is based on the regularity of research, which requires a constant material base and regular funding. However, market sees no need to sponsor “obscure” and “ineffective” scientific research. In connection with the Corona virus pandemic mentioned above, memes dedicated to this aspect are appearing on the Internet. For example, a text attributed to a certain “Spanish biologist” goes viral around: “You give millions for football players per month and only 1800 € for biologists per month. You need a vaccine right now. Go to Cristiano Ronaldo or Messi and they will find you a vaccine” [Eco, 2016].

Despite the lack of reliability of the authorship of this statement, the idea that the meme expresses, is quite clearly conveyed to society. Market preferences are determined only by the laws of market development and not by the real needs that humanity can have.

The analysis of market demand options leads to yet another element that will be in demand. Oddly enough, this is not the result but the story that accompanies it. Society will demand not only the practical result but also the legend. Since those ancient times when this was the main form of transmitting information, little has changed in society unless now the market sets its price for a well-made story. Today science needs myths in order to receive funding and exist.

A true scientist always understands that he can be wrong and therefore must always go further to make sure that he is right. It takes time. However, the demands of the market make many scientists eager to publish and evaluate the results of their research as quickly as possible. They begin to care about what is achieved and not how it is achieved. In order to avoid this trap, researchers need to rely on certain values, including the pursuit of truth and the mandatory verification of any discovery for reliability.

One way to shape values is through stories and myths. It is from myths that people learn about great deeds and achievements, warriors and philosophers, about how people interact with each other and with the world which they live in. Myths strengthen the collective values and beliefs of the society. Scientists also create myths that played, are playing and will play an important role in the future. Thus, Andrew George draws attention to the fact that the creation of such myths is a unifying factor within the scientific community itself. In the modern world, myths and stories still have an

important role to play – even in scientific research. Scientists have stories about important people and great events in science, such as the discovery of penicillin, uncovering the structure of DNA, the development of vaccines and the battles that Galileo and early proponents of a sun-centred model of the solar system fought with the reactionary forces of the Church. Together, these stories help young scientists understand the collective benefits of research that go beyond personal advancement and success [Andrew George, 2019].

Scientists used the myth within the scientific community to explain a new idea more effectively and intelligibly or to express a complex idea. However, a scientific myth creates history embellishing it substantially. The mythologization of science itself and its history within the scientific community is justified and realized, that is it that creates a certain culture of generations succession, highlights such basic moral values as passion, striving for truth, responsibility for the result. Such a question remains: Is it permissible to put such legends and myths outside the scientific community into the society where it will be difficult for many people to separate fact and fiction and Is it possible to give the conception of science using those methods that are not typical for it?

Science is looking for general laws and patterns. It is based on the analysis of environmental phenomena, critical reflection, the development of scientific world understanding methodology. But the more complex and diverse the process to find the answers to the questions of humanity is, the more society is inclined to imagine this process in a reduced form, being satisfied with both the illusion of answers and the illusion of understanding what is happening.

The human brain by its nature does not want to remain ignorant because it carries only the fear of the unknown. One of the most ancient and sought-after forms to avoid realizing your ignorance is a myth. The myth creates and explains the whole universe without justification, analysis and critical reflection.

The myth is understandable and well structured, it has a number of guidelines for action and it is characterized by a clear division of everything into right and wrong. Moreover, all this is supported by moral categories, i.e. the right is good and the wrong is bad, evil. The objectification of problems with the perception of modern science lies precisely in the field of mythological perception. Science is understood in society not from the standpoint of scientific knowledge but from the standpoint of the mythological perception of the world. Thus, the formed idea of science as “right” immediately appeals to the issues of confronting “good”–“bad”. This also applies to the opponents of scientific knowledge. They declare the falseness of science, they move from the field of argumentation to the sphere of judgments, declaring both science itself and its achievements “evil”.

The popularizers of science, who decided to tell the story of a scientific discovery, in fact find themselves in the situation where they have to create a legend according to all the rules and canons of classical mythology. Let’s have a look why this is so.

In order to profitably sell a product on the market, the product itself and its seller must inspire consumer confidence. If we are talking about the popularization of science, then people should trust science. The paradox is that trust in rational knowledge forms pop culture using emotions. Not scientific facts, not objective logic, not rational thinking, not even common sense, but emotions. The methods of scientific research are hidden and references to authoritative names, ethical categories and self-evidence, everything that transforms scientific knowledge into a new mythology serve as evidence of “scientificity.”

In *The Oxford Handbook of the Science of Science Communication* it focuses on what: Previous scholarly analyses of science’s public image found that entertainment media before 1990 often depicted science as a mysterious and magical process. [...] The implication was that science is an almost sacred endeavor superintended by an elite and privileged group able to understand and produce such specialized knowledge. [...] Since scientific instruments are depicted as exotic and scientific methods as complex and obscure, the processes by which scientists gain their knowledge in particularly mysterious. The scientific research methods are generally hidden from public view [*The Oxford Handbook of the Science of Science Communication*, 2017].

It should be kept in mind that scientific knowledge is out of moral, it does not fit in with human ideas about good and evil. Evaluation of the scientific discovery of the possibility of atom splitting cannot be “positive” or “negative”, because scientific knowledge is morally neutral. The use of scientific achievements has already been outside the scientific field, i.e. the problems whether an atomic bomb that can destroy millions of people will be created or a source of energy that can ensure the existence of these millions will be solved in the social and moral sphere. The myth brings the strongest emotions to the history of the development of science and the description of the life of

scientists: from complete enthusiasm and acceptance to bitter hatred and rejection, leaving the essence of science completely beyond the bounds of the legend.

The process of “glorification” of the image of a scientist in history or myth is standardized and the general plot of the myth always remains common. The first stage of mythologizing the life of a scientist most often tells of the difficulties that he experienced as a child, when he was just starting to study. When describing people in creative professions (musicians, poets), attention is often drawn to their innate talent which showed itself early (the first musical compositions played at three years old, compositions written at an early age). Overcoming obstacles is a characteristic feature for the stories about scientists. Legends may say that they were not recognized at school, their mind could not have been appreciated, they often did not have the opportunity to study due to various circumstances (status, lack of funds, gender, etc.) and this fact did not affect their further achievements. One can observe a classical fairy tale where the main character has certain advantages but others cannot appreciate them. The image of a scientist in this perspective brings him closer to the layman. He is a simple and understandable character who, like any other at his time, was not understood and not appreciated, and it is most likely that what he discovered will be understandable and necessary to each person.

Further development of the positive image of the hero includes possible trials, difficulties and sacrifices. Ignorance and denial of scientific discoveries come from the “evil” with which the hero has to fight. A classic example illustrating the presentation of the scientific history can be the period of the Inquisition related to the formation of the heliocentric picture of the world. The highest point of glorification is achieved with the scientist’s willingness to die, protecting knowledge. The bonfire on which Giordano Bruno burned down becomes a moral guarantee and moral proof of the scientist’s rightness and accuracy of scientific knowledge, although science itself does not accept this argument. As well as it does not require a mandatory statement, such as the one attributed to Galileo Galilei: “Eppur si muove!” Science uses facts and analyzes phenomena. But the legend requires confirmation of the moral image of the hero. And if Galileo was forced to disclaim his statement in the face of the Inquisition, then in the face of the listener he must remain faithful to his ideals, because he is on the side of good.

As it has already been mentioned above, success of science is closely related to the progress. However, the progress is also associated with the sacred sacrifice. It can be lost health for Marie Skłodowska Curie, loss of loved ones for Alfred Nobel, the death of a researcher in the study of dangerous diseases, etc. It is supposed that all this was a sacrifice in the name of science and for the benefit of humanity. The importance of scientific knowledge in this case is determined either by the presence of progress or by the price by which this knowledge was obtained.

The desire to make the story exciting and consistent with the canons of legend often leads the narrator away from the truth. A detailed and reasoned analysis of such stories about scientific discoveries turned into a myth is given by John Waller in the book “Fabulous Science: Facts and Fiction in the History of Scientific Discovery”. [John Waller, 2002]. The book contains several examples of discoveries made by Charles Darwin, Alexander Fleming, Gregor Mendel and other famous scientists. Paradoxical as it may seem, each of the cases described is connected both with facts and with fiction used by scientists themselves and other storytellers. It should be noted that the real stories of scientific discoveries that the author cites right there in the text of the book are no less interesting and fascinating, but the scientists no longer look like ideally positive characters in them. Nevertheless, if a fictional story is repeated from time to time, then it turns from a myth into a kind of reality which no one calls into question.

When we talk about the presentation of science in pop culture, we assume that the purpose of this process will be to expose at a generally accessible level the essence of the knowledge obtained by scientific methods. We also assume that science is not lost in this case since the scientific content is presented in a form adapted for the general public. It goes without saying that such an adaptation involves the use of analogies and simplifications among other things. In this regard, the question of the popularizer responsibility arises since any simplification carries the risk of distorting the essence of a scientific phenomenon and many analogies may be misunderstood. While getting to know science fiction, one can see that not all popularizers have such a responsibility.

The next point is the demand for science popularizing of a certain form of material presentation. Popularization assumes that scientific knowledge is presented in a form that should inflame the listener and arouse his interest. For example, Neil de Grasse Tyson, the director of the Hayden Planetarium in New York City, approaches space with a mix of pop culture, science, and

humor. “Yes, we talk about zombies. However, if you use zombies as proxies for a slow-moving virus that has no cure, then zombies are a perfect analogue to a virus outbreak... So when we talk about zombies or anything pop culture – is that a word? We are finding the science in it and using that pop culture as a scaffold for the science” [Simon Worrall, 2020].

Clifford V. Johnson, Professor of Physics and Astronomy, University of Southern California said: “I work as a science advisor for various forms of entertainment, from blockbuster movies like the recent “Thor: Ragnarok,” or last spring’s 10-hour TV dramatization of the life and work of Albert Einstein (“Genius,” on National Geographic), to the bestselling novel “Dark Matter,” by Blake Crouch. People spend a lot of time consuming entertainment simply because they love stories like these, so it makes sense to put some science in there” [Clifford V. Johnson, 2020]. Clifford V. Johnson wrote the work as proof of concept [Clifford V. Johnson, 2017]. This is a new kind of nonfiction science book that can inspire more people to engage in their own conversations about science, and celebrate a spirit of plurality in everyday science participation.

The variety of examples confirms that no matter what the popularizers of science pursue, they actively use a variety of entertainment forms, starting with books as the most traditional forms of popularization and ending with musicals, comics or quests as the most exotic forms.

The meaning of the term should be also specified since when speaking of the “science popularizing” two interconnected but essentially different connotations are often interwoven. First of all, one can popularize the results of scientific activity, scientific knowledge as such. But one can also talk about the popularization of the activity itself and the role of the scientist in society. And even if it is difficult to talk about scientific results without affecting the features of the activity that allows them to be obtained, one should distinguish between these two areas in popularization, though.

1. The first and most significant problem of popularization is the question of the quality of the content and the control of the criteria that must be presented to any scientific knowledge.

Science arises and gets an opportunity to be formed where the schools are established and scientific communities appear, following the scientist, teacher. The idea of a scientist who is doing something alone in his laboratory, hidden from everyone, in pop culture takes the form of the label “mad scientist”. “Normal” science involves openness, interconnections, discussions, interaction within the scientific community and science popularizing in society. However, a scientist is not always a popularizer, although a popularizer must be a scientist. The required simplicity and entertaining form in science popularizing often result in a reduction of knowledge rather than its professional adaptation in order to understand what the public has said. However, there is no special authority that could control the quality of the work of the science popularizer except for himself. The scientific community can surely act as a regulator in this process, but, unfortunately, the following problem arises here.

2. The relationship of the science popularizers with colleagues in the scientific community.

The popularizers are placed in conditions when they use all available means to disseminate scientific knowledge. Moreover, they go far beyond the scientific community encountering the most effective mechanism for disseminating information in society, i.e. the media. Representation in the media has its own laws, similar to mythological foundations. The media must prove to their consumers that they know everything and can explain everything. Just as there is nothing that remains beyond the borders of myth, so the media strive to be absolute. In addition, any knowledge is exposed as a sensational discovery. Otherwise the attention of the public cannot be retained. However, the journalist knows only what concerns the public, but in science, as a rule, he is not well-grounded. Thus, in the end, we get the popularization of the *myth of knowledge* instead of disseminating scientific knowledge. The consumer receives a persistent illusion of knowledge which is much more dangerous than ignorance, because now there will no longer be any discussion of critical reflection of information, as the layman has formed an *opinion* about the subject.

Other types of problems arise within the scientific community. The scientists themselves often consider the popularizers to be at least frivolous scientists and sometimes they accuse them of being unscientific, profane, and flirting with the public. They often indicate that a scientist should be engaged in science and not turn it into an exciting show. It becomes a critical factor for many scientists. The threat of loss of authority within the scientific community prevents him to be engaged in the popularization of science. In this regard, we recall the story of an editor who worked at a popular science book on biology. The editor very much asked the author to make references and explain to readers what “eukaryotes” and “prokaryotes” are. The author resisted arguing that the book

would be read by his graduate students and colleagues and such references would be a blow to his scientific reputation.

3. The first two problems create the third: the popularization of pseudo-knowledge.

A form that does not require critical reflection, vague scientific criteria, loud statements and forecasts without reason, a specific situation with content control all lead to the fact that among the general public “*alternative knowledge*” appears spreading pseudoscientific ideas. Myth-making reaches unprecedented heights in these areas. Fear of the unknown is a powerful emotion. It is the easiest way to make a myth and play the market. That is why “terrible threats” arise along with any scientific achievements. At different times, electricity, antibiotics, GMF, vaccines were declared dangerous, but any alternatives to scientific ideas were declared useful and effective ones at the same time. People who do not have special educational background and the necessary knowledge, and who uncritically use any information from unverified sources begin to contest the truth of their belief on any issue. Is it worth mentioning that their conviction is based on the erroneous conclusion that they possess knowledge while this is an illusion of knowledge.

4. The next problem is lack of critical perception of information among people who are not in science. Being at a popular science lecture with funny pictures (reading a book, playing a quest, etc.), the majority of students (readers, participants) do not assess the given knowledge as scientific. Only the representatives of the minority with inquiring minds will pay attention to the presentation of various points of view, to the sources and confirmation of the initial data on which the popularizer’s evidence is based.

Conclusions. We will try to identify the tasks of presenting science in pop culture according to the above said.

The desire to meet the demands of the market and the consumer leads to the ambivalence of the process of popularization of science. Thus, informational openness turns into sensationalism. Entertaining forms cause a frivolous attitude to knowledge of any kind. Simplification of the material presented leads to a reduction in the essence of processes because only the end result is of interest.

We propose to direct the course of popularization not to the presentation of any information, facts, achievements of science, but to coordinate it in the direction of the formation of the necessary tools for cognition, that is, *critical thinking*. The idealization of the images of scientists and the simplicity of scientific discoveries which is proposed both during popularization and in the official presentation of the history of science (for example, at schools), leads to the formation of a new mythology but does not contribute to the development of critical thinking.

In fact, telling only stories about success, pop culture makes the classic “survivor mistake,” a phenomenon that the ancient Greek philosopher-cynic Diogenes drew attention to for the first time. He is credited with the caustic remark that he made in response to surprise at the abundance of gifts brought in gratitude for the fulfillment of the vows in the shrine of Samothrace. He said that there would have been much more if they had been brought by those who were NOT able to escape. In the modern view, the concept of “survivor error” is defined as a kind of systematic selection error, when a lot of data were received for one group (“survivors”) and practically there is no data for the other (“dead” ones). In this situation researchers actively use information about the “survivors” and do not take into account the fact that there is no less important information concerning the “dead” that is not available to them. A classic example of the “survivor’s mistake” and its successful overcoming is the work of the Hungarian mathematician Abraham Wald related to the study of aircrafts damage participating in the Second World War.

Taking into account the “survivor mistakes” one should, showing the evolution of knowledge, discuss in detail the mistakes of scientists and show the ways to overcome them, without hiding, and show how slowly science is gradually developing with difficulties. It should be noted how important is the regularity of research, hypotheses, experiments, errors and analysis of errors for science. The image of a scientist should not be mythologized. Despite the importance of the role of the individual in science, scientific knowledge is not determined by the authority of the scientist. It is verified empirically, in a number of experiments. The opinion of the scientist does not matter. Only facts are important in science. Here is another important point. The scientist is not a “universal representative of science”. The scientist is placed within the framework of his competence and has no right to go beyond its borders.

Particular attention should be paid to the popularization of scientific knowledge among children. It seems paradoxical that in a group that is just beginning to comprehend this sphere an

increased concentration of efforts is already required. But in fact, there is no contradiction. The school as an institution is part of the state system of education and, therefore, is included in the discourse of power, and not education. It would seem that schools should accustom children to the correct idea of scientific processes. But it is here where the first distortions and simplifications occur. Whenever possible totalitarian systems attribute any scientific discoveries to the representatives of their states without hesitation, pursue the primacy of scientific discoveries, declare whole areas of science “dangerous and harmful”, or, conversely, create their own, pseudo-scientific teachings.

Taking into account the ambivalent effect of the methods of representing science in popular culture, it should, nevertheless, be understood that the idea of awareness is not obsolete, even taking into account the specific demands of the market. It contains a huge potential for the transformation of social consciousness since science is a unique achievement of human culture.

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ЗНАННЯ НА РИНКУ: ДИЛЕМА ПОПУЛЯРИЗАЦІЇ НАУКИ

Сучасна наука складна і зайва для простих людей. У сучасній науці, яка швидко розвивається, тонкощі досліджень і відкриттів часто виявляються переведеними в доступні для широкого загалу форми. Однак цього спрощення може бути недостатньо у світі, де наука змагається за увагу на ринку, переповненому інформацією. Стаття заглиблюється в мінливу динаміку популяризації науки, виходячи за межі традиційних освітніх ролей і заглиблюючись у сферу маркетингу. У цю епоху наука — це не просто сукупність знань; це бренд, і його просування вимагає поєднання довіри та емоційної привабливості.

Наратив досліджує, як популяризація науки зазнає трансформаційних змін, виходячи за межі освітньої сфери та охоплюючи маркетингові стратегії. У статті стверджується, що для того, щоб завоювати довіру суспільства, наука все частіше подається як товарний «продукт» із слоганом «Підтверджено наукою». Це явище відображає відхід від звичайних освітніх підходів, оскільки наука прагне викликати довіру споживачів, подібно до комерційних продуктів.

Крім того, у статті розглядається роль поп-культури у зміцненні довіри до раціонального знання через емоційні зв'язки. Досліджується, як почесні імена, етичні міркування та самоочевидність наукових відкриттів сприяють створенню нової міфології навколо науки. У цьому контексті наука стає більше, ніж набір фактів; вона перетворюється на розповідь, яка резонує з людьми на глибшому, емоційному рівні.

Дискусія в рамках статті ведеться навколо амбівалентності, притаманної цим сучасним методам популяризації науки. Хоча поєднання науки та маркетингу може підвищити доступність і залученість, воно також викликає питання щодо потенційного спотворення наукової інформації та етичних наслідків перетворення знань на ринковий товар. Стаття має на меті спонукати до роздумів про еволюцію взаємозв'язку між наукою, маркетингом і популярною культурою у формуванні суспільного сприйняття наукових зусиль. Наукові знання перетворюються на нову міфологію. Ця стаття присвячена амбівалентним сучасним методам популяризації науки.

Ключові слова: наука, міф, популяризація науки, попкультура.

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