

Life on the Stargazing Hill: Belgrade Astronomical Observatory
at the Intersection of Gender, Science and Culture in Post-Socialist Serbia

by

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Abstract

This thesis is a result of ethnographic research conducted at the Belgrade Astronomical Observatory in 2015-2018 period, among Serbian astronomers and astrophysicists. The thesis is threefold: it focuses on the intersection of knowledge production, post-socialism and gender issues in today's Serbia. These three topics were used as anchors for examining the realities of work and life of Serbian scientists. The research is grounded in concepts of epistemic cultures and knowledge cultures used for analyzing scientific practice and scientists' work at the Belgrade Astronomical Observatory. Epistemic culture(s) present at the AOB are shaped by two factors: the demands of the discipline (epistemic cultures of international astrophysics communities) and the realities of post-socialism. In this thesis, I describe the main practices, attitudes and relationships that exist in Serbian astrophysics. I treat "epistemic culture" of the Belgrade Astronomical Observatory in terms of performing science in the specific historical and political circumstances: the realities of post-socialist Serbia and the legacy of socialist Yugoslavia. Special attention is given to the issue of gender and women in science, and a seeming paradox of having a gender balance but still experiencing a strong "glass ceiling" effect at the Observatory.

In this thesis, I argue that the Observatory serves as a protective bubble that shields researchers from the chaotic socio-political circumstances of contemporary Serbia. Despite modest funds and other hardships, scientists at the Observatory enjoy a relative security in terms of employment and social benefits, which can be attributed to the legacy of socialism. This is particularly important for female researchers, who can realize themselves as both mothers and

scientists. Furthermore, the lack of government's care for sciences enables researchers to pursue topics and questions they find important, without any control from the government or funding agencies. This freedom results in a community that enjoys many of Polanyi's ideals of the republic of science: the Observatory is a place where researchers can focus on their intellectual pursuits and perform "pure science for science's sake".

Preface

This thesis is an original work by Mirjana Uzelac. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Physical Sciences in Post-Socialist Serbia”, study ID: Pro00064368, approved on 27 April 2016. No part of this thesis has been previously published.

Dedication

For my husband

Acknowledgements

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List of symbols

Č (lowercase: č) – [ch] Pronounced like “ch” in chocolate.

Ć (lowercase: ć) – [tɕ] Pronounced like “ch” in choose.

Đ (lowercase: đ) – [dʒ] Pronounced like “j” in jack.

Š (lowercase: š) – [sh], [ʃ] Pronounced like “sh” in shoe.

Ž (lowercase: ž) – [ʒ] Pronounced like “s” in pleasure.

Chapter 1. Introduction

In the spring of 2016, I visited the Astronomical Observatory Belgrade to enquire about the possibility of doing my fieldwork in this institution. I was warmly welcomed at the Observatory and offered coffee while I waited for the director. I did not sit alone in a waiting room: instead, I was asked to join a group of scientists doing their work in a shared office. There were five scientists in the office when I arrived, chatting and laughing as they worked on their laptops. I was not the only woman in this room: when you are among scientists in Serbia, you are rarely the only woman in the room; this is something that many state as a fact with great pride. I got introduced to everyone and asked about my work; I told them that I wanted to do research on scientists in Serbia. I turned out that one of the women working in the office was a recent post-doc, freshly returned from Germany. In a somewhat rare move of a “reverse brain-drain,” she expressed her satisfaction at being back in Serbia. “There is no money here, but there is a soul,” she said. “I did not want to work in the West anymore. They discriminate against women scientists so much. They force you to choose between having children and career. That does not happen in Serbia,” she added proudly.

A lingering pride in her voice made me think about differences in the ways female scientists are not only treated in Serbia versus “the West” but also differences in ways they perceive their position. Also, I did not fail to notice a quick separation into “us and them,” “Serbia and the West.” Positioning oneself in regard to the West is a common theme in Serbia, and scientists are no different. Ultimately, I decided, this is exactly what I want to explore, the role of gender in science and all of the contributing factors that shape the lives and work of scientists in post-socialist Serbia, particularly in terms of being at the periphery of Europe.

In so many ways, researching astrophysicists feels like coming home for me. After graduating from high school, I enrolled in the Faculty of Mathematics in Belgrade at the Department of Astronomy and Astrophysics. I remained there for several years and passed some of the exams with good grades, but I never graduated. My childhood dream did not survive the reality of the profession. Realizing that pursuing a dream I had at thirteen would not make me happy, I

switched to a topic in which I have long been interested in: archaeology.¹ I graduated with a Bachelor's degree in archaeology in 2010, and then enrolled in a Master's program in the department of Ethnology and Anthropology, where I got my MA in 2013. I found myself in socio-cultural anthropology but the idea of sciences and scientists never ceased to interest me. This is why I was drawn to the anthropology of science. For my Master's thesis, I conducted research in the Nikola Tesla Museum in Belgrade. The inventor and engineer Nikola Tesla is considered a huge figure of national pride in Serbia since he was an ethnic Serb and thus the public in Serbia views his contributions as something that Serbs gave to the world. I was interested to see how Tesla and his work were represented and interpreted by the Museum. For my doctoral research, I decided to go even closer to my former interest and research astrophysicists and astrophysics scientific practice in Serbia. In so many ways, it feels like making a full circle. It is more than a sentimental move: the years I have spent studying astrophysics in Serbia have given me not only an understanding of the subject matter (partial, at least) but also a direct contact with the Serbian astrophysics community.² This is a great asset not only in terms of understanding astrophysics and scientific practice but also understanding how scientific communities in Serbia operate.

Research Questions

This thesis is a result of ethnographic research conducted at the Observatory in 2015-2018 period. The thesis focuses on the intersection of three topics: knowledge production, post-socialism and gender issues in today's Serbia. These three topics were used as anchors for examining the realities of work and life of Serbian astrophysicists. My goal was to analyze all of the important factors influencing researchers' work and scientific practice in order to examine the complex interplay between gender, science and culture in Serbia. I define these factors as the crucial conditions that shape up the work of these scientists, such as the socio-political reality of early 21st century Serbia, sources of funding and post-socialist transition but also more detailed, micro-factors such as equipment, division of labor and internal organization

¹ "Switching" is too easy of a term to use here. There is no such a thing as "changing a major" in Serbia. One enrolls at a specific department and studies there. If you want to study something else, you need to start from scratch: pass another qualifying exam and enroll in the first year of studies.

² Most of the professors that were teaching in the early 2000s when I was a student of astrophysics still teach today. Many of the prominent figures of Serbian astrophysics still work at the Astronomical Observatory Belgrade or are still active in the astronomical community.

at the Astronomical Observatory Belgrade. At the same time, these conditions are not the only ones that shape scientists' worldview and influence their work. Deeper cultural factors, assumptions and ideas that shape the work of Serbian astrophysicists are also examined, such as gender relations, nationalism and prevailing notions about Serbia's liminality and being "in-between" the East and the West, which is a major factor affecting all areas of life, including sciences. Specific attention was given to scientific practice itself: what kind of research is done and in what way, and how it relates to the other themes of interest, such as gender, nationality, liminality, and so on. One of the main research questions is the local knowledge production in astrophysics, that is, a specific way that astrophysics is practiced in Serbia.

The research is grounded in concepts of epistemic cultures (Knorr-Cetina 1999) and knowledge cultures (Knorr-Cetina 2007) for analyzing the work of scientists at the Belgrade Astronomical Observatory. I treated the "epistemic culture" of the Belgrade Astronomical Observatory in terms of performing science in the specific historical and political circumstances: the realities of post-socialist Serbia. This approach is combined with Traweek's (1992) way of analyzing the lives and work of scientists within a laboratory, their perception of time and commitments, the corridor talk (Traweek 1992; Downey et al. 1997) and other factors influencing the work at the AOB. Differences between doing astrophysics in Serbia and abroad are touched upon whenever possible. I also focus on Latour and Wooglar's discussion on the distribution of credit, which takes a specific form among Serbian scientists, as well as Michael Polanyi's concept of a republic of science, which takes an unexpected (and, I argue, unintentional) form among astronomers in Serbia. In treating AOB as a specific culture under the influence of a wider knowledge culture of contemporary Serbia, I was able to identify important factors that influence scientific work at the Observatory. The context of post-socialism (and, more specifically, post-Yugoslavism) plays a crucial role in shaping the realities of work at the Observatory in numerous ways, from core scientific practice, to organization, infrastructure and gendered aspects of scientists' lives at the AOB.

Gender is examined in terms of percentages of women at the Observatory, their presence in the hierarchy and ways in which gender affects scientific practice. I wanted to explore a seeming paradox of having a gender balance but still experiencing a strong "glass ceiling" effect at the Observatory. My goal was not only to analyze these factors and come up with an explanation –

after all, things like gender (in)equality and glass ceiling are well-researched in literature (Lorber 1994; Cotter et al. 2001; Rosser 2004) – but also to see how these factors play into day to day scientific practice for astrophysicist in Serbia. I wanted to hear scientists’ own words and their own interpretation of gender relations, particularly since my preliminary research showed that this topic is something that people at the Observatory do not seem to see as a problem; on the contrary, it is often a source of pride. This is a complex issue for a researcher and required a careful approach. I did not want to contextualize this attitude as “Serbian scientists being blind to gender inequality” or “women in science in Serbia not understanding feminism.” I argue that this issue, just like many others, is culturally-specific and I wanted to approach it that way. Instead of judging (in)equality in Serbian science using pre-conceived (Western) parameters, I wished to explore what gender relations in science mean in Serbian context and for the scientists directly affected by it. Does the high percentage of female scientists truly mean equality? Does it reflect the status sciences have and potential prestige of scientific profession in society? Does the fact that women tend to occupy lower echelons really means less power?³ How is power built in Serbian context and does it have gendered connotations? Finally, what is a living reality of being a woman and a scientist in Serbia and how does this affect everyday work? For that matter, what is a living reality of being a man and a scientist in Serbia and how does this affect everyday work? Are sciences, in this case, astrophysics, coded male and are male researchers seen as default? These are some of the most important questions I wished to examine in relation to gender issues.

I start by setting the stage through the description of the Observatory itself (Chapter 3) and move to exploring formal and official science performed at the Observatory and scientific practice (Chapter 4a). This topic proved to be strongly related to the issues of funding (Chapter 4b) and changes experienced through decades (Chapter 4c). Since formal and official work and scientific practice are often shadowed by informal, I explored familiarity and informality present at the Observatory (Chapter 5). I gave special attention to informal strategies that AOB scientists use to overcome obstacles posed by the lack of funding and lack of proper

³ For example, the highest-ranking and the best paid position at AOB is the Director of the Observatory. At the same time, being the Director means a lot of administrative work that does not leave enough time to do science. This is why the position is undesirable and the best members of the staff tend to avoid it. These members have a lot of power and influence within the scientific community even though they might not be the highest-ranking in the hierarchy. Similarly, someone who accepts the position of the Director might be a person with less power.

government strategy. Women in science is a pressing issue on a global level, and I explore this question in detail (Chapter 6): the numbers of women in Serbian science, possible gendering of science and the glass ceiling effect. Finally, I explore how scientists are treated in Serbia and abroad, and how they contrast their experience with that of their Western colleagues (Chapter 7).

The Importance of Research

Why study scientists in post-socialist Serbia? The truth is that studies of the former “second world” are still sparse and there is not enough understanding of how scientific practice is shaped by culture and other factors in post-socialist countries. It can be said that science in post-socialist countries is a rich yet relatively poorly researched field. There is even less understanding about gender and science in post-socialism. In a more specific sense, there is not much understanding of how these things operate in the case of former Yugoslavia, which is something of a “special case” when it comes to history of socialism and post-socialism.

The fall of socialism in the early 1990s marked the end of USSR and most of the socialist countries. Social studies of science today often focus either on the “first world” (the West) (Latour and Woolgar 1986; Traweek 1992; Knorr-Cetina 1999) or the “third world” (post-colonial countries and post-colonial context) (Abraham 2000, 2006; Anderson 2002, 2008, 2012; Anderson and Adams 2008; Harding 1998, 2008, 2011; Lin and Law 2015; Mcneil 2005; Seth 2009). It is difficult to find specific studies focusing on Eastern Europe, Russia and the former Eastern Bloc, despite the surge of interest in the fall of socialism in the early 1990s. The case of Serbia, as a successor of former Yugoslavia, is more complex because although it was a socialist country, it was never aligned with the USSR: on the contrary, it was part of the Non-Aligned Movement. Despite these differences, a study of science in today’s Serbia can be seen as a study of post-socialism and science in the (former?) “second world.” Understanding science in post-socialist countries not only improves the understanding of how scientific practice is done around the world but also offers new insights into the roles that cultural and socio-political factors play in scientific practice. This is why studies examining science in post-socialism are important.

There is even less research done on gender and science in post-socialism. The intersection of gender, sciences and post-socialism is a complex subject that is worthy of research. Studies

focusing on gender in Western science or the lack of women in STEM fields are not necessarily helpful for understanding the gender dynamics in sciences in post-socialist countries, as the percentage of female scientists tends to be higher and there is often a gender balance in sciences not present in the West and some other regions (UNESCO 2012; 2014.) I was not able to find any comprehensive study focused on this specific issue. One notable exception is *Women in Science: Token Women or Gender Equality* (1991), edited by Veronica Stolte – Heiskanen et al. This volume includes case studies from various European countries, some of which are post-socialist ones, including Yugoslavia. However, this is a book detailing the early post-socialist period. Needless to say, there are no such studies focused on Serbia or former Yugoslavia, save for Blagojević's work on gender and semi-periphery (2009.) Marina Blagojević, a Serbian sociologist, has produced numerous studies focusing on the issue of women in science at the European semi-periphery (Blagojević 1991, 2004, 2009, 2010.) Her study, *Knowledge Production at the Semi-periphery: A Gender Perspective* (2009) is the most valuable for my research because it discusses the specific aspects of gender and professional engagement at the semi-periphery. At the same time, Blagojević's work is more theoretical in nature and does not focus on the actual scientific practice; also, when talking about "women in science," the author often speaks about social sciences, which is not the focus of my research. As such, Blagojević's work does not overlap with my research since it does not examine the actual scientific practice in Serbia. In this sense, my research will be among the rare ones to focus on these topics and the first one to examine gender in specific scientific practice in Serbia. It is apparent that there is a lack of literature on the subject of women in science in post-socialism in general and Serbia in particular. This is unfortunate, because such studies can yield valuable results not only for analysis of today's Serbia or post-socialism but can also be used for a better understanding of the mechanisms between gender, culture and scientific practice in other cultural contexts.

I do have to mention one study conducted seven years ago because it is specific for my proposed research site. Andrew Hodges' thesis *The everyday geopolitics of science in post-Yugoslav space: from war and 'transition' to economic crisis* (2013) was based on research conducted in Belgrade, Serbia and Zagreb, Croatia. His main research site was the Astronomical Observatory Belgrade, where he conducted research in 2008 and 2009. This is important for my work, because this is the same institution that I have selected for my

fieldwork. Since it is a small institution and Hodges' research stay was relatively recent, I spent my research stay with the same people as he did. For now, I want to briefly discuss Hodges' thesis and demonstrate that while it is a valuable addition to social studies of science, it does not cover the topics and questions I examine. Hodges' thesis focuses, first and foremost, on the socio-political aspects of transition (period after the fall of socialism) and its influence on sciences and scientists in former Yugoslavia. He talks about the historical and political context of the early 2000s in the region and most of his research is focused on the change that scientists experienced between socialism and the present (Hodges 2013.) Hodges' thesis does not focus on the actual scientific practice; there is very little data about the actual work and research the scientists at AOB perform. Also, the thesis is almost silent on the issues of gender and the roles of female scientists in the Serbian astrophysics community, which are all topics I examine in my research. Hodges' thesis focuses on changes in the region, and how scientists in Serbia suffered as a result, particularly in terms of sudden re-peripheralization (Hodges 2013,8). My thesis, on the contrary, focuses on strategies that Serbian astronomers use to overcome these hindrances in order to stay relevant in international terms, as well as keeping their position in Serbian society in order to minimize negative effects of transition.

Chapter 2: Theory and Methodology

2a. Theoretical Concepts

This thesis is rooted in the long tradition of lab ethnographies (Doing 2009; Dumit 2004; Gusterson 1996; Latour and Woolgar 1986; Lynch 1985; M'charek 2005; Myers 2015; Rabinow 1996; Sormani 2014; Traweek 1988; Vertesi 2015), particularly those that focus on the role of socio-cultural factors and political circumstances for the lives of scientists (Traweek 1988, 2004). One of the most prevailing ideas about science – often held by scientists themselves – is that of an objective, rational activity that reveals facts about reality and/or nature; it builds human knowledge about the world (Sismondo 2010). Knowledge in science is gained through a meticulous application of scientific methods that involve testing hypotheses and analyzing results in a bias-free manner. Science and Technology Studies view science and technology as social activities: scientists are member of specific communities and scientific practice leads to production of knowledge in these communities (Pestre 2006; Sismondo 2010). In other words: scientific knowledge is a cultural product and can be studied as such. Doing researching in a laboratory setting allows for studying scientists as a specific group with their own culture. By observing scientists as an “unknown tribe” (Latour and Woolgar 1986, 15-42) it is possible to demystify scientific practice.

This approach to scientific practice allowed me to view the work of scientists at the Belgrade Astronomical Observatory in terms of “distribution of credit” (Latour and Woolgar 1986, 192) and to contextualize their efforts in terms of effort toward building credit in the points system (Chapter 4b). Latour and Woolgar discuss credit in terms of published academic papers and being recognized by their peers (Latour and Woolgar 1986). Scientists choose their topics carefully in terms of maximizing credit and credibility, and focus on topics that are deemed the most rewarding (Latour and Woolgar 1986, 223). This discussion is particularly important for Serbian astronomers, because of the specific circumstances and limitations they face in their scientific practice.

Latour's work primarily focuses on science “relatively free from obvious sociological events” (Latour and Woolgar 1986, 31). Such approach tends to view scientists as uniform groups whose activities are to construct and produce scientific facts (Latour and Woolgar 1986). The

insistence on symmetry (Latour 1993, 1999) equates human and non-human actants in ways that obscures and often denies important differences between scientists and their socio-political realities (Martin 1998; Star 1990; Todd 2016). For example, Latour and Woolgar comment on informants' reluctance to speak about scientific practice, and their eagerness to discuss topics the authors label as "gossip, scandal and rumour" (Latour and Woolgar 1986, 193). The authors insist that scientific practice is worthy of sociological enquiry even when it is devoid of those elements (Latour and Woolgar 1986, 32), which is true, but this approach actively ignores important circumstances that shape the lives of scientists. Since my informants at the Belgrade Astronomical Observatory live and work in circumstances they themselves often describe as "abnormal", it was of utmost importance to focus on the socio-political events that influence their work. Also, instances of gossip and informal talk proved to be crucial for understanding these circumstances.

The work of Sharon Traweek is particularly valuable for grounding this thesis, because of Traweek's emphasis on scientists and specific cultural factors that influence their work: their interactions, hierarchies, spaces and culture they form (Traweek 1988). Her attention to "corridor talk", "gossip" and informal interactions as crucial for understanding scientists proved to be an excellent guide for analyzing astronomers in Serbia. Traweek describes the everyday lives of scientists, their habits, how they see authority and how they operate within the lab community (Traweek 1982, 1988.) Traweek's description of scientific apprenticeship as a way of reproducing scientific community (Traweek 1988) was particularly useful in terms of understanding dynamics of training and apprenticeship at the Belgrade Astronomical Observatory, as well as leadership styles and networking. Finally, the notion of "culture outside of culture" (Traweek 1988, 162) that scientists share is an ideal that persists among astronomers in Serbia: they see themselves as close to astronomers around the world and lament the outside circumstances that prevent them from enjoying this "universal scientific experience". Traweek's work also focuses on gender and the place of women in particle physics, as well as cultural differences (Traweek 1988, 1992, 2004). This emphasis on gender and national/cultural differences and particularities was particularly important for my analysis of gender and socio-political realities at the Belgrade Astronomical Observatory.

This emphasis on social realities is not new. The laboratory does not exist outside of the society, and it needs to be understood in terms of a wider cultural context that influences the lives of scientists and scientific work itself. Topics such as power imbalances, feminist issues and post-colonialism have gained more attention since 1990s. These issues tie together questions about science, power, and culture⁴. Feminist studies have questioned the role of female scientists and the gendering of science (Pestre 2006). Another important topic of post-1990s STS research is science outside of the West. Traditional laboratory studies mainly focused on Western science and Western approaches. These approaches are not necessarily true all around the world, so it is important to be aware of the local contexts and differences. In her criticism of “traditional objectivity,” Donna Haraway proposes “situated knowledge” instead: the research subject is never passive or stable and the researcher’s scientific gaze cannot be omniscient and “coming from nowhere” (Haraway 1988, 584.) Haraway argues for questioning the idea of an objective, decontextualized observer and proposes a stance in which the researcher is clearly positioned, embodied and complicated (Haraway 1988, 583-584.) These issues (situated knowledge and positioning) are important for researching and understanding science outside of Western context. Those topics open up questions about politics, globalization and ethical scientific practice, which influence wider societies beyond laboratories or national borders. This thesis focuses on scientists “outside of the West” and analyses important socio-political factors and realities of doing science “on the margins”, namely, on the semi-periphery of Europe. This is a peculiar position because it does not share realities of post-colonialism and the developing world, nor does it fit into realities of “the center” and doing science in the West.

Because of the crucial role that socio-political factors play for the lives of astronomers in Serbia, this thesis focuses on the analysis of those factors and on scientists themselves. Rather than view scientists as one of the many “epistemic subjects” in knowledge production (Knorr-Cetina 1999, 11), I position them front and center as humans caught in specific circumstances that prevent them from being “universal scientists”, not matter how much they wanted this to be case. That not to say that Knorr-Cetina’s work is completely ignored: I found her concept of epistemic cultures (1991, 1999) and knowledge cultures (2007) to play a role in understanding

⁴ These concerns have also prompted a trend of moving from laboratories and other sites of “direct” production of facts (Hess 2001) into the other fields that can provide valuable information about scientific practice, particularly in terms of the interplay of science and larger social factors.

how science (and scientists) in Serbia operate. Epistemic cultures are cultures that create and warrant knowledge (Knorr-Cetina 1999, 1.); different scientific fields and knowledge communities have their own epistemic cultures - different ways for doing science: what kind of objects they use, what kind of equipment, how are scientists organized, how reality is configured, how knowledge is produced, what social arrangements are used to arrive to such knowledge, and so on (Knorr-Cetina 1999). And if epistemic cultures are the environments and factors that enable the construction of knowledge, knowledge cultures are what helps or prevents the development and working of epistemic cultures (Knorr Cetina 2007). Wider societal factors, such as policies, funding, and resources influence scientific practice in numerous ways. Inter and intra national factors play their role as well. All of these factors are crucial for the development of epistemic cultures and knowledge cultures that help them or prevent their work. These mechanisms are important for understanding specific circumstances that scientists in Serbia face in their work and their scientific practice.

Finally, I wish to discuss another approach that proved useful for my research: Michael Polanyi's emphasis on tacit knowledge and the republic of science. Polanyi is probably best known for his concept of tacit knowledge (Polanyi 1958, 2009 [1966]): this knowledge is based on bodily and communal social experiences (Polanyi 2009[1966]:14). This is knowledge that cannot be verbalized: "we can know more than we can tell" (Polanyi 2009[1966]:4). One of the main aspects of tacit knowledge is that cannot be learned through series of instructions (Polanyi 2009[1966]). Tacit knowledge plays a significant role for scientific work, even when it is not recognized. "Scientific intuition" and "knowing where to look" are part of scientific enquiry that rely on tacit knowledge. This knowledge needs time and experience to develop and is not something that can easily be transferred to other scientists (Polanyi 2009[1966]). This complicates the process of apprenticeship in science; building one's tacit knowledge is part of becoming a good scientist, and an experienced one.

Polanyi argues for "a republic of science": a vision of scientific community that is free and self-regulating, like a free market (Polanyi 1951, 1962). He argued that state control is detrimental to sciences (Polanyi 1951, 1962) and that scientists should be left alone to pursue interests that they deem important. Scientists, according to Polanyi, should be motivated by seeking the truth and not by any material interests (Polanyi 1958). This view of scientific purity that can be

tainted by material interests or by government control and totalitarianism (Nye 2011) emphasizes the authority of science and is very close to beliefs that Serbian astronomers have about the role of science in the society.

Post-Socialism and Serbia

In recent years, various authors have expressed doubts about post-socialist studies (Humphrey 2001; Stenning and Hörschelmann 2008; Chari and Verdery 2009; Rogers 2010). According to this opinion, post-socialism is not an adequate label; the transition toward capitalism is over, so once-socialist countries could be viewed in the light of neoliberalism. While I understand these reasonings, coupled by dubious origin of the term “post-socialist,”⁵ I argue that this is the best way to contextualize today’s Serbia. The country is still deep-rooted in socialist legacies, as my research will show; transition towards capitalism is not completed, at least not in people’s minds. The best way to put it, is that today’s Serbia is still “post-Yugoslav” in many ways, which I will demonstrate in this thesis. For this reason, I felt that “post-socialist” remains the best label for describing today’s Serbia. The label is not perfect, but it does signify the importance of socialist legacy that exists in Serbia.

Furthermore, Serbia is not “just a post socialist” country. Serbia is a post-socialist country with a painful history of war during the 1990s. The fall of socialism in the early 1990s meant the breakup of Yugoslavia, leading to war(s) in Croatia, Bosnia and Kosovo. Serbia faced economic embargo and hyperinflation during the early 1990s and Milošević’s regime. The downfall of this regime in 2000 did not bring immediate improvement like many people hoped so the country is still recovering (or, better said, struggling.) This legacy and problems manifest themselves unevenly, and are present in many areas of life, including science. Sciences and scientific work are directly affected by politics since they depend on government funding. Interestingly, the government still manages to find some funds to keep scientific projects going, which is why people at the Observatory have more secure job prospects than those working in the private sector.⁶ On the other hand, funds are limited, which affects scientists in numerous ways. The struggle to do high-quality work without adequate funds is a real problem for people

⁵ Namely, it was a term invented by Western scholars and not a label that people in former socialist countries choose for themselves.

⁶ I dare to say that the job security in this sector is better than in the West.

working at the AOB and, as my research revealed, one of the main themes scientists want to talk about.

This period in Serbia is often referred to as “transition,” which is sometimes understood as a transition between socialism and capitalism. However, I will use the term in the way described by Katherine Verdery: a transformation of the former socialist countries into new forms, some of which may be close to Western capitalism, while others may not (Verdery 1996, 15-16.) At the time her book was written it was too early to predict what would happen with former socialist states; I dare to say that results are still inconclusive in the case of Serbia, which is seen to be still going through the transition. The periods of Yugoslav socialism and post-socialism are important for the understanding of the cultural and political context of contemporary Serbia. Verdery’s work (1996, 1999), while not focusing on Serbia, is very useful in contextualizing the inner workings of socialism, its problems and its benefits (Verdery 1996), as well as post-socialist change, particularly in the ways “dead bodies” are used in the post-socialist context (Verdery 1999). Similarly, the work of Kristen Ghodsee (2004, 2015) provided a useful base for discussing women’s emancipation in socialism, women at work and (negative) changes that women suffered after the fall of socialism.

However, it is important to emphasize some unique aspects of Yugoslav socialism and post-socialism that are not necessarily true for other countries. Yugoslav socialism was “different”: Yugoslavia was never part of the Eastern bloc and never directly a part of the Soviet sphere. The Yugoslav brand of socialism was known as “Titoism,” named after Yugoslav “great leader” Josip Broz – Tito and it was based on workers self-management. Yugoslav socialism was characterized by its in-between status, between Russia and the West, between Eastern and Western bloc: geographically, politically and culturally. Yugoslavia was a proud member⁷ of the “Non-Aligned movement,” established to avoid alliance with any of the two Cold War blocs (Bogetić, 2000; Lampe et al. 1990; Lazić 2003; Rajak 2005). Tito was a well-respected figure among numerous Western leaders and during his time (post-WWII to 1980), socialist Yugoslavia enjoyed its in-between status between two blocs while maintaining friendly relations with both (Zivkovic 2011, 47.) Such a position allowed the country to enjoy a certain level of stability and standard of life for its citizens not seen in other socialist countries (such as

⁷ Tito was, in fact, one of the main founders of the movement, established in 1961.

open borders, traveling without visas, relative accessibility of Western goods and Western popular culture, etc.) In this sense, regardless of the post-Yugoslav nationalist sentiments, socialist Yugoslavia was a relatively stable period which allowed people a better standard of living than the one present in other socialist countries.

A second important factor for understanding post-socialism in Serbia is the end of Yugoslav socialism. As Verdery describes, most of the countries broke through socialism and entered “transition” with optimism (Verdery 1996.) In Yugoslavia, however, the end of socialism brought up violent conflicts and the disintegration of the country. One by one, former republics declared their independence, starting with Slovenia in 1991. In some cases, this proved to be relatively simple, while in others (particularly in case of Croatia and Bosnia-Herzegovina), it marked the beginning of violent conflicts. This time was marked by war, economic failures and a much reduced standard of living for most ex-Yugoslavs. In addition to this, the freedom of movement was suddenly greatly reduced for many of them (Jansen 2000.) The Yugoslav post-socialist period is therefore characterized by wars and heightened nationalism, which became a dominant political force in almost every corner of the former Yugoslav space starting in the late 1980s.

This socialist legacy and post-socialist reality are of crucial importance for contemporary Serbian culture, including its science. While not all institutions in Serbia draw from socialist legacy, the country is still seen as being in “transition,” which affects its institutions, including institutes and other places where scientific practice is performed. Furthermore, scientists themselves are affected by these changes. There is another aspect of socialist legacy important for researching sciences: since science is government-funded, scientists are almost by default public sector employees. This guarantees scientists a certain job security or even lifestyle not enjoyed by those employed in the private sector. In some ways, therefore, science in Serbia retains its socialist or quasi-socialist nature even during post-socialist transition.

Another important thing to keep in mind is Serbia’s perceived location on the symbolic geography of Europe. There is a prevalent cultural notion about constantly being “in between” the East and the West. This liminality affects numerous areas of life, including scientific work. This is why “the West” is mentioned so often in conversation with scientists: while all people working at AOB see themselves as white and European, they do not perceive themselves as

Westerners. This position of being in-between and practicing science in a liminal place is another important theme that comes up in conversations on a regular basis. The concept of liminality is one of the most pervasive aspects of contemporary Serbian culture, which can be observed in almost all areas of life and in all of the previously discussed concepts. Being “in between” is a powerful cultural notion that takes numerous forms and is described in several metaphors: a bridge, being “between the East and the West,” being “neither here nor there,” etc. People in Serbia are well-aware of their liminality, which proves to be both a source of frustration and pride (Zivkovic 2011.) It is vital to understand that this liminality is not just symbolic: it often carries practical consequences and influences Serbian people and culture in numerous ways. One of the goals of my research is to explore how liminality affects Serbian science.

These aspects of Serbian liminal position are well-expressed in Marina Blagojević’s work on knowledge and semiperiphery: *Knowledge Production at the Semi-periphery: A Gender Perspective* (2009.) This is one of the rare studies about knowledge production, gender and sciences within the post-Yugoslav/Serbian context. While the book largely focuses on gender, it also offers a useful analysis of Serbian liminality and the place Serbian (and ex-Yugoslav) scientists occupy on the world scientific scene. Serbia is located on the semiperiphery of Europe, that peculiar place that contains characteristics of both the center and the periphery (Blagojevic 2009). This is a liminal position that influences power (im)balances that are felt in all areas of life in Serbia, including its science.

2b. Methodology

My field research was done in the 2015-2018 period, although I did not spend all that time in the field. Due to teaching obligations and coursework at the University of Alberta, I spent roughly one to two academic semesters in Canada during that period. This allowed me to stay for 3-4 months in the field and come back four or eight months later to observe changes and conduct new interviews. My primary goal was to do a classic “lab ethnography” through participant observation, which opened up its own problems of “studying up” and “studying sideways” that many authors have talked about (Nader 1974; Gusterson 1997; Stryker and Gonzalez 2014.) The reality of doing ethnographic work without being able to participate is an issue in itself. A person in my position, according to Collins and Evans (2002) is typically at the level of interactional expertise, or acquires this knowledge over the course of the fieldwork: the ability to “interact interestingly with participants and carry out a sociological analysis” (Collins and Evans 2002:254). This includes asking relevant questions and understanding, at least in part, language used by those with contributory expertise (Collins and Evans 2002:254), in this case, astronomers and astrophysicists. However, I was treated as an “uninitiated,” by my informants: the one who does not know and cannot engage in scientific endeavors and activities that make the core of activities at the Observatory. Because of these constraints, classic participant observation was not my goal; instead, I observed these people working and talking about their scientific practice. For this reason, I focused my attention on interviews and unstructured talks with the staff, both individual conversations and the ones done in a group. These problems refer specifically to doing ethnographic research of a professional group (Nader 1972) in general, and lab ethnography in particular (Forsythe 2001; Hess 2001).

This included stays at the Observatory during the work hours. The exact time and duration of these visits were determined by my own research and in part by participants’ reactions. Sometimes, less proved to be more. I feared that a regular, prolonged stay at the Observatory would make me an intruder. In order to avoid this, I targeted my visits during times I knew there would be many people or when specific scientists I wanted to talk to were present. During those visits, I was allowed to sit in the office and “do my thing” while researchers interacted. Typical work they perform consists of manipulating data on their computers, but the atmosphere is anything but quiet. There is always some degree of talk, be it directly related to

work or more relaxed in nature. My particular goal was to examine these informal talks and what these conversations meant for scientific practice. Shared offices also provided a good way to see how scientists at different levels and career stages interact with each other. Since the Observatory is so small, the offices are divided by projects, so each contain people at the higher levels of research career as well as those at the entry levels. It was very important to record their interaction and see if there was a degree of training and apprenticeship involved. Also, these conversation and group dynamics were good for examining gender relations and how male and female scientists interacted. This goes both for the purely work, science-related things and for those involving everyday problems. One of the most striking things about the work at the Observatory is that the vast majority of scientists do not do any observations. In fact, there was a notable anti-observation sentiment that I will describe in more detail in Chapter 4.

Most of my direct interaction with researchers at AOB consisted of unstructured interviews. I set a goal to talk to as many researchers as possible. I wanted to talk to everyone who agreed to participate, although I did not expect to have the same success with each talk. During my fieldwork, I managed to secure interviews with thirty researchers, which makes the majority of the staff. Out of those, fourteen ended up being my key informants (Bernard 2006): those who gave me the most in-depth interviews, repeated interviews or people I have interacted with the most.

Early in my research I have realized that the interviews need to be as unstructured and as informal as possible. This approach tended to bring better results and made people open up.⁸ The major themes that I wanted to focus on in these conversations were those that appeared as the most important during my preliminary research: doing science in Serbia (particularly without adequate funds), knowledge production, gender, and relationship with Western science. How do they view the role of science in post-socialist Serbia? How do they position themselves in the global scientific community? How are Serbian scientists affected by “in-betweenness” and liminality of Serbia’s position at the periphery of Europe? How to practice astrophysics without adequate funds? What are the specific roles and potential obstacles that women face as astrophysicists and part of scientific teams at the Observatory?

⁸ I have discovered during my research and in Serbia in general is that informal, even casual, tends to get people relaxed, talking and in general yields more material for research.

I started each interview by giving an opportunity to the speaker to share what they thought was the most important to talk about. I found this to be an effective way to identify what people find crucial and what are the burning issues that they want to talk about. This also allowed people to describe topics in their own way. Initially, I received somewhat negative reactions when I tried to position myself as someone who “knows a bit about astrophysics,” referring to my years at the Department of Astronomy. Scientists at the Observatory did not see me as their peer, not even as someone with a basic knowledge of natural sciences. In their eyes, I was a social scientist; someone who knows nothing about the subject of astronomy. When I presented myself as such, an anthropologist who “knows nothing about science,” they opened up. Not in a condescending, “let me explain to a stupid social scientist what is going on,” but an enthusiastic and eager: “it is easy to understand! There is no mystery knowledge! It is nature, and the way it operates.” This approach proved to be more successful. While I never hid my interest in astronomy nor my years studying it, not emphasizing these facts made for richer and more relaxed interactions with scientists.

When conducting research, my goal was to capture both scientific work at the Observatory and the lives of scientists. At the same time, I allowed my informants to discuss themes they deemed important. Latour and Woolgar argue that informants resort to gossip and rumour in conversations with outsiders, and that they are reluctant to talk about scientific work (Latour and Woolgar 1986,193). Part of it proved true: my informants were more interested in discussing socio-political circumstances than their scientific practice. However, it is important to note that they focused on discussing the same themes, along with gossip and rumour, with their direct colleagues; AOB researchers spend a lot of their time at the Observatory discussing themes that are not necessarily related to work or science. It was therefore of utmost importance to focus on those conversations and analyze social and cultural factors that influence the work and lives of scientists at the Astronomical Observatory Belgrade.

Observing researchers and structured interviews provided me with information, but did not always yield the richness of anthropological detail I was looking for, at least not in topics I was interested in. This is why I also turned to informal socializing, which I have developed with some members of the staff (mainly female scientists in their 30s), most of whom I was already acquainted with during my studies at the Faculty of Mathematics. This socialization, often

outside of the Observatory, provided me with a better understanding of the AOB and the context of scientists' work. The demographics of the scientists I socialized with made me better acquainted with certain people at the Observatory than the others. It also gave me a much better insight into their point of view than the other, more senior researchers. Nevertheless, this informal socialization often proved to be more fruitful than observing at AOB or conducting interviews.

However, there was another notable peculiarity of my research at AOB: the heightened informality of researchers' everyday interaction at the Observatory. There was a lot of informal, free flowing conversation done among scientists working in a shared office. This informality prevailed at all the activities that I have observed, from everyday chat to performing work tasks. The only possible exception were staff meetings, but I did not attend those. The informality provided for a relaxed experience of spending time at AOB, but also proved to be a source of frustration. I felt that I was unable to capture anything of importance for the topic of my proposed research. Most of the conversations and interactions had nothing to do with practicing science. Instead, researchers would talk about personal life over coffee or would discuss politics. I later learned that many of AOB researchers do not perform their work at the Observatory at all; many confirmed that most of their work is done at home. Instead of treating these moments as an obstacle, I tried to embrace them; the free-flowing conversations ended up making the bulk of my notes and provided the richest ethnographic material. For the most part, my presence did not stop these conversations and I was allowed to capture them.⁹ While I do not want to imply that the staff was completely undisturbed by my presence or that no conversations were altered because of it, it did help in collecting materials because people were generally ready to talk and share. These conversations often happened in addition to the core work (or as part of the core work) done at the Observatory so they made an integral part of scientists' research that I wanted to explore. At the same time, I felt that the informal atmosphere of the Observatory allowed for moments of social participation that were extremely valuable.

The main obstacle for doing research at the Observatory was finding a good balance when it comes to time: due to the informal aspect of work at the Observatory, staying there for full

⁹ All of the researchers were aware of my presence, my notebook and the recording devices.

working hours every day proved to be non-productive. Instead, I needed to focus on interviews and informal talks more than observation itself. These social aspects and interactions made the core of my observations at the Observatory; as explained in future chapters, I was not able to observe much of the actual work. Because of this limitation, most of the information obtained and observed focuses on interactions and social aspects of the life at the AOB and not the core scientific work.

Compared to this, the formal nature of unstructured interviews made a clear change of pace, particularly in the case of senior researchers. They were friendly and eager to talk to me, but the fact it was a formal occasion made me aware that “this is not how things are generally done.” The interviews, particularly those with senior researchers, were all “front stage” talk (Goffman 1959), although all of the interviews had their moments of a changed pace when the interviewee would slip into “backstage” mode (Goffman 1959). These moments proved to be the most fruitful for my research. Interviews done with younger researchers, particularly younger female researchers, tended to be more informal from the start.

During the course of my fieldwork, I realized that staying at the AOB for long hours or visiting the Observatory on a day to day basis might not be the best approach. I felt I was not getting new material in this way, so I opted for targeted visits at different times and periods within a year. The fact that I generally spent one semester in Canada per year over the course of my research helped in this matter.

Ethics

Before starting my research, I had secured the official ethics approval from the University of Alberta. The research was outlined as anonymous in terms of informants: I have decided to give pseudonyms to my informants, unless they insisted that their full name is shared. Since AOB is such a small institution it is difficult to protect someone’s identity because any data listed, even the smallest one (gender, age) might be enough to identify the individual. Because of this, I choose not to reveal almost any data related to the individual except the gender and, when I feel it is not revealing, the researcher’s title.

If I were to discuss potentially revealing data in more detail, I did it in such a way that did not link to any individual in particular. Again, with such a small institution, this was difficult to

achieve, and I cannot claim that members of the staff would always be unable to recognize their colleagues. What makes it more difficult for keeping things anonymous was the fact that most people openly talked about all of the subjects in front of whoever was in the office at the moment. It was not unusual to conduct an interview with one person while the others listened, and even jumped in to offer their views without hesitation. This is similar to the situation Traweek (1988) described among Japanese scientists, although in this case, those situations happened often because of the communal nature of the offices. Generally speaking, if a person did not want something to be included in my thesis, they would openly inform me of it. I also had a feeling that most people did not mention things they didn't want their colleagues to know. This makes me more comfortable about potential holes in anonymity.

It is also important to add a note on consent. All of the participants were informed about the research and the possibility to withdraw their consent at any time. I also explicitly asked for a permission to use conversations in the shared offices when I was around scientists, even when they were not talking to me directly. These conversations were very important for my research and they needed to be included. Informal talks and dynamics of group conversations were very important for understanding on how scientific practice is done at the Observatory. Furthermore, these joined conversations and informal tone are common in Serbia and excluding them would take away from my research. Also, informal talks in a group often improve trust and I expected that for many people it would be easier to open up in this way than during one-on-one formal interviews.

In general, I did not use signed consent forms. I have explained my reasoning during the ethics approval. Form signing is considered a highly formal act; something that is not done when there is not a dire need for it. Asking for a signed consent would seriously breach the trust between my informants and me and would make people doubt my motives. "If everything is harmless, then why asking for a signature?" is a dominant way of thinking. It is also seen as too formal for what was, to them, a friendly talk or interaction. I did not want to jeopardize my trust with AOB researchers, so no consent forms were given. The only formal thing I allowed myself was the use of a recording device. This made some informants tense, despite the fact that they were typically talking in a room full of people. The fact was not simply about information and opinions being heard; it was about the recording device making everything

more formal and “serious,” as one informant put it. Another fear was about the recorded information getting into the wrong hands. To overcome this, I would ask a person for a permission to record the conversation, assuring me that no other person (in Serbia or Canada) would ever listen to these recordings. I explained that these are only for my use, so I could transcribe conversations. This explanation made people relax and I was never denied a talk or forbidden to use a recording device.

Walking the line between informality (harmlessness) and formality (potential danger) was a thin one. Sometimes, I would say something that seemed too formal and the informant would visibly tense. For example, I ensured people that they are free to revoke their consent at any time. This made many of them suspicious. The sentiment was: if there is no danger to this, then why would you tell me I can revoke my consent? To overcome this problem, I would tell the informant that this was just something required “by the Canadians,” after which we would both laugh at the stupid things Westerners ask for and continue with the interview without a problem.

2c. Access to Field Site

My entrance to the Observatory was provided through personal connections to one of the researchers, who has been my friend for years. This person was the one who talked about my proposed field research at the AOB, and the agreement to allow it was communicated through them. The Director of the Observatory had not even asked to see me or my project proposal before allowing it. My character and honest intentions were vouched by said researcher. This was enough for everyone, even those who did not know me before, or those who were not part of their immediate research team.

I have to emphasize that knowing someone from the Observatory was not necessarily mandatory to gain access. The Director and scientists are generally happy with researchers visiting AOB, particularly if it allows them to discuss pressing issues and to be heard. However, the best way to gain access and to be welcomed is to be recommended by someone who knows the Director or a researcher personally. This approach is seen as “more natural” and produces more trust. This is not simply about networking: knowing someone who knows someone is more in line with Serbian informality and touches upon what is understood as *veza* (connection). Similarly, a previous researcher, Andrew Hodges, was accepted because he was introduced to one of the prominent researchers at AOB beforehand. My *veza* through one of the researchers guaranteed not only access but also a specific treatment by researchers. It was understood that I was granted this favour because this person had vouched for me. These instances of gaining access may not look so different to professional networking in the West, but there is an important, unspoken difference. There is an emphasis on informality: words get exchanged between colleagues and friends without any need for a person seeking access to be present. More importantly, the nature of access is gained through personal connections in terms of favours that are not expected to be returned (particularly not in a material way), but that do carry an unspoken understanding on how they need to be honoured. The reputation and power of the person granting this connection carry the largest weight in terms of how the one receiving this favour will be treated. Another important factor is the closeness between the person granting the connection and the person receiving it. My closeness to them was deemed strong enough to allow for a quick building of trust. The fact that many people from AOB

already knew me played a part, although I am positive that the biggest factor of my access was an AOB researcher's vouching.

As a result, I was warmly welcomed at the Observatory, with the Director and researchers making sure that I am comfortable. I was given free reign on when to arrive and when to leave; I was allowed to move freely through the main Observatory building and to take photographs of the Observatory and its grounds. The Director welcomed me during a formal meeting, conducted more than a year after I first began my research at AOB. The reason for this late admittance were his schedule and informality. While he was more than ready to welcome me officially, he did not see this meeting as any prerequisite for my research at the Observatory. I had met him early on, months before our formal meeting: he stood in the hall of the main entrance, with his small dog on a leash. "He cries when we leave him alone at home," he explained, "So I had to bring him with me to work." I introduced myself, but he already knew who I was: my connection had announced me beforehand.

No ID or any sort of official proof of my research was ever asked. I provided the official University of Alberta information pertaining to my research: study description in Serbian and English, consent forms and other materials. The AOB staff accepted those, but they made it clear they were doing it just because they were required by the U of A. "If they insist on this, so be it," I was told by a senior researcher. The forms were accepted by the administration, but I cannot guarantee that they were not thrown away immediately. Part of mutual understanding was that this is something I had to do "because *they* require it," and that the actual rules of my fieldwork operate under different parameters. These parameters were never made explicit but were implied and understood as part of mutual cultural understanding of how to behave in this situation. For example, I was expected to notify researchers up front if I wanted to visit their specific offices or to schedule interviews. I could not go to the administrators' offices uninvited; reaching scientists was much easier and informal than reaching any of the support staff at the Observatory.

People at the Observatory were more than happy to share their limited resources with me. The Observatory lacks space: the offices are small and without a sufficient number of chairs, the tap water is undrinkable and there is general lack of funds. However, I was invited to use all of those resources whenever possible, and I was always offered coffee and refreshments. Part of

this approach was undoubtedly because I was treated like a guest and offering coffee and refreshments is a necessary part of Serbian hospitality. In some cases, my informants would prepare bigger refreshments in the form of snacks and sweets at the time of our scheduled interviews. All of those were bought by their own money and as part of a guest treatment.

The guest treatment at these occasions didn't mean that I wasn't accepted at the Observatory as a part of everyday life. For the most part, I was welcomed as someone with ties to the AOB, by the nature of my ties to one of AOB's researchers. Regular coffee and refreshment offerings are part of everyday culture at AOB and being included in those offerings signaled that I belonged. The fact that I couldn't drink nearly as much coffee as offered was not taken with similar understanding.

What Was Expected of Me

The unspoken understanding of what I was supposed to do to honour this treatment was clear. As a Serbian with ties to a Western institution, my role was to give true voice to Serbian scientists and show them in a positive light. This "positive light" meant an honest light: to show that Serbian scientists are capable, civilized and "normal,"¹⁰ just like Western scientists. The assumption was that Serbia and Serbian people have such a bad reputation in the West, and that it was important to demonstrate that this was not true. This was heavily implied: do not embarrass us in front of *them*. "Us" in this context meant more than people employed at AOB; it included collective "us" as all Serbians, me included. "They" were all potential Western readers of my work; this identifier didn't limit itself to members of my PhD committee or staff at the University of Alberta. The unspoken sentiment was that I should know what kind of things are too private and reserved only for the in-group ears.

Reporting truthfully about AOB and people who work there was a strong implication made through presumed mutual understanding. I was an in-group member: a Serbian person who is familiar with the situation concerning the overall socio-political circumstances in the country, its history, its politics and, most importantly, its bad reputation in the West. This understanding presumed that I knew what to say to demonstrate that AOB scientists are worldly people who perform science to international standards and have civilized behaviour and moral code. Even

¹⁰ References about normality are plentiful and carry a specific meaning.

more than this: I was to show the truth of Serbian scientists achieving all of this despite lack of money and resources. More broadly, I was to dispel myths about Serbia and Serbian people in general. By showing how AOB researchers are, I would be able to show the truth about Serbian people.

For the most part, this approach expected me to tell the Real Truth about Serbia in general, and AOB and its people in particular. While none of my informants articulated this goal in terms of giving voices to marginalized groups, this is what it was. My informants and Serbian people in general are not familiar with the concepts of identity politics and marginalized identities. At the same time, they do use very similar concepts, but without specific names attached. By the virtue of my connection to a Western university, I was recognized as someone who can spread their – or, more precisely, our – voice to the world. This doesn't mean that they overestimated my power and influence. Most of my informants were people who hold PhDs; others were PhD students. They all understand the relative lack of power a PhD student can hold. Nevertheless, a prospect of a thesis written for a Western university seemed like a good enough opportunity for these voices to be heard.

I have to emphasize that I was never pressured to write about a specific thing or to present something in a positive way. My informants talked about their work, their hardships and their lives, and were more than happy to let me record these conversations, even the more informal ones. There was no talk about a correct way to present these things; there was not even any talk about my role as a giver of voice and truth. No interview or informal conversation included a word about this; there was not a single mention along the lines of: “write about our truth.” Nevertheless, my duty to perform this was implied and part of the unspoken understanding. After all, I am Serbian, I am one of them, and it is in my interest to spread the truth.

I will talk more about Serbian understanding of the West, but I must emphasize here that, for the most part, I understood what was expected of me. I understood the belief of being seen as uncivilized and wild; this sort of bad reputation is something that has plagued the country since the 1990s. On the other hand, even my limited knowledge of Canadian culture allowed me a better context of the “other side” that many of the people from AOB do not have, by the virtue

of relative unfamiliarity with foreign countries.¹¹ For the most part, I have learned, Canadians are not familiar with the details of Eastern European politics in a way that Western Europeans might be. On the other hand, Canadian anthropologists, who are the presumed audience of my thesis, should possess knowledge and understanding that would remove them from this type of views about Serbia. For my part, I did not have any fears about how my potential audience would view my informants. Of course, I was also cautiously optimistic about my own research and writing abilities. At the same time, I must admit a certain degree of pressure that this arrangement had generated. While I always did the best efforts to maintain academic integrity, and while I never promised to anyone (including myself¹²) that I would present things in a way that AOB people wanted to be presented, a certain degree of pressure was there. The pressure stemmed from the fact that I knew what was expected of me from both sides: academic integrity and moral obligations to my informants. For what is worth, I did view my role as someone giving the voice to this specific group, although not necessarily in a way that the informants themselves expected of me. The fact that these expectations and duties were completely unspoken and assumed as joined understanding did not make the situation easier.

This is particularly true in the case of things the informants did NOT want me to write about. Unlike positive things, these were explicitly stated. Certain things that were off limits were implied, while others came up during conversation. Typically, an informant would talk about a topic in detail, then add: “don’t write about this last thing I said.” Or: “don’t talk about it.” The fact that this was shared with me, often in the company of other people, and recorded, did not bother people. They simply did not want me to share these things with Westerners. Most of the time, topics that my informants did not want me to mention involved the poor state of the Observatory’s building or some of the chaotic working practices. These were shared casually, sometimes with a smile, as part of mutual understanding. However, I was told that it’s best not to talk about it in order not to “embarrass us *out there*.” This approach of cultural intimacy (Herzfeld 1997) was a common occurrence. Cultural intimacy is a commonly employed approach in which ex-Yugoslavs describe their own culture among themselves. Herzfeld defines cultural intimacy as “the recognition of those aspects of a cultural identity that are

¹¹ Lack of travel opportunities is a big problem for scientists at AOB. This theme is present in many of the conversations and discussions with Serbian scientists.

¹² This is a work of a native anthropologist. I am presenting my own culture to a different, more powerful culture. There is pressure and ethics questions posed by me, to myself.

considered a source of external embarrassment but that nevertheless provide insiders with their assurance of common sociality...” (Herzfeld 2005:3.) A certain form of cultural intimacy is frequently found in everyday life in Serbia, especially in informal talk, when certain negative traits Serbs ascribe to themselves are hailed as positive, such as Serbian *inat* (Zivkovic 2011, 147.)

In some cases, informants were more than happy to air dirty laundry, provided that I “don’t write about this in the thesis so they don’t think we are uncivilized and pathetic.” Their localized workplace gossip and dirty laundry was often shared with me, and I was expected to understand what kind of stories should never be shared with Westerners. There seemed not to be so much concern about their colleagues learning what they told me; the issue was only that this dirty laundry should not reach Western ears.

There was a common problem with taking photographs, for example. While I was granted the Director’s permission to take photographs of AOB’s interior and exterior, many of the informants complained about it. “Why are you taking pictures of this dirty hallway? Look at that window, it is so old and can’t be closed properly!” Or: “This office is in a mess, don’t take photos of that.” The reasoning was, again, implied: do not show Westerners that we work in such an old building, with so little resources. “They will think we are dirty barbarians,” one informant said. This fear about possible portrayal and representation for the Western eyes is very similar to incidents that Verdery (2018) describes in the case of Romania: Romanians are also sensitive about what Westerners think of them and how they are portrayed by researchers (Verdery 2018).

In situations like this, I devised an approach to make them explicitly say their reasoning for protests. Since photographs of the ambient were important to me, and since I knew that stories about internal workings of the Observatory were rich in anthropological details, I tried to explain that these were not damaging. For example, I shared an anecdote about heating not working in my office at the University of Alberta at one point, so all the people from the office had to seek a different space to work or would sit in their coats. This story was met with surprise and disbelief; many people could not fathom something like this happening in the

West.¹³ Sometimes, I would say: “They don’t care about the mess in the office; many of their offices are messy, too.” Or, even more openly: “The fact that AOB building is old might be interesting; the whole architecture and history of AOB.” Upon hearing these explanations, most informants would allow for pieces of talk or photographs to be included. On more than one occasion, the permission was given with the words: “you know them better; you know what you are doing.” Of course, I never included in this thesis anything that I was explicitly said not to include.

Producing this type of a text was not a direct return of the favour to use AOB as my research site. It was understood more as a part of a moral code and respect. However, violating this understanding would be met with disappointment and social consequences. I doubt I would be welcomed to AOB ever again, and it is not inconceivable that my connection would be scolded for vouching for me. This sort of violation of understanding and *veza* can bring serious problems, depending on the strength of the previously formed social ties. In this specific case, the strength of ties is not so strong as to bring such damaging social consequences, so I doubt anything dramatic would happen in the case AOB researchers dislike how they are represented in this work. Similarly, I doubt my connection would be ostracized from AOB’s social circles for inviting me. The only stronger social tie that could potentially suffer is my own relationship with this person. To my end, I have done everything to explain my position and research and prepared her for the fact that my thesis is not about promoting AOB and its people, nor about making the elusive Westerners realize that Serbs are cool. I don’t expect any dramatic social consequences on that front, either. Nevertheless, the pressure was there, and it emphasized the duality of my position: an in-group anthropologist associated with a foreign institution, producing a text for said foreigners.

I have to move away from absolutes for a moment. It is perfectly possible that some of my informants did not care about what I would say or how I would represent them. When working with assumptions and implied understanding, it is difficult to judge each person’s individual views. Many people seemed very relaxed when talking to me, and many did not display much

¹³ The fact that my experiences are in anthropology did not make any difference. Many of my informants did not fully understand different approaches to funding in STEM and social sciences in Canada (and “the West”). The fact that my potential audience apparently knew what it is like to work in an older building was enough to calm people’s fears.

of an interest in my research at all. Also, a production of a non-favourable text would not be seen as particularly damaging in itself: after all, they know how little power a PhD student has. I do not want to imply that AOB staff thought of my role as particularly important or potentially damaging. I am sure that they would not be fazed by my “negative” or merely neutral text (see below for reactions to Andrew Hodges’ thesis). The unspoken understanding surely put more pressure on me than on my informants. An unwanted result would be more of a moral stain on my character than something damaging to them. In this sense, respecting their hospitality and all of the implicit assumptions described above were more tied to my integrity as a person and not as something that could have any practical consequences to them. This fact did not make my position any easier.

Previous Researcher

The issues of access, honesty and representation were very much true in the case of a previous researcher who conducted his research at AOB. There is a marked difference to how he was greeted at the Observatory and how his research was perceived compared to my experience. These differences make an integral point of this thesis and I will be coming back to Andrew Hodges’ presence at AOB numerous times.

Andrew Hodges is an anthropologist from the UK who conducted his research at the Observatory in 2008 and 2009 (Hodges 2013). I knew about this through my AOB connection, although for a long time I did not know that he was an anthropologist. As he remarked in his thesis, most people at AOB did not understand what anthropology was (Hodges 2013), which is a problem I encountered myself. This is about the only thing that I found similar to my experience conducting my research in the same institution. Throughout his thesis, Hodges mentions his struggles to explain his honest intentions to AOB staff and describes people’s suspicions and occasional lack of cooperation. He does not mention this explicitly in his thesis, but the informants were more than ready to tell me what happened: many people at AOB saw Hodges as a Western spy. “Spy” might be too strong of a word here; the informants understood that he was a PhD student doing his thesis and did not doubt his identity. This was not a case of AOB researchers believing Hodges to be a secret agent in disguise. “Spy” in this context meant a person with Western power, and this power was seen as potentially damaging. These fears were not completely unfounded. Katherine Verdery recounts her own experience of being seen

as a spy in Romania, with Securitate keeping a detailed file on her (Verdery 2018). While Hodges' situation was far more harmless, there was a trace of a similar sentiment about his presence at the Observatory:

"Who knows what he could do with these results," one older male researcher told me. "I know what is done. They talk to us, they see what we care about and how we think, and then they use it against us." Not knowingly, this person described historical negative effects of applied anthropology (Ghodsee 2011). A younger female researcher admitted: "People didn't want to tell him things. Some even lied to him. We had to protect ourselves." Of course, the attitudes toward Hodges were not universally bad. As he emphasizes in his thesis, he was warmly welcomed by specific people, and those informants did not harbour suspicions. General sentiments toward Hodges had mellowed out after a while, when he learned Serbian and formed friendships with AOB researchers. It is interesting to note that he emphasized learning Serbian as part of his anthropological work and made an effort out of respect for the informants and for the benefit of his research (Hodges 2013). However, his decision to learn Serbian was understood as a sign that he was changing and becoming enamored with Serbian culture. "When he first came in, he thought we were monsters. You know, barbarians," one informant told me (a sentiment that is nowhere to be found in Hodges' thesis). "But then he got to know us, and he realized how great we are. He fell in love with our culture" (again, a sentiment that is nowhere to be found in Hodges' thesis.)¹⁴

I have read the thesis in question and, unsurprisingly, could not find any ill approaches, nor recommendations on "what to do with Serbs." I also dare to say that he did not fall for potential lies he was served. However, the results of people's suspicions are clear: I have learned more about certain things in my first interviews than he was ever allowed to know. My informants were not coy about this: "You are [my connection] friend. You are one of us." I am not sure what kind of information was hidden from Hodges, since his description of AOB and its researchers is factually correct. This leads me to believe what was missing is the "meat" of ethnographic description that is so freely offered to me: how they manage through the chaos,

¹⁴ Not a single person admits having read Hodges' thesis. I asked about it whenever my informants mentioned it, and responses ranged from "I didn't have time for that" to "I wasn't at AOB back then." I cannot decipher whether this is true or not. Nobody seemed even vaguely familiar with his thesis or his actual research, so it is not impossible that they are telling the truth.

how they feel about certain things, and the aforementioned dirty laundry. I also suspect people did not share their personal, informal stories with him in the same way they did with me.

The initial suspicion and lack of cooperation were a defense mechanism. As an agent of the West, Hodges was considered potentially dangerous. By the end of his research, this danger had subsided to a degree, mainly through the informants' belief in his acculturation and love for Serbia. The informants told me that they still refused to talk about certain things and in a certain way, but that most of them accepted him as non-threatening. Still, the caution remained: "He proved to be a good person. But one has to be careful. You never know; what if someone bad was in his place?"

The fact that Hodges was a PhD student without much individual power of his own did not matter. To the people of AOB, he was a Westerner, with all the power this position brings. In some cases, this meant assumptions about his great wealth and in others, about the influence he could have (Hodges 2013). While Hodges makes it clear he did not possess any of this, and that he saw his research as "Studying Up" (Nader 1972), I will argue here that there was an unchecked power imbalance. He might have been only a PhD student without individual power, but his informants did not see him as belonging to a group beneath themselves. On the contrary: AOB researchers saw Hodges as a Westerner, which is not an underprivileged position. It is important to emphasize that while Hodges might have not possessed any individual power, the truth remains that his informants were people from the Balkans. The truth also remains that his informants were positioned as a group with less power and privilege than the target audience of Hodges' thesis. Because of this, I would not say that Nader's "Studying Up" and Forsythe's claim of "informants not having difficulty being heard" (Forsythe 1999, 8) is necessarily true in this context.

All these factors combined made for a very different welcome that Andrew Hodges encountered at the AOB than the one that was granted to me. His positioning and perceived motives were also interpreted in a very different way than mine. When I was given open trust and warmth, he encountered suspicion and doubt. Where I enjoyed informality and people openly sharing personal stories with me, he had to struggle to gather information. All these differences will undoubtedly reflect in differences between our research findings and final texts. However, the main reason I included the Hodges episode (besides the fact that it was

often mentioned by my informants) is the duality of my position and my attempt to reconcile my research with my position as an insider.

Communication Problems

One of the interesting things during my stay at the Observatory was the attitude of AOB scientists towards my research. For the most part, Serbian astronomers do not collaborate with social scientists, and are not forced to negotiate trading zones (Galison 1997) with them. This created certain communication problems. Generally speaking, people were unfamiliar with anthropology and what it included, despite the fact that most of them remembered Andy Hodges and his research. Assuming that I was a sociologist was a common theme. This was not surprising: Serbian STEM scientists rarely have a chance to come in contact with social scientists, the way this is done in Research and Development abroad (Albert et al. 2008; Viseu 2015). However, this does not mean that AOB researchers rejected the idea of an anthropologist at the Observatory. Many people were interested to learn more about anthropology and what it includes and seemed interested to be a part of such a research. Some AOB researchers assumed a different attitude: they kept telling me how I should do my job. Despite not knowing anything about anthropology, they offered instructions on what needs to be done to make my research successful. The advice typically consisted of instructions on how to apply statistics or another scientific research method. Both men and women were the ones offering this type of advice, although men were more numerous.

“You should build statistics. This is very important for your research. Get all the statistics about scientists in Serbia. It’ll be important to you,” I was advised. “Get the official government data about the number, age, gender and other parameters of all scientists in Serbia. Talking to 40 of us here is such a small number. It is not enough to build proper statistics. The numbers are too small.”

When discussing gender in science, I was advised not to talk to individual people, but to trust the statistics. “What we say or do may be irrelevant. Your statistics should clearly show tendencies about men in science versus women in science. This is the only way to know.”

“You need to do a proper analysis: compare average salary, number of children per woman, age (why not), all the parameters of importance. This is how you build a proper research,” another scientist told me.

I thanked them for their suggestions, mentioning that I would use statistical data in my analysis, but that it is not the core of my research. The idea of relying on people’s words and actions more than statistics did not sit well with them.

Some of these researchers made it clear that they wanted to help me, but that my choice of research institution was all wrong. “Talking to us here at the Observatory is not enough. We are just one small institute. To get a full picture and scientific merit, you need to visit at least four or five prominent institutes in Serbia,” I was told. I was offered help (*veza*) to gain access to these institutes.

In one case, focusing on Serbia alone was not seen as enough to “paint the full picture.” “You should include Bulgarians and Romanians in your research. They have many problems that we also face, because of socialist legacy, but there are also some notable differences.” When I reminded them that the Yugoslav socialism was very different than the one in Bulgaria and Romania, they agreed with me. “True. We were always West for them. They can get into the EU a hundred times.¹⁵ There is a mess in their countries. The only thing they have it better are the roads; I give them that. No, you are right. Our socialism was different. You should research both the Eastern bloc and Western bloc to get the full picture.”

“If I were you, I would make a correlation. We are too small to make any conclusions. This is why I advise you to compare us with some countries that had similar experiences. This way, you would have more people, so your sample is not too small,” I was told.

These attitudes reveal that AOB researchers, at least some of them, feel that their knowledge of natural science(s) can be applied to any sort of research, including humanities. Part of this attitude is a common sentiment towards social disciplines, that is sometimes expressed when talking about social scientists in Serbia. It is a belief that is familiar to me: a condescending attitude towards anything outside of STEM was clear during my time at Faculty of Mathematics. The idea of “*glupi drustvenjaci*” (“stupid social scientists”) is a popular

¹⁵ A popular exaggeration. “It happened to me a hundred times” (“*sto puta*”).

sentiment and something that is not necessarily limited to Serbian astronomers. However, the eagerness of certain AOB scientists to help with my research by making it “more properly scientific” also speaks about their ideas of objectivity. Statistics and other methods deemed impartial and objective were seen as the only way to do research; talking to people, observing people, spending time with people – all of it was deemed useless or even harmful. This is hardly surprising, coming from STEM researchers, but what I found particularly interesting is that most of the actions and interactions I have observed at AOB were exactly this: people talking and spending time with other people. This is an important point I will go back to in Chapter 5.

Bringing local, Serbian interest and Western interests together posed a specific challenge. Here I mean the themes, topics and conversations that matter to local informants on one hand, and those that matter to the Western audience on the other. Early on in my research, it became clear that themes that are of interest and importance to my Serbian informants are not necessarily those that my Canadian (or, more broadly, Western) readers care about. Similarly, themes of importance in the West were not necessarily those that mattered to Serbian scientists. This put me in a precarious position of finding a balance and the best ways to approach my research. I felt, more on one occasion, that I had to juggle all these different things and translate from one “system” to the other.

This was more than a simple methodological challenge. In essence, the problem of very different themes and interests revealed the core of my research, that is, how specific circumstances of doing science in early 21st century Serbia shape the lives of those scientists, and how the overall culture and society influence their work. At the same time, it revealed a lot about how these factors influence what is considered important in Canadian and/or “Western” cultural contexts. Finally, it influenced my own approach and my own thoughts about this research and these specific topics. During the years of my research, I have faced, more than once, a challenge of translating the aim of my research and its importance between Serbian and Canadian/Western audiences. I have done this with various levels of success, and an unexpected result of my research was learning how to do this translation in a way that is understandable to both groups. This is a challenge that I am still perfecting.

Because these issues are so important for contextualizing my research, I will describe each of the major themes that proved out to be challenging, the reason for complexities and misunderstanding, and how I tried to reconcile these problems of miscommunication. Many of these themes will be further explored in specific chapters.

One of the first problems I have faced in the fieldwork was to get information about certain themes I knew were of importance for the West. These themes are expressed in recent academic works, as well as everyday life. The interest in these themes was apparent in both professional and informal conversations I have had in Canada. When asked about my research, and upon learning about my interest in Serbian science, one of the first thing people enquired about was gender. What about women in science? How is situation with female astrophysicists in Serbia? This interest is understandable: after all, low number of women in STEM fields is a well-recognized problem (European Commission 2001; National Science Board 2010; UNESCO Institute for Statistics 2018). This issue is often perceived as a global problem to the point of serious inquiries about what, exactly, makes women less interested in STEM fields (Etzkowitz et al. 2000; Lucht 2006; Ceci et al. 2007; Hill 2010). However, it is important to note that this (very real) problem is something that actively happens in the Western countries (Etzkowitz et al. 2000) and, although it is hardly localized in the West, this is something that happens in the most developed countries in the world. Perhaps because of this, a common belief is that it could only be worse outside of the West. In this sense, interest in women and science is understandable.

“Doing science” was another theme I found difficult to discuss. This did not surprise me, but it made my research more challenging. Scientists working at AOB are astrophysicists, engaged in hard science and subscribing to ideas about objectivity and rationality (Fanelli 2010). They do not see their work and the way they approach science to be in any way, shape or form, subjective or different than astrophysics done at other places in the world. “The only difference is money,” was a common reaction to these questions. “We have to engage in research that we can do with the amount of money we have. But the science is the same.” The adamant “we are scientists, full stop” attitude made it next to impossible to research the actual scientific work at AOB. The problem was exacerbated by the way science is performed, by downloading data

onto laptops and working on laptops alone, often away from the Observatory. Science and scientific work at AOB are analyzed in Chapter 4a.

The abovementioned issues posed a methodological challenge during my research. I listed these challenges here to emphasize the lack of interest in certain themes among Serbian scientists. This does not necessarily mean that these themes are unimportant or unworthy of discussing, but it does demonstrate that they are not of particular interest to scientists working at AOB. I have to note that this is very different from refusing or avoiding to talk about a subject (such as money or ethnic identity), which is a completely different situation. My informants found the above themes uninspiring and, for the most part, “non-issues.” In short, these were not recognized as problems or themes of importance. This made it challenging for me to gather data on these topics, which was even more frustrating because I knew how relevant and important these themes were for my audience. This difference in themes of importance often posed a challenge for me in areas other than core research. For example, it was sometimes difficult to formulate the object of my research for the purpose of conference papers or funding applications. This is where I felt that telling the truth about my research would diminish its relevance for the Western audience. On the other hand, presenting my research as being focused on Western-relevant themes (gender in science, for example) seemed dishonest. Through the years, I found the way to announce Western-relevant themes through abstracts and proposals but to contextualize it as “not being the most burning issues” in the analysis. I still feel I have a lot to perfect on this front, particularly in terms of finding how to talk about themes relevant for Serbian scientists that might not be of particular interest for the Western audience.

Vignette: “What Do You Do?”

There are many themes that people in Serbia will accept as conversation starters, from the prices rising to the abysmal state of public transportation in Belgrade.¹⁶ But one theme is not acceptable: asking your new acquaintance what they do for a living.

To be honest, I was unaware of the popularity of this question before moving to North America. I can also say that I am still unable to ignore a twitch of unease when asked that

¹⁶ With total honesty, and having experienced public transportation in Canada, I can say that the public transportation in Belgrade is fine.

question, even though I do have a socially acceptable answer. However, this is not a question one deems appropriate in Serbia as a conversation starter.

It may seem simple to explain why. The levels of unemployment in Serbia are high,¹⁷ and this is just the official statistics. Unofficially, many people do not work but are not recognized in the system (there is no consistent welfare help for those who do not work, so many people do not bother signing into the system), and many people work illegally (mainly because their bosses refuse to pay required benefits and insurance for their workers.) Getting even the lowest-paying job is often a challenge, while those better paying, or more prestigious positions are often acquired through *veza*. Many people with university education cannot find a job, so asking them “what they do” might be a slap in the face.

Interestingly, people in Serbia do not shy away from probing, way-too-intimate questions. It is not unusual, for example, to be asked why you do not have children or what your parents’ illnesses are, even by people you have just met. (Similarly, receiving unsolicited advice on health, relationships and finances is a common thing in light conversations.) Talking about money, or, rather, complaining about the lack of money, is a favourite national pastime. Asking about someone’s job is not simply a too personal, potentially hurtful question; Serbian people do not mind asking personal questions, and in many cases, they don’t mind answering them.

So, why not asking about work, then? The truth is that this sort of information is not something seen as being of importance for a new acquaintance. Because of complexities described above, what a person does for a living (or whether they have a job at all) is a combination of external factors such as luck or connections, not them as a person. It does not reveal much about a person’s interests or even their way of life. People in Serbia are not known to identify with their job (Blagojević Hjuson 2013). Indeed, many people, when asked this question, will tell you what their qualifications are. “I am a plumber,” “I am a historian” – regardless of where they are employed or whether they are employed at all. While there are people who like to brag about what they do, or where they work, this sort of information is typically volunteered without the other person’s input. Working or not working is not something people shy away

¹⁷ As of 2019, the official unemployment rate is 12.1%, according to the Labour Force Survey (2019). <http://publikacije.stat.gov.rs/G2019/PdfE/G20191137.pdf>

from disclosing, and the issue of someone's job does come up in conversations, but rarely as a conversation starter. At the same time, this sort of information *is* seen as something more intimate than many other themes, so it is not a typical conversation starter.

Chapter 3: The Observatory

Science is performed in specific places, and these places matter. Before I go into descriptions of scientists and scientific work at the Observatory, I want to describe the place itself:

Astronomical Observatory Belgrade.

Getting There

The Astronomical Observatory Belgrade was built in the early 1930s about 6km from the city centre¹⁸ (Dimitrijević 1997, 11). A forest-covered hill south-east from the city proved to be a good location for astronomical observations. Far away from city lights and higher than most of the surrounding area, it was remote enough for the purpose. The name of the municipality, “Zvezdara” (“star-house”) comes directly from the Observatory (Dimitrijević 1997, 107) Once an area far away from the city, Zvezdara today is one of the municipalities closest to the city centre. City lights and pollution prevent observations, at least those of scientific significance. This problem is often addressed by people working at AOB, and it was one of the main reasons for building a research station Vidojevica in southern Serbia (Bogosavljević 2012).

While city lights and pollution might have ruined astronomical observations, AOB is still located in a relatively remote area. A good part of the Zvezdara hill is still covered in forest; the area surrounding the Observatory is isolated and quiet. There are private houses near the main road leading up hill, but it is very much away from city noise. There is only one bus line, 65, going up the hill, which proves in its own way that the area is remote.¹⁹ The road is steep and relatively narrow; there are not many houses around the observatory, although another scientific institution, The Institute Mihailo Pupin (IMP),²⁰ is located one bus stop down hill from the Observatory. Some researchers have their own cars and use them to go to AOB. These are mainly the more senior ones. Younger people, and indeed, most of the people I talked to,

¹⁸ The Observatory was founded in 1887, but was later moved in the new complex, built from 1930 to 1932 (Dimitrijević 1997, 11). The new Observatory was moved in on July 1, 1932 (Djokić 1993, 116).

¹⁹ Despite negative attitudes people in Serbia have against public transportation it is fair to note that the city itself is well-connected by buses and other means of public transport. Since many people in Belgrade do not own cars, public transportation is often the only means of getting from point A to B. The fact that there are not many bus lines going to the observatory and Zvezdara forest does speak about the remote aspect of this area.

²⁰ “Mihailo Pupin” is an institute for information and communication technologies.

use public transportation. There is parking on the far side of the main building, and there are always at least several cars parked. One informant has estimated that about half of the people use cars, while others take the bus. However, it seems that everybody references the bus and their experiences with it. Talks about coming to and from the Observatory are mainly talks about the bus. It might have something to do with the fact that coming by a car doesn't result in frustration and is thus not worth of mention. Complaining about bus 65 offers a more interesting conversation.

The 65 line is one of the longest in Belgrade, stretching from the Bežanija hill in Novi Beograd all the way to Zvezdara. It is a fifteen-minute ride from the city centre if traffic is favourable. In 2017, road construction on the main street leading from the city centre to Zvezdara made for changes in the bus schedule. This resulted in a 45-minute ride from the city centre. Many angry complaints about president Vučić were exchanged over coffee at the AOB regarding this.

After passing the city centre, the bus arrives to the foot of the Zvezdara hill. The road is steep and the old buses struggle to climb it. During the winter, the bus 65 might not even go up hill. When this happens, astronomers either go on foot or do not go to work at all. I never witnessed anyone walking up the hill; there is about 2km of climb. The last bus stop is built on a flat area before the last ascent of the hill. There is nothing around: no kiosks, no small shops, which is atypical for Belgrade. The forest starts immediately to the right. There are not many passengers who go all the way to the last stop (image 1).



Image 1: The last stop of the 65 route, Zvezdara

The moment one steps out of the bus, a new world starts. It is quiet and deserted. It does not feel like Belgrade anymore. There is nothing but nature to the right, small houses to the left, and an asphalt road continuing up the hill. To reach the Observatory on the top of the hill, one must continue on foot. There is about 500 meter distance from the bus stop to the Observatory, but it seems longer. Because of the forest and the meandering road, it is not possible to see the Observatory from the bus stop. The five-to-ten minute climb (image 2) is typically quiet. Even with houses and a restaurant on the left and a park on the right, the area is generally devoid of Belgrade noise. More often than not, there are no people in sight. During warmer, sunny days, there are people in the park: couples sitting on the benches, old people playing bocce in the park. The bushes and trees muffle the sounds, so it truly feels like going away from the civilization as one climbs up the hill. The air is fresh; the scent of leaves and soil persists throughout the year. It always feels a bit chillier than in the rest of the city.



Image 2: Climb to the Observatory

There is no sidewalk to speak of, so one has to make a choice between the road and the grass. The grass passage on the edge of the forest is muddy and slippery during rains. It is better in the spring and summer. There are small stretches of the sidewalk here and there but are typically used by the (improperly?) parked cars. This is why people opt for the road. The left side is narrow and covered in bushes; front yards and fences stretch all the way up the hill. It is impossible to walk on that side, so one must stick to the right. Doing this means not being able

to see the oncoming traffic. Luckily, there are not many cars going up the hill, and drivers are aware of pedestrians on this stretch of the road in a way they rarely are anywhere else in Belgrade. It means walking up the road in a relative safety. However, once you hear a car approaching, you have to move right, to the edge of the forest. This going left and right keeps one alert during the climb.

The most prominent building to the left comes in the last third of the journey. A two-storey house with a red slated roof and a prominent air-conditioning unit attached to the side of the façade. It is built right at the edge of the road so it sticks out like a crooked tooth among the other buildings hidden behind their front yards. This is “Šumski bar” (Woodland bar). A small fast food joint opened on the front of (presumably) owner’s family house. For those who do not have time to sit down to order, there is a white kiosk to order your *pljeskavica* or another “traditional Serbian” grilled offering. One of the kiosk’s windows has a page from an old newspaper duct taped to the glass. A picture of an old man dominates the page. *Tito*. President for Life of former Yugoslavia and the symbol of Yugoslav socialism (Bringa 2003; Brkljačić 2003; Videkanic 2010). The newspaper is dated May 4, 1980: the day of Tito’s death. People at AOB tell me that they sometimes go to “Šumski bar” for a quick lunch or a drink, although a more popular option is a larger restaurant further up the hill. Before they got access to the cafeteria of the Pupin institute,²¹ AOB researchers would often have their lunch in the restaurant, and “Šumski bar” was treated more like a store. Everybody laughs at the mention of Tito’s photo. “The man attracts attention,” one researcher said. When asked about the newspaper, people at “Šumski bar” were proud of having preserved the historical paper, “when we finally got rid of *him*.” Encountering marshal Tito on the way to the Observatory is a fun coincidence, and the one that becomes unintentionally, yet highly symbolic: so many things

²¹ One of the staff members has secured lunches at the Pupin institute. AOB staff were given security passes so they could go to the Pupin institute for a lunch at their own convenience. Going for a lunch at the Pupin institute is typically made into group outing. Researchers would gather around 1PM or so and walk downhill to the Pupin institute. While the lunch at the Pupin institute is served from noon to 4 PM, there was no specific time for AOB researchers to lunch. There would typically be an informal agreement on day to day basis on when to go. My informants praised the food. “It’s a good lunch. There are often five or six meals to choose from,” I was told. Researchers also agree that it is a good chance to catch up with others. Since I did not have a Pupin security card, I could not join AOB staff in these lunches, but I was told that the conversations out there are “typical. What you might expect”. This refers to conversations about private things and politics, with a rare mention of work-related subjects.

about the Observatory are still marked by the socialist legacy. This legacy persists at the Observatory in ways that is non-existent in so many places in Belgrade, and in Serbia.

The final stretch offers access to the park. Wooden benches and tables are placed some ten meters from the road, between the trees. Concrete trash cans are painted bright yellow. For the most part, the trash finds its way to these, which is a pleasant surprise. However, it is not unusual to find squashed cans and cigarette butts on the ground. A bit further away but visible from the road, there is a bocce field covered in red cinder. On sunny days, pensioners (all male) gather here to play (image 3). Some of the most fond memories of AOB researchers are lunch breaks in the park. “We would buy beer and sit on benches, talking,” many of the younger researchers recalled. “I miss those days,” another young female researched said. “We would spend hours there when weather was nice. But with so many people married with families these days, there is not so much time for that anymore.”



Image 3: A park near the Observatory grounds

This last stretch of the road is also the most likely place for an encounter with one of the many stray dogs who live in the area. Truth be told, some of the dogs that could be seen on top of the hill belong to people who live in the houses on the left side of the road. It is never easy to tell: both types will keep a watchful eye on the approaching pedestrians. On a good (bad?) day, one can meet as many as four dogs during the climb. At least one of them will bark in the approaching person’s direction. Some will cross the road to the woods to meet the visitor. Most

of the time, the dogs are more interested in the oncoming traffic, jumping ferociously to the side of the car and barking in rage as the car travels up hill. But they are also very aware of the visitors, especially the new ones. I was told not to be scared of them. “They leave us alone,” many researchers told me. “They will remember you after a while.” Indeed, after visiting AOB for a week, the stray dogs became less interested in my presence. I also learned which ones are tamer than the others, and which ones are less likely to run into my direction, barking. While I am not afraid of dogs, being alone on the road with a group of them is not a pleasant experience. I devised a strategy to turn a bit deeper into the park if I saw the less friendly ones patrolling the road.

The stray dog situation is a well-known problem for people working at AOB. One of the female researchers, Sandra, told me: “There are many stray dogs. Some of us are really scared of them. This is why many people wait for each other to go home together because of dogs. I have a system: I bring some food I throw it to them, and they leave you alone.” Mila, another female researcher, admits she carries a pepper spray with her to fend them off. She also prefers to come to and from the Observatory with someone else. She would agree to meet a colleague on the bus stop to climb together to AOB, or she would wait at the Observatory after she is done with her work to have someone to go back to the bus stop. Interestingly, no male researchers complained about the dogs in the area.

“It is even worse when you go all the way through the woods. There are even more dogs out there,” said Jasna, another female researcher in her 30s. “They can be a big problem. Here, from the gate to the 65 bus, it is ok. They will bark, this is their territory, but that’s all. But when you have to go down through the other side of the hill and through the forest, they can be very aggressive.”

Apparently, many people choose this part of Zvezdara forest to abandon their dogs. Since so many dogs are not neutered, they mate and produce offspring, so the problem increases. Is there something that can be done? My informants didn’t seem too optimistic. “People who live here sometimes call animal services, and they come from time to time and sterilize dogs and then bring them back. So, this is all that happens.” This is said with a shrug; this is how it is. The lack of outrage or faith in public services is evident. Nobody expects anything from them, and nobody even thinks about official services ever being interested in solving this problem.

The Observatory gates await straight ahead on the top of the hill. The road turns left, and a small path leads right, deeper into the forest and to the other side. The Observatory buildings are separated from the road by a metal fence, although there is no other security. Despite an effort needed to climb from the bus stop to the main gate, this is by far the easiest and safest way to reach the Observatory. The other option is going through the other side of the hill, all the way through the forest. There are paths for pedestrians and cars to pass, but it is not a preferred way. Some researchers use it because it is more convenient from where they live, but all agree that it is not enjoyable. There is a concrete road down from the Observatory to the foot of the hill on that side, and not many houses. An abandoned military building stands on the left, and the forest stretches to the right. Houses start only further down.

“That side can be scary,” says Jasna. “Stray dogs are not the only problem. There are also homeless people in the forest. There were also some murders. I’ve heard that a woman was murdered in the forest years ago, and a few years ago they butchered a man and buried the body in the forest; sometimes drug-related. Also, there are junkies who come here to take drugs.” When I asked her if there was anything done about this, she shrugged “Police have an obligation to go through this area at 2 am. They sometimes come, sometimes they don’t. This is a bigger problem for people who live here, not for us.” Other people confirmed the junkies and murder stories, but nobody could provide details. It doesn’t seem like anyone was interested in particularities; dogs, junkies and murders were listed as part of the area’s lore, as something that just is. “I’ve heard of those things,” Petar, a male researcher in his 30s said. “Well, not *heard*; there are no specific stories of incidents. These things simply are. This is how it is.”

Despite these issues, AOB researchers claim that they feel safe at the Observatory. When I asked Jasna if she is scared to come to work, she smiled. “No, not really. It doesn’t really affect us, these things. I felt a bit uneasy about the dogs at first. You just have to wait when they jump and bark at the car, just wait for them to be done with it. And the other stuff, the junkies and homeless people, most of those things happen at night, and further into the forest. We don’t go there at night. So no, I am not scared.”

Other researchers confirmed this story. While most of them will avoid going through the forest at night, particularly on foot, and while many of them repeated the junkies and murder stories, nobody regarded the Observatory as an unsafe place. “These things just don’t come here,”

Stefan, a younger male researcher told me. “They don’t concern us.” The fact that these things do happen so close the Observatory’s grounds do not seem to be of much concern.

The remoteness and nature is something many researchers at the Observatory praise. The general consensus is that it is a beautiful location. “The Observatory building, I love it. I like it that it’s not in the city centre. For me, city centre is something where I go to do some business or to meet someone at a coffee shop. It is beautiful here, nature and everything,” a younger female researcher, Milica, told me.

Observatory Grounds

The main gate is always open, although I was told that it is locked at night. After passing the gate, there is a simple sign in Cyrillic: “Astronomska opservatorija” (image 4). To the left side of the path leading toward the buildings, there is a lovely sun clock on a marble base. The sign informs visitors that it was built in 2012. This is one of the most recent things to be seen on the Observatory grounds. The Observatory buildings were built in the early 1930s and designed by the famed Czechoslovak architect Jan Dubovy (Djokić 1993; Dimitrijevic 1997). This was one of the first examples of the modernist style in Belgrade (Brochure of the Astronomical Observatory Belgrade 2011). The architecture and sculptures on the façade provide a striking visual impression despite their age. Researchers at the Observatory agree: the buildings are old and dilapidated. The signs of time and lack of investment can clearly be seen, but the Observatory’s architecture keeps its charm. There are eight buildings in the Observatory complex designed by Dubovy: the administrative building, various pavilions for telescopes and other equipment, and auxiliary buildings (Milašinović-Marić 2002). The buildings are scattered along the top of the hill and connected by paths. Almost everything that could be found at the Observatory grounds was built in the early 1930s. At the time, the hilltop was cleared, but today, the bushes and trees surround the area and can be seen on the Observatory’s grounds.

When arriving from the bus stop and after passing a low concrete shack, the main building appears. It is a two-storey building with prominent composite windows on the ground floor. This is the backside of the building; the main entrance is located on the other side. Most of the time, people use the other entrance, on the side of the building (image 5). This is so common that it is not always clear in conversation what people mean when they refer to the “main entrance.” For most researchers, particularly those who use bus to come to the Observatory, the

main entrance is not the “largest entrance,” but the one they use the most. There is a tall ashtray on the ground perpetually filled with cigarette butts. On more than one occasion, I saw a cup filled with Turkish coffee waiting on the stairs. Five or six concrete steps lead to old wooden doors with glass panels. White wire mesh can be pulled over the doors for security. I have never seen these doors closed, and researchers claim that only those who come really early or stay very late would witness it. On a wall next to the door, there are three rows of metal mailboxes, rusty and uneven.



Image 4: AOB gate with the sign (the main building can be seen in the background)

Across the path from the side entrance, behind the trees, there is a tall and narrow building: a pavilion with apartments for astronomers. There are people living in this building, but most of them are not employed at the Observatory. According to my informants, people living there have obtained their apartments “who knows how” during the 1990s. This means *veza* (connection)²². The 1990s were a precarious time for obtaining apartments. People living in government apartments (which was the majority of people in Serbia) had a right to buy these apartments and become owners. The prices set were ridiculously low, particularly in terms of hyperinflation. Depending on the apartment size and location, one could buy their apartment for as low as 100 Deutsche marks. Larger apartments in more exclusive parts of Belgrade could

²² I will describe informalities and *veza* more closely in Chapter 5. At this point, it is important to say that it is considered the most natural way to gain this sort of access, and it is part of larger understanding of favours.

be bought for 2000 marks. It allowed almost everyone to become owners of the apartments they lived in. The problem with apartments at the Observatory is that they didn't go to right people. "People who have nothing to do with the Observatory bought those apartments during the 1990s," Sandra told me. "These apartments were originally built for scientists, but scientists don't live there. Those are just some random people. I don't know how they got those apartments. Well, we all know how. And there is nothing we can do. You can imagine this situation." One of the people living at AOB is a former security person who doesn't want to move out. Police had been called to intervene, but to no avail. "He simply doesn't want to move out," Sandra told me. Because of this situation, no researcher goes near the tall building, although they gather in its proximity during the warm days to sit on wooden benches, drink coffee and converse. There are several beehives nearby. The bees and the hives are owned by the people living in the tall building and thus are not to be mentioned.



Image 5: Observatory side entrance

The other side of the main building is slightly more presentable. The main entrance has a porch with four pillars and an inscription above: OMNIA IN NUMERO ET MENSURA ("All things in number and measure") (image 6). This central part of the building does not have a second floor; instead, there is a terrace and a small dome hosting a Photovisual Refractor (Dimitrijević 1998). Traces of time and decay can also be spotted here. Composite windows are dirty in

places and hang inside of shivery wooden frames. The frames are freshly painted white, but they seem easily breakable and bent in places. Many windows come with outdoor metal shutters that are typically pulled aside, traces of rust corroding the white paint. The main entrance overlooks parking filled with leaves and dirt. Paths of concrete blocks lead further into the Observatory grounds, toward other pavilions. These paths are covered in leaves throughout the years and partially hidden in the grass. Trees grow on both sides of the paths, which makes it difficult to see domed pavilions. I have never been there; pavilions and old telescopes are of interest only on special occasions, such as guided tours for visitors interested in the history of AOB. This explains the grass growing over the paths, unraked leaves and mushrooms growing on the sidewalks. The main building, also known as the administrative building, is where everything takes place. Because telescopes and other instruments hosted in pavilions are old and obsolete, there is no need for scientists to even visit them. They seemed enthusiastic about the librarian taking me there and telling me all about AOB's history, but they made it clear that they have no use of any instruments located in those pavilions. "That is all completely obsolete," Petar told me. "That will be turned into a museum for visitors."



Image 6: Observatory building – the main entrance

Interiors

The inside of the main building is divided between offices for scientists and administration. The entrance hallway receives natural light from the dirty panel windows on the roof. The wall closest to the door includes wooden mailboxes with the names of scientists glued or taped on pieces of paper. Some are done more neatly than the others: printed on a computer and meticulously attached to the front of the box. Others are done by hand, some on pieces of notebook paper of uneven size. Some of the names are so old that they could hardly be read; others have papers attached on top of the old ones. Narrow glass cases on the adjacent wall display old issues of the Observatory's magazines.

To the right of the entrance doors, there are two metal safes that serve as stands for discarded items and empty coffee cups. Two tall, old clocks are mounted to the wall next to the office doors. Between them, there is an equally old barometer. All these instruments are part of the Observatory's legacy. Above the clocks, there are two more modern, digital clocks displaying different time. These walls host cork bulletin boards, one of which is completely filled with old announcements and posters. The other one is neater and includes printed current announcements with the Director's signature. At one point, the most prominent one was: "This is a notice to all the employees of the Astronomical Observatory that the main building's doors are locked after exiting the building after 16:00 o'clock." This is not a clumsy translation; the way the announcement is worded, it is not clear whether the employees should be the ones to lock these doors. I was told that they all have keys to the main building, but nobody ever complained about having to lock the door or being locked out.

Almost all of the doors have a no smoking sign, a worthy reminder that many – but not all – employees obey. Notable exceptions among researchers openly smoke in their offices, while others take frequent smoke breaks outside. These breaks are rarely, if ever, done alone or without an accompanying cup of Turkish coffee. These cups can be found all over the building, empty, nested in each other, half-full or untouched. Many times, there are no owners to claim them. At the same time, it is an unusual sight to catch employees without a coffee cup in hand or a cup resting on a desk nearby. The cups are scattered around, but it seems that people are always drinking coffee. The number of coffee cups that are sown around the building is larger than the number of people. Some people have their own cups to claim. Others use communal

cups from the kitchenette. Visitors have to use communal cups; I was advised to bring my own coffee cup if I intend to spend more time at AOB. When I said I didn't drink coffee, I was met with awkward silence.

The most prominent feature of the entrance hallway is a large desk pushed to the side of the stairs leading to the second floor (image 7). It is stacked with old books and surrounded by potted plants and old posters of astronomy conferences. The underside of the desk is a home for the abandoned computer cases and printers. A wobbly wooden chair stays next to the desk, unless it is needed in one of the offices. A used cardboard box is pushed to the wall next to the desk. "Recycling paper," says a note taped to it.



Image 7: AOB entrance hallway

A narrow hallway to the left of the desk leads to the Director's office and administration. The Director's office is the only room in the building that has an upholstered door. Further to the heart of the building is a small kitchenette where coffee is made. One needs to go through it to reach the library. The building is designed in such a way that the library is easily reached through the main entrance, but most people use this side of the building. It means walking through a series of narrow corridors and a dark kitchenette to the library. Designed by Jan Dubovy (Milašinović-Marić 2002), the library (image 8) is the most spacious and prominent room in the main building. It is an oval room with a wooden gallery and floor to ceiling

windows on one side. These windows are among the first things a visitor sees when approaching the building from the direction of the bus stop. Inside, book cases rise to the ceiling and massive desks allow for ample work space. Glass cases positioned near windows host smaller astronomical equipment of historical importance for the Observatory. A large sky globe rests by the wooden steps leading to the gallery. The library is a beautiful room very different than the rest of the Observatory. Work is rarely done here; it is reserved for staff meetings, guest lectures, celebrations and other special occasions.



Image 8: AOB library

The upper floor has grey and beige tiles and hosts five offices and a washroom. Just like the one downstairs, this washroom is unisex. Many of the project leaders have their offices on the second floor, although this is not always the case. What is true about these offices is that many of them are occupied by a smaller number of people. Sometimes, there is only a project leader and another person sharing the office. Boxes and old furniture are pushed to the wall between office doors, including a stand with an empty water dispenser. A row of potted plants leads to the terrace door. The terrace sports a Serbian flag and offers a better view of the Observatory's grounds. The first time I climbed there, I could see auxiliary buildings behind the trees and the Director's dog playing on the pathways. The terrace leads to the other wing, also populated with offices. This one is darker and more isolated and hosts a fewer number of scientists. My

astronomy informants were hosted there, as the opposite of the astrophysicists, who occupy the offices nearer the common entrance.

The offices (image 9) are relatively small and can only host two or three desks and bookcases. Modern desktop computers and laptops make a sharp contrast to the old furniture. In some of the offices, windows cannot be closed properly, which brings draft and bugs. More than one interview was paused to chase a stinkbug away. The walls are covered in framed pictures and cork boards with notes. Most offices include air conditioners, and some have their own white boards perpetually filled with formulae. There is a mess in all of the offices: stacks of books on desks, coffee mugs, scientific journals, documents that need to be signed, coffeemakers, overflowing boxes. The only semi-neat offices were the ones that were tidied up because of me. Several female researchers admitted they tried their best to clean up the mess before a scheduled interview. Some offices are so packed with chairs and desks there is not much room for anything else. Many offices host more people than there are chairs, so it is impossible to work properly. This is particularly true for the first office on the main floor. It hosts six people in a room that can barely sustain three. The adjacent office is packed with boxes and two computer clusters. The clusters could be moved to the basement to make room for people, but this is not happening. As a result, people need to take turns to use the office space.



Image 9: One of the offices at the Observatory

The hallways are typically quiet, with murmur of voices coming from behind the doors. Those housing administrative people are permanently closed, at least for me, while scientists come and go. The atmosphere is vibrant and relaxed at the same time. There is always something happening, and there is always an opportunity for a talk. At the same time, heightened informality of language and people's movements make everything seem almost carefree. The voices get loud from time to time, and it is not uncommon to hear bursts of laughter and clinking of the coffee cups. Other times, it is quiet, only a low buzz of voices persisting in largest of offices. The cleaning lady comes and goes with cups of coffee. Sometimes, a door is slammed accidentally because of the draft. A tabby cat could be spotted on windowsills or in the hallways. It is the resident Observatory cat and it minds its own business.

“Old” and “breakdown” (*raspad*) are common words researchers use to describe the building and infrastructure at AOB. There is also a great deal of shame about it in terms of reporting the situation in my thesis. Other than my thesis, researchers were happy to talk about the problems with the building, quick to complain about problems such as lack of space or windows that cannot be closed properly. They complained about the former Director not even being able to find funds to paint the offices. The current Director managed to do it: he secured funds by renting out the library to a film crew. They shot a film titled “Skidanje” (“Undressing”). “No comment,” was a cynical reaction to that.

Another notable problem is that the building itself is under the protection of the government, which means that no funds are invested in maintenance. Being under government's protection effectively prevents the staff from fixing things on their own, particularly in terms of the façade. The building has to keep its modernist look, with windows and other details the same as they were when the Observatory was built in the early 20th century. It means that they are not allowed to put new, modern windows to replace the faulty ones. The only way to go is to order special windows that are crafted using contemporary technology but have the same physical design as the old ones. Essentially, this would mean ordering custom-made windows, which costs money that the Observatory does not have. This is the type of restoration that the government should pay for, but there are no funds in the budget. As a result, employees have to deal with draft, bugs, faulty pipes and other problems. I was told that the other pavilions are in an even worse state than the main building. Recently, the Observatory had a problem with

heating. In the past, they had used coal heating, but they decided to switch to pellet because it was cheaper and produced less waste. But it also meant changing the cauldrons. The whole Observatory was without heating until this was fixed. One of the main problems is lack of maintenance staff. The Ministry gives specific rules on how many people can be hired. It is regulated that for a specific number of researchers, there needs to be a specific number of administrative and other employees. Since AOB is a small institution with a small number of researchers, they are only allowed to hire one person for maintenance (a janitor) and one person in charge of heating. That is not enough to maintain the whole building, particularly not the one that is almost 90 years old.

The atmosphere at the Observatory is a lively one. When the office is closed, the main hallway is quiet, but a murmur behind the doors prevail. There are people alone in their offices, working in silence. The sounds of their work are sounds of typing and mouse clicking. However, most people at the AOB are not alone. Offices are crowded, so there are always people to talk to.

Clinking of the coffee cups and laughter is a common sound. People talk, and they talk loudly. They talk as they work, and they talk as they don't work. There is always someone going in or out; visiting people at other offices is a common thing. A visit might be work-inspired, but there is often a general chat involved. Even if people haven't seen each other in more than an hour, there is always something new to discuss. It is always a good time for a cup of coffee. When the weather is nice, they go outside to sit on the benches. Coffee, cigarettes and gossip fill the air. When the weather is bad, they seek the warmest offices in the building to gather into. Coffee makes them warm and the cold is more bearable in good company.

Vignette – Coffee

Coffee drinking is a staple of Serbian socialization. Any sort of a talk, interaction or occasion calls for a cup of coffee. The act of coffee drinking in company, talking and socializing is called “*kafenisanje*.” The coffee in question is always Turkish coffee; while many people drink other types of coffee, these are not considered “the real one.”

The real one is a strong, bitter coffee that has to be made by boiling grounds in water. It is drunk from small ceramic cups, or, if these are not available, from bigger cups. Some people take it with sugar. When preparing coffee for someone, it is necessary to ask how many

teaspoons (in Serbia, unsurprisingly, known as “coffee spoons”) of sugar to take. A polite answer is generally less than three, so one has to be prepared to withstand the bitterness. The spoons are often provided with the cup of coffee, but those foolish enough to actually use spoons to stir the coffee need to be careful. Go too deep into the cup and you will disturb the grounds, making the sludge from the bottom rise to the coffee itself. Such coffee is undrinkable. The sludge needs to be left where it belongs: to the bottom. It is not unusual to use those grounds, after the coffee has been consumed, to tell fortune. This activity is considered uncultured and “peasant-like,” so it is not practiced at the intellectual institutions such as the Observatory.²³

The coffee in question is Turkish; part of the Ottoman legacy. Some people do, indeed, refer to this coffee as Turkish, but terms such as “domestic” or “our” coffee are also common. There is something to be said about the differences between people who call the coffee Turkish and those who insist on it being “domestic; *our* coffee.” Some people flinch at our coffee being called Turkish; it evokes uncomfortable realities of the Ottoman rule on the Balkans. It also makes people ponder the fact that something that is such a staple of Serbian everyday life and socialization is not Serbian in origin.



Image 10: Coffee ready for *kafenisanje* on the steps of the Observatory

²³ Not to my knowledge, at least.

Coffee drinking can be a solitary activity in some situations. For example, waking up typically includes a cigarette and a cup of coffee, even if there is nobody else around. It is in no way socially unacceptable to drink coffee alone. However, it is also a highly socialized activity when there is another person in the room. You will be offered a coffee as soon as you arrive, and you better take it. A refusal might be taken as a borderline refusal of socialization, which is a socially questionable behaviour. If you are to refuse a cup of coffee, you better have a good reason.²⁴ Conversations revolve around a cup of coffee; friendships are made, secrets are revealed, politics is discussed. People complain and bond through shared complaining over a cup of coffee.

One unspoken rule of *kafenisanje*: it is not something to do in a hurry, at least not if you want to drink coffee properly. This is why it is so difficult to find places in Serbia selling coffee in paper cups for the go. You don't drink coffee "on the go." Coffee needs to be taken while sitting down. It requires time to be consumed. It asks for people to slow down and talk. Depending on the situation and conversation, basic *kafenisanje* - drinking one small cup of coffee can take an hour, or more. By the time one reaches the sludge, a vivid conversation is formed. Finishing a cup of coffee prompts a question: "another one?" At that point, the person might decide to stop and turn to work. If not, the conversation is continued over a new cup.

²⁴ "I don't drink coffee" is not considered a good reason.

Chapter 4. Performing Science

4a. Scientific Practice

Murmur prevails in the largest of the offices on the main floor. Five people sit on their desks that face freshly painted walls. They have their laptops in front of them and coffee cups next to the laptops. Clicking of the keyboards mixes with conversation. Linux screens flash before sequences of text and numbers. One of the scientists works with a program producing graphics. The air is sticky; there are too many people in the room. Despite lively clicking and conversation, the atmosphere is relaxed. It doesn't seem anyone is in a hurry.

An older male scientist talks loudly on the phone. "Ask them to send those documents... When will it be?" Pause. The answer makes the scientist laugh bitterly. "Oh well, it's not surprising."

"It's not ready yet?" a younger female scientist asks, not reverting her gaze from the laptop screen.

"Of course it's not ready," her colleague sighs and turns to his laptop.

Projects at the AOB

Laptop work, graphs and series upon series of data are part of the everyday work at the AOB. In many ways, those make the core of the work in astronomy and astrophysics. Actual observations of the night sky are not performed at the Observatory.

Scientific work and projects were among the favourite themes that scientists wanted to talk about; the only more popular theme was complaining about the lack of funding (see Chapter 4b). In many ways, conversations with AOB researchers about their work ended up being promotional speeches about their projects. I received a lot of "official talk" about the projects, typically delivered in a formal speech. This stood out compared to the overall informal and relaxed type of communication at the Observatory. It was clear the researchers did their best to slip into their "promo/explaining" mode when talking about science. Most of the information delivered in this way could be directly read from promotional brochures about the institution's work.

Since it seemed so important for researchers to communicate this information to me, in this matter, I will go through the content of these “promo talks,” making added commentaries when necessary. Most of this information came through the interviews, as a response to my question “what do you do at the Observatory?”

Science at the Observatory is organized around seven research projects funded by the Ministry of science: Astrophysical spectroscopy of extragalactic objects, Influence of collisional processes on the astrophysical plasma, Gravitation and structure of universe on large scales, Stellar physics, Dynamics and kinematics of celestial bodies and systems, Visible and invisible matter in nearby galaxies: theory and observations, and Astroinformatics: Application of IT in astronomy and related fields of research (Brochure of the Astronomical Observatory Belgrade 2011).

The projects typically employ up to ten people at the AOB, although many of these projects also include researchers from other institutes and universities in Serbia. Each project has a senior researcher who is the project leader and the boss of the team. While all projects are done within the Observatory, they all enjoy relative autonomy. Each project team works separately, even though they are within the same institution. The situation is described as “republics in SFRY”²⁵ (Socialist Federative Republic of Yugoslavia): projects are within the same institution, but not necessarily connected. The Director of the Observatory does not influence these projects since they are approved by the Ministry itself. In practice, it means that the role of the Director is more administrative in nature and does not extend its power to the science itself. Project leaders are the figures with the most power to guide science at AOB.

The Observatory prides itself on a long astronomical tradition. The first projects done at AOB, until the mid-20th century, were mostly focused on astrometry and building a proper coordinate system (Radovanac 2010). Work done at AOB was based a lot on the observatory astronomy: small bodies, Sun, polarity of stars, movement of poles on Earth, etc. In the mid-20th century, astrophysics started to develop and AOB work soon expanded to include research in astrophysics (Radovanac 2010). Today, most projects, particularly the most prolific ones, are

²⁵ Republics within SFRY enjoyed a certain degree of autonomy. The level of this autonomy is often perceived as too low or too high, depending on the person’s attitude towards Yugoslavia as a union of different ethnic groups.

done in astrophysics (Brochure of the Astronomical Observatory Belgrade 2011). Astronomy projects still exist but are smaller and considered less “cutting edge” than the astrophysics.

“There are also people who see astronomy as less prestigious than astrophysics,” a younger female scientist, Milica, told me.

This claim was not repeated openly by other informants, although I had people jokingly point out the location of astronomy offices. While people working on astrophysical projects reside in the main building, astronomers are delegated to offices in the back. These offices are connected by the terrace with the main part of the building and people working there often use a different entrance than those using the main offices. Most of the time, those working in the main part of the building do not come in contact with those working in the back. There is a quiet separation between these projects.

In my conversations with scientists, I found it particularly interesting to note the way they talk about their work. Researchers at AOB are aware of the fact that their work is highly specialized and not something that is easily understandable by the general public. Some of them have admitted their lack of experience in “translating” scientific facts in a way understandable by the non-astronomers. I asked all of my informants to talk about their work in a way they find comfortable, often asking for further explanations when I felt their language was unclear. Due to my own background in astrophysics, it was sometimes difficult to me to judge whether something was understandable or not. Some researchers were enthusiastic about thinking of ways to describe their research to non-scientists, while others had a visible resistance to “dumb down” their work. After several attempts, I have found the most effective way to make researchers open up: I would let them tell me all about their work using “proper scientific language,” but I would often ask for clarification with a prompt: “tell me now/translate it for ‘stupid social scientists’ (*‘glupi drustvenjaci’*).” This approach typically attracted humour and more willingness to explain their work in simpler terms. Different researchers had different levels of abilities to do so, which made me think about the lack of opportunities (or need) for them to ever talk about their work for the members of the general public or for anyone who is not already involved in the field.

Nevertheless, researchers were all eager to talk about their work and to present it in as many ways as possible. I was often offered books, scientific journals and CDs with published articles

from AOB researchers. These materials were offered as a gift. In other circumstances, I was offered a guide on how to locate their work online or how to download their research papers from the AOB website.

There are four projects at the AOB that have originated in an older project on astrophysical spectroscopy, started by veteran scientist, Professor Stojković. These four projects are referred to as “children projects” and its staff conducts joint meetings once per week. This has provided good research dynamics for people working on these projects but has also caused a level of animosity from other groups at the Observatory.

“Others look at us like we are some kind of separatists, like we are Vojvodina” a younger female scientist, Sandra, admitted. “Other projects are not joined in this way, so there is a bit tension between us and the others. Others are each to their own.” Sandra told me. The comment about Vojvodina refers to the ongoing political tensions in the Serbian northern province over autonomy. While the issue has calmed down in the past years, Vojvodina is often used as a symbol of separatism within Serbia.

The project Sandra is working on is one of the four aforementioned projects. It focuses on spectroscopy of out-galactic objects. There are also people from the University of Belgrade involved in it, as well as people from the University of Kragujevac. The project focuses on other galaxies and gamma bursts. When asked to explain the project to non-experts, Sandra said: “the gamma rays are turned into spectrum and through spectral lines we analyze what kind of conditions are there. We read physics from these spectrums. All our research focuses on these far away objects, nothing about our Galaxy. Gamma rays are extremely exotic, extremely unclear and extremely popular.”

The spectroscopy of out-galactic object focuses its research on the active galactic cores. Those are galaxies with massive black holes in the center, and as the black hole sucks the matter, they read the spectrum of “what is going on.” This sort of research is considered important in today’s scientific terms on a global level. “We are doing this very important thing, and this is very relevant in international scientific terms,” Sandra told me.

One of the projects at AOB is a joined one between two teams. This project is completed through international collaboration with a Russian Observatory at Caucasus. Based on this

research, it was concluded that one object previously thought to be a gravitational lens was actually a regular double quasar. “Thanks to the AOB team, this object is excluded from the database of gravitational lenses,” one of the project leaders told me. This discovery was published in the *Astrophysical Journal* in 2010 and the AOB team was recognized. “This was important in international terms,” he emphasized.

It seemed extremely important to Sandra and other scientists to point out that their research is “relevant in international terms.” This claim was repeated with pride and always emphasized: the work that AOB does is not just of local importance, I was told. The “international terms” mentioned here always referred to the global scientific community, which was often assumed to be the only relevant one. “Global” in this context means “world science,” although most of the scientists that AOB researchers wanted to impress were Westerners (see Chapter 7) and, in case of certain AOB teams, Russians.

The project “Visible and invisible matter in nearby galaxies: theory and observations” involves a team of 24 scientists. Some of these people are from the AOB, while others come from different institutions in Serbia. The project focuses on both theoretical work and observations²⁶. The project is considered very successful: it has numerous papers published in leading journals and conferences organized in Serbia. “We also tried to popularize our work and projects for the general public. It’s been many years since we published this. The old Director of AOB is now an academic²⁷, but we still meet with him for this project. AOB has a different Director but the old one is still active with the project,” one of the scientists on this project told me.

Another research field at AOB is cosmology and out-galactic astronomy. A project, “Gravity and structure of cosmos” focuses on problems involving gravity. People on this project research black holes and modified theory of gravity as an alternative to black matter. There are three main methods in their research: theoretical approach, numerical experiments and simulation, and finally, comparing results of these with observations. For observations, researchers use world database of Hubble, Chandra and other telescopes. They compare the two and come up with results.

²⁶ By “observations” it is not actually meant that researchers perform observations themselves; it refers to data downloaded from telescopes around the world.

²⁷ A member of the Serbian Academy of Arts and Sciences.

There is a clear pride about the projects and science done at the Observatory. However, some scientists were quick to point out that they are struggling to stay relevant:

“We had much better results and more important achievements in the 70s,” one of the project leaders told me. “Great research with double stars, for example. That was very important in international circles. Today, we manage to swim and be relevant, but it is not cutting edge. My group is very good and does great, so I can’t complain. But some AOB projects are on the bottom. This is particularly true for those who do pure astronomy, mathematical astronomy. It is a bit of a dead branch, while my research is live branch. So, the lack of success is simply a result of that. On the other hand, it is also down to the project leader. Some of them live in the past and don’t understand how things work today. They don’t understand that you have to work for it and to really produce some results. There is a problem of dull supervisors. Astronomy is simply not as active and relevant as it once was. They mainly work with small objects and the like. Astrophysics is more fertile, but this is not an excuse for people to do nothing.”

Comparison with “the past,” typically referring to the time of socialist Yugoslavia, is something that happens often, implicitly or explicitly.

The project that was explained to me in the most detail was research focusing on the modified theory of gravity as an alternative to dark matter. It has been believed for a long time that the dark matter can solve certain problems with gravity. However, recent research showed that not even dark matter can solve these problems. I was told of Stacey McGogh, one of the leading researchers in this field (Popkin 2018). According to the AOB team that focuses on this topic, dark matter cannot solve this issue. AOB team has used his theoretical approach to see if modified theory of gravity can solve these issues, and they concluded that it could. “There is no need to include exotic concepts, such as dark matter and dark energy,” project leader told me. “No: all of that can be solved by slight modifications of fundamental laws. We just need to fix the general theory of gravity and we can solve this.”

They already have results in this area. During the current project cycle, they have published four or five papers in leading journals, such as Physical Review, Journal of Cosmology and Astro Particle Physics. They have demonstrated and tested the use of modified theory of gravity on the movements of stars around the supermassive black hole in the centre of our galaxy. “This is a unique lab where you can observe relativistic effects. In some ways, what

was observed matched the new theories of modified gravity, and in some ways, there were differences. Now we can take a look at those differences to test new models and to see where modified theory of gravity fits in, and how to modify it even further. We can see whether these discrepancies can be used to further modified theory of gravity, or to abandon it and seek new theories,” project leader explained.

What he seemed particularly enthusiastic about was the fact that all of this can be done from Serbia. “We are actively working on this. I am very proud that such research can be done here, in Serbia.”

He assured me that this is a “huge deal”:

“If we get some convincing results, it would completely change our (human) understanding of this cosmological model. Of the whole cosmological model. The present model predicts that our universe consists 95% of dark matter and dark energy, and only 5% of regular matter. If it turns out that dark matter is not needed, it would change our understanding of the whole cosmological model,” he said.

There is an ongoing battle between the proponents of the modified theory of gravity and proponents of the dark matter. The project leader compared his battle for the modified theory of gravity in Kuhnian (1962) terms of scientific revolution.

“The problem is, it is not enough to get a few results. It would mean changing the whole scientific paradigm. The current scientific paradigm includes the Big Bang, in which dark matter and dark energy are essential parts. Even this took decades to be accepted as a standard scientific fact. Currently, there are two models: the so-called ‘standard model’, which predicts the dark matter and dark energy. The alternative direction is the one that predicts modified theory of gravity. It is not enough to have a small group of scientists in Serbia and other small groups around the world to change our understanding of cosmology. A few results are not enough, and it can’t go this fast. A whole scientific revolution needs to happen for it to be accepted.”

He made it clear that the battle for the modified theory of gravity is not simply about science. He recognizes a range of societal and political factors that play into all of this.

“There is also a sociological problem. Do you know how many people had defended their PhDs, and wrote papers and base their whole research, and their whole funding, on dark matter? Imagine what would this paradigm change (shift) mean for them? And you can imagine that they would provide a resistance to this. It is not so easy to change a paradigm when the standard one has so many proponents and they are so powerful. There is a lot of money involved. All of it going into the dark matter “camp.” We can’t compete with that.”

This “sociological problem,” as he called it, was something that is accepted as a fact. It is interesting, because most of the “pure talk” about science I received at the Observatory focused on presenting astrophysics as objective knowledge (Krautwurst 2014) and the Truth about Universe. However, the debate about two competing theories not only illustrates different scientific opinions but also includes factors beyond “pure” science: funds, political interests and power. The importance of economic interests (Krautwurst 2014, 136) cannot be ignored. AOB researchers firmly believe their science to be rational and objective but are simultaneously quick to point out at societal and political factors that make their work challenging.

Money and investments that the project leader talked about mainly referred, in this specific case, to the current CERN project focused, in addition to other research, to finding the dark matter particle. “They have been trying this for years, but to no avail. If they manage to find the particle, it would mean that I was wrong and that my model was wrong. If they don’t manage to find it in due time, well, they would need to admit they were wrong.”

It was explained to me that the CERN is looking for a specific particle that possesses a huge mass but does not interact with other particles in any way, except with gravity. “We know the precise characteristics of such a particle. We cannot see it, so we have to seek it based on its gravitational interaction with other particles.”

“So, when they find it...” I started.

“*If* they find it,” he corrected me.

“If they find it, they would know it’s the one?”

“Yes, we know the precise characteristics of this particle. If they find it, they would know it’s the one. It is not possible to confuse a different particle for that one. But they’ve been trying for decades to find it, but to no avail,” he said with a smile.

He did not hide his scientific opinion on the matter: according to him, the modified theory of gravity is a better model to describe the physical reality of the universe than the dark matter. However, he openly said he would accept the proof of the dark matter, if there is one:

“I am a scientist. I want to know the scientific realities more than I want to be right. If it turns out that dark matter exists, that would mean that we are wrong. Which is fine by me. Although, I must say: even if they find the particle, this is not enough to explain all the matter missing from the universe. They have claimed that certain objects that they have observed prove the dark matter theory, but the standard model is not in line with what is being observed in this object. So, even if dark matter exists, I would say that we still need modified theory of gravity.”

He also pointed out errors in the other side’s argument:

“For dark matter model to work, it needs to be five times more present in the universe than the regular matter. If this dark matter exists in such a huge quantity, it would also work to slow down the expansion of the universe. And the newest research shows that the universe is not slowing down; it is actually speeding up. So, what do they do? They introduce new epicycles, to call it like that: something new to neutralize the effect of dark matter, and to encourage the universe to speed up. This new thing, new epicycle, is called dark energy. To me, it truly looks like all those epicycles in the geocentric system. Those are just new patches: whenever they encounter a new problem, they bring a new patch. To me, this is a clear indication that the model is wrong,” he said.

He was referring to the Ptolemaic system, a popular theory to use when discussing scientific revolutions. The geocentric Ptolemaic system, first proposed in the 2nd century, attempted to explain the movements of the planets, the Sun and the Moon around the Earth. To explain the movements of the celestial bodies, the system proposed that the bodies move around the Earth in a large circle (different), but also move around a smaller circle (epicycle). Over the time, and with new observations, it became clear that this system could not explain the movements of the bodies. So, the new epicycles and other elements were included to explain these movements

(Crowe 1990). This had led to a robust system full of elements that still could not fully explain the movement of the celestial bodies. This issue was resolved with the introduction of Copernicus' heliocentric system (Kuhn 1962; Crowe 1990), which was essentially a scientific revolution, and perhaps the most famous example of it²⁸.

"I don't have an illusion that the paradigm change will happen soon," he said, after a bit of thinking. "It *might* happen during my work years, in the next 20 years or so."

This conversation illustrates the way AOB researchers talked about their work. They were quick to name details about their projects, even though they knew it would ruin their anonymity. It seemed very important for all scientists I interviewed that their projects are reported accurately. "Journalists always get it wrong," one of them complained. They made me promise to quote them and to present their research just as they reported it. Reporting accurately meant to spread the truth about their work, and to present their work in a manner that it deserves. This was particularly important because, as I explain below, I was unable to actually observe AOB researchers performing any substantial research.

Scientific Work

Observing research at AOB proved out to be difficult because of several factors. One, it is not easily observable, because it mainly happens through typing on the laptops. Two, a lot of work is not done at the Observatory itself, since many scientists work from home (see Chapter 5).

This problem ties with the issues of visibility versus invisibility of scientific work (Garforth 2012). Many times, the only observable task was keyboard typing. Sometimes, scientists typed programming code; at other times, they worked with sequences of data on screen. Even the graphs, the only visually striking result of research, was done as a product of typing. Everything else was hidden from view: scientists thinking and trying to solve problems, for example. This thinking, so prevalent in their work, according to scientists' own words, is not something easily observable (Garforth 2012). On the other hand, I did not feel comfortable staring behind their necks while they typed; the condition of my stay at the Observatory was

²⁸ The events and theories described are a simplification. For the purpose of the project leader's metaphor, the actual complexities of the theories and the historical development of the geocentric and heliocentric systems are irrelevant. He was clearly evoking this story in its most popular form to illustrate his opinion on the current state of the dark matter models.

not to disturb their work, and what would a social scientist know about the things they type? This made typical “participant observation” impossible (Beaulieu 2010) so I had to rely on what was visible and what was reported to me as important.

Research at AOB, regardless of project, consists mainly of analyzing data provided by large international telescopes. The researchers at AOB download data acquired by telescopes not located at the Observatory or Serbia; these important databases are taken by large international telescopes. After downloading data they need, AOB researchers analyze it to test their models and hypotheses. This “laptop approach” is in line with scientific work performed by astronomers and astrophysicists around the world, including those in the “core” countries (the West) (Borgman et al. 2015; Sands et al. 2012; Whynholds et al. 2012; Zuiderwijk and Spiers 2019).

For example, one of the projects focused on active galactic cores means analyzing spectra from many objects that have massive black holes in the middle. Spectra are valuable because they provide scientists with information about the physical conditions that exist in the chosen objects. These objects are “known” to be the ones suitable for research: it has been established in international circles that those are objects containing black holes. This is not something that AOB researchers focus on or question, although new research can question or change the nature of a previously known object, as explained in the case of a demoted gravitational lens.

Spectrums from the selected objects are readily available for use: they are taken by large telescopes around the world and AOB researchers (or other scientists) can download them for analysis. This is a string of data that can be seen on numerous laptops at the Observatory. Research is not focused on one particular object; rather, scientists download data from a large number of objects. Spectra from all these objects are needed so researchers can notice potential patterns and tendencies that would provide explanation for the phenomena.

In the case of one specific project, I was told that the number of objects they work on is a couple of hundreds. This is deemed an appropriate number to notice patterns. Who decides on the number of objects? “This is how it is,” I was told. “That is the optimal number to allow you to make correct conclusions.”

It is clear that the number of objects was a thing that was decided by *someone* in the past, but it is now taken as a “natural” standard that is not to be questioned.

Once the spectra are downloaded, they need to be processed. The researchers use special software solutions for that. Scientists do not need to use their own programming skills for this step; the software does this part of the work. In other words, the process is black boxed in a laptop. Nobody was particularly interested in talking about this step. “Software does it; there is not much you need to do.”

Once the data is prepared, scientists start measuring what they need for a project in question: absorption lines, emission lines, continua, etc. Measuring is done with the processed spectra based on specific models. There are around twenty distinctive things that need to be measured in a spectrum for a typical research (and to produce one typical journal paper). Manual measuring is not reliable; it is not precise enough. This is why models are used for measuring and separation of the spectral lines.

This is the most time-consuming and daunting part of the project. It is called “fitting” (fitting (*fitovanje*)), and referred to as “manual work”: applying a model through the chosen spectra. “That can take months. It is boring and thankless,” Sandra told me. This is the work typically delegated to the junior researches in a team. This type of tasks were Sandra’s first research contributions. Now that she has a PhD student working under her, Marina, Sandra can delegate this manual work to others.

The models in question are a crucial step of the work because the results can vary significantly depending on the model. “The Model” is a theoretical calculation that describes the condition of the real-life objects in the universe. The models are tested on real spectra to see how well (or not) they “describe reality.” If real spectra behaves how the model predicts, it makes the model more reliable, while simultaneously reveals the conditions in the real objects.

AOB researchers are proud to use their own models. Some of the most popular and widely used models were proposed by the senior AOB members. These models are “proved to be very precise” in “describing reality,” I was told.

Models are typically published online so anyone can use them for analyzing data and performing research. Anyone can use a model, as long as they cite the author. Other models are

not so readily available: if a research group wants to use it, it has to form a collaboration with the model creators. “If you want to use our model, OK, but it has to be a collaboration and we need to be included in results,” one of the project leaders said.

AOB research often uses models developed by AOB researchers; in this sense, their results are the product of the Observatory and also Serbia (see Chapter 6). Results calculated using these models are not necessarily results made by other scientists, so the challenge is to demonstrate that their particular research “describes reality” more precisely, as they like to put it.

Once the measuring is done, researchers perform statistical analysis. They look at statistics to see patterns and tendencies, and what they can conclude about the objects in question. Tables and graphs are built to illustrate findings and to present their results. This part of research is analysis and interpretation, and it requires more knowledge and experience. These are typically done by researchers who are past the junior level. “I am getting to this point now,” Sandra told me. “After six years, I am finally in a place where I am starting to do my own interpretation.”

Sandra’s experience is subjective and does not fully reflect the scope of apprenticeship. Indeed, there are researchers who reach this stage sooner than the others, and those who slowly build their abilities to do interpretation. AOB scientists never spoke about interpretation in such terms, but they did talk about “having good intuition”, which suggests this aspect of work requires tacit knowledge (Polanyi 1958). One needs to have experience and to slowly build understanding of the material; these tasks require knowledge that is not easy to transfer through verbal instructions. People build this tacit knowledge over the course of their careers, and the best scientists at AOB are those who, I was told, have the best ability to “feel” what kind of questions should be examined.

All these varied tasks are done for the purpose of producing a journal paper. Each step is distinctive and done by different people in the team. However, all of those steps “look the same” on the outside: endless typing on the keyboard.

The only dynamic part of this process is exchanging opinions between colleagues and apprenticeship, typically done between two people leaning over a computer screen or a notebook. For this process to run smoothly, there needs to be a project leader who is good at organizing and dividing tasks.

Project leaders are typically described as “fair” by their team members. Many leaders are praised for insisting on being the last author on the paper, in the case all they did was to give an idea on what to do in a research. The final papers do not reveal who performed which part of research, but the standard practice is to first list people who have made the biggest contribution. This is something that is described to me as “a courtesy”: I was told stories about project leaders “outside of AOB, and from abroad” who always put themselves as the first author, even if they didn’t contribute much to the paper itself. While this practice is not overly criticized, the sentiment expressed by AOB researchers is that it is morally sound for project leaders to put themselves after the team members who have contributed more to research.

A good project leader is described as someone who is always there for their team, but who allows their team members to work on their own from start to the end. In this sort of arrangement, a researcher is free to do research individually, with the project leader simply giving the final touch. This “final touch” can be more or less involved. In many cases, it includes writing interpretation, particularly in the case of junior members working on a project. Only after this, the paper is said to be ready for publication.

Miroslav is praised by members of his team to be this type of a supervisor. “He encourages us to try to do as much as we can on our own. He actually likes if a student can write the whole paper themselves. But students cannot do that. You are simply not knowledgeable enough at that point, nor qualified enough, to write interpretation,” I was told.

So, what happens? “He always asks students to try interpretation, but it is generally bad. You can tell that the lines are copied from a book. I also tried to do interpretation when I was a junior researcher, but he would always change it, because it was shit. And it was fair of him to do it. You have to do manual work first. I am only now at the point where I can write a paper from start to finish,” one female member of Miroslav’s team told me.

Most researchers past the junior level have at least one paper where they are the first author. Many AOB researchers have many of those papers. Some also have collaborators abroad. There are also projects in which team members work together. “Some research is highly individual, in a way that you basically work alone and only present your findings to the project leader once it is done. Other research is done in a team: you work in a smaller or a larger group,” Sandra told me.

Vignette – No Observations at the Observatory

There is a marked sentiment against performing actual observations among many AOB researchers. While people claim they “have nothing against it” and that “observations are important, particularly for astronomy if not for astrophysics,” there is a clear air of neglecting the actual observatory work.

Part of it is practical: the AOB itself does not have any telescopes or other equipment that is good enough to perform observations relevant for modern science. The new telescope at Vidojevica might work to solve this issue, but “you cannot expect the leading AOB researchers to actually look through the telescope’s lens,” I was told. The actual observing of the night sky is something that carries the aura of “amateurism”: after all, amateur astronomers are the ones who are looking. Professional science does not include observing - or at least that is the sentiment present at the AOB.

This is particularly important in terms of separating astronomy and astrophysics. Astronomers are those that deal with the movements of celestial bodies, and those who are typically labeled as “observers.” Astrophysicists, on the other hand, deal with their models and spectral lines on computers, never even looking at the night sky. There is a notable lack of training in terms of observations that I remember from the Department of Astronomy and Astrophysics²⁹.

“We need to break some prejudices. ‘I never look through a telescope’. Because it is all done through the computers,” professor Stojković said.

An older female scientist, Valentina, agreed with him. “Some people have prejudice about observations. Yes. That exists. I will tell you, that exists. But it depends on the type of your research. Not all of them require the same approach. You can’t relate some old research with the new one without it. Being an observer, doing observations, that is not easy. And yet, there is a bit of stigma to it. It is simply the way the sentiment is.”

Valentina herself is an astronomer who has dedicated a lot of her research to observations, back in the days of Yugoslavia.

²⁹ An illustrative example: students are never taught the names of stars and constellations, nor how to identify them on the night sky. It means you can be an expert in astronomy without being able to tell any constellation or a star, which is something every amateur astronomer knows.

Production of Papers

Production of papers for scientific journals is the main goal of research. The entire scientific process: downloading data from telescopes, preparing it, using models, “manual work,” production of graphs and interpretation, all of this is done for the purpose of publishing a paper. There is no research “as is”; journal publication is the main motive. Journal publication is crucial for scoring points (see Chapter 4b), which is why research is tailored towards work that can produce a journal paper in a relatively short period of time (a few years).

There is always a goal to publish in relevant international journals with a high impact factor. The leading journals that AOB researchers publish in are The Astrophysical Journal and The Astronomical Journal from the US; European Astronomy & Astrophysics, and UK’s MNRAS (Monthly Notices of the Royal Astronomical Society). These are not the only journals where AOB researchers publish their findings but are considered the most prestigious. They are also worth the most points in the Ministry’s scale (see Chapter 4b). (Službeni glasnik RS 2017)

Typically, I was told, a paper has around two or three authors working on the core research for a paper. One person is principally in charge of a paper, and one or two people add something to the paper. There are several researchers and papers being done at the same time.

“You are never completely alone. You have your boss to consult all the time. You can work individually, but as part of a team project,” Jasna told me.

Who chooses the subject? Sometimes, a subject “crystalizes itself,” I was told. Previous research opens up new questions, or a specific data set points out at an interesting phenomenon that can be examined. Typically, the project leader is the one that proposes and chooses subjects. However, team members might notice something in their research that they think is worth of exploring further. In these cases, team members suggest a topic to the project leader.

“Sometimes, the project leader accepts it, and sometimes he replies with: ‘no, this is stupid’. But most of the time, project leaders still let their team members do it,” I was told. “A project leader is likely to say: ‘ok, do it, prove me wrong’. In some cases, this is exactly what happens. Team members did their research and proved the team leader wrong in the past; it happened. So, it is not so strict to listen to the project leader.” It is generally agreed that the project leader

(“the boss”) chooses the project together with a team member; it is not presented as a strict directive that a team member has to follow without any input.

Researchers generally agree that the project leaders, if they are good, are the ones who know how to choose the best topics.

“Miroslav, my project leader, has the most experience in the field out all of us,” I was told. “He is in the closest contact with foreign colleagues: he goes on conferences, and he knows what is active and relevant in world research, where we can dig into it. He is “the brain of the operation” (*mozak operacije*”).

Once the subject has been decided, each team member works alone. The project leader provides guidance and advice on how to proceed. Junior team members need the most guidance.

Researchers at AOB agree that this sort of guidance is provided freely and enthusiastically.

“Project leaders are there to guide us,” I was told. “That is why they are on the highest positions. That is a natural process that we all have to go through. You either go forward or go back.”

Several younger female researchers admitted that they are still learning how to do interpretation or to suggest a topic, and that are still not ready to completely lead a research project.

Interestingly, this attitude (“I am not ready yet”) was never voiced by male scientists. Younger male researchers seemed confident enough about all stages of the research, even in situations when they, too, lacked any experience writing interpretations or suggesting topics. I will go back to gender(ed) realities of practicing science in Serbia in Chapter 6.

In the end, the project leader reads the findings, check them for validity, provides feedback and potential corrections. Both the team member and the project leader are signed on the paper.

Research and paper production is not a fast process. In many cases, it takes a few years of research to analyze data and perform research that will be published as a journal paper.

The process goes faster if there are two or three team members involved in the same research, or in the case there are foreign colleagues who also work on the project. In these circumstances, it is possible to complete and publish research within a year. “Of course, it all depends on the research,” I was told. “Some subjects require years and years of research.”

This is an important issue that ties directly to the points system, further discussed in Chapter 4b.

The published papers need to be detailed about the steps taken in research: what kind of software is used, what was the original idea, theoretical framework used, model that is applied, all the tables, etc. AOB researchers often publish all that data online, so anyone can check their findings and what they did. “Anyone can come up with a different solution than we did and to do their own interpretation or get a different result. They can take our data and do something else with it. Science should be transparent,” Sandra told me.

Researchers have specific standards of what makes a “good paper.” More than conclusion and core argument, they talk about meticulous display of all the steps done through the research and all the little details that need to be displayed in a paper. Any small intervention, along the lines of: “I threw this object away because it doesn’t fit” needs to be mentioned. A good paper also mentions the model used for research. It is important to disclose all these things, or else the results would be deemed “falsified”.

“Sometimes, people rush through these steps and you can’t really see their process and how they did something. That is not a good way to go, because it doesn’t allow other scientists to repeat their research. In a good scientific paper, all has to be transparent,” Sandra said.

Big Telescopes: Data Providers

Researchers at AOB consider themselves lucky because of the existence of large international projects. These large telescopes scanning the sky and uploading data online are “what saves us,” as one researcher told me. Many of these databases are freely available and do not require any specific license (Accomazzi 2011; Pepe et al. 2014; Henneken 2015; Zuiderwijk and Spiers 2019). The data is already calibrated and prepared. Anyone can take these data sets and perform research. “Anyone” here means “anyone with internet access.” One does not need to be affiliated with any scientific institution or a specific project. I was able to easily navigate some of those telescope pages and download data sets in .csv format.

One of the main telescopes to take data for Miroslav’s project is SDSS (The Sloan Digital Sky Survey) telescope, located in New Mexico, USA. It is a relatively small telescope: only around

2.5 m in radius (Gunn et al. 2006). However, it provides enough valuable data for AOB researchers to use. A lot of AOB research, even outside Miroslav's project, is based on its data.

The SDSS telescope provides more data than what each of the project needs. Researchers select only data that is relevant for their ongoing research. As I was explained, there are many different types of research that can be done with data from just this telescope alone.

While SDSS was the most often cited "public telescope" that AOB uses, scientists have mentioned other notable telescopes that also upload their data. The most famous of them all is the Hubble telescope (Xapsos et al. 2014). "There are millions and millions of objects and data available in this way. So many research questions possible to explore with this data," I was told.

Indeed, some research groups pride themselves for being recognized in international circles: in China, in Russia, in USA. I was told of an important congress in China about active galactic cores that Miroslav was asked to attend. According to his team, "he was even paid by the organizers to attend." (Which was also the reason he did attend this congress).

However, not all telescopes share their data freely. Some of the prominent powerful telescopes keep their data subscription-only. In other words, institutions and research teams need to pay for this data. Scientific groups around the world that have access to the "locked" (subscription-only) data are in a position to perform research that others cannot do. This creates a clear imbalance between those who have access and those who do not. While I was assured by AOB researchers that "public data is not bad; many prominent world scientists work with this data and it is possible to do great science with this data," the truth remains that subscription-only data provides opportunities to study further phenomena. As I was described, public data is not comparable to a "free version" of a paid program; what you get through this data is highly specific, valuable and fully operational. The trouble is when researchers want to study objects not scanned by "free" telescopes. Subscription-only telescopes provide an opportunity to study more objects or to tackle some phenomena not scanned by the "free" telescopes.

I was told that most scientists around the world combine data from the public and subscription-only telescopes. There are some that work only with subscription-only, and those that focus mostly on public data. The general consensus is that combining the two yields the best results:

to do good science, I was told, it is best to have access to as many objects as possible. The AOB researchers do not easily fall into this category: while they all work with public data, the Observatory simply does not have money to pay for subscriptions.

There are ways around this. The official way is for research teams to write a proposal and apply for time at the subscription-only telescopes. In a proposal, a team needs to explain why their research is important, and in case it is approved, the team is allotted a telescope for a few nights to scan just the type of data the project needs. Such a proposal has to be approved by the telescope's team. "If the telescope team decides that our proposal is significant, we get time on the telescope, and the telescope works for us. At first, only the team gets this data, and later it becomes available to others," I was told.

The possibility of proposal writing is mentioned, and while it was confirmed that some people at AOB write these proposals, this is not considered the most effective way to go. Generally speaking, while researchers at AOB were somewhat successful³⁰ at proposal writing, this is often mentioned to me in passing. "Oh yes, it is also possible to write a proposal," I was told. It seemed that this highly formal way of acquiring data from telescopes is not something that AOB researchers find particularly effective. What I have observed is that proposal writing is almost an afterthought and not something AOB researchers and project leaders see as a vital component of their job. This is a stark difference to Western scientists, for whom proposal writing is a must at all stages of research. In general, it can be said that Serbian scientists are not used to proposal and grant writing because it is not something they need to access the funds or to perform their science on day to day basis. When I enquired about proposals, certain younger scientists were enthusiastic to discuss them, while older researchers were less interested in this aspect of doing science. To them, proposal writing is an unwelcome task that is considered almost administrative in nature and something that takes people away from doing "real science." They do it when they have to (for example, when applying to the Ministry during a new project cycle), but it is not something they see as a core component of their job as

³⁰ I was able to learn of certain successful proposals, but not to which extent the AOB researchers are successful at proposal writing. It might be that their success is sporadic at best. What I have observed is that nobody was particularly interested in talking about proposal writing.

scientists. For the most part, the realities of science financing in Serbia (see Chapter 4b) allow them not to think about proposal and grant writing.

International Collaboration

A more popular measure to get data from “locked” telescopes is through international collaboration, or “international *veza*” as AOB people called it. The word “*veza*” (connection) is used in humorous tone, because it does not really refer to shady aspects or informality in the full sense of the word (see Chapter 5). International collaboration is a legitimate approach to acquire time at subscription-only telescopes, without paying or without writing “impersonal” proposals.

International collaboration is important because “this is how projects work these days,” I was told. “There is no such a thing as one country developing its own solutions. Everybody uses international solutions from USA, Europe, and so on. There is no point in inventing the wheel when things are already developed. These institutions already have teams who provide support. This is why all the world uses these solutions. But in order for them to help, you need to be visible. They need to know that there is an actual institution that does science,” project leader Danilo told me.

For example, one AOB team is collaborating with a Russian team that runs a telescope at Caucasus. This 6 m telescope is available for team’s research without pay. In fact, I was told, the Russian team pays for AOB scientists to come to Russia to perform observations, if needed. This international collaboration is attributed to the project leader’s social competence and ability to attract international colleagues. In turn, the Russian team gets their names signed on AOB papers as collaborators.

As the project leader put it: “they have the technology and we have the ideas. We have a good idea, they get the data, so this is great collaboration.”

A large, 6m telescope on Caucasus is used to observe gravitational lenses for one of the Observatory’s projects. It is important to note that this international collaboration was finalized “properly”: through following all the rules and regulations of such an endeavor. Miroslav and Nenad wrote the proposal for the project, while Sandra and another younger female researcher, Jasna, went to Caucasus to perform observations. Proposal writing for this project was part of

collaboration, but only once the collaboration was secured. There was no shunning of proposal writing in this case, but once again, the proposal was seen as a formal component and not the core of the collaboration itself. When talking about this project, all researcher involved contextualized it as: “Miroslav secured it through his contacts,” with an implication of a social, even personal, connections with the Caucasus team. It is important to emphasize that nothing about this collaboration was “shady” or illegal (hence the word use “contact” and not “connection,” “*veza*”). However, social connections and “bonding between scientists” were emphasized as the main reason for forming this collaboration. Proposal writing was just a formality. That is not to say that Miroslav’s social skills were seen as more important than his merit as a scientist; on the contrary: it is assumed that the science that his team produces is good and deserving of international recognition. However, it is also assumed that formal steps are not enough to secure such collaboration.

“We all need to learn how to write proposals. I never had a chance to write one, but I am getting there,” Sandra told me. “Typically, project leaders are the ones writing proposals, but team members who are not juniors anymore also need to know how to do it.”

Another international collaboration for teams at AOB is with Bulgarians, who have their 2m telescope. Again, this is a similar arrangement: international collaboration secured to acquire data from a private telescope for free. In the past, the team has also enjoyed a collaboration with an Italian team in a similar way.

It is emphasized that all of this international collaboration was secured informally before formal proposals were put in place. It is all done through socialization and informal approaches. “How else would Serbs manage?” was a common comment.

As Sandra put it: “We are a successful group because of Miroslav’s connections around the world. He makes connections during conferences and similar endeavours. There are ways to make people bond and agree to do a collaboration.”

Not all project collaborations are with neighboring countries. AOB scientists have also secured a collaboration with a large astrophysics project in the USA, the LSST (Large Synoptic Survey Telescope) project. When asked about the manner in which this collaboration was secured, it was attributed to informal bonding through *kafana*. *Kafana* is a Balkan type of a tavern, a

popular place for socialization through drinking and eating (Đurić-Zamolo 1988; Van der Port 1999; Zivkovic 2011; Đorđević 2016) (more about this in Chapter 5).

“One of the project leaders is a Croatian. He happened to attend one of our conferences a few years ago. He liked it, made friends with Miroslav and Nenad, drank with them, had fun. As a result, we collaborate on this project,” I was told.

There was even a LSST conference organized in Belgrade. AOB’s involvement on this project is through programming, led by Nenad. So far, informants claim, they did not have to pay anything to be involved in this project.

“A lot of great things and collaborations were done by socializing with foreigners,” Sandra told me. “Hobnobbing” was a common way to describe it. A lot of it is based on personal connections that project leaders build.

The importance of attracting international collaboration through personal connections cannot be overstated. All of this, or most of it, needs to be done in Serbia, because AOB project do not have money to send people to conferences.

“We cannot go anywhere anymore, unless those inviting us give money. We could travel before 2012, but this is when the Ministry cut the budget for travelling. They don’t want to give us money for conferences, or they give very little,” Ivana explained.

“The main problem in Serbia are finances. In order to be relevant and to follow all the newest research, you need to be able to travel to conferences. But this is not happening,” Miroslav told me.

So, they have to find a different way, and that is a struggle. They do it through inviting people to come to Serbia, or through bilateral collaboration. They form teams with scientists from abroad. Some of this collaboration is done through formal means, such as COST (European Cooperation in Science and Technology) actions of the European Commission. There are also certain bilateral projects that the Ministry made with specific countries. For example, Miroslav is a member of a team formed between the University of Belgrade and University of Federico II in Naples, Italy. There is a prominent scientist working on modified theory of gravity, who is AOB’s collaborator and who publishes joint papers with the Serbian team. Some AOB teams

also have a good collaboration with scientists in Russia in the institute for mathematical and theoretical physics (ITEF) in Moscow.

However, the highest emphasis in international collaboration is given to the “human element,” as Miroslav described it. Personal networking and socialization are regarded as the most effective ways to connect to people and to secure international collaboration (Hodžis 2013, 179).

“You need to have a feeling for this,” Miroslav told me. “This is a feeling in science. If I am talking to you, and if you have a facility or if you are part of a project, and I have an idea, we might connect over it. You need to be open to meeting others and talking to them, discussing ideas. You need to know how to approach people and how to recognize what ideas sound good. For example, I know one part, and if you do this other part, it will create one whole. It would be better than me or you just presenting something at a conference. If you initiate this, you need to know how to make your partner agree to it. Sometimes, you need to be ready to chase people and nudge them. But once they give you a chance and once they see that there are results, you don’t need to chase them anymore. They will chase you. Of course, there is also a human dimension; you need to know how to approach people. This is an important component. You need to know science, and you also need to know how to approach and propose. This is how it is in life. When you meet someone, you can tell if you like them or not, if you can work with them or not. You can tell: I can work with this one, and I can’t work with that one. This cannot go through a protocol. This all goes on a personal basis. This is why we have conferences. I have a good collaboration with some colleagues. First, we fight over certain problems, and then we collaborate. But this is not a real fight, this is a creative discussion. And this discussion happens during a dinner, over a drink, or at a walk. We discuss these problems, and we bond, and this is how international collaboration is formed.”

These networks are important for collaboration among scientists (Traweek 1988), although in the case of AOB researchers, the main goal is to build connections with colleagues outside of Serbia, instead of relying on AOB colleagues who go abroad to do their post docs or to get permanent employment. This is mainly because the number of such people is relatively small; those who keep their connections to AOB once they go abroad are seen as a good *veza*, but their number and influence is not enough to build solid international collaboration. Networks

that AOB researchers build are typically closer and tighter than those done by mainstream Western scientists³¹. This is in line with findings by Murillo et al. (2012): women, people of colour and foreign (in the US) scientists tend to rely on these connections more than white, male Western scientists.

Vidojevica Station

To mitigate the obstacles created by the lack of proper equipment, Vidojevica telescope was built. This is currently the best astronomical telescope in Serbia “and in the region,” as the Director of AOB told me.

Many AOB researchers mentioned the new Vidojevica station to me, but the main conversation I have had about it was with the Director. He was very enthusiastic and ready to talk about Vidojevica. He welcomed me in his office and was ready to show me pictures from the ongoing construction works that he had on his laptop. His description of the Vidojevica project was detailed and promotional in tone. At times, I felt like he saw my research as an opportunity to promote AOB “in the West” and all the successful projects that the Observatory has achieved. I was also showered in information and given instructions on where to find more information about the Vidojevica project. Later, when I talked to Danilo about his work, he used the opportunity to gift me publications and CDs about the Vidojevica project.

The road to building Vidojevica station was a long one. In order to build a worthwhile observational station, it was necessary to locate a spot without pollution. When AOB was built, I was explained, the hill was away from the city. As Belgrade expanded, the original observational spot became more polluted. In the late 20th century it became impossible to do any observations from AOB. Simultaneously, the original telescope became more and more obsolete. All these reasons prompted astronomers to start searching for a new location that would be suitable for astronomical observations. They found out that the best conditions are in southern Serbia, near Prokuplje, at the mountain of Vidojevica. The conditions were tested again in 2015 and “it turned out that the quality of observations was excellent, on the level that is Chile,” I was told. It is impossible to retain this level of quality throughout the year, because of rains and overall climate, but “when it’s good, it is good.”

³¹ Here understood as “the dominant group”: white, male Western scientists.

“This is one of the rare dark spots left in Europe. Europe is too bright, and there are not many spots in Europe that are good for observations. That is a problem, because you cannot move all telescopes to Chile and call it a day. We need to observe certain phenomena in continuity, so you need telescopes at many different spots on the Earth: in Asia, in Chile, and we need a telescope in Europe,” the Director told me.

The construction works have begun in 2005. The construction moved slowly because the funds were received partially; it was often necessary to stop the works until the next payment was received. The main influx of finances came in 2011, when AOB managed to acquire funds for the telescope through the EU project BELISSIMA (Samurović 2017). Most of the money came from the EU fund. “This is not a loan,” the Director of AOB emphasized. “We don’t have to return this money. However, the condition was to finish all construction works in time and to install the telescope.” Deadlines were important because the whole project could have failed. I was told a cautionary story about Romanians, who were also promised a telescope, under the condition that the government builds all necessary infrastructure at a designated spot. They could not do it before the deadline, and they were forced to return the money³² (Vaduvescu 2011). The construction of the Vidojevica station was a race against time. Luckily, Vidojevica had already possessed certain infrastructure, due to a former station object that was built on it. There was an existing road, as well as electricity, so the water supply was the only major thing that needed to be added.

“How did we persuade government to give money? Well, we have a scientific tradition,” the Director told me. “AOB has already been recognized as an important, long-lasting institution. There were never any problems, any scandals with AOB. We didn’t have money, but we always worked as much as we could. There was a good reputation. This was recognized, both in Serbia and abroad. There was a person from EU who came to see all our pavilions here at AOB, and we didn’t want to lie. We said: ‘come and see, and make a decision’. And he liked it so much that he didn’t want to go. They had to call him to come back,” he laughed. “This is very important, this visual moment. ‘Come and see.’ That is very powerful.”

³² There is a web page dedicated to the failed Romanian telescope project TELEROM. The page is fashioned as an obituary, along with “birth” and “death” date of the telescope (2010-2011): <http://www.ovidiuv.ca/TELEROM/> (Vaduvescu 2011).

The way this was presented to me clearly indicated that the decision was made on the strength of the good impression that the AOB team and Serbia have had on the EU visitor.

Once the EU project was approved, the government agreed to add funds needed to complete the astronomical station. “This was a rare opportunity to get this instrument. Our Ministry backed up this project, although it took them a lot of time to respond,” the Director said.

“Had the EU not given most of the money, our government wouldn’t have provided the rest of the money. It would be an embarrassment if they didn’t. They gave just this small difference, to look like they care,” Danilo told me.

“The Ministry paid for the new dome, and the infrastructure at Vidojevica was financed from the government budget (Samurović et al. 2018). It was supposed to be done in three years, but it was prolonged to six,” the Director told me. “But this is not unusual when it comes to setting up a new observatory. They are rarely completed on time. There are many different parameters that have to fall into place to build an observatory. You can have a minor problem with a telescope, and it’s all gone. This is a problem with astronomy: typically, all projects are 1:1. When you buy a microscope, if there is something wrong about it, you get another one. But with a telescope, it is one of a kind. And you have to build specific buildings for it and install Internet connection. So, this is how it is. Even the Americans have to break deadlines. For example, a huge telescope they wanted to build in Hawaii. They had millions of dollars, but they didn’t get a building permit for their chosen spot, so now they are searching for a new location. And we got all those permissions, and it’s not easy to do that in Serbia.”

The telescope was finally installed in 2016. The telescope was named after Milutin Milanković, a famous Serbian astronomer and climatologist. The proponents of the projects described the telescope as “one of the best in Europe, and definitely the best in the region.” The Milanković telescope is fully robotic (Martinović et al. 2012; Samurović et al. 2018), which means that it does not require an observer to reside at Vidojevica to perform observations. Observations can be done remotely, from any spot on the Earth.

At first, a temporary pavilion was built at Vidojevica because a permanent one with a removable roof was not ready yet. The construction works had to be rushed and the telescope made operational before a deadline that was fast approaching in 2016. As a result, a temporary

pavilion was built so they could fulfill the conditions of the loan. A temporary pavilion was described to me as “important, but better suited for Tenerife and similar climate regions. Our climate is a bit sharper, so it requires a different type of pavilion.” The permanent dome was built in Italy and it was designed to fully protect the telescope from elements.



Image 11: Astronomical Station Vidojevica

Source: <http://belissima.aob.rs/>

Having a functional telescope in Serbia that can be used for AOB projects was just one of the motives behind the Vidojevica station and the BELISSIMA project. The goal was also to attract Serbian scientists who have done their PhDs abroad, to come back and join AOB projects. “We found three people even before the station was completed. People from the region typically have difficulties to attract people to come back, but we found people easily,” the Director told me.

The BELISSIMA project also attracted international collaborators from Bulgaria, Hungary, Greece, and then later from Germany and Italy. “For Vidojevica telescope, we made a preliminary rule book, at around 10 pages. We decided who can use this telescope and how.

Anyone from the world can use it, but Serbian researchers take precedence, as well as those who collaborate with Serbian researchers,” The Director told me.

Danilo, another proponent of the Vidojevica project, emphasized its importance for research. “Vidojevica is a jump, both qualitative and quantitative. Without it, we would be a theoretical institute. The telescope at AOB is just a tourist thing. They want to make a museum here out of it. This is a trend in the world; Observatories that are located in city centres, they don’t want to demolish them, but they tend to turn them into museums. Our telescope here, the great refractor, was one of the largest in Europe at its time. It has its own pavilion. AOB was one of the rare sites in Europe that had all the most important instruments of the time. This is important as a legacy, and it would be important to preserve it. This is why turning it into a museum is a great idea. But Vidojevica is our new beginning. This is how I see it. We are required to produce many papers, even without a telescope. We wouldn’t be able to go on like this for much longer. This is why Vidojevica is so important. I can see some research that I can personally do. Vidojevica is important because you don’t have to rely on anyone abroad. We are free to do whatever we want.”

While Vidojevica project may seem like a win, not everybody at AOB was in favour of it. There were many rifts about whether money should be invested in Vidojevica. The AOB staff got divided on this subject, often following personal animosities. Those who oppose the project emphasize that Vidojevica is a small telescope of only 1.4 m; this is too small to do projects of international importance on it. AOB is said to be unable to compete with large international telescopes with such a small telescope. While some projects might be able to be done on such a telescope, a lot of it is beyond its reach.

However, the proponents of Vidojevica claim otherwise. The groups that advocated for Vidojevica project emphasize the importance of a working telescope in Serbia. While the telescope is small compared to many others around the world, it is still one of the largest in the Balkans.

These professional reasons were often cited, but deeper reasons for this rift around Vidojevica are often explained as personal animosities and intra-Observatory fights. “The science is hurt because of personal fights. This is a bad thing. Science suffers because of this stupidity,” I was told.

“We brag about having the biggest telescope in the region. No. Bulgarians had a bigger one decades ago. Then Greeks. Then in Romania. Today, anything less than 4m is considered a small telescope. I know even amateurs who have telescopes that are 80cm, 1m, 1.2m. But it is good to have a working telescope in Serbia,” I was told.

Apprenticeship

Researchers at the Observatory are divided into a clear hierarchy. In science research, there are official academic ranks (titles) that are equivalent to ranks in universities (Službeni glasnik RS 2016, 2017). Universities have assistants (TAs), docents, assistant professors and associate professor. Science has equivalents to that: junior researcher (istraživač-pripravnik), research assistant (istraživač-saradnik), assistant research professor (naučni saradnik), associate research professor (viši naučni saradnik) and full research professor (naučni savetnik) (Službeni glasnik RS 2016, 2017). The Ministry of Science has very strict criteria on who can become a full research professor. One has to have a specific number of papers (and points collected), to be a project leader and to supervise new PhD students (Službeni glasnik RS 2016, 2017). Most importantly, such a person has to engage in business trips and secure collaboration with other scientists. The ability to secure collaboration is highly valued and sometimes seen as a key skill required for a project leader. This specific skill is also often the most gendered of all the tasks required by project leaders and full research professors.

In order to become a full research professor, one needs to fulfill those criteria proposed by the Ministry. A scientist can apply to become a full research professor if they fulfill these criteria, but they still need to be chosen by the AOB. This is yet another step that might not happen, my informants told me. Both the Ministry and the AOB have to choose you. The rules proposed by the Ministry are unclear, which opens up the door for possible machinations and choosing people who might not be the best for the job. “The rules say quantitative and qualitative factors. What does “qualitative factors” mean? This is unclear and it can be abused,” Sandra told me.

Researchers generally agree that the level just below the highest one (associate research professor) is still a very high level. This is a level in which a scientist enjoys a great deal of positive reputation and authority. One needs many high-quality papers to reach this level, and once you are there, you are considered a successful scientist. The salary is also considered to be good. In many ways, this position provides many of the perks of being a full research professor,

with none of the responsibilities and obligations. The highest level of a full research professor requires all those additional things (mentorship, project leading, securing collaborations) that are more demanding and time-consuming. This is why there are very few people who reach it; not everyone necessarily wants to be elected into this position.

In my conversations with scientists, I have encountered people who have openly said that the full research title is not on their top list of ambitions; “it is something that would be nice if it happens, but the associate level is very satisfying in itself.” Perhaps not surprisingly, most of the people who expressed this opinion were women. While there were many female scientists who said that becoming a full research professor is their goal, there was only one male scientist who said that reaching this level is not his ambition.

There are also people with a special status, those who are involved in international, global projects. Those projects are organized because of important observations. They are described to me as “astrophysics projects like CERN in physics.” Those are huge projects, employing thousands of people. Whenever they publish results, all of these 2000-3000 people are signed when a paper is published in Nature. “Some Serbian people were able to squeeze themselves into those collaborations, and often based on *veza*. Even though they are not great at science. While someone else is a much better scientist, but this is never recognized on paper. It is such an unfair system,” I was told.

“Climbing” through titles is something that comes with age and experience, as well as production of papers. In order for a person to start climbing through the hierarchy, they need to learn how to perform research first. This is where apprenticeship comes into play.

Researchers agree that the education they have received at the Department of Astronomy and Astrophysics at the Faculty of Mathematics is thorough and of high quality. It provided them with excellent theoretical foundations in physics and astrophysics. At the same time, they also agree that the education did not prepare them for their jobs “at all.”

“When you come here to work, you know nothing,” Jasna told me. “You have to learn everything from scratch.”

Serbian education is known to be theory-heavy (Arandarenko and Ognjanov 2012), which is a problem in many disciplines. When it comes to scientific work, it means that a young

researcher needs to go through a period of apprenticeship on the job to learn how to perform research. This apprenticeship is not official: those providing guidance are not necessarily paid to do so. In other words, it is assumed that a new person on the job will receive help from the older colleagues or else be unable to perform job duties. This reliance on unpaid help from colleagues happens in other disciplines and is something present from the old socialist days. If colleagues are not willing to help, a young person will have many difficulties to learn the practical aspects of their job. Luckily, people at AOB are more than ready to provide this sort of guidance.

Apprenticeship in science is not something limited to Serbia. It is how scientific communities “reproduce” over time; new scientists are slowly introduced to research through the apprenticeship (Lynch, 1985; Latour and Woolgar, 1986; Traweek, 1992). In the case of AOB, a newly graduated student is typically accepted “on a project” as a junior researcher when they start their MA or PhD studies. The typical path is to go straight from the university into AOB projects. Such a student is accepted to the project as a junior researcher. The thesis the young researcher writes, is a product of the research they did during this time on the project. After acquiring their PhD, the young researcher is accepted into the title of research assistant. Generally speaking, the researcher will start to climb the ranks at the Observatory from there, advancing through the years and based on the published papers (see the points system in Chapter 4b) to the ranks of assistant research professor, associate research professor and full research professor. It takes one’s whole scientific career to reach the highest rank, but the path is more or less secured the moment a student is accepted on a project. This is similar to situation that Traweek (1988) describes in Japan: “getting in” is the hard part; after this, the advancement through the hierarchy is almost guaranteed.

It is not unusual that young researchers start out as volunteers before they are formally accepted on a project. During these volunteering days, a young researcher has their own duties and is guided by a mentor. The main difference is that they do not receive salary until they are officially accepted “on a project,” which typically happens when they start their PhD studies. The government has set a specific program for junior researchers to be accepted on research projects and to be paid by the government.

According to younger AOB researchers who started out this way, being accepted on a project was a huge thing. “It meant you had a job and a perspective,” I was told. It is a big move that many young researchers appreciated as a clear sign of going forward and a step into security.

What they agree on is that they were completely unprepared for the job. “The studies are completely unfit for our scientific work. For example, we had programming with mathematicians. And the course that was about how to interpret data was with an old professor who was a bit uninterested. As a result, I arrived on the project completely unprepared. I knew nothing. I was an astrophysicist who didn’t know how to do scientific work. Our curriculum was completely unfit to prepare us for what we actually do as scientists. I had to learn everything, almost from square one. All my grades mean nothing when I didn’t know how to download data, analyze it and come to a solution. I only had theoretical knowledge. I lacked knowledge in those computer skills and programs. To me, Linux was just a black screen,” Sandra told me.

Inadequate curriculum that does not prepare students for employment is a problem inherited from Yugoslavia (Bacevic 2014). It is not unusual for universities to provide only theoretical knowledge, while practical tasks related to job can be learned only once the person is employed. This is a standard introduction to research at the Observatory. Young members of the staff told me that almost nothing they learned at the University was relevant for the work at the Observatory. Interestingly, while researchers say it would have been helpful to learn some of it at the University, they generally regard their education as “strong.” “Belgrade University has a strong theoretical tradition and that is not a bad thing,” I was told. “It is not like in the West. They learn only a bit of theory, and everything else is just practice. That is good for preparing you for the job, but you are left with so many holes in your knowledge. You can’t do this without a solid theoretical background.”

Serbian higher education in natural sciences is still very much following the Russian (and former Soviet) trends, with a heightened emphasis on theories. This move leaves a lot to be desired in terms of the practical aspects of the field. At the same time, theory is regarded as the crucial foundation of knowledge: good university education is assumed to be highly theoretical. In this sense, AOB researchers do believe their education to be better than that of their Western

colleagues. The lack of practical approaches still feels like a loss for many of them, but it is generally accepted that “this is how things are.”

In these circumstances, getting accepted on a project meant the start of their research apprenticeship. They had to learn all the work. In some cases, even the simplest tasks had to be explained to them. The first few years of working on a project are generally marked by extensive training. This training does not stop once one acquires a PhD. There is an ongoing process of learning more and more, of gaining experience in more complex aspects of research and paper writing.

This is where help from the supervisor and other colleagues come into play. Fears about getting a bad supervisor are similar to fears Traweek (1988) described among graduate students in particle physics: to be in a team that is not productive (Traweek 1988, 75). In the case of Serbian astrophysicists, it all depends on the supervisor. I have talked to younger AOB researchers who agreed that this help was crucial for their growth as a researcher.

“My supervisor and other colleagues helped me a lot. They didn’t have any obligation to do this. But they helped me and then I learned how to do this, how to do science,” Jasna told me.

“The hardest for me was to learn Linux; I only knew Windows, and just basics. Miroslav and other colleagues had to show me everything. I started from zero. There was the whole apprenticeship thing. So, here I learned how to download spectrums and how to use a program to analyze them,” Sandra said.

Typically, a junior researcher in training will start by doing the so-called “manual work.” In the case of astrophysical projects, it often refers to fitting the spectrums and performing daunting tasks that take a lot of time. Starting out with these tasks helps a researcher learn the first crucial steps in how to conduct research. It also allows a young researcher to appear as an author of a paper.

“I had my first paper that same year I got into the project, 2007,” Sandra told me. “I was the 4th author and I was delighted to be published. But also, I felt like it was unfair to be only the 4th author when I did so much measuring. I spent months working on it. I felt like I deserved to be more recognized. But later, I realized that what I did was the dumbest part of the job; I just clicked the mouse, basically. The difficult part was to figure out what to study, how to study; to

formulate the research question and to write the paper. I did none of that. It was right to put me as the 4th author.”

For many young researchers, going through this period of “ego deflation” was educational and helpful. “It makes you realize what the important, difficult and most sensitive parts of research are,” a younger female researcher, Sanja, told me. “You can’t see it straight away, but it becomes clearer as you learn. As you realize what work there is to be done. You realize this as you go; you realize that this part of the job is the least responsible one.”

There is also a learning curve for this stage of the job. “Clicking the mouse is the lowest level. It took me months and months to do that. Today, I would do this much quicker. Today, I would automatize this: I would write a program to do that,” Sandra told me. “The good thing is that Miroslav and others on the team let me learn at my own pace. They didn’t rush me out. They were happy that I managed to push through that on my own.”

“When you are young, you don’t see this, you don’t see the whole picture. You don’t understand where you stand,” a younger male researcher, Goran, told me.

The younger researchers agree that there is a bit of a positive change at the University. The curriculum was changed in the last ten years to include more practical work. Students are actually trained on how to use software that they might encounter once they start working on a project. The theory is still deemed important and a foundation, but there is a bit of practice introduced to help young researchers once they start practicing science. They all hope that it would help new researchers learn the research process quicker, but there is still “no way to tell.”

Young AOB researchers agree that new students are accepted whenever projects are allowed to accept new people (which means: when the Ministry gives them money). Since there are around ten people graduating every year, and many of them go to pursue their PhD abroad, there are not many eligible people that remain. The Observatory is committed to accepting as many new students as possible, but this generally comes in waves. New people are typically accepted during the new project cycles. Whenever there is money, and whenever a project group is not full, new young people are accepted.

Does this hinder the quality of research? AOB scientists agree that a good team can help even an average student thrive. “An average person will not ruin the whole group. They can even make a great PhD thesis if the supervisor is a good one who knows how to guide a student properly,” Sanja told me.

The issue of student exploitation in collaboration (Slaughter et al. 2002) is rarely mentioned. Individual cases exist and are talked about, but the general consensus is that AOB project leaders are fair and that PhD students receive valuable experience and apprenticeship. The teams at AOB are generally small, so researchers work in closely knit groups. While each person has their individual responsibilities and research to perform, the nature of research is oriented towards teamwork.

“This is not about a lone, genius scientist working alone,” Miroslav told me. “There needs to be a leader with a vision, but it is all down to teamwork. You need to know how to work with people and how to create this productive dynamic.”

Sandra explains the nature of teamwork: “As a PhD student, your mentor is a co-author on each paper, because the idea came from him, and all the comments he gave you. This remains even after you get your PhD. There is a period when you still don’t have enough confidence to work alone. You receive comments from your mentor. Then you slowly gain more and more independence. It is natural for us to publish papers with more authors. This is not because people falsely sign others on papers; this happens in institutes sometimes, but a honest research in astrophysics has to have more than one author. That is the nature of our research. Now, the faculty of Mathematics require you to publish individually. This is one of the requirements for a PhD. But we typically solve this by publishing an individual paper in a lower ranking journal. We do this simply to fulfill this requirement. But the core research is always teamwork.”

The supervisor’s role is crucial for the young researcher’s success. This is something all informants agree with. “A good supervisor can make or break your career,” Jasna told me. In a situation where a researcher gets accepted to AOB straight from the university and then spends their whole career working at AOB, having a good supervisor is important for successfully publishing papers and collecting points.

“I hear that in the West, if your supervisor is a big shot, you don’t even get to see him. Maja had a big problem with this, and that’s one of the reasons she came back to Serbia,” Sandra told me. “A supervisor who is a successful scientist is always busy, so you are on your own. It is a bit different here with us. Those who don’t want to deal with junior researchers don’t have to be big shots at all. The opposite is often true, actually. They are simply bad people, or bad researchers. They ruin their students in this way. They don’t know how to guide young researchers. As a result, students are left behind. They struggle to finish their PhD thesis, and all of the deadlines are broken. These students race to reach those deadlines and to manage to complete their thesis before it’s too late. While other supervisors might be big shots, but still have time for students and know how to help them and work with them.”

So, how does one secure a successful and helpful supervisor? Young researchers agree it’s down to luck. “It’s all about how lucky or unlucky you are. If you are lucky to get a great person, your career is secured.”

Since students do not know project leaders from AOB during their time at the Faculty of Mathematics, they do not always know who would be a good fit as a supervisor. Many times, it is down to a pure chance: a project leader who has a room on their project to accept new people. Sandra explains her research path:

“I started my PhD in 2006 and 2007 got my official job at AOB. I was simply lucky to get Miroslav. This was an accident. He had a lecture at the Faculty about active galactic cores. I approached him just because I liked the lecture. He agreed to let me volunteer for him at AOB. That was it. I was lucky that he ended up being a successful one. I had no idea how things went, and how salary is calculated, and all of that. I was just lucky. Maybe students today think about these things, but I know many people in my generation didn’t think about it. They ended up with bad mentors. I am not sure what the limits are on the projects. I don’t think there is a specific number.”

Since a chance to get a job is too important, many people do not even think about the supervisor’s success or research topic itself. “You are just lucky to get into the projects system,” Jasna told me. “You don’t ask who it is, or what they do. There may be some people who have more information on supervisors and projects, but most of us had no clue. We just happened to be accepted on a team who was open to hiring new people.”

In this game of chance, it is not surprising that certain mentorship relationships are better than the others. A bad mentor can make it more difficult for a student to do research needed for defending their PhD thesis, and it can make it more difficult later in career for a young researcher to publish.

People who had a bad mentor got there simply at an accident. “They didn’t have luck. That’s all. They were simply unfortunate to land a bad mentor,” Sandra told me. “They are no worse researchers than me, or anyone else who ended up with many papers and a good research. It is all down to luck or lack thereof in terms of who your mentor is.”

Milica admits she had the misfortune to get a bad supervisor. This has prolonged her PhD studies and she was forced to change her mentor and her whole research midway through the PhD studies. In 2017, she was rushing to complete her thesis so she could defend it before the final deadline.

“Originally, a PhD program could last around 10 years maximum. But they made a change recently, to be in line with the Bologna, so it is maximum 8 years. I will fit this criterion because I already submitted my thesis. But it was a race against time. Technically, the full time is six years, and your faculty can grant you the 7th year, but the Ministry can give you the 8th year. But many people use a trick: for example, they say they were ill and could not work on their thesis. So, they are allowed to freeze one year so it doesn’t count in their total number of years. You actually work all this time for your thesis, but that year doesn’t count. So, yes, you have to be resourceful,” Milica said.

“I have three papers on SCI list from my doctoral thesis. I have results for the fourth paper, but I don’t have time to write it. I have to prepare my thesis defense, so I am very busy,” Milica said. She described her chase with time to complete her thesis in time and the troublesome path that she had to go through.

It was all down to misfortune to land a bad mentor. She didn’t provide details about her first mentor, but other researchers at AOB told me that her first mentor was a person who got his PhD with a *veza*. He had a *veza* in the Ministry, despite not having published any papers in the international journals. It was all against the rules. The identity of this person was never revealed to me, but I was told that he still works at AOB. This supervisor was also accused of

using Milica's work: he made her do a poster for a conference, and then wouldn't even put her name on the poster; he took all the credit.

"My new mentor is better and more successful. I was lucky to find him after all I've been through," Milica said. "If the mentor is not successful, the student has no chance."

"These things happen, and it's a very unpleasant situation. It's something that's supposed to be a normal thing: if two people can't form a good working relationship, they part ways.

Sometimes, it's one person's fault, sometimes the other person's fault, and sometimes, it is nobody's fault, but people simply cannot function together. So, this happens, but it's very unpleasant," Milica said. "We had a case here, where my female colleague had to change two mentors, and in the end, she went to do her PhD in America. She couldn't find the third person in her subfield. This is a problem when scientific community is small. When this happens, you have to change your field."

Young researchers agree that there is no system in place to vet potential supervisors. "There is simply no system that would qualify certain people to be mentors. It is completely unregulated. Anyone can be a mentor. As soon as you get a PhD you can be a mentor, and some people are simply not a good fit for the job," Sanja told me.

Getting a good mentor also directly impacts a young researcher's success and their salary. Since the salary is calculated based on the number of published papers, those with successful supervisors are in a better condition.

"Salaries can differ by more than 20 000 dinars depending on the number of papers," Sandra told me. "This is a huge difference, especially if you have to rent an apartment, and to live, and get all things you need. And it's all down to pure luck whether you will be in a good team or not. You just don't know when you are a student and when you are only starting out."

Researchers who are now in their 30s were among the first generation of scientists accepted on projects under the "junior researchers" program. The results of this generation is reflected through the strengths of the teams they are in. Those with "bad mentors" barely managed to defend their PhDs in time because the rules prescribe that at least one paper in an international journal is needed to obtain a PhD. Some of those people barely managed to publish at all. On

the other hand, researchers who are on more successful teams have managed to publish 5-10 papers by the time they obtained their PhD.

“If I could tell one thing to new researchers, it’s that they need to understand how important it is that your project leader is successful. Those who are with project leaders who are inert and don’t produce results..., then you, as a student on this project, will not have results. The years will pass, those years when you should build results and papers and points, and they don’t have that,” Sandra told me.

A good mentor, I was told, is not necessarily the one who will do a lot of hand holding. They should know how to guide a student, explain things, but then allow a young person to do things on their own. Doing stuff “on your own” is highly valued and considered the only way to learn science. However, a supervisor should be there to provide initial guidance and to help whenever a young researcher is stuck. “You need to have such a relationship with your supervisor where you are comfortable to ask for help when you are stuck,” Goran told me. “So you don’t feel like you are a failure who knows nothing. And supervisor needs to know how to help you in a way that will explain things but that will also make you learn stuff on your own. There are many things to figure out.”

“Working on your own” is not simply about learning. Each researcher focuses on their own specific topic, and once a person gets to the point of working on their PhD, there is nobody who can help them directly. Nobody knows this material as well as you do. The goal of a mentor is not to give everything to you on a platter but to guide you and help you build your skills so you can work independently.”

Sandra, who is currently mentoring her first student, says that she is implementing this approach with her student.

“I am always there for her. Even when I was at the maternity leave, I told her she could write to me and I would help her. I am there to push her when she’s stuck. But she needs to learn how to perform research tasks on her own.”

Her student, Ana, had a somewhat unconventional path to her PhD. After graduating from the Faculty of Mathematics, she left science to pursue a career elsewhere. She had a well-paid job as a manager; she got married and had children. Both she and her husband were almost wealthy

by Serbian standards. I heard stories about them “buying two apartments and an expensive jeep” to illustrate the standard of living they enjoyed. Unfortunately, both Ana and her husband lost their jobs unexpectedly. While unsuccessfully trying to land another job, Ana decided to pursue her old dream of obtaining a PhD in astrophysics. She got back to do her PhD so “she doesn’t just sit and wait, doing nothing.” Finding a supervisor at AOB and volunteering on a project was the step into the right direction.

However, Ana is struggling to be officially accepted on the project because of her age. The “junior researcher” program assumes that all the candidates are employed right after the University; the program assumes that they are starting their PhD straight away and that they are under 30 years old. Since Ana does not fit these criteria, she has a problem being officially employed on the project.

Ana tried to check the official rules, since “under 30” is often cited, but it is difficult to find any official documents imposing that rule. She even decided to go to the Ministry itself and demanded to be shown the official guidelines stating that junior researchers have to be under 30. The administrator at the Ministry got angry with her and refused to show her anything. Ana believes that they couldn’t show her the official guidelines on age because there is no rule about it.

“This is likely something that the Ministry people stick with, even though it is not official,” Sandra told me.

In order for Ana to be accepted on a project, she needs to accumulate 3 points by doing research. In the past, she has managed to get these points by presenting her research in conferences. However, when she brought her results to the Ministry, she was told it was not enough. While it was not officially written, she was told the points had to come from international journals and not conferences. This is a big workload; to produce a paper, one needs at least one year of research. This is what Ana decided to do: volunteer at AOB on a project, with the hope to publish her research and to finally be hired on a project. This unpaid volunteering is a frustrating and challenging for her, because she has a family to care for.

“She is an excellent researcher, but they don’t care. All they care is that you are under 30,” Sandra told me. “This is ageist discrimination, that’s what it is.” Ana even contemplated about

suing the Ministry but gave up on it because she realized it is futile. Resorting to legal measures and suing is often considered a waste of time and energy due to inefficient legal system.

The only way to fulfill these Ministry rules and get accepted on a project as a junior researcher is to be accepted straight from the university. “If you have any breaks, for whatever reason, you are eliminated,” Sandra told me. “The Ministry put these limits because from their point of view, those are the people with the best prospect. All has to go in a straight line. If you stray from this even a little, you are not recognized. You can be the best, but you are ignored, and you have no right to anything. And you can be as good as someone who is accepted straight after university, or better.”

The problem with the Ministry’s guidelines is that they do not recognize any path different than a straightforward one: graduate from high school at 19 and enroll in a University straight away; graduate as soon as possible and finish your Master’s so you can enroll in a PhD program before the age of 30. This system assumes there are no breaks for jobs or starting a family; such a system also assumes that a student is fully supported by their parents until they get into a project. (Ghodsee and Bernardi 2012)

Maja is another person on Miroslav’s project. She obtained her PhD in Germany and has a paper published in *Science*. This has awarded her enough points to be accepted straight into a project with a good salary, even though she was over 30 years old. Because of the paper in *Science*, she has a guaranteed A1 level and the highest salary in the next ten years. The fact that she was not one of the first authors on the paper and that her contribution to research was relatively small is not important. This is a stark contrast to Ana, who is struggling through volunteering to publish a paper to be awarded points.

These are two different situations for researchers starting out at AOB after the age of 30. The unfairness of the system was also pointed out through the opposite examples: people who have secured their places on the projects because they were young enough, even though they were not right for the job.

Sandra told me a story about two PhD students who were accepted on AOB projects a few years back. These students, both women, had a straightforward journey, “just how the Ministry

likes”: they had decent grades and have started their PhDs right after university. “They seemed great on paper,” Sandra told me.

The problems started almost immediately. “They didn’t fit in at all; they were very difficult to work with. They didn’t want to do things as instructed. The project leaders told them what to do and how, but they wouldn’t listen. They said ‘they knew better’, and of course, they did it in a wrong way. They rejected authority and team and didn’t understand that project leaders and the rest of us know more than they do. They wouldn’t listen to their mentors,” Sandra told me.

When the senior researchers told them about their mistakes, they got angry. One of them even threatened to jump out of the window from the office on the ground floor. The distance from the window to the ground is less than two meters.

“She opened the window and said: ‘I am going to jump now’. Everybody rushed to their feet: ‘fuck!’ It was so immature,” Sandra told me.

The same student’s lack of regard for authority made other team members look bad. I was told of an incident in which she did research without following instructions and advice, and the results were wrong. However, she signed both herself and her supervisor’s name on that paper. “It was a huge embarrassment for him,” Sandra told me.

Another of those junior researchers had a conflict with Sandra. The researcher was newly accepted to the project and was given work to do that was beyond her capabilities. “There was nothing wrong about it. She was a beginner; that was normal. But Miroslav made a mistake that he put her as the first author for her first paper. Typically, you are the 4th or 5th author on the first paper you publish. You just do one segment of the paper. This was Miroslav’s big mistake. You need time to get into this job and to gain experience. You can’t write a whole paper straight away. First, you do manual work, you run a program numerous times over and over again, to use a software to measure something. You click a lot of things over and over again. It takes a lot of time and it produces just a small piece of result. You do it over many days, and it doesn’t require much knowledge on your part. This is how you start. This is all part of the training. So, it was a mistake that she got to be the first author on her first paper. This happened when I was on my first maternity leave. When I came back from the leave, Miroslav told me: you do this with her, tell her what she needs to do, tell her to listen to you so she knows what

she's doing. So, I gave her the manual work and told her all what she needs to do. She used my data. All she needed to do was to do a graph from my data. Something I worked for years on. I wrote the whole text in the paper, and we finished the paper. And when this was done, she sent us a message, saying: 'take my name out of the paper, this is not my paper, I don't want to participate in it'. And she asked us to remove her data, this graph. I was furious and I couldn't sleep that night. This hurt us all. 'Her data'? What her data? My small child knows how to draw a graph. It was not her data, it was our data, my data that I calculated over the years. So, she asked to be removed and for her graph and data to be removed. All this while she was in Germany, where Miroslav sent her on the prestigious Max Plank institute. She wouldn't be there without him. He sent her there over *veza*. He pulled a *veza* to get her there and give her a scholarship. He made her a huge favour, and she sent an angry email to us from there. The day after that, I wrote her a stern email to explain how things are done. She had a way too high opinion of herself."

"They both came like they are above us, and they were really insulted when we told them how to do things. They came like they knew everything already and we should be lucky to have them. They had an attitude of wanting to go abroad and they looked down at us as we were rats: 'drop dead'. And they did manage to go abroad thanks to our recommendations, that we gave freely only to see their backs," Sandra said.

Those two young researchers were just what the Ministry likes. They did everything in a straight line and were great on paper. But they were not adequate for the job. They couldn't fit in, and they didn't even perform their work correctly. Ana had a different path. She paused, she worked, and now she is coming back to science. "But she works well. She is mature. She doesn't have a problem with authority. She doesn't fight and argue. She says her opinion, but all in a mature way. She knows how to handle things in a mature way. And she works well. But the Ministry doesn't recognize her and ignores her and actively prevents her from being on a project because she didn't follow a straight line," Sandra told me.

Vignette: "Papirologija" (Paperwork)

AOB researchers did not hide their lack of enthusiasm for administrative tasks. People at the highest position, such as the Director of Observatory, are the ones who need to deal with a lot of administration. Project leaders are also plagued by this. However, even regular AOB

researchers have their share of administrative tasks to perform. Whenever one of these tasks rears its ugly head, they are quick to voice their annoyance. “These things need to be done; I know. I just hate doing them,” I was told. Another researcher commented with: “This is a necessary evil. I don’t like it. If I wanted to be a bureaucrat, I would have not done a PhD in astrophysics.”

Administrative tasks are varied. The Ministry asks for a report every six months on what has been done at the Observatory. “This is not bad, because it makes you work. But the paperwork (*“papirologija”*) is daunting,” Jasna told me. There are also frequent conferments for titles going on at AOB, and there is always a lot of documentation around that.

“It takes a bit away from the job. I want to work on my project, but I have to do administration. Or if we want to go to a conference, we have to apply for grants and beg for money. I am kind of used to it, but yes, it does take some of your time,” Danilo told me.

4b. Financing

“Pare nisu problem – para nema” (“Money is not the problem – there is no money”)

Science is the second favourite topic that AOB researchers like to talk about. Monetary problems and lack of funding are the first. Informants talked about it regardless of the topic of the conversation; all talk would go back to this issue, in one way or another. Complaining about the lack of funding was done openly, in front of me and other AOB staff, including the Director. It was assumed that I understand these hardships and that they would not come to me as a surprise. According to AOB researchers, the main culprit for the sad state of financing are the government and the Ministry of Science. The Ministry appears as the main “villain” of all these stories and complaining: researchers at AOB are very clear about who is to blame for the lack of funds.

Most of my conversations with Serbian astrophysicists revolved around money and funding, in one way or another. There was a clear miscommunication that revealed each group’s lack of knowledge about how these things are handled in the other group. Namely, my Western audience wanted to know how funding is done, what Serbian scientists do when it comes to grant writing and whether they have problems securing funding for their projects. For the most part, the Western audience knows about the economic struggles in the Eastern Europe, and, for the most part, Eastern Europeans are very vocal about their economic struggles. This opens up questions about funding and grant writing, but these problems are not something scientists at AOB have to face, at least not in a way that scientists face in the West.

Belgrade Astronomical Observatory is a government-funded institute, just like most of the other scientific institutes in Serbia (Službeni glasnik RS 2015). The Ministry of Science provides money for AOB’s projects and researcher salaries. There is not much money in the government, but what exists is given to scientific projects without much effort on the scientists’ part. There is some proposal writing involved before the start of each project cycle, but this is not as competitive nor as daunting as project proposals in the West. (Almost?) all proposed projects are approved, and from that point on, scientists are free to engage in their work without any probing from the government or outside bodies. While many of them do engage in external project writing and grant proposals, the core of their work is not dependent on the whims of finance-giving bodies. This gives Serbian scientists much more freedom to engage in projects

they deem important, even if these projects are not financially feasible. Of course, the sheer amount of money is not huge, and that is one of the main problems. However, scientists working at AOB do not know what it is like to depend on funding or not to know whether your project will qualify for funding next year. This made conversations about funding and grant writing difficult. However, the issues of financing were prominent ones and have yielded a lot of material.

Projects are organized in cycles, with each cycle lasting 4 or 5 years, although the current cycle has been ongoing since 2011 (and has been prolonged numerous times) (Ministarstvo prosvete, nauke i tehnološkog razvoja³³ 2018). Project leaders in institutes write a proposal for the Ministry, applying for their project to be selected. The reality of science in Serbia is that all projects (or almost all) are accepted by the Ministry. “This devaluates the whole process,” Miroslav told me. “They want to rank projects, but ranking is meaningless. They claim they will be changing this in the future so it will be more competitive.” The details of these changes are still unknown, and scientists do not know details on how the Ministry will proceed in the future.

In essence, project financing was put in place so better scientists and better projects could be ranked highly and receive more money. There are even quotients depending on the quality and the projects are ranked based on several criteria. This approach sounds good in theory, but the practice leaves a lot to be desired.

The amount of money a project receives from the Ministry is predetermined and falls within the agreed budget (MPNIT2016, 2019). In essence, the Ministry gives funds to the approved projects in institutes and researchers engage in their work. Apart from writing the original project proposal before the start of a new project cycle, scientists do not have to apply for funding, nor to prove their results to the Ministry, except in nominal ways. The funds are not plentiful, but they are guaranteed.

The Ministry provides money for researchers’ salaries and in addition to this, projects themselves get a predetermined amount of money. This project money can be spent on equipment and organizing conferences in Serbia. There is also some money for travel, but it is

³³ In further text, MPNIT.

extremely small and cannot fulfill the needs of scientists. Lack of money for travel and conferences is cited as one of the main problems for researchers at AOB.

Not all projects get the same amount of money. It depends on how successful a project is, how many people are on it, and how many papers are produced. The projects are ranked and the higher a project is ranked, the more money it receives. These amounts of money are generally small – too small for what projects realistically need. “It doesn’t really matter if your project is highly ranked,” I was told. “Sure, you can be proud of your project being highly ranked, but it still receives so little money that it doesn’t matter in terms of funds.”

However, salaries are not dependent on this ranking. Salaries are calculated based on two factors: one, a researcher’s title (associate research professor, full research professor, etc.) and second, the number of points the person has collected during a specific project cycle. These points are collected by publishing monographs, papers in scientific journals, conference proceedings, and more (MPNIT 2016). In astronomy and astrophysics, the most points are awarded for publishing in renowned international journals.

There are six salary brackets (A1-A6) that depend on the points collected within a project cycle (MPNIT 2016). A1, the highest salary grade, is 1.75% of the lowest, A6 grade (MPNIT 2016). It effectively means that the most productive bracket, with the most points collected, results in a salary that is almost two times higher than the lowest bracket. It also means that people holding the same research title can have vastly different salaries.

Since the salary is directly dependent on the number of published papers and points that a person has collected, it means that the work at AOB essentially boils down to the collection of points. The Ministry has prescribed that one needs 25 points to reach the A1 level (MPNIT 2016); a paper published in a leading international magazine carries 8 points (MPNIT 2016).

The lowest bracket (A6) requires only one point to be collected, which can be achieved by one conference proceeding or a paper in a national journal without a high impact factor (MPNIT 2016). However, I have never heard of anyone at AOB not achieving this salary bracket, despite lack of work. For all intents and purposes, the A6 level seems guaranteed; one cannot go below the minimum guaranteed salary even without producing any results. Indeed, I have heard stories of “phantom researchers”: people on the payroll who never even appear at AOB

nor do any work. Their salaries remain low but are still existing. Depending on the title, such a researcher can have at least a minimum wage salary; in the case of higher titles, this base salary is much higher than the minimum wage. In fact, a researcher of this kind can often earn more by doing nothing than a person employed in a private sector.

Those interested in higher than a base salary need to earn their higher salary brackets through publishing. All AOB researchers work in teams, so the paper produced (and points earned) are never the responsibility of a single person. The system does not differentiate between the first author and the last one; all earn the same number of points. This allows younger researchers to gain experience by contributing a smaller portion of work for the same reward. The system is also open to abuse, through “signing names on papers”: including names of researchers on the author list even though they did not contribute to the paper at all.

Since guaranteed base salaries are too low for the cost of life in Serbia, most AOB researchers make a significant effort to publish. It would be too simplifying to say that the salary is their own motive for doing research; AOB scientists tend to be very enthusiastic and dedicated to science despite “inadequate funds and recognition,” as more than one informant said. However, in practical terms, this is what their activities are: collection of points. In Latourian terms (Latour and Wooglar 1986), this is what AOB researchers do: they produce articles for the accumulation of points. The cycle of credit (Latour and Wooglar 1986) is directly related to monetary means in this case: the more they publish, the more points they collect and the higher their salaries will be. Scientific effort and achievement are directly related to points and financial necessities.

Differences in salaries for the same rank (research title) are seen as unfair by some AOB researchers. It is important to mention here the base idea of fairness regarding salaries. This is an attitude inherited from socialist Yugoslavia. During socialism, salaries were calculated based only on two factors: education and the number of years of employment. Other factors, such as gender or productivity, were not of importance. Research titles are understood to take both the education and years of employment into account, and differences in salaries based on titles are considered fair for everyone. To add another factor, such as productivity, changes this system. Points accumulation based on published papers effectively makes for significant differences in salaries, even for people in the same research title. This is regarded as a fair

reward by some AOB researchers (typically those who have collected many points), and a “complete disgrace” by the others (the term “complete disgrace” was used by more than one researcher who was unsatisfied by this system).

I was told about a female scientist from the Vinča institute, who wrote a post on Facebook about this. “I have a PhD in nuclear physics and my salary is 33000 RSD³⁴.”

“There are extreme differences between paychecks,” Jasna told me.

Some people are undecided. “I am not sure I have my opinion on this system,” Sandra told me. “I don’t have enough information. This is how things were ever since I began. Older people remember another system. Some people dislike this system with a passion, and you will probably hear bad things about it. Others praise this system.”

This turned out to be true. Most researchers I talked to have a strong opinion on the points system: some like it and praise it, while others hate it with a passion. Not surprisingly, those most in favour of the points system are those who regularly produce papers and collect many points. They praise the system for rewarding dedication and hard work. Those who do not have enough points collected to reach the highest grade brackets are more critical. They often claim irregularities and abuse of the points system in the form of signing names on papers as the main problem of the system.

The Ministry is criticized for changing their rules often, without a warning or consistency. They shorten the time you have to reach a new title; they keep asking for more points, they make the whole thing stricter. It means that researchers have to work more and publish more.

“But it is a problem in science: just because you work and have some results, doesn’t necessarily mean that you can publish them. It is a good thing that criteria are stricter, but it would also be good if they would rise our salaries. The entire sector has low salaries,” Milica said.

It is not unusual for the Ministry to change the rules as the project cycle goes; in this situation, one is not necessarily able to predict their salary in the next project cycle even after collecting all the points they thought were needed.

³⁴ As of 2019, that is around 300 euros or 400 CAD per month.

The points race is seen by some as pitting scientists against each other. According to the Ministry's rules (2016), only the top 10% of scientists can be in the highest, A1 category, provided that they publish in renowned international journals. The next 15% of scientists can be in A2 category, provided that they publish in specific categories of journals. The next 15% scientists will be in A4 category, then the next 20% in the A4 category, and the remaining ones in the lowest A5 and A6 category. It is unclear how these rules are implemented at AOB; no researchers complained about collecting 25 points and not being in the highest (A1) category (or collecting any number of points and not reaching said category). It seems that this system does not affect them, be it because it is not implemented, or because AOB scientists are among the most successful researchers in Serbia. However, some scientists criticize the system itself because it pits scientists against each other.

"There are numerous consequences of this. First, this competition. Second, it forces us all of us to think in terms of what you can achieve in one year or in one project cycle. We cannot afford to tackle any issue that might take years to show results. Because if we don't have any results after three years, this project cycle is gone, and we don't have any papers. So, it forces us to choose only what is relatively secure and what will give quick results. This allows us to publish at least one paper per year. This thing alone limits us. It doesn't mean that you cannot do good and quality science, but it dictates what you can and cannot do," Goran said.

"You never know how many points you need. And the rules on how to secure these points change. Which makes no sense, to change things retroactively. For example, we were accepted to this project cycle with certain rules, but the way they intend to rank us for the next project cycle is different, and according to different rules. In some cases, rules are not even implemented. The rules are changed as we go. They haven't even done any rankings in the last five or six years. They probably saw that many people would jump to a higher category and receive higher salaries. They probably realized they would have to spend more money, so they don't implement this. They simply ignored it. Even though they were supposed to do this according to the rules, but there are no sanctions if they don't do it. That is how you get so many colleagues who are stuck in the same category, even though they regularly publish papers. This is a big injustice and thievery, if I may say so," Goran said.

“You could only be angry that you worked 15 years of your education, and your salary will be like a beginner’s salary of a kid in a company. And yes, I am angry that they are prolonging the project cycle. And they also promised that they would do re-evaluations every two years, so our salaries would jump. We all publish papers, and we have benefits as young researchers, and based on all of that, our salaries should be higher. But this is not happening. They are basically stealing my money for five years. I am on the lowest level for year. There was even a pay cut at one point for all government employees at 10%, despite me fulfilling conditions for a higher category. So, I ended up with a lower paycheck in a higher title than I started with,” Sanja said.

There is an interesting way that salaries in “companies” are compared to salaries at AOB. In this context, “companies” refer to privately-owned businesses, typically foreign-owned ones. These companies are stereotyped as offering excellent salaries to their employees. Salaries from AOB cannot be compared to a “dream” salary from such a company. At the same time, private businesses and companies are often shunned as being seen as harsh places with strict work conditions. The realities of privatization and capitalism in Serbia make these dream salaries more of an ideal than the truth. Not all employees can have such high salaries, and AOB researchers generally know about this. It is not unusual to evoke such companies as both an ideal in terms of pay and unwelcoming, harsh places, depending on the context. Comparing their own salaries unfavourably with salaries in “companies” is often used as a tactic to emphasize the unfair treatment scientists face.

Chasing points and over-production of papers can also be bad for science itself, I was warned. One of the researchers who insisted on anonymity in this matter described the situation as a “cretin post-doc effect”: the fact that people are forced to produce research without a true point and only because of requirements. According to their words, this is often happening in the West, among the post-doc researchers (hence the name): those researchers are under pressure to produce results and papers in the short one to two year time they are employed. Many of those papers are described to me as “lacking purpose”: “They all go along the lines of: ‘I measured this, I did this, and these are results.’ But what for? You can tell that it was written coldly, only to gain points and only to get a post doc.” This effect is well-known, but I was told that it is not researchers’ fault. “They need so many papers to get tenure or to prolong their post doc.” The

same effects is rearing its ugly head in Serbia, I was warned, because of the whole points system.

The criteria for electing scientists into higher titles is also criticized. “Once you get to full research professor it means that you get a permanent job. Not before that,” I was told. Does it mean other levels are not a permanent job? “This is an unspoken rule; you kind of do have a permanent job, but you also depend on funding. If there is no funding, you are out of job,” I was told.

“It should be that once you get to status of full research professor you don’t have to chase points anymore – you got there, you are a good researcher, now take your time. Take five years if you need. This is how it should be. But they can’t do that anymore because they are forced by the system to behave differently,” Petar said.

Ranking based on published papers is also cited as unfair because of the nature of teamwork. The points system does not differentiate between the first author and subsequent authors, who typically do less work in a specific project. Some AOB researchers emphasize that the only fair system would be to award first authors with more points than authors down the line. On the other hand, positioning can be misleading, I was told: depending on the paper, the first author might be the project leader who wrote the text and not the person who did most of the scientific research on the paper. “So, you never know,” Jasna told me.

The problem is not the absolute lack of money; it is how it’s distributed. Science receives only around 0.3% to 0.35% of the whole budget. During certain times and certain politicians, it would rise to 0.8% to 1.2%, which was better, but still far below European standards.

“Each Minister of Science, when he’s first appointed, changes where the money goes. But when it’s time to be fired or replaced, they open the ‘black funds’ and pour money at you. So we receive more money in those waves, only so we will vote for them,” Valentina said.

There is a lot of ridicule when it comes to social scientists and the way they work. Natural scientists see social scientists as not working as hard. STEM researchers see papers published by those in social sciences and humanities to be of low-quality and for “local use only.” There is a high degree of contempt of social scientists.

There are also differences in the points system. While both STEM and social scientists require the same number of points to reach specific titles and salary brackets, journals carrying these points are different. Social scientists are allowed to publish in local journals and earn the same number of points that those in STEM get when publishing in highly ranked international journals. This difference is not surprising to researchers at AOB, and most agree that this is fair. At the same time, many cite this difference as the reason why social scientists do not work as hard as those in STEM.

“They can take any Serbian journal and get the same number of points as us, and we need to go through international peer review process. It is easy for them to get points for salaries and titles; much easier than it is for us,” Petar told me.

There is also a belief that these papers must be of lower quality than those published in STEM fields, which is yet another proof of STEM’s superiority. Interestingly, my conversations with social scientists showed that they believe they are disadvantaged compared to STEM scientists.

“Those in STEM have international journals, and there are many of those. We only have 1-2 Serbian journals to publish. All of us, and only a few journals. So of course the professors and those in charge will get to publish. It is difficult or impossible for the rest of us,” a PhD student in anthropology told me.

Sandra believes that it is fair to have two different point scales for STEM fields and social sciences. “Some themes that are of local importance should be published but might not be interesting in international circles. Those papers are worthy of being published, and it doesn’t matter it’s in local academic journals. I do think there should be a leeway for social scientists in this way. Social sciences are not astrophysics; some themes are worthy and important only locally. I do agree that social scientists should have a different treatment than us when it comes to points and where they are required to publish in order to get those points.”

“We in natural sciences can have opportunities to publish in international, top journals with high impact factors. It is more difficult for social scientists. History and sociology, they have to be politically suitable if they want to publish abroad. They would have to behave like NGO and talk against our country and talk “how pathetic and bad we all are” in order to be published in international journals. So that’s a problem for them,” Jasna told me.

In the spring of 2016, the Ministry announced a new project cycle. This was long awaited, since the previous cycle was supposed to end in 2014 (Vreme 2016). However, the newly announced cycle never went through:

“This whole new cycle thing created a circus and was very politicized. It was so bad that the Ministry had to cancel it. So that’s how this project cycle was ruined. After this, they made several bad decisions, one of which was, and this needs to be said without hesitation, that the authority of the Ministry, which is the authority of a government body, was compromised. Imagine the government stopping its own project cycle. It also beheaded many people. We started writing new projects, and now we don’t know what is going on. So, we continued with the previous project cycle. We are now in the sixth year of the same cycle. And this is too much,” Miroslav complained.

This happened in 2016. The new project cycle was announced, but had to be cancelled (Gusijan 2016). As of 2019, the new project cycle has not yet started, which means that AOB researchers essentially work in the same project cycle for nine years. It also means that their ability to hire new people or to elect the existing researchers in higher titles is very limited.

“It is a mess, that’s what it is. But what else do you expect from the government?” Jasna said.

“People with ideas and ambition cannot perform their research properly. Those in charge don’t know what to do, so what happens now is that we are stuck, which is worse than starting a new project cycle. With a new project cycle, we could recognize which institutes we need, and the money would be invested not that someone can lie here all day, but to work, and to know what his job is. This is a huge problem. People need to have specific tasks. I don’t care about your work time, but you need to achieve enough results in 2-3 years that will make you keep your title or jump to a next one. If you don’t achieve that, you lose your job. So we don’t get another situation of “*lezi lebe da te jedem*” (literaly: “lie down, bread, so I can eat you”; refers to people who want paycheck without much effort). People are motivated if you present them with this situation,” Miroslav said.

“But some people, and we should be scared of that, there are people who don’t have true affinity or love for science. They just see this as a means of survival, so what happens, happens.

This is not good. These bad times attract such people. We need to look into the future, and not one, two years in the future but 50 years in the future,” Miroslav said.

EU Loan: “Chaotic Purchase”

Another monetary issue is the lack of infrastructure or access to infrastructure. AOB researchers agree that the infrastructure that is available to them is often inadequate, obsolete or simply non-existing. There are not many attempts to improve this situation, and those that exist, are criticized by the AOB staff.

The main attempt (and main failure, as it is described) that researchers talked about was the EU loan secured in 2010, during the time when Bozidar Djelic was the Minister of Finances (Mićević 2009; Tanjug 2010). According to EU requirements that researchers cite, a certain percentage of government’s money has to be invested in science. (Veselinović 2016; Jarić Dauenhauer and Tatalović 2019). Reaching this percentage is one of Serbia’s goals for fulfilling EU membership requirements. In order to satisfy these criteria, former Minister of Finances, Djelic, secured a loan from the European Bank for Development. The loan, 250 million euros, was supposed to improve infrastructure, but it was done poorly.

Researchers at the AOB are highly critical of this loan. The conditions of the loan are limiting. The funds cannot be used for all scientific needs; the only way to spend the money is by purchasing equipment. The amount of money is too high for what the Observatory needs in terms of new equipment, and there are penalties if they do not spend the money. Needless to say, this is a loan with an interest, and it will have to be repaid by the taxpayers.

“In this way, EU gets its money back with interest, and we get nothing,” Sandra told me.

The loan has resulted in a chaotic purchase of expensive new laptops for the staff. New laptops are bought every year, even though researchers do not need them. The laptops are described as state of the art and “space” (“*svemirski*”: highly powerful and innovative). These computers are much stronger than what researchers at AOB need to perform their work. In addition to laptops, the staff has purchased smaller devices, such as highly powerful tablets.

“I have a ‘space’ tablet that I don’t use at all – I give it to my child to play with,” Sandra said.

The dynamic of equipment delivery was also a problem. For unknown reasons, many of the devices arrive in periodic waves, which is not so much of a problem for AOB, but it creates a serious issue for institutes storing dangerous chemicals and other sensitive equipment. In those situations, there is simply not enough room to store everything that arrives before the old ones are used.

“This has led to chaotic acquisition of computers. I had five computers in reserve, and they all arrived at the same time. Not to mention those in other institutes, who need chemicals for their research. All those chemicals arrived at the same time. They don’t have where to store all of that. They can’t store it like we can with computers,” Miroslav complained.

The only truly useful purchase that resulted from this EU loan were powerful computer clusters that the entire AOB uses (image 12). These clusters were necessary, and they improved the researchers’ productivity. However, the clusters’ cost was just a fraction of the money that AOB was allotted, which inspired the chaotic and unreasonable purchase of the equipment nobody really needed.

“It is true for all scientific institutions in Serbia,” Sandra told me. “I’ve heard stories about institutes buying complex machines they cannot fully use, only to replace them with even better machines after a few years. And all of that for nothing. And with no explanations on how they will use it, or what the relevance of those machines is for the project. It’s madness!”

The blame was put on Djelic and the government. Politicians are blamed for wanting to score points with general public without even understanding scientists’ needs or consulting scientists about what they truly need.

“It was pretty bad, this loan. It was good that we got to acquire some devices, but it was so poorly organized. The main problem is that you can’t make great politics from science. But we are such a poor society, so whenever some money shows up, we go crazy. I can’t claim, but maybe someone abused this. It is clear that this was done sloppily,” Miroslav said.



Image 12: Computer clusters acquired through EU loan

Institutes vs Universities

Researchers at the Observatory cite differences between themselves and scientists working at universities in Serbia. There is a perceived unfairness when comparing themselves to those working at universities. University researchers typically work both in research and lecturing, and because of this, they are not subjected to the points system and project financing. Instead, they receive fixed salaries from the Ministry (MPNIT 2017). It means that their salaries are consistent and do not depend on accumulated points. Researchers at AOB claim that scientists at universities often do not do any research, even though it is in their job description. Also, their research work and published papers are judged through the points system, but only as an addition to their regular salary.

“They are allotted a certain number of ‘project months’ on top of their regular salary. Which can be around 133% salary in total. The problem is that people working at universities are ranked on the same list as AOB researchers. The university people make more money, which in turn makes researchers in institutes fall down on those lists,” Nenad told me.

In case the government decides to cut money for scientific projects, those working at universities will experience just a bit of salary cuts: they will not receive the same amount of money for that “addition on the salary.” However, their core salaries would not be affected. It is a different situation for people at institutes, such as AOB: if there are cuts for project money,

their core salaries are endangered. Also, if projects are not funded anymore, researchers in institutes are all out of work. “We are constantly scared about it. While they at the Universities don’t care – they have their jobs and they will get to keep them,” Nenad told me.

Professors at universities are criticized for not doing proper research and not working as hard as researchers at institutes do. “We have one retired professor at AOB who is here every day and works more than any of us. But the government turned the system into a joke, so there are many of those who don’t have to work anymore or improve,” Nenad told me.

“Those professors at universities who don’t have to do anything – he is there, just makes his lectures and that’s all. And they had a nerve to tell us that we are not doing anything. So, they made us work more, and now we are also ranked based on how much we publish,” Jasna said.

People at universities are criticized for not “caring about science.” “They should do research, too, not just lectures. This is in their job description. They should care about science, and they don’t. These two things: scientific work and academic work, are treated as two completely different things, and that is not right,” Petar told me.

“There is a big problem with the law about science and research, where you have equivalences in titles between universities and researches. Universities have the autonomy and they choose their own people by themselves. Nobody can control that, and government can’t control them. But our elections into titles are on the level of government. So, government controls us, and has to approve our titles. A title is a license. If I don’t have an appropriate title, I can’t approach the funding, I can’t participate in a project. This is an eliminatory step. But if I have a title that I got who knows where, I am automatically recognized, and I can approach this funding without being competent, without knowing anything about science,” Miroslav said.

Even worse, the people in the government and Ministry of Science who get to decide about the redistribution of money, are people from universities. “They work in their own interest and they transfer money to themselves, while researchers at institutes are left with crumbs. Only a minority of those people are scientists and researchers,” Nenad told me.

“There are also many people from private universities and private institutions. Which means that there are only a few real scientists; real scientists are in a minority. This is why our status is the way it is,” Petar said.

Private institutes and private universities are heavily criticized. This is a common trend in Serbia, where people have little faith in private educational institutions of any kind. This lack of belief is not unfounded; the way private sector is organized in Serbia today is a direct consequence of transition.

In the case of private universities, these are often seen as shady projects aimed at awarding diplomas to the rich and undeserving. Many of the current government's ministers have diplomas from a private university "Megatrend," which is often cited as a reason for their lack of skills and education. Private universities and institutions are often plagued by rumours of corruption and "*veza*" favours to award diplomas and titles to those who do not deserve them.

It is not surprising that researchers at AOB have little to no respect for private universities and institutions.

"In these 'Mickey Mouse universities', it is allowed for a person to give themselves a title. 'We need someone who has a title, so you will get that title.' And such a person is judged with the same parameters as us. Private universities can give themselves titles and claim that these are equivalent with ours, when they are not," Petar said.

"It is also a problem that private University diplomas are treated equally with ETF³⁵ or Faculty of Mathematics. If you have a PhD, nobody asks you where it's from. I've read this recently, there was this boom in diplomas. People from the Ministry talked about it, and they are the first ones who bought their diplomas! So yes, it's a chaos," Milica said.

"The government needs to decide which institutes it needs. They have to clearly say which institutes they want to finance. Once this is decided, a project cycle should start, but this money should not be for salaries. A smaller portion can go for salaries, yes, but most of it should go for travel, for organizing events, for funding new PhD students. Also, that those who produce the best results can seek additional funding," Miroslav told me.

This is needed to differentiate between the government institutions and private institutions.

"It is important to force everyone to pass the government licensing. I am not spitting on private professors and institutes, but they should pass the same scrutiny. If you are a private professor,

³⁵ Faculty of Electrical Engineering, a government institution and part of University of Belgrade.

you should pass the same criteria. If you indeed have the same title, you can get the same money. If you are in a lower rank, you will receive a lower rank and less money,” Miroslav said. Many informants complained about the lack of mechanisms to control this at the present date.

Publishing Requires Money

Out of all of the scientific journals in which AOB researchers publish their results, the US “Astrophysical Journal” and “The Astronomical Journal” are considered the most prestigious. They are also categorized as the M21a and M21 journals (MPNIT 2016), those that award scientists 10 and 8 points. Unfortunately, in order to publish in these journals, one has to pay. The prices are typically well above the AOB’s ability to pay. Depending on the journal, prices can come up around 150 US dollars per page. “You write a 45-page paper, how are you going to pay? This is around 4000 dollars; there is no money of that kind on the project,” many informants told me.

“All of my papers were published in ‘The Astrophysical journal’, which is 4th or 5th journal at the international level,” Sanja told me. “The only higher-ranking journals are those that publish reviews and data, so they are more cited. But this one is very high among those that publish papers, and you have to pay for that. I have two papers published in that one, and another paper in a bit lower ranking, but still very well ranked journal. But you don’t have to pay for that one. So, I know many people who publish there and not in “Astrophysical journal.” Again, because of the money. There is a minimum difference in terms of ranking but a lot of difference in terms of money. So, you have to balance things. If my paper is the best fit for “Astrophysical journal,” ok, I will publish that, and I will pay. But I can’t ask them to pay for me twice per year, so another paper will be published in the non-paying journal.”

In some cases, the payment for publication can come from the project funds. If it is a shorter article that requires 300-500 euros, the project might be able to pay for it. “This is not something that you can pay by yourself. So, we divided things. My mentor is in two projects, so she took money from both projects. My project paid 300 euros, I think, and she paid just as much. You pay per page, and per illustration, and if you want pictures to be in colour, you have to pay more. Of course, we don’t want to publish in colour. So, there is a bit of thinking about how to organize this publishing. Some people at the department believe that we should never

publish in journals where you have to pay, because projects simply don't have money for it. Or, to allow only one person per year to publish in that journal," Sanja said.

While it might be possible to pay for publication in some cases, most of the time, projects simply do not have that kind of money. So, what to do? The choice is to either publish in a journal that does not require payment, such as British MNRAS, or to whine. Both strategies are commonly used. To get a paper published in a journal such as The Astrophysical Journal, a carefully penned letter "of whining" is sent to the editors.

"Before you get the receipt, you write them a letter in which you say: 'we are poor, we don't have money to pay. Can you waive the payment?'" Ivana told me. AOB researchers claim that excessive whining is their preferred strategy: you whine as much as you can, but do not lie about the situation. Some people even say: "we were in a war and economic sanctions."

In most of the cases, this strategy is successful, and the fee is waived. "It works. It worked for me twice," Sandra told me. "They waived around 3500 each time; this was in 2010 and 2015. The highest-ranking academic journals in my field waived those fees for me. I would not have published my papers in this journal otherwise."

It is interesting to note that some researchers, Sandra included, emphasize that they would never pay that amount of money "even if they could." "This is unethical," Petar told me. "A very capitalist and non-scientific approach. It is truly reprehensible."

The "whining game" to publishing has its rules. The first rule is to let everyone have their chance. "You have to play fair," Sandra told me. "You should not request this too often - you have to let others around you do it. You let your colleagues do it, and those from other projects. They cannot have too many requests of this kind at the same moment. This is why it's important to target when to publish so they never have more than one AOB paper at the same time."

The waiver game does not always work. Sometimes, the journals simply reply with: "we don't have funds for this; we cannot do it." From time to time, it is possible to change this answer to the positive one if you write another plea letter. "They probably have funds for poor countries, but they don't want to state it openly so not everybody would ask," Petar told me.

There is a distinctive “code of decency” involved in this arrangement. AOB researchers see themselves as part of the same collective, even if working on different projects. It is considered fair by all scientists I talked to. The fairness is simple: you need to allow others to use the fee waiver. Targeting the waiver is a game in itself that was not fully explained to me, but the general agreement is that one person (or one team) should not request it too often. Even if one has new research to publish, it is considered a poor form to request the waiver if they have done so recently. I have not encountered any bad feelings about this arrangement; all researchers I talked to agree that it is a fair way to go.

Similarly, I was not told of any conflicts or fights regarding “whose turn it is to ask for a waiver.” It is possible that AOB researchers did not want to talk about that topic with me. However, considering the amount of other gossip I became privy to, I would say that this is one aspect everyone agrees with.

“There is no conflict among colleagues about it,” Sanja said. “We are such a small group, and we are all friends. Maybe it would lead to conflicts if there are different people. But here, on my project, all people are good people. So, it all depends on people and how they are. I am lucky that we have great people on my project.”

The fact that people get along and agree to share fee waivers does not mean that researchers are not angry about payment. As noted above, the request for payment is seen as unethical, regardless of the project’s (in)ability to pay. Some researchers also feel that it is the government’s fault for putting scientists in a situation where they need to beg for a fee waiver.

“It is bad that it basically depends on people’s individual qualities and how they are with each other. I can imagine in some other groups that it could lead to conflicts. But, if you think normally, you would not be angry with those people; you would be angry with the government,” Sanja said. “Project leaders will not refuse you; if there is money and you are first to request it, you get it. But the next person will not get it, because there is no money. It’s not about how good your paper is versus the other person’s paper. It’s all about funds. This is a problem with the government. Also, the journal that you don’t have to pay, MNRAS, is also an excellent journal. It also carries the same number of points if you publish there. So, this circumstance makes it less conflicting for everybody. And yes, it’s down to sheer luck, but everything is down to luck here. I can’t think of a single thing that is organized properly in

Serbia. I might say that, well, OK, health insurance is a bit better organized than in America. But that's the only example I can think of."

The Points System

Since projects are organized around a 4-5 year long cycle, they produce research that can be done in that span of time. Some research takes several months to one year from the concept to the finished paper. Other research requires several years of work. There are, of course, certain research questions that require even more work.

"It all depends on the research," I was told. "Some subjects require years and years of research."

However, there is an important limitation. With the points system in place, researchers at AOB cannot dedicate years to one project that might not produce enough papers. Doing so would hinder their ability to accumulate points needed to advance into a higher title or to keep their salaries.

"So, what to do? One possibility is to abuse the system and get your name signed on papers where you didn't contribute much," Petar told me. However, this approach is not popular among senior scientists who wish to dedicate years to specific research. "This is a tactic for lazy people," I was told. Instead of this abuse, senior researchers choose to focus on projects that are doable in one project cycle (4-5) years.

"We all choose what to study, based on the limitations that we face," Miroslav told me.

In this way, the points system directly dictates the type of research done at AOB. While it is not the only limiting factor (funding, equipment and access to telescope data are important factors guiding the type of research done at the Observatory), it is an important factor determining the type of projects and research done at AOB.

It is undeniable that today's Serbia struggles with finances, which includes funding awarded to scientists. AOB researchers are very well aware of these issues, particularly in terms of salaries and insufficient funds to cover conference travel. Complaining about these issues, which often

made the majority of my talks with AOB researchers³⁶, is not surprising. It was clear that AOB scientists are very frustrated about lack of funding and about general chaos that exist in today's Serbia.

At the same time, it is undeniable that AOB researchers have it better than the average person in Serbia. It was a rare informant who was self-aware or realistic enough to admit this. For all the complaining, AOB researchers actually do not have so much to worry about. Their salaries are higher than Serbian averages (Republički zavod za statistiku 2019), especially for those who do collect a lot of points and reach the highest salary brackets. Even those who do not do much (or any) publishing have a salary that is above the minimum wage. This does not sound like much, but it is important to remember the realities of today's Serbia: regular salaries and secure employment are very hard to come by (Vujošević et al. 2012). AOB researchers have not only decent (and, for many of them, high salaries for Serbian standards), but also enjoy an extremely secure employment. They work in a government institution, which means that they are awarded all the benefits mandated by the law, which is not something that those employed in the private sector necessarily enjoy³⁷. Furthermore, AOB scientist are employed permanently, which means that they do not have to worry about losing a job. Insecurities over changes in funding and the points system are frustrating, but it is not likely that the government will ever erase funding for scientists, and they know it. The ever-changing rules and chaotic measures imposed by the government rightfully make scientists angry, but none of this compares to problems of so many people in the private sector. That is not to say that AOB researchers need to be quiet just because other people have it worse, but it would help to put their situation into context. Despite all of these issues, AOB researchers enjoy a lot of security that can be paralleled to the one that existed during socialism. In today's Serbian climate, that is not an easy thing to achieve.

³⁶ I do not overexaggerate when I say that any conversation, about any topic, would inevitably go back to the issue of money. AOB researchers really wanted to talk about the lack of money and their bad economic situation, and they always found a way to link any existing topic of conversation to this. It was not just during conversations with me: their own conversations over coffee would often turn into mutual bonding through complaining about the lack of money.

³⁷ Needless to say, what happens in the private sector is illegal.

4c. The Past and the Present

“Radio ne radio, svira ti radio”³⁸

Senior members of the staff remember changes that the AOB experienced through the decades. There are three notable periods that older researchers mention; they divide their work experiences into these specific periods and note all of the changes they had to go through. The first period is the time of socialist Yugoslavia (until the 1990s); the second period is the breakup of Yugoslavia and wars (the 1990s, until 2001); the third period is transition that is still ongoing (post 2001).

The first period of socialist Yugoslavia was marked by economic security and peace. This was the time that some AOB members remember with nostalgia. However, older members of the staff also emphasize that the attitude towards scientific work was not necessarily the best.

During the time of socialist Yugoslavia, the Observatory received institutional funding, just like institutes in all Yugoslav republics. It meant that the AOB received a specific amount of money for salaries and other things; the budget was not high, but it guaranteed salaries for the staff. The salaries were determined based on the research title and years of employment. One's productivity and published papers did not factor into the salary, although AOB scientists received an addition to salary for night observational work (Radovanac 2010, 2016). According to my informants, some other scientists, such as physicists, received project money in addition to institutional funding, particularly those who worked for the military. However, AOB was completely institutionally funded.

“In general, physics and astrophysics were very much tied to and turned to the West. We wanted to become members of ESO, the European Southern Observatory. This was ruined because of the war and breakup of Yugoslavia,” Miroslav told me.

Professor Stojković was more critical of the way scientific work was organized in socialist Yugoslavia:

“In those days, it was all surrounded by the veil of secrecy. If you needed to work on your thesis, it was considered your private thing. ‘Do it in your own free time’. This was in the 70s

³⁸ Literally: “Whether you work or not, a radio plays music for you.” You receive salary regardless of effort.

and 80s. When I was starting out, it was said that your thesis and what's in your thesis is confidential. None of that should be published. If you publish something, it should not be in the thesis. This was pushed in astronomy, this mindset. I fought against that. It happened to me that my boss said: once you publish a paper, you are 'useful for the society' because you took (*maznuo*) money from the government.³⁹ But when you publish two papers, you are 'harmful for the society' because that's the same money and you wasted paper and time, instead of spending time in meetings," Stojković said.

In those days, the expectation was to satisfy the minimal criteria from the Ministry. "To work a bit here and there and that's all," Stojković said. "You would receive your salary regardless how much or how little you worked. It was all '*radio ne radio, svira ti radio.*' Just like in all government-funded jobs, and most jobs were government-funded. You would get your salary regardless, which made some people work very little, or at all. If you wanted to work and produce results, they would look at you as if you were the odd one out."

This is an important commentary about the socialist approach to work that was common in Yugoslavia. With high job security that existed in socialism on the one hand, and lack of particularly high salaries, many people took it upon themselves to slack at work (Chelcea 2015). There were no repercussions for not being productive, and no rewards for being productive. Some people felt that their salaries were not high enough to warrant much of an effort. A common saying of the time was: "*ne mogu toliko malo da me plate koliko ja mogu malo da radim.*" ("They cannot pay me so little, as little I can work.") That is not to say that people in all occupations had this luxury to slack; certain professions were known for hard work and significant efforts. The most often cited example, to the point of being symbolic, were coal miners. On the other hand, people working on administrative positions and similar office jobs had a lot of leeway. There is a stereotype, very present to this day, about lazy administrative workers in government institutions. This lax approach to work was seen as less of abuse and more of "sticking it to the government" (that people in former Yugoslavia are so fond of.)

³⁹ It is assumed that taking money from the Government is a good thing.

Furthermore, as professor Stojković mentioned, a more hardworking person would make the others look bad in comparison. If there is one worker producing more results, this runs into the risk of becoming something that everyone is expected to do, and nobody would want that.

In addition to this, there was a dose of socialist paranoia towards the West. While Yugoslavia was, generally speaking, on friendly terms with Western countries (at least compared to other socialist nations), there was still a prevailing idea of science being something that belongs to the nation itself and something that is not to be shared with others.

“When I started publishing in international journals, they accused me. Why didn’t I want to raise the status of domestic journals? Instead of that, I helped Americans. ‘You sold your work to Americans’, they said. ‘If you do that, why don’t Americans pay you?’ I fought against this but I couldn’t do much to change those attitudes.” Stojković said.

It all changed for the worse with the breakup of Yugoslavia, wars and economic embargo in the early 1990s. AOB researchers regard this as the “dark period,” even those who were too young to work at the Observatory in those days. During the 90s, there was nothing interesting going on in science. “There was nothing interesting in terms of funding, because there was no funding,” Miroslav said. Only minimal funding existed in those years, and the sole goal was to keep institutes open. AOB researchers describe those years (early 1990s until 2001) as “one big nothing.” “Everything stopped in those years,” Ivana told me. During the 90s, they tried to do science that didn’t require much funding or infrastructure. It was mainly theoretical work, data processing or some laboratory experiments that they could do with little funds and equipment that they already had.

More than lack of funds and equipment, AOB researchers regard sanctions as the most damaging factor. There was no science because of sanctions, which were very strict. This time is described as “very dangerous for the whole society, and especially for science.”

“It was really unfair,” Miroslav told me. “Sanctions went so far as scientific journals receiving guidelines not to accept any papers from Serbia. It was very difficult to fight to overcome that. This was during the time a researcher from AOB was the Minister. Many letters were exchanged, and we tried to fight against that. It was very Nazi-like.”

At first, when sanctions were implemented in 1992,⁴⁰ journals started returning papers without sending them to referees. They simply said that it was because of EU sanctions. It was very difficult. “Science in Serbia had gone through a horrible period. The work was based on enthusiasm. It is still like that, but especially then. It was maybe for the best, because many people left, and those who stayed are those who had the urge to do science,” Miroslav told me.

“It was such a huge problem that even high-quality people ran away. Many had gone abroad to do science. One whole generation - ask them at the university - the whole generation had gone abroad. We who stayed, we attempted to do things that will be recognized in the world.” Miroslav told me.

This was next to impossible to achieve during the sanctions, but in the mid 90s, this embargo push relaxed a bit. There were journals that were not as strict, so some papers were published (Hodžis 2015).

During those days, the Minister of Science was a scientist employed at the Observatory. He wrote to scientists around the world in an attempt to break sanctions imposed on scientists in the early 90s, to a varying degree of success. “There were many unpleasant scenes. People would look at you as if you were there to murder someone, because Serbs were presented as monsters. Of course, real scientists would recognize you, but it was difficult,” Miroslav told me.

“You can’t impose sanctions on a whole nation, in all the segments. Spain had Franco, and he was gone, and Spain stayed and developed science, despite Franco’s politics. You simply can’t look at people, at scientists, like that,” Miroslav told me.

“We were very open and turned to the West in that time. But then we realized that we should connect to everyone. We shouldn’t limit ourselves. This is science, and we all belong to it. East or West, it doesn’t matter. Science doesn’t have a religion, or skin colour, or any of that. That is the point. Scientists can easily find a common language,” Miroslav said.

This period was over around 2000. After the 1999 bombing, it started to open up, “our road to Europe,” as my informants put it. Miroslav had managed to secure a scholarship in Poznań,

⁴⁰ The UN Security council Resolution is available at [https://undocs.org/S/RES/757\(1992\)](https://undocs.org/S/RES/757(1992)) (Accessed on August 4, 2019).

Poland, as early as 2001. It was for a month, but it was a start. He talked to people there about science and what is science.

The biggest changes came after 2001, when Dragan Domazet was the Minister of Science. This is when a switch to project funding was made, my informants said. Project financing is limited to four or five years, depending on the project cycle. The current project cycle has started in 2010, but was prolonged several times, which is a constant source of frustration for scientists.

“Domazet has implemented new ideas. Instead of having one project for the whole AOB as in the past, he made a system of more smaller projects. Also, he implemented rankings, so those who produce more and publish more have more money; drastically more,” Stojković said. This has introduced the points system that is still ongoing.

“At first, these changes were clumsy. But it was good that we switched to project funding,” Miroslav said. “This opened up a competitive spirit, which was beneficial. Before, researchers were paid whether they worked or not. *“Radio ne radio, svira radio”*, which was really bad for science. Then there was another change that I think was good, but many people complained. The honoraria were divided into categories. Those who produce more were rewarded. We can talk whether quantity is the best criteria of scientific worth, but it did make some positive changes. In universities, they started requesting paper publications for PhDs. Not like before, where you were not even allowed to publish anything from your PhD. That was completely unacceptable,” Miroslav said.

Prof. Stojković agrees that these changes were positive. “I lived through all of those stages through decades. It is much better today than before. When I was starting out, in mid 70s, it was *‘radio ne radio, svira ti radio’*. There were only a few people who were known in international circles, and a few people who were cited in foreign journals. Today, we have more people, and this explosion was created with Domazet’s system. When I worked here, I had 120 000 RSD paycheck, and a person in my category who didn’t do anything had 60 000. I was rewarded for my productivity and work.”

However, these measures were not welcomed by everyone at the time. “It was a scandal,” Stojković remembers. “How can someone with 30 years of work and with a title of associate

research professor, have a lower salary or the same salary as a junior researcher? There was a huge uproar: how is this possible? It was seen as unfairness, a disgrace.”

The idea about salaries reflecting results is a foreign one to people in socialism. The established parameters for salaries (education and years of employment) were seen as the only valid criteria. Adding performance and results was seen as unfair and borderline unethical, particularly when violating the above two criteria. This is the attitude that still prevails at the AOB, which is witnessed by constant uproars about younger scientists that publish frequently having higher paychecks than seniors who do not publish much.

“Published research and results are the only valid criteria and judgement of someone’s rank and quality. The advantage of Domazet’s system is that the money goes for the best researchers. Domazet’s model had undergone numerous changes over time, and there was some criticism, but that is to be expected. Even Plato talked about if you want democracy, you need to be prepared for a middle solution. And if you want autocracy, you have to be prepared that the best person will not be on top. Domazet’s system might not be perfect, but it is much better than ‘*radio ne radio, svira ti radio*’ system that we had before,” Stojković said.

“When I was starting out, you could have full tenured professors without any published papers. He couldn’t even be a junior researcher today. We called those jokingly, “*šumski profesori*” (“professors from the woods”). Those were the ones who arrived directly from the partisans,” Stojković said. “Many people who are not particularly productive have a strong nostalgia for those old days. They write petitions against the points system and talk about people signing names on each other’s papers, as if this is how we got all those points.”

However, despite these criticisms, many senior researchers agree that “times were better during Yugoslavia.”

“I don’t mean this in any ideological sense,” one of the researchers was quick to point out. “I have no illusions about the political side of things. But it is undeniable that the standard was better. There was more security, and Yugoslav science was known on the European map. Today, we have to struggle to keep that up. Of course, those are those of us who want to work, who want to produce results.”

The consensus is that the Yugoslav decades might have been too lax on those who did not want to work hard, but that it was a time of security and prosperity. This was true, my informants say, both in terms of scientific work and general standard of living.

“We were proud to be scientists,” one senior researcher said. “Back in those days, it meant something.”

Researchers are divided over whether the old system (institutional financing) or the new one (project financing) is better and fairer for scientific work. One of the criticisms of the new, project financing is that it ruined a collective, centralized vision of science that existed on a government level during socialism. Even some who agree the changes were positive, like Miroslav, are critical of this aspect of the project financing:

“Project financing and the points system are good in principle, because they motivate people to work. But there are also bad sides to it,” Miroslav told me. “What happened with the introduction of the points system is that people who worked in institutes technically lost their jobs and they were switched to project financing. It was a good system for those who are in universities. They have permanent jobs, plus addition from projects. But we at institutes are honorary workers. This was bad for two reasons: one, if you don’t have institutes and employees, there is no joint idea about what to do about science. The government doesn’t have an idea what is happening with science. And two, because the country needs these projects and these people need to be employed, once the projects are open for applications, basically all projects pass. Whoever applies, passes and is approved,” Miroslav said.

In Miroslav’s opinion, this system created an imbalance. It made institutes into just a basis for projects and people’s research. “They were not real institutions anymore,” Miroslav said. “A bad thing about this system is that there is not enough investment in science. I think this is because of lack of any strategy or treating science as unimportant. Science is marginalized. So, because of this, we can actually be extremely happy with what we produce.”

According to Miroslav and some other senior researchers, a centralized approach to science organized on the government level is a better option. It means that the country cares about what happens to science and scientists, and that science is recognized as important.

“Back in the day,” one senior researcher said. “Science had a place. The government knew the importance of science and it had specific measures and ideas about how science should be. Today? Not at all.”

“Back in the day” refers to socialist Yugoslavia. Again, many of my informants are quick to point out that they do not praise this time in an ideological or political sense; there seemed to be an urgency to denounce any nostalgia for socialism itself. At the same time, there is a clear tendency to praise the “old approach” of a unified vision of science organized on the government level. The idea of science being nurtured “from above” is not seen as a bad thing, nor as a limiting factor. On the contrary: it is seen as a sign that the importance of science is recognized, and that the government takes active measures to nurture science.

Changes to the Point System

Turning to the proposed changes to the system happening in the near future. The main change is the source of financing: the new system proposes that half of the funding for researchers should come from the project and half from the institution. Funding through projects is the current system, while institutional funding means that a scientific institution (in this case, Observatory) receives money from the Ministry and then allocates this money to the researchers. In essence, these changes will seek to combine the old, pre-2001 institutional funding and the new, post-2001 project funding. Institutionalized funding means that the AOB Director will receive money from the Ministry and then redistribute it. Project salaries will only count as an addition to the fixed salary. In this system, all researchers would get a decent salary, and a smaller number will get this addition.

Not surprisingly, the proposed new system is not to everyone’s liking. There are many who openly complain about it. These complains are seen as a “normal thing,” as many of my informants remarked. “This is how it always goes: there is a system, and people complain about it, then there are changes, and people complain about that, too.”

“They are changing this, and they don’t even know what they are doing,” Jasna told me. “Once again, politicians are deciding for scientists. Or, if there are scientists among them, those work for their own interests. Classic Serbian business.”

The proposed changes were unclear as of 2019, and AOB researchers are unsure what these changes would include, or when they will be implemented.

“This was all done sloppily. It is not surprising that 100% projects are approved, because institutes can’t survive otherwise. Researchers working in these institutions need to have salaries, and these salaries need to come from this money. So, they are all accepted. And this is how you get bad things. Because there are no criteria; there is no control.

“The 2001 system was slowly developed, but it seems that this ‘*radio ne radio*’ mindset is winning again,” Stojković said. He referred to the announced changes about institutional funding in the future (Službeni glasnik RS 2019).

The proposed switch (or, as Stojković put it: “going back”) to institutional financing will be “great for most people, but it will be bad for science. Many people will default to ‘*radio ne radio, svira ti radio*’ mindset,” Stojković warned.

Some AOB researchers fear that institution financing will lead, once again, to Directors of institutions advising researchers not to publish that much.

“This is, in part, going back to that old system,” Stojković said. “The new system encourages and rewards those who work. Those who don’t want to work and expect their name to be signed on papers. Those are people who don’t produce many results. They all go: ‘why should this person have a higher salary; we have the same stomach, the same number of children’. They see it as unfair.”

“This system made people group around a leader, a person with ideas. This way, you get into a productive team, you practice high science, you learn a lot, you get results. But if you get into a team lead by someone who is not productive, you don’t have results. With a newly proposed system, this problem will be eliminated, and this is what most people want. With a new system, people will fight to go to those bosses who don’t do anything rather than to those who ask people to work. Because the salary will be the same,” Stojković said.

The New Law

The new law about science and research was adopted in July 2019. The announced changes were implemented, so the institutes, including the AOB, will once again switch to the

institutional financing (Službeni glasnik RS 2019). The changes will officially be implemented on January 1, 2020.

This news was met with dissatisfaction on the part of researchers, particularly those from Universities. These researchers find one of the changes questionable: the new law mandates that Universities cannot employ researchers who work on projects only and not in lecturing. Since there are many of those who are employed on projects only, they fear for their jobs (Dauenhauer and Tatalović 2019). On the other hand, scientists working at institutes such as AOB will receive fixed salaries that do not depend on projects only. This is good news for part of my informants, but some see it as a back to the old system of “*radio ne radio, svira ti radio.*”

Chapter 5. Familiarity and Informality

One of the most defining aspects of the work atmosphere at the Observatory is the informal manner in which researchers communicate and perform their tasks. This relaxed, informal atmosphere is in a direct contrast to the formal, official conduct scientists often adopted with me when talking about their work. However, in other situations, informality and familiarity was a defining feature of the life at the Observatory. I knew I was “accepted” at the AOB when researchers started treating me with familiarity, which mainly happened with younger female scientists. However, the informal aspect of communication between scientists was not directed along gender or seniority lines; this was an accepted and readily embraced code of conduct for everyone.

In this chapter, I explore this familiarity and lack of formality among the researchers. I argue that this aspect of the life at the AOB is very important for the work itself; this is how they perform their science, and this is how research is done. Very close to it are issues of informality in a more specific sense of the “ambiguously legal” and shady activities. It is important to note that “informal” and “informality” here do not necessarily refer to illegal or shady, dubious activities. While there is a degree of this present, particularly in terms of navigating *veza* networking and complex relationship with the Ministry, for the most part, “informal” means just that: informal way of address and behaviour. This is not the opposite to the official and legal, but to formal and strict. However, informality, defined as “world’s open secrets, unwritten rules and hidden practices” as “ways of getting things done” (Ledeneva 2018) is important for analyzing the work and life at the Observatory.

This informality prevails in all communications, behaviours and tasks done at the AOB. In some ways, it could be said that it is a crucial aspect, because it permeates everything. Relations between people, conversations, even approach to work – all of this is done with noticeable informality. This informality is not the same among all people and in all situations, but there is always a degree of it. My own experiences with AOB researchers could be summed up based on the informality expressed: the friendlier, more in-depth conversations and situations were always accompanied by a higher degree of informality. It is not surprising that it mainly happened with younger female researchers. However, relations between scientists

were not necessarily divided by gender and age. It was almost impossible to find an aspect of the life at the Observatory that does not include informality, often to great degrees.

“We are a small community. We all know each other. We have a very family-like relationship. This is even true for bosses and regular employees. For example, the man who is the Director of the Observatory, we are all informal with him. Nobody addressed him formally⁴¹; we just use his name,” Sandra told me.

This form of address may vary slightly, but it is generally true for all researchers at AOB. Even the most senior scientists generally insist to be addressed informally, and by their name only. When talking about a senior researcher who is not present, some of the younger scientists will use more formal means. For example, it is not unusual for professor Stojković to be referred to by his title and last name, which is why I used this to refer to him in this thesis. On the other hand, researchers, even the youngest ones, address him by his name only.

This is not usual in Serbia. Depending on the degree of formality, younger people will typically address older people in such a way, particularly when there is also a certain seniority level involved. It is up to the older person to set the rules of address and invite younger people to use less formal means, never the other way around. This differentiation is typically made based on age, although more strict institutions and formal situations also insist on the hierarchy (such as titles, for example). However, this sort of address is not usual for the Observatory, and even a more formal Department of Astronomy and Astrophysics does not go too much into the “strict” side of the address. Even with this, there are notable differences between the way older senior researchers are addressed at AOB versus the University. These differences are typically explained with the small number of AOB researchers and a close knit nature of the AOB community.

“It was strange for me in the beginning,” Sandra admitted. “I struggled to call Stojković by his name. How can I call him ‘Dragan’, when he is a senior researcher and one of the most famous scientists that AOB has ever had? The man is an institution. But then I saw others do that and don’t bat an eye, so I got used to it.”

⁴¹ Nobody uses “vi” (plural you) pronouns to address the Director; the informal “ti” (singular you) is used.

It was particularly difficult for her in the beginning, when she first arrived. Short after commencing her work at the Observatory, the team had an organized trip to a research centre in Bulgaria. They travelled by train and sat together in the same compartment. The atmosphere was fun and relaxing, with many people telling jokes. Many of the jokes were of the lascivious kind (“*masni vicevi*”). Even senior researchers engaged in this behaviour. Everyone, including senior researches, used slang terms and frequent swearing. This behaviour is not unusual among friends in Serbia, particularly same generational friendships. However, it was shocking for Sandra to witness this informality after a more distanced relationship with professors at the University. “I wasn’t offended or anything. I was just really, really surprised. I couldn’t believe this. But everybody else laughed and were very comfortable. It took me some time to get used to it, but I actually got used to this sort of relationship pretty quickly” she laughed.

The same familiarity and informality persist in projects. The project leader is often referred to me as “their boss” by other employees, but there is a lot of informality going on. The teams are small and close knit inside and outside of the Observatory. They perform their work together and, more importantly for becoming close, they all go together to local conferences and dinner celebrations that follow these conferences. People know each other well and often regard each other as friends. It is customary for project leaders to be invited to weddings of the younger researchers. Not all projects are so relaxed and informal, but this is a trend I have observed among most of my informants at AOB.

“We don’t go to each other homes, even though it is so common to go to friends’ houses regularly. My boss came to my wedding, but he’s never been in my house,” Sandra said.

AOB researches have their own codes of what is done and what is not, what is considered appropriate and what is not. These behaviours are carefully built and navigated, and part of one’s introduction to AOB life is to learn these ways. Many of these things are not spelled out explicitly, so there is a bit of a learning curve for the new employees. Once a person gets used to the “AOB ways,” it is relaxed. All researchers cite this relaxed atmosphere and informality as one of the best things about their job.

The lax atmosphere and informal address make researchers seem like friends, which they generally are. However, there is still a difference between project leaders (and senior researchers) and younger members of the team. The lines are blurred, and in many cases,

relationships are defined as friendships, but it is not unusual for the project leader to have a bit of a paternalist attitude towards the team. This paternalism involves both informality but also a degree of respect; a project leader often features more as an older family member (father) than a friend. This paternalism and seeing the team as a family is generally considered a good approach. Many younger AOB researchers do not mind being seen as “children” on the project, and will sometimes even jokingly refer to each other as such. As Traweek (1988) observed, apprenticeship patterns are not the same in the USA and Japan, despite the same discipline; she argued that these differences reflect national cultures (Traweek 1988,16). I observed this in my conversations with Serbian astronomers: heightened paternalism and viewing one’s team as a “family of children” was a common way to describe good project leaders at the Observatory. In general, paternalism and parent/child dynamics of professional relations are not seen as demeaning nor condescending. On the contrary: this is what a good mentor is supposed to be, according to researchers.

This is in line with dominant cultural trends about parenting (Tomanović-Mihajlović 2000). The ideas of proper family dynamics in Serbia assign a lot of responsibility to parents, even when children are adults. It is a norm for a student to be supported by the parents, and to still live in the parents’ home (unless they go to University outside of their hometown). It is not unheard of, particularly for younger researchers at AOB, to still live with their parents. An 18-year-old person might be considered a legal adult in Serbia, but nobody expects them to not be their parent’s child anymore; parents’ support (both financial and otherwise) is expected well into the adult years. In these circumstances, to have one’s boss approach the relationship along the lines of parenting is seen as a positive thing. A parent has authority, but also loves you and will take care of you. One’s relationship with a parent in Serbia is often defined by a great deal of informality and closeness.⁴² This is what a good supervisor is, AOB researchers tell me. A different sort of approach to the team might not always work. For example, a project leader who is too strict or insists on a too formal, work-only atmosphere is not described as ideal. On the other hand, a project leader who wants to completely blend in with the team and be their friend might not be the best option, either, because they risk to lose their authority, which is

⁴² Of course, this is an idealized situation that is not always true. However, it is a model used for a “project parent” at the AOB.

needed for proper research. Because of this, paternalism, the one of a relaxed, informal “father” is considered a good thing for a productive team.

Part of the informal atmosphere is the approach to authorship. There are no rules on who owns intellectual property on which part of the project. It all goes “based on feeling” and respect, researchers insist. I could not access the truthfulness of this statement, but no informant complained to me about any issues with this arrangement. The notable exception were young researchers who later left a project, and a story I heard about Milica’s first supervisor who failed to credit her for her work. So, these irregularities happen from time to time, but are generally seen as morally repugnant. In her ethnography of scientific teams working with Mars rovers, Janet Vertesi points out how scientists from different disciplines and on different hierarchical levels work together to establish a collective vision and incorporate different perspectives of the Mars rover imaging (Vertesi 2015). These negotiations and overcoming conflicts often draw distinctions between various team members; the result reflects social relations among the scientists and their social order (Vertesi 2015). Similarly, AOB scientists’ consensus over ownership and authorship is a result of a carefully negotiated power dynamics between different team members. This negotiation and the resulting agreements were invisible to me, for the most part; at the time of my fieldwork, most members were well-accustomed to this dynamic and power relations that didn’t need further negotiation. “Trust” and “understanding” of “how things should be” were often cited to explain how authorship is handled, and how power dynamics are organized at the Observatory. There was no doubt about project leaders being seen as benevolent, paternalized “fathers” of the teams, whose role was to allow each team member an opportunity to exercise their own autonomy and to have their ideas heard. Again, this perfect image of a smooth cooperation was probably idealized to an extent, but complaints about authorship and hierarchy were rarely mentioned to me.

It is undeniable that there is a strong moral and ethical code over the issue of authorship at the Observatory, but also the one that is not formally written. Formal rules in writing are not considered the best way to go, not because AOB researchers want to bypass them, but because they feel there is no need for it. When people trust each other, which is something AOB insists on, there is no need for writing. It is all done through understanding: understanding who authored which part of the paper and understanding that they will be fairly credited. Bringing

written regulations into it is a cause for suspicion: if everything is fine, then why is there a need for writing? This is akin to researchers reacting badly to me when I had a consent form but feeling relaxed when I was without one. These issues are considered to be better organized without writing. For the most part, it works: with so many people working together, tasks are public, and all team members know what the others are responsible for. This is how they operate, and researchers agree that it is a good approach to the issue of authorship. The fact that all authors on a paper receive the same number of points makes it easier for this process to go smoothly. People remember who does what, and, for the most part, there are no authorship issues arising within members of the teams.

These informal approaches are generally considered comfortable for AOB researchers. However, some scientists agree that the prevailing informality has its downsides.

“This is great because it’s so relaxed, but it means there is no authority,” Sandra said. “There is no discipline. For example, the Director, when he was first appointed, asked us to come to work every day, and to come on time. This was a mini scandal at the Observatory. Imagine, having to go to your job every day. And if you don’t want to come, he required us to have some sort of a excuse. But some project leaders didn’t want to sign that new rule book. They wanted us to be like free artists, to come to work when we want to,” Sandra said.

The informality works great for cultivating a relaxed work atmosphere and friendship, but it can be bad for discipline and the chain of command on project. “We are all informal with each other,” Sandra said. This is particularly problematic in the case of misunderstandings and conflict. “There has to be conflict when things are not properly organized and laid out. If everybody is too informal with superiors, with project leaders, with the Director of the Observatory, there can’t be any proper organization. It is important to know who is in charge, and we don’t have that here.”

Some people are accused of not wanting to listen to the senior researcher’s advice or the Director’s word. Some people are accused of refusing to work in the light of a prolonged project cycle. “There is no new project cycle; I don’t want to work” attitude. AOB researchers claim that this is not happening at the Observatory but it is happening “out there. At the University and other places.” The informal approach is blamed for this attitude. My take on this

is that it is probably happening at AOB, too, at least from time to time, but nobody wanted to talk about it.

Two female PhD students who had to leave their projects at AOB because of the lack of understanding with project leaders is an example of this relationship going sour. These PhD students are criticized for not following the established rules: be informal in approach but do know when to listen to the seniors. These PhD students are criticized for insisting on doing things “on their own” from the start, which is regarded as a wrong way to go. They lacked respect of authority and they had no understanding of discipline.

As described in Chapter 4a, it is impossible to perform research without the learning curve and apprenticeship. These students ignored the unspoken rules and made mistakes. More than factual mistakes in their research, AOB staff is critical of their attitudes. “They thought they were the smartest ones and would never do tasks they were assigned,” I was told. These students ignored the AOB culture of apprenticeship and careful navigating of informal approaches. The fact that the senior researchers are often the ones imposing these lax conditions and informal communication might have made it difficult for those students to understand that they had to listen to the seniors and that there is an unspoken authority to be respected.

“Again, this informality is great, but it makes it difficult in terms of discipline. A project director can’t order any of us to do anything,” Sandra said. “I think that there should be some discipline and some respect for authority. I think it’s best to find a middle ground. So it is not too scary for the employees but there is some respect and authority left to the project leaders,” Sandra told me.

It is not unusual for researchers to take long breaks during work time to go to the nearby park. These outings are done in pairs or, more commonly, in groups. The breaks are particularly popular during hot spring and summer days. The researchers buy beer at the store and go to the woodland park to drink and talk. Those who refuse to participate in these breaks are often frowned upon, unless they have a good excuse. For example, female researchers with small children often do not participate; instead, they go home to take care of their children. This is considered an “excused absence” from beer breaks. Staying at the Observatory to work, on the other hand, is generally taken as a refusal of socializing. A person regularly doing that can

quickly be labeled antisocial. Some young researchers take a lot of their AOB time to work on their research to prove themselves. Once they publish their papers, they generally feel more relaxed to participate in beer breaks.

It is important to understand that this is not just random socializing. It is crucial for teamwork and professional success. In a situation where informal relations are a norm, and in which co-workers are close, a refusal to socialize can have more serious consequences.

Informal outings, beer breaks and other opportunities for socializing are crucial for team building. Without it, it would be impossible to organize work smoothly and to run a successful project. Frequent *kafenisanje*, breaks and laughing over politician memes are as important for scientific projects as they are for work-related activities. Without team members being relaxed with each other, it would be more difficult to agree on who comes to AOB and when; it would also be more difficult to organize tasks and assignments on projects. The whole apprenticeship, so important for becoming a good researcher, depends on informal relations. Senior team members who show youngsters the ropes are not officially obligated to do that; a lot of explaining and help is done informally, and often during socializing. It is not unusual to see a pair of researchers drinking coffee and discussing things down on a laptop, mixing work-related talk with gossip and everyday subjects. Some of the bonding is done through this informal help, and a lot of help is secured through socializing over breaks. In many cases, these activities are done in groups, and ensure that the whole team is on the same page in terms of closeness. In this situation, outright refusing to socialize or maintaining a strict work-related talk is not an ideal way to go. People (women) with small children and those who have other obligations are excused, but the excuse needs to be valid not to cause bad feelings. If someone has an important task to perform, they are excused; however, always working and refusing to socialize is not the best option. A person needs socialization to be part of the team and to build closeness,⁴³ which is an imperative for job success.

⁴³ It is important to note that while this closeness and socialization are a staple of AOB life, most people are not close friends. They generally do not socialize outside of AOB-organized activities and do not visit each other's homes, which is an imperative for someone to be considered a friend. Also, the level of private talks and intimate secrets shared is not particularly high by Serbian standards (but might be considered too high by Western standards.)

In fact, many AOB members claim that they do not get to socialize with their co-workers *enough*, particularly with those from other teams. In this sense, conferences and larger group outings are seen as a perfect opportunity to spend more time together. That is not to say that all AOB researchers love each other, or that there are no internal conflicts. There are, and I was told of several notable fights happening between teams during the course of my fieldwork. However, this sort of socializing and closeness, including fights, is seen as “the only way to be.” It is “the only way to be” because AOB researchers need each other; when the Ministry and official rules fail them, they can build success through mutual helping and enthusiasm.

On another level, this is in keeping with socializing common in Serbia. Colleagues being close, frequent breaks and *kafenisanje* are considered a norm. This is what workers in Yugoslavia typically enjoyed during socialism, and this is one of the bad things named about privatization: private business owners might not be so keen to allow this level of socializing during work time. However, people manage: even in places where work discipline is stricter, people typically go on breaks as a group. Doing things alone is not a norm; if a person does not participate, they can quickly earn a label of being “strange” or “antisocial.” To only wish a good day to someone or to exchange a five-minute chit chat is not seen as enough.

Socialization takes time, and it is not a coincidence that it takes so long to drink a small cup of coffee. This time spent together in bonding is a specific time, outside of the regular one; it creates a “spiritual expanse” for the people involved (Pesmen 2000, 164). Such socialization is important for building bonds and connections with people. This is one of the ways to build *veza*: socializing with people and becoming close means getting access to their circle of people, each one of who might be able to provide *veza* in a time of need. That is not to say that people socialize for *veza* alone; in fact, trying to get close to someone for this purpose is seen as unethical and something that can earn you a label of a bad person. People socialize in this way because they do not know any other way to socialize; this is seen as a norm, and as the only way to be. Connections gained through these friendships are seen as a normal thing: of course you will help your co-worker or neighbour when they need it; this is what friends are for.⁴⁴ This

⁴⁴ This extends to your circle of friends and acquaintances and not just you alone. For example, if a co-worker mentions that their niece needs help getting their passport quickly, and your neighbour works at a police station, you will offer help in this matter. You will ask the neighbour for a favour, who will call their colleagues at a police station where the niece lives so she can come and get her passport without waiting. In this way, you provide your co-worker *veza*, but this is not what your relationship is based on.

sort of approach to socializing and building networks of relations is so normalized that anyone failing to do their role is labeled a bad person, strange, or is ostracized. It is not surprising that AOB researchers subscribe to the same approach to socializing, even when *veza* shenanigans are not on anyone's mind.

Who Has Power?

The Director of the Observatory is de facto leader of AOB. However, there are many problems people in this position have to juggle. While this is the highest-paid position at the Observatory, it is not necessarily the one that carries the most power. Because being in this position means to focus a lot on administrative things, those with more power and influence simply refuse to do it. As a result, the highest position at AOB is filled by people who actually do not have enough power and authority. Project leaders are often those who can command the most authority, although that depends on the situation. It is one of the reasons why many of them refuse to be voted into the Director of AOB. "When you are a Director, say goodbye to science," I was told.

The current Director, who has respect from his scientific staff, is said not to command authority over other employees at AOB. While researchers respect him, non-scientific workers often do not take him seriously.

"To be a Director, you have to fight with a cleaning lady to do her job, with janitor to do his job, and with all the employees to do their jobs," Jasna told me.

This goes well in line with the old socialist work dynamics in state-owned work places. People were employed permanently, and Directors did not always have a power (nor willingness) to fire employees. The heightened call for "equality for everyone" made workers on all levels secure in their jobs; there was no reason for anyone to behave nicely if they did not feel like it. This sort of approach is still present at AOB, which makes it difficult to get non-research staff to do their jobs.

Sandra told me openly: "Listen, the lower you are on the hierarchy, the fewer problems you have, and you get to enjoy life more. It depends on who wants what. I definitely don't want that. I do want to be a project leader one day, but I would never want to be the Director of AOB."

This also opens up the question of the next AOB Director. The prerequisite for the Director is to be a full research professor at AOB. People with this title generally rotate in the role of the Director. Miroslav was once seen as a good candidate, but he refuses to be even nominated in the future. The only suitable candidate for a future Director is the only female full research professor, Olivera. It means that the AOB could soon have a woman at the highest position in the institution, which could look good on paper, but does not truly reflect the power balance at the Observatory.

“The Director cannot control his own collective,” Jasna told me. The word “collective” (*kolektiv*) is a term that was regularly used in socialism to signify all employees working in a specific place. It is not a coincidence that this word is used: a lot of work at AOB still runs as it did in socialism.

This particularly refers to non-research staff, such as janitors. A telling episode happened with a broken window. During the night, a window was broken in one of the front offices. They never found out who it was, but the incident was blamed on junkies who frequent the forest during the night hours. The rock created a hole in the window, and because it is the office overlooking the road, it is the first thing a visitor sees when approaching the Observatory (image 13).



Image 13: AOB office windows

Around that time, AOB had organized an international conference, with scientists coming from abroad to the Observatory. The staff agreed that the window needed to be replaced beforehand; it was embarrassing for people (foreign scientists) to see the hole in the window. However, the conference came and went, but the window was not replaced. When researchers asked the then Director why it hasn't been replaced, he said: "I couldn't make the janitor do it. He said it was not his job."

"Imagine," Jasna told me. "The Director doesn't have any power to make a janitor do their job. The janitor doesn't give a fuck about anyone here."

Janitors are singled out as extremely uncooperative. Luckily, I have never had a run in with either of them (there are two), but the AOB researchers have numerous stories to complain about. The janitors regularly get mad when they are asked to do anything that they do not consider their job; they often argue between themselves and the cleaning lady over who is going to perform a task.

Another incident happened with the watercooler. The AOB has tap water, but the pipes are old and rusty. Around 2015 or 2016, the staff had noticed black particles in the water, so they decided not to drink tap water. As a result, they got a new water cooler for the AOB. The water canisters are stored in the basement. Once a canister is spent, the new one has to be carried from the basement. However, the janitors do not want to do that. They claim it is "not their job." So, the cleaning lady had to carry the canisters. The canister is heavy and carrying heavy things is not considered a job for a woman.⁴⁵ One time, the cleaning lady was unable to carry the canister, so Nenad and Petar were the ones who carried it. "They both have PhDs and one is a project leader, and they did it. All because nobody could make janitors do it. They cannot be controlled," Jasna told me. "This is a relic of communism."

The "relic of communism" can be seen among many of the people working at AOB. The non-research staff is a good example of it. One important thing to note here is the power imbalance. Generally speaking, power in a Serbian context cannot be easily gauged through parameters such as salary level or place in the hierarchy. Indeed, in the socialist tradition that still persists

⁴⁵ It is a common belief in Serbia that women should not do heavy lifting and that this is not a proper task for a woman. My informants mentioned it as one of those things that are assumed and "natural". They also assumed that I share the same beliefs, so no added explanation was provided.

today, those who are formally low in the hierarchy were often people with a lot of power. Janitors, cleaning ladies, administrative clerks: those people often managed to accumulate power through social contacts. These occupations are great for forming contacts with many people, and a clever cleaning lady or a janitor could often amass a lot of power through building *veza* networking through socialization. Those who know many people and are good with many people, inside and outside of the work, could build their *veza* extremely successfully. The fact that socialist employment was hard to terminate also meant that people at those lower positions did not necessarily have to “behave” in order to keep their jobs. Angry cleaning ladies and janitors ordering people around is a bit of a socialist stereotype, but one that still rings true.⁴⁶ Since work culture and conditions at AOB are very similar to one during socialism, so are similar approaches to those work positions. While AOB’s cleaning lady is quiet and meek by Serbian standards, AOB’s janitors fully play into the stereotype: the stories about janitors refusing to perform work or the Director being unable to make them fix a window illustrate this approach. A similar thing can be said about people in the administration. While I did not have much contact with them, my researchers often mention Sava from the administration. Since so many documents (for being elected into title, receiving funding and other things) depend on Sava’s stamp, researchers need to placate him to get him to sign and stamp documents. Needless to say, researchers are entitled to this, and it is very much part of Sava’s job, but he is not so keen on working much. There is always something to sign and to type in administration, so if scientists want to get it done in due time, it helps to be friendly with Sava. The best way to make him sign or stamp a document for you is to bring him beer. Scientists often use this approach when they need something signed quickly. Like janitors and the cleaning lady, Sava’s official position in the AOB hierarchy is relatively low. He is not a scientist, and his salary is lower than many of the researchers’ salaries. Similarly, scientists working at AOB have more education than him. By all official parameters, AOB researchers should have more power. However, this is not true. Sava’s stamp gives him power⁴⁷. AOB

⁴⁶ I am still surprised by quiet and almost submissive cleaning people in Canada. Once, I studied until late at night at the U of A library with my things on the desk and floor. The cleaning person arrived, and I jumped to my feet. “I will move immediately!” I pleaded. The cleaning man looked at me, confused. I realized this was a reaction born out of habit. In Serbia, the cleaning lady would arrive, shouting: “Move so I can clean! Come on, I haven’t got all day!”

⁴⁷ The same is true for administrative workers around Serbia, particularly those working for the government. Inherited from former Yugoslavia is the importance of a seal. Most documents require some sort of official seal and signature, and these are provided by administrative workers. These workers typically have only high school

researchers are very much aware of this situation, so this is why they do all they can to keep Sava happy with beer. Nobody wants to make him mad: doing so could result in a person being late for deadlines.

Some of these tensions go beyond the borders of the Observatory. The AOB has its own union, that used to be part of the larger science union. However, there was “a fight” and the Observatory got kicked out. The larger scientific unions are organized on the wider Serbian level. However, the membership in this union costs money. AOB stopped paying, so it was kicked out.

The AOB union costs 500 dinars per month and from this money, they buy presents for children for New Year’s, for women for 8 March; they sometimes organize field trips if there is enough money, and so on.

Researchers are particularly enthusiastic about the New Year’s celebration. Before the organization of the AOB union, one of the older scientists had to play Deda Mraz (Santa) for children. Now, with the union money, they are able to pay for an actor to come and be Deda Mraz for children. “We are lucky to have this. This doesn’t exist in most of the private businesses. Even many government institutions don’t do that anymore. I am so happy that we get to keep this tradition here,” Sandra told me.

Work Hours

“Here, it is possible to work from home and AOB is very lax about work hours,” Jasna said.

When the Director was first appointed, he made a round from office to office and saw that there was no one there. So, he decreed that people have to come on time, citing his decision on fear of potential work inspections. However, some prominent researchers stood up against it, so it was never implemented. There was even a mini scandal around it. One of the project leaders wrote a protest email to the Minister of Science and the deputy of Minister to complain about it. All AOB researchers were CC-ed in all of this. The Director reacted by replying in a similar

education, not particularly high salaries and are, for the most part, female. Many are employed as window clerks in government institutions. The access to the seal gives them a lot of power that they often use. They are aware of this power and display it through the dismissive and unhelpful behaviour towards customers. In the case of more important seals, administrative workers might take a bribe for stamping a seal to a document. Their bad behaviour and attitude are so well known that there is a slang term for them: “šalteruša” (from “šalter,” office window).

tone, which prompted internal fights at the Observatory. The situation was, as one of the researchers put it: “Like old women at a farmer’s market.” The incident is recounted as a great embarrassment for everyone involved. The Minister never replied.

“Official work time is 8 hours, but in practice, it is ‘*kad ko doš’o, dobrodoš’o*’ (‘Whenever you come, you are welcome’.) AOB is very lax about this, and it is something I like a lot. Not just because of children, but this flexibility suits me. All my colleagues like to work like this,” Sandra said.

I was advised not to come in the morning, at the start of the official work time. Only one or two people ever bother to appear at 9 am, I was told. Typically, those who arrive at 9 will “*poljube vrata*” (kiss the door) if they don’t have the key. There are even joking anecdotes about people who do appear at 9 am. These are typically newly employed young researchers who still have not realized the AOB culture and who think that they have to be on time. They arrive at the Observatory, only to realize the doors are locked.

Slowly, as the day goes, people start to come. Some appear at 10 am, some at 11 am. The influx of people typically happens around noon. However, it is not unusual for people to arrive later, around 2 pm or even later. Some do not show up for work at all but choose to work from home.

I was unable to confirm who actually unlocks the doors, because there are so few people who ever witness this event. Many believe that people from administration are those who do it, because they maintain a more rigid schedule. Indeed, people from the administration tend to come and leave on time.

Small and crowded offices are often cited as a problem. “There are seven people in my office, and it is an office for two,” Sandra told me. “It is crowded and we all ‘sit on each other’s head’ even if it’s only half of people in the office that day. I can’t imagine what would it look like if we all showed up for work on the same day.”

It is often impossible to work in these conditions because there is always someone talking. Conversations revolve around work at times, but often about unrelated things, such as personal stories or politics. Sometimes, a visitor from another office comes for a coffee. Coffees are always filled with conversation. “You can do some things in these conditions, but only those that don’t require deep focus,” Sandra told me.

There is an adjacent office to the one where Sandra and her colleagues work. The adjacent office is about the same size, and it would be ideal for half of the people to move there. Even with the additional office, the space would be tight, but it would provide much better work conditions. However, this office is filled with equipment, including the atomic clocks and the new computer clusters that the AOB received through the EU loan. The clusters could be stored elsewhere, such as in the basement or another non-office space, but there is a problem. The clusters are said to “belong to Miloš,” one of the project leaders, and he insists that the clusters to be stored in this room.⁴⁸ Not surprisingly, nobody, including the Director of AOB, can make him agree to the clusters being moved.

“It is too embarrassing to write about this for Canadians,” I was told. “We have not enough chairs. So, we need to agree among each other when to come to work so we can switch.”

“While I was a PhD student, I would arrive in the morning and would stay up until late at night. Sometimes I would come at weekends. My boss works more than anyone else on the project. He comes during weekends. It all depends on your enthusiasm. While I was unmarried and didn’t have children, I would stay there all day,” Sandra told me. “I used to do the most demanding and important things at home or when other people leave. You can do mechanical things at AOB, but the most demanding ones, no.”

With constant talking and crowded offices, people need to resort to tricks. Some bring large headphones to put on their ears, so they don’t hear the others talking. Others simply wait for their colleagues to leave to work. Some researchers decide to come to AOB on weekends, which should be their official days off. The Observatory is almost empty during that time, so it is quiet enough to work. Even with these precautions, researchers agree that it is difficult to work at AOB. It is particularly difficult when they need to perform careful calculations or write something in English. Most of the important things cannot be done in the office, they agree.

Working from home is normalized for the AOB staff. With data downloaded from the internet, their office can be anywhere. They can also access the AOB’s clusters from home or from any place in the world. Many adopt this approach: do important work at home and come to the AOB only for side tasks and to talk to their colleagues. Some researchers claim that they work

⁴⁸ It is also worth noting that the project leader in question does not share the crowded office.

better when there are people around to push them and motivate them. However, even these scientists say that it is impossible to do tasks that require full concentration at AOB. Advising with colleagues and asking for advice about work is something that AOB is for, and for much-needed teamwork socializing. I have witnessed this. The offices are never quiet; there is always someone talking about what is going on in their life. There is always someone drinking coffee and gossiping. These conversations are intersected with work-related talk and research questions in a mashup that doesn't have a clear rhythm.

Miroslav, who was among the project leaders who rejected Director's request for coming to AOB on time, explains his views:

"This is what people don't understand. The work time means nothing to me. It means nothing for me to sit for eight hours here, doing nothing, if I have no ideas. I can twist and turn but I have no idea. And sometimes, it happens at night, you get an idea, and you start writing. For real science, you need to have inspiration. Technique and technology, this is just to help you achieve it. If you focus on that alone, you are a technician in science. Fine, if you have equipment, you can do it. But to do real science, you need to go one step further. You cannot be limited by your work hours."

"Science is like art," he said. "You can't do science 24/7. You can think about it, but you mainly work when you get inspiration. Science is very clear and precise, true. It is not like art in that sense. We don't have artistic freedom. But it is like art in terms of inspiration. If you want to solve a problem, you need both imagination and inspiration. Of course, your imagination has to fit in these exact rules, there is no artistic freedom. We have artistic freedom only within natural laws. We follow this determinism, so we need to find artistic freedom within these limits. I work hard, and I work regardless of the official time."

This sentiment is adopted by most of AOB's researchers, at least in terms of when to appear at work and when to go home. Sanja agreed with this attitude:

"There is no specific work time here. Well, there is, but it's never enforced. And in general, you always think about science anyway. They can force you to sit here for eight hours or whatever, and you might be unable to do anything. But you will continue to think about it when

you get home. This arrives in waves. If you think about it for long enough periods of time, eventually you will solve this question. And this can't be enforced in specific work hours."

This reveals a specific work etiquette that is not unusual in Serbia (nor was it unusual in former Yugoslavia): employees are ready to work hard when things need to be done, or when there is an important task to be completed. However, outside of these situations, there is no urge to work at full capacity. This attitude is often openly described as: "*kada se radi – radi se, kada se ne radi – ne radi se*" ("when we work – we work; when we don't work – we don't work"). It recognizes work not as a steady line but as a combination of high and low points. This work regime was common in socialism throughout Eastern Europe. Frequent shortages prevented steady flow of work in many cases, which caused distinctive periods of idleness and heightened work intensity (Verdery 1996). Work time at Observatory is organized through a similar rhythm, although this one is not dictated "from above," but through the internal project research schedules. From time to time, work rhythm is dictated by external factors, such as conferences or journal paper deadlines. This rhythm changes between idleness and frenzy are very different than the time in academic work observed in the West (Traweek 1992; Ylijoki and Mäntylä 2003). Research and academic time in Western institutions is described as being divided between the accelerated pace of scheduled time, which makes the majority, and rare moments of time without external pressures (Ylijoki and Mäntylä 2003). That is not the case at AOB: relaxed and idle time makes up the majority; that is not to say that there is no productivity during this time, but there are no specific pressures from the outside. This time is replaced with hectic, accelerated pace in the case of deadlines or paper preparation. Through this regime, the distinctive rhythm inherited from socialism is maintained: periods of relaxation and idleness are replaced by frenzy and overtime work, only for the pace to go down once a specific task is completed. This is in line with E.P. Thompson's analysis of the emergence of new work discipline in capitalism and "time thrift" (Thompson 1967). AOB works according to the work pattern of alternate periods of intense labour and idleness. This pattern, which Thompson labels as "pre-industrial capitalism" persists even today among those who are in "control of their working lives" (Thompson 1967, 73). Researchers at the Observatory are not subjected to strict work discipline or time sheets; instead, they self-regulate their work rhythm according to the needs.

In times of paper preparation and writing, AOB researchers are willing to work for prolonged hours, investing themselves and immersing themselves completely until the work is done. All of this is completed without any expectations of extra hours to be paid (nor would they be paid), and without anyone keeping track of how much and how long they worked per day. I had people tell me about days they spent at AOB until late in the evening, completely forgetting to eat; others described sitting in a room in their home with laptop for days, only breaking this cycle to use bathroom. This high productivity at the times of need is seen as a good work etiquette, and those who slack during those moments are not viewed favourably. They might bring the team down and could be described as uncooperative or even irresponsible.

On the other hand, the researchers recognize the slow times, in which work productivity goes down. Times around holidays, or during sunny days, do not make for a productive work atmosphere, and this is seen as acceptable. It is normalized not to be productive at all at certain times; coming to the AOB only to catch up over coffee or to laugh at politician memes is normalized. It is not uncommon for this atmosphere be contagious, so one person who is not in the mood for working quickly becomes the entire office. This is how time spent talking with me was often used. I would ask, repeatedly, whether my questions slow them down, and to tell me when they needed to go back to work. This rarely, if ever, happened. Talking to me was used as an opportunity for a break, which was often used enthusiastically. Interestingly, none of this made any negative consequences to researchers' actual work: the AOB continued to produce papers and research on a consistent basis.

Bonding through socialization worked wonders for making strong teams, and these pauses and low work times allowed AOB researchers to have a break before the new high productivity period. While I was constantly reminded that "this is not like it in other institutes," it was an approach to work reminiscent of the situation inherited from socialism. In a situation in which you cannot get fired for not working consistently during the work hours, people will form their high and low productivity periods. At least AOB researchers were ready to work hard when it was needed.

My informants are generally happy about the informal atmosphere and lax approach to work times. However, I have been warned numerous times not to assume that this approach is true for other institutes.

“This is not typical for all institutes. We are different in that regard. People at Vinča⁴⁹ even have cards and clock time when they come and go. I am not sure about other institutes, but the Observatory is too much. I believe Vinča is one extreme, and we are the other. But there are thousands of institutes in Serbia, and we are definitely not the norm in terms of informality,” I was told.

The story about Vinča and their strict discipline was repeated numerous times by different AOB scientists. It is clear that AOB staff sees their informal situation in regards to work time and relationship between senior and junior researchers to be fairly rare for Serbia. The informal situations that I have witnessed were simultaneously regarded as both a source of pride and shame. Pride, because AOB staff clearly enjoyed the informal atmosphere and lax attitude about work time. Shame, because they knew it wouldn’t present them in the best light. Because of this, I was asked several times whether I would need to write in my thesis about the fact that they do not come to work on time, and would it be possible to downplay this information. Also, I was repeatedly told that AOB is an outlier and that other scientific institutes are very different. “You shouldn’t judge scientific institutes in Serbia by us,” Jasna told me. “We are different.”

I have no doubt that discipline is strict at Vinča or in other institutes. I have also collected information about numerous other institutions (including the Faculty of Mathematics) that have similar lax approach to work and informal atmosphere. The evidence about this is anecdotal, but it does play into a stereotype about the “lazy government employees” that exists in Serbia. While AOB scientists, as a whole, provide good results in terms of research and paper publishing, the lax approach to work does not speak in their favour. This is one of the reasons why the informal atmosphere was something that is to be enjoyed, but not necessarily brag about. On the other hand, it is not possible to say that AOB researchers are slacking. On the contrary: they are very dedicated to science and love their work. While the old, socialist approach to work dynamic (idleness and frenzy) is maintained, it does not prevent productivity. Researchers are ready to stay longer when needed and dedicate a lot of their time to science. The only difference is that this productive time (versus idleness time) is not strictly divided and regulated. It is all done through informal means. Things “regulate themselves” when there is a

⁴⁹ Vinča nuclear institute, a nuclear physics research institution.

need for more productivity. Close bonds between researchers and emphasis on socialization help to run things: when the need presents itself, AOB researchers work as a team smoothly and without much formal scheduling.

***Veza* Networking**

Such a strong emphasis on informal way of doing things opens up a question about the staple of Serbian informality, *veza* (connection). Unlike harmless informal conduct prevalent at the Observatory, *veza* carries shady connotations due to its moral and legal ambiguity. While not necessarily illegal, *veza* refers to informal contacts that allow for certain opportunities that cannot be acquired through formal channels (Stanojevic and Stokanic 2018). In this way, *veza* can be seen as a close equivalent of Russian blat, the economy of favours (Ledeneva 1998; 2009). It is important to note that *veza* goes beyond obtaining goods and services through informal networks; it is a powerful source of social capital that can be used in all areas of life, from simply speeding up perfectly legal tasks to doing deeply illegal things, and everything in between. For example, *veza* is often needed in today's Serbia to obtain a good job; connections gained through political associations are particularly effective (Stanojević and Stokanić 2015). Due to the shady nature of *veza* (even in terms of legal tasks), it is not surprising that people generally do not want to talk about it, especially when it favours them. On the other hand, it is common to point out that someone else uses *veza* to advance in life.

What role does *veza* play at the Observatory? Seemingly, none; this is one topic that AOB researchers did not want to talk about openly. For example, when asked about *veza* and party associations, my informants were generally coy. They all denied these things happening at the AOB, although some of them have admitted of hearing similar machinations happening “in other scientific institutes.”

On the other hand, AOB scientists were open to talking about *veza* in more general terms.

Veza is important in all aspects of society, researchers agree. Not so much when it comes to hiring at AOB; the number of eligible candidates is generally too small to warrant this. The number of people who I personally know from University, and who are now working at AOB, proves that positions are, at least in part, filled through merit. While I cannot claim that there are absolutely no people who got in because of *veza*, I can claim that the percentage of people

who I am positive were employed based on merit is high. (Higher than in a typical Serbian organisation). To be honest, these types of positions in the hard sciences are more likely to be filled outside of *veza*: hard sciences are not easy to study and there are not many interested candidates. With many people leaving the country to pursue their PhDs abroad, the number of qualified scientists is low enough to allow for employment without *veza*.

“From time to time, we receive a note from the Ministry that says: ‘ok, you can employ a certain number of people’. And we know that this permission will be gone (“*prodje voz*”) in six months or a year. As a result, everybody who happens to be here at AOB is employed. More or less everybody who is there in this vacuum: they have finished their studies and haven’t gone abroad to do their PhD. Typically, everybody is employed because it is such a small number of people,” Goran said.

“Everybody is employed who is there at the right place at the right time. There is no selection at all. Naturally, you get some great people among them, but there are also those who are, so to speak, not really sure if this is for them or not. So, you get a sort of a... A situation with people who might not be great for the job, or who might not even know if this is for them. They simply started their studies, graduated, but are not really sure they are for science. This will naturally reflect in the future in their work and achievements,” Goran said.

The lack of *veza* machinations, so typical for Serbia, does not necessarily imply complete fairness. A lot of time, the position is gained through luck and hearsay. For example, Sandra, who graduated from her Bachelor’s program in 2004/5, found her way to the AOB by following the grapevine whispers of “young scientists being admitted to projects.” The first time she asked one of her professors about it, she encountered a wall and was promptly dismissed (with shouting) from the office. “You came here begging me for a job!” The second time, she asked around about a professor who might be willing to share the information. Just the information, mind; not the actual projects. The professor S. proved out to be merciful and shared a well-kept secret: young scientists, those who have just completed their studies, can be admitted to government-funded projects as junior scientists. She was advised to go to AOB and ask if one of the researchers was willing to get her on the team.

She was lucky. This was Miroslav, one of the most prolific project leaders at AOB. She was soon admitted as a junior researcher and began her doctoral studies. Being admitted meant

more than just getting *a* job: it meant getting into the system that guarantees long-term career, my informants say. Once you are in, you are there to stay and climb the ladder (or stagnate, if you are not particularly willing to work hard). Fallouts with project directors or inability to fit into a team could jeopardize this path,⁵⁰ but for most people, getting that first junior researcher position means a whole work age guaranteed until pension.

Luck is one part of the equation. Another is suitability. While *veza* is not a determining factor in getting an employment, “merit” and “fairness” might not be factors, either. Students admitted to projects as junior researchers (and those admitted as TAs at the Department) are often vetted for compatibility. This is not necessarily rooted in scientific competence and knowledge, or even work compatibility in the strict sense of the word. Factors such as personal likes and dislikes of project leaders (professors at the Department) are more important than knowledge or competence. It is not a rare thing, particularly at the Department, for students to receive TAships because they are friendly to the professor. Many times, those students have a lower GPA and might not be the best people for the job, but hit it off better in informal, social situations with the professor. Compliance and social compatibility are often rated high when it comes to the choice of students to employ. There is also a sentiment, expressed by many students, that certain professors choose weaker candidates on purpose, so they don’t outshine the professor. “They all want someone who is more stupid than them,” as more than one student said. This is particularly concerning, because once a student gets a TA position, their future path to a tenure is almost guaranteed.

The stakes might not be as high in research, but some people express concern that the same pattern might be happening on projects, at least when it comes to certain hires. While I could not find the evidence of strong candidates being overlooked for less competent ones, I did hear numerous people expressing a concern that certain people were admitted “because they are obedient and docile.” Why? “This allows project directors not to do anything. These people are not complaining, and none is the wiser,” as expressed by more than one of the younger researchers at AOB.

⁵⁰ Interestingly, deciding to move abroad to pursue astrophysics is not necessarily a reason for this to end. While some people leave never to return, and while some cut all connections with AOB, some of them remain collaborators and/or even continue to receive their salary while abroad. This is true not just for AOB but research projects and positions in general.

The matter is complicated by the official regulations. According to government rules – some of which are unspoken, but nonetheless strictly enforced – only a specific type of a person can be admitted on a project. Namely, such a person has to be under the age of 30. The logic behind it is that a good student who knows their work will finish their bachelor's and master's before the age of 30. This belief completely ignores excellent students who might have started their studies in mid-20s, for example, or those who had to prolong their studies because they had to work, or because of other types of complex circumstances.

To understand holes in this logic, it is important to take a quick look at the educational system in Serbia. Typically, a person graduates from high school (here called middle school) at the age of 18 or 19. (European Commission/EACEA/Eurydice 2018) It is assumed that everybody who wants to study will begin their studies at that age. Why wouldn't they? University is free, at least for those who were good in high school and who did very well on the entrance exams. There is also the assumed family support. Young people are not expected to leave home at the age of 18, or when they begin their studies. On the contrary: it is assumed that their parents will continue to support them while they study (Milić and Zhou 2015). The only exception are people studying away from their hometown, but parental support is assumed for them, too. This parental support is both emotional and financial. A person is not expected to work during their studies, except on irregular basis or over the summer. In fact, working while studying is often seen as harmful; work takes time and energy away from studies. It is a common parental saying: "Your job is to study." Part of being a good Serbian parent is to fully support one's children while they are at the university. In turn, children's role is to get good grades and finish their studies on time. Finding a job can be, and often is, detrimental to studies. The concept of working part-time or choosing to work at the hours you are available outside of studies is practically non-existent. There are hardly any jobs of this kind, and even when they exist, they are flooded by desperate candidates outside of the student population.⁵¹ The way lectures are

⁵¹ It is important to note that many employers do like students, as long as those students don't focus too much on their studies. The reason is the loophole in the law that says that student workers can be employed as seasonal workers so they do not have to be paid benefits (Službeni glasnik RS 2014). They are much cheaper for the employers.

scheduled, and the fact that most of them require mandatory attendance,⁵² do not allow for much, if any time to work (Avalić and Šulović 2010)

Another problem is the extremely demanding nature of Bachelor's studies in Serbia. This is something that I have personally experienced while studying at Belgrade University. This reflects the opinion of many of my colleagues. Bachelor's studies are extremely demanding and difficult; the curriculum is packed with material that cannot be easily prepared even if you study regularly. This is one of the reasons why many students only sit a few exams per an exam cycle; there is often no time to prepare for more. This is also one of the reasons why many students study longer than 4 years (a typical length of the program). This is one of the reasons why students in the past (before lectures were mandatory) often decided not to attend lectures: going to the campus would mean losing time to study. Interestingly, things become more relaxed once you get to the Master's level. Bachelor's studies, on the other hand, are known to be demanding. This is because the concept of majors (and minors) doesn't truly exist: by sitting a qualification exam for a specific department, you are considered a future expert in that specific field. You cannot choose a varied selection of courses to see what suits you best, nor can you change your major easily. If you study astrophysics, you study astrophysics; if you want to know more about history or theoretical physics for that matter, you need to leave the program, take a qualification exam for your new "major," and start again from year 1. This was exactly my situation when I decided to leave astrophysics and study archaeology. Any courses that you passed on your first go are ignored, except in a rare circumstance when these also appear on your new program of study. Speaking of which: there is a very strict number of mandatory courses, with a limited selection of electives. The mandatory courses are demanding and, in theory, should prepare you for your future in the field, even though this is not always the case in practice. This is why Bachelor's programs are more demanding, and this is why it is not easy to graduate, especially not on time.

⁵² This is a new thing brought by the Bologna convention, first implemented in 2004. It made lecture attendance mandatory, although this was the way Serbian Universities interpreted the convention and not in the convention itself (Penezić 2017). Before that, many University lectures were not mandatory, which allowed students more freedom. Students typically knew which lectures were useful and which could be skipped. The culture of camaraderie allowed a student to skip the class and get notes from a friend; as a student, you always knew you could get notes from someone who was there.

Ideally, your parents will support you through university, and you will still be living under their roof. This is certainly a cultural ideal. However, it is not always achievable in practice. Not all parents can provide full financial support. Some students have to work, even if it means prolonging their studies. Also, because of the rigid and demanding system, there are students who realize in their year 2 or 3 that they cannot complete their majors or that they might be better in another major. There is a financial side, too: if you prolong your studies too much, you will have to pay. However, if you leave the program while it is still free, you can begin a new program and get in for free if you are good at the qualification exam (Službeni glasnik 2018). Finally, there are also people who could not start their studies right after high school, be it because they couldn't get into their chosen program on the first try, or because they had to work, or because of another circumstance.

All of these situations are ignored and penalized by the system. For example, a student with the highest GPA in their generation might not be eligible for any type of a scholarship just because they had not started the university the same year they graduated from high school.⁵³ An excellent student who had to prolong their studies because of work or other obligations is similarly ignored. This thinking is directly enforced by the “junior researcher” program. The strict age requirement means that some excellent candidates are ineligible simply because they are over 30.⁵⁴ This is not about the age itself: it is because of the assumption that everybody starts their studies at 19, and, if you are a good student, you should finish your Master's (and start your PhD) well before you are 30. This is explicitly expressed among people at the Ministry of Science: “we want the best students as junior researchers. If you are good, how come you didn't start your PhD before the age of 30?” The answer might simply be: “because I first enrolled at university when I was 25.” This is not something that crosses their mind, AOB researchers told me.

This problem is well recognized, and criticized, at AOB. Numerous people mentioned excellent candidates and promising researchers who simply could not get funding because they were over 30. Similarly, weaker candidates were admitted, and all under the false belief that the age at

⁵³ The Ministry's scholarship application and rules (in Serbian) available at <http://www.mpn.gov.rs/stipendije-mpntr/> (Accessed on August 1, 2019.)

⁵⁴ The age requirement is not explicitly stated in the Ministry's rules, but is nevertheless enforced by the Ministry's staff.

which you start your PhD reflects how knowledgeable you are. I have heard stories of specific strong candidates having to struggle to publish their research so they could collect points to be admitted on a project as a regular researcher and not a junior researcher. These people were forced to work for free and to pay for their own PhD studies (which most people in Serbia do not have to do), only to, perhaps, collect enough points in a span of several years to be admitted to a project. One such researcher, Ana, was present at the AOB during 2017/18.⁵⁵ Her collaborators on a project rushed to publish papers that would include her so she could be admitted to a project. Nobody liked this situation. It was seen as extremely tone-deaf on the ministry's part. "Age is not a guarantee that someone was a good student," many people expressed.

Worst of all, some researchers at AOB claim that the age requirement is not an official rule at all. "It is not written anywhere," I was told by Sandra: "Ana went to them and asked, 'show me the part of the law, of regulations, where it says that researchers have to be under 30'. They couldn't produce evidence and threw her out." Many people claim that this is an unwritten rule, but it is strictly enforced anyway. There is nothing one can do about it.

There is only one AOB member who was mentioned as being hired through *veza*, because their father was the Minister of Labour during the time of their hiring. However, AOB researchers have no ill feelings about it: the person is said to be a hard-working scientist who deserves to be here. They have also fulfilled all of the official criteria to be hired. It happened before the large influx of young researchers' program at the AOB.

A situation like this is often cited as one of the problems with *veza* in Serbia: one generally needs *veza* even for things they deserve; for example, when one is the best person for the job. The realities of the job market are as such that, in many cases, *veza* is the only way, and this includes genuinely qualified people. This is yet another thing that sets AOB apart from private workplaces: *veza* is not generally needed. Indeed, younger people who were employed through the junior researcher program came to AOB without any *veza*.

Researchers at AOB evoked *veza* frequently in conversation, typically in regard to the wider Serbian reality. The emphasis was that it is "not about paying; *veza* is never about that." I was

⁵⁵ She was finally accepted (officially) as a researcher in 2019.

told of an anecdote from the Faculty of Physics: a colleague from the Niš university asked for his son who is studying in Belgrade to be granted another chance to take an exam.⁵⁶ This sort of corruption in higher education is common in Serbia, and also appears in other post-Yugoslav countries, such as Bosnia and Herzegovina (Sabir El-Rayess and Mansur 2016).

Sometimes, *veza*-like situations and informality are mentioned as a source of joking or “this is how it is” situation. This often happens when the government is tricked in the process. Winning these small victories against the government is a common thing, and something that Serbs generally enjoy doing. Civil disobedience is a popular measure, but even more are these slights against the government. It is typically done as a way to “stick it to the man,” generally because of the prevailing belief that the government is working against people anyway. People in the government are perceived (often, rightfully) as corrupted and eager to take money away from citizens to benefit themselves,⁵⁷ so doing things against the government is seen as a rightful revenge. At best, it is seen as a victimless crime, because tricking the government is not seen as hurting anyone. At worst, it is perceived as a necessary measure brought by the government itself: the politicians are corrupt, so the only way for a regular citizen to survive, is to sidetrack rules whenever possible.

AOB researchers do not often get a chance to defy the government, but they do use any chance they get. For example, whenever some money is offered under any reason (including the infamous EU loan), AOB staff will work hard at spending all of it. “If we don’t do it, then those at the Ministry will,” researchers said. The idea about politicians abusing their power and unlawfully spending the money is so ingrained that one counts a bit of a victory whenever they prevent it, no matter how small the scale is.

There is also playing against the official rules, when the rules are deemed impractical or unrealistic. This is often the case with government guidelines and rule books. These are often deemed impractical at best⁵⁸ and happily ignored by everyone. A good example is conference

⁵⁶ University exams in Serbia are organized around 5 to 7 exam periods throughout the year. Once a student has attended lectures, they can pass the exams during any of those periods. The person from the anecdote asked for additional exam period for his son that he was not eligible for.

⁵⁷ There is a common belief that people want to become politicians so they can steal budget money. These beliefs are not necessarily unfounded, which is witnessed by numerous affairs about politicians taking money from the government budget or through bribes and corruption.

⁵⁸ Many times, rightfully.

accommodation. The official rules state that AOB needs to organize tendering for hotels to send their proposals for accommodation. However, AOB staff always choose accommodation beforehand, because they know what kind of a hotel they want. This is particularly important for conferences that attract foreign scientists. Accommodation for foreigners and additional features such as good *kafanas* are considered of utmost importance. The official rules state that AOB has to accept proposals from various hotels and other providers, and to choose the offer that is the cheapest. The only way around this is to write very specific conditions that the accommodation needs to fulfill. In practice, AOB staff chooses a hotel beforehand and invites it to apply. They write their requirements in such a way to ensure that only that hotel will fulfill all of the conditions. The staff is generally amused by the “stupid procedure” that they nonetheless have to follow: proposals arrive in envelopes, and these envelopes are opened in front of witnesses. There is always Aleksandar from the law department of AOB to oversee this process. They open the envelopes and read the proposals to decide which one is the best. Needless to say, it’s a farce: all participants, including the non-winning hotels, know that it is rigged. The non-winning hotels participate because they get to advertise their offer for free and see it as a promotion. They might be chosen the next time the AOB’s requirements are different. This whole procedure brings a lot of laughs for everyone involved.

However, AOB staff insists that they are honest. They do not take a cut from the winning hotels for themselves. They simply do it to ensure that the chosen offer fulfills all the needs of the conference, and of the foreigners (see Chapter 7). Researchers agree that taking a cut would be an abuse of the system. Rigging the process in a way they do it is seen as fair because they ensure the venue and accommodation they need, and there is a “stupid government mandated process” that they have to follow.

Vignette – Scientist Giving Birth with and Without Veza

Sandra is a scientist in her late 30s. She has two children, born three years apart. She describes her experience of giving birth at a hospital without securing any *veza* beforehand.

“The first time I was pregnant, I didn’t even think about it,” she said. “My pregnancy was fine, and I didn’t make any payments or secured a specific doctor through connections. I paid for an epidural ‘*na crno*’ (informally), and that was all.”

Unfortunately, this turned out not to be enough to have a decent treatment at the hospital. Once she arrived, the nurses ignored her and shouted at her; the doctor requested for Sandra's birth to be speed up without her consent and without medical necessity. "They just wanted to finish it as soon as possible so they could go home," Sandra says bitterly. After giving birth, she experienced a significant blood loss that made her unable to get out of the bed. Nurses ignored her complaints, throwing insults at her and calling her "spoiled." At that point, she decided to call her aunt, who works as a nurse at a different hospital, to help her. With aunt's intervention through her colleagues, the treatment improved. "Although they realized my condition was serious," Sandra said. "They finally saw that I was bleeding and needed an infusion. But it would've happened sooner if I had a *veza*. It wouldn't have come to it," she said bitterly.

For her second delivery, she decided to play by the *veza* rules right from the start. She located a good gynecologist through her husband's friend. She secured a spot at a hospital and a specific doctor to perform the delivery. She paid for the epidural, plus some more for the anesthesiologist. This time, her experience was good: the hospital staff was polite and accommodating. She has positive memories of giving birth the second time.

Informal payments are a common occurrence in Serbian health system (Buch Mejsner and Karlsson 2017; Pantović 2019). It is important to note that informal arrangements that Sandra organized included several different approaches, from *veza* networking (her husband's friend) to illegal payments (for doctors and epidural). It is not uncommon to blur the lines between the two; sometimes, the money in these situations is an open bribe, while in others, it is treated as a gift, which depends on the context (Buch Mejsner and Karlsson 2017). In this case, Sandra is open about bribing the doctors to have a comfortable delivery. "I didn't want to go through that humiliation again," she said. "But it is horrible that they make people give bribe and pull *veza* connections only to get services that are guaranteed through health insurance." For a detailed analysis of maternal care and giving birth in Serbia's, see Pantović "The Private within the Public: Negotiating Birth in Serbia" (2019).

Gossip

Needless to say, there are periodic tensions among different groups and individuals that are only slightly obscured for the sake of talking to an outsider (me). I have heard stories about legal actions taken by a member of the staff who lives at the Observatory over AOB cutting

their heating. Another gossip concerned a newly retired member of the staff who continued to come to the Observatory. Due to a conflict with the Director, she was denied entry and the lock to the entrance was changed. People were instructed not to give her a new key. In another instance, the flowers she kept on the windowsill were thrown away.

These incidents are attributed to people's misplaced interest and abundance of free time.

"These things are happening all the time, as if people have so much time to spare," I was told. When asked if scientist truly have so much free time to spare, most researchers replied with: "I don't. People who do this obviously have too much free time on their hands. You cannot have that much free time if you are truly dedicated to your work."

Scientists generally claim to be busy and dedicated to their work. And yet, these things happen on a consistent basis and are almost a daily occurrence. Some members of the staff, I was told, are really invested in this sort of a thing and dedicate a lot of time to it.

This sort of bad blood is mainly attributed to the older generation of scientists. Members of the younger generation claim to get along well. "We all look at that and we laugh at them," I was told. "We shake our heads: 'look at those fools.' This is simply not our thing."

"They try to get us into it, but we try to resist. For the most part, we succeed, and I would like it to stay that way," I was told.

The animosities sometimes seep into the scientific work. For example, when one group's leader organized a conference that was of importance for a "rival" group, the "rival" group's leader never gave his team green light to participate. He never prevented his team from going, but he never informed them about the conference. When one of the "rival" group's researchers showed up at the last day of conference, the organizing leader shouted at her: "are you normal⁵⁹, what are you doing?"

"You" in this context meant their group as a whole. The researcher in question was just unfortunate enough to be the first one that the organizer of the conference saw. The whole thing was considered a mini-betrayal and putting personal animosities above the science.

⁵⁹ Literal translation. In Serbia, it is never asked "are you crazy"; it is always: "are you normal?" Normality and abnormality are concepts that are frequently used to signal socially acceptable and unacceptable behaviour.

It is not easy to divide these animosities along political lines and party allegiances, or along any other parameter. The oldest generation at the Observatory has inherited these animosities from the even older generation of people who are now retired. The root of the conflict originated in politics during the 1990s and early 2000s. Some of the now-retired scientists were supporters and members of Milosevic's SPS, and others supported pro-European parties. After the October 5, 2000 changes, the then-Director, who was in SPS, was unlawfully fired from the position (but not from AOB as a scientist). This is one of the reasons for the initial animosities among that group. However, researchers claim that this cannot fully explain the animosities of today. "We are all mixed within teams in terms of political orientations and opinions."⁶⁰ It is not possible to make a clear cut "who belongs where." These are, for the most part, inherited animosities," I was told.

Another source of conflict are attitudes towards scientific work or towards EU loans. All teams at AOB use EU loans and even those who declare themselves to be "more patriotic" in their political views are "not squeamish about Western money," I was told.

AOB researchers point out that the situation at the Faculty of Mathematics is "much worse." At the Faculty, members of the staff are often chosen along the party lines. "This is a known fact," I was told. The assistants (TAs) are always chosen among the politically suitable people. This is important, because assistants, for the most part, stay at the Faculty for decades and are promoted into professors when the person they were assisting retires.

Researchers at the Observatory are adamant that this is not the case at AOB. "The animosities here are based more on personal dislikes," I was told. "It makes the whole situation more pathetic than if they were based on political opinions or other higher reasons."

Hacking the System

Attitudes towards rigging the official system are not as positive when it comes to scientific work. The points system for achieving higher salaries has resulted in abuse that is often mentioned, but names are never named. In order to gain all the points needed for the higher salaries, researchers often agree to sign each other on papers that they did not author. With

⁶⁰ It is possible to find supporters or members of the opposing political parties such as LDP, DS, or SRS among people on the same project.

most papers being done by teams, and authored by a group of people, the idea is that it is easy to include a few “additional” names without suspicion. Generally speaking, the first authors are the ones in charge of research, and the ones who are contacted by other scientists interested in research. The added list of names are people who have contributed smaller things in a paper; the reasoning goes: who cares if there are a few of those who did not work on the paper at all? They are there to receive points. The motives for this practice are told to be existential: people need money to survive, and the system makes them resort to it.

“This system is not fair. It cannot be fair. This is why people hack this system, due to existential reasons. Bigger projects automatically publish more than smaller ones. These people realized that it is everybody’s interest to sign everybody’s name on the project,” Petar told me.

“People don’t do this out of prestige, but because the system allowed people to do it. I’ve never looked whether there are cases like this in astronomy, but I know from colleagues in other sciences,” Goran said.

“Let us say that there are 10 people on the project – I use this number because it is easy to calculate. Let us say that each of them publishes one paper per year. In five years, they will collectively have 50 papers written each if they include everyone’s name on the papers. It means they all will get to the highest position in those five years,” Petar told me.

Researchers are quick to admit that this is hugely detrimental to science, because it means that inadequate people can rise to the highest positions. On the other hand, they claim that the system itself forces scientists to do it, because they will lose their salaries otherwise. The system makes them profit under this pretense, but they do it because of it. It is not anybody’s interest, they say, but scientists are forced to do it.

“This only inflates things artificially. Although when you take a look at the total numbers of papers published, it is not so much different than before. Because you can’t publish an unlimited number of papers; research requires a process and there is only so much you can publish in a given period; in this case, one year. However, the number of papers per person is highly inflated,” I was told.

Researchers at AOB were very open to discussing this phenomenon in theory. Discovering who does it in practice was more difficult.

“There are projects that do it, and those that don’t. Those that don’t, bring harm only to themselves, while others profit. So, in the end, even those who didn’t at first, started doing it,” I was told, without naming any names.

Signing each other’s names on papers is not always an equal affair. Sometimes it is done “fairly and equally,” but I was also told of a tendency to sign those who are suitable and not sign those who are not. “This is how you bring corruption into the system. You can buy a status at the university and other papers because of signing people who don’t really deserve to have their name on the projects. They might have done a small thing but that is not fair,” I was told.

According to mid-level scientists at AOB, junior researchers are in an even worse position. The system that led to hyperproduction of papers does not always have room for young researchers to publish. Because of the overabundance of signing one another’s names on papers, there is no room for new names. The practice of signing names for points is explained in terms of needing money, but this sort of machination is not looked at favourably by anyone. It is not surprising that I was unable to learn of anyone who does this practice at AOB. This was unlike rigged tendering for hotel accommodations, which was recounted openly as a funny anecdote. Names signing is about science, and this is something that researchers at AOB take seriously.

Scientists want to keep their integrity and to show dedication to their work; this is why all talk about signing names for points was framed as “something that is done elsewhere.”

AOB researchers have a very clean idea about what is fair and what is abuse of the system. It is fair to sidestep the rules if it is perceived that nobody (save, perhaps, for the government) is harmed. Most government rules and regulations are seen as inadequate anyway. If it was just for the points system abuse, nobody would care. It just means that the Ministry will need to give more people higher salaries, which is not seen as much of a problem. There are many who believe they deserve higher paychecks anyway. However, points system abuse is about the actual papers, which means that it involves science, too. Irregularities regarding the actual work and scientific research are not seen as fair by many researchers. This is why signing each other’s names on papers and points abuse is seen as controversial by many of my informants. You want to trick the government, but you do not want to fabricate your actual scientific work.

This is a big source of pride for many people, and an ethical issue that is never raised when it comes to tricking the government.

***Ćevapčići* and Conferences**

Organizing conferences in Serbia is often cited as the key for the success at securing international collaboration. It is also regarded as an achievement of clever project leaders who need to display a lot of social skills and ability to navigate the informal, “Serbian way” of doing things. Sometimes, these conferences are organized by the University, and sometimes by the AOB. There is no fee to participate in these conferences. The conferences are international and made with the goal to attract specific international (often Western) colleagues who are leaders in their field. There are typically people from all over the world: USA, UK, Canada, Japan, Russia, China, and more. The people invited are generally people AOB researchers want to collaborate with. Since AOB does not have money to send their researchers abroad, bringing international researchers is the only way to meet and form international collaborations. Depending on the conference size and the project, around 20 to 30 people are invited. There are also other scientists who arrive to the conference so there is typically around 80 people in total, including the AOB researchers.

Miroslav’s group is a perfect example of this. They organize many conferences that attract international researchers they wish to target for collaboration. The conference itself has numerous important papers, but I was rarely told about the official part of the conference. Instead, what is considered truly important is the informal part. That is to say, everything surrounding the conference itself. The conferences are carefully organized to include field trips around Serbia, dinners with music in *kafanas* and other informal outings ideal for socializing. They hire a bus for the group to take them to interesting places in Serbia. They sing on the bus, they play *kolo*⁶¹ during the lunch and make new friends. The atmosphere is informal and highly relaxing. The conferences are cited as the key to bring people together, which was often cited as *the* most important goal of a conference.

There are both male and female foreign researchers who are invited. Women also participate in *kafana* going. They are not as likely to get drunk as the men, I was told, but they enjoy the food

⁶¹ A traditional dance.

and music as much as their male colleagues. Professor Stojković is said to be particularly good with the ladies. He knows many senior female scientists from France and he often takes them to elegant restaurants and great dinners.

Once there is bonding between people, I was told, it is easy to form research collaborations. Once the people get to know each other, they are taken to a *kafana*. There is always a traditional Serbian restaurant with music, and foreign scientists are taken there for a good time. “This is the point of the conference. Of course, everybody goes to lectures, but the real life starts at night,” Sandra told me. This nightlife does not include any scandalous or illegal activities; the goal is to simply show foreigners a good time. “There is getting drunk and singing. Miroslav chooses the best restaurants. They eat *ćevapčići* and drink *šljivovica*. Of course, we pay for everything. The guests love *kafana* and they bond with us,” Sandra said.

Miroslav is regarded as an excellent leader for these social outings and conferences. In fact, his skills at navigating informal socialization with foreign colleagues are often cited as one of the main reasons for his success in securing international collaboration and excellent research success of his group. These skills are highly gendered, which will be explained in Chapter 6.

“These things make friends better than anything else. We might not see each other so much at work, but this is the main bonding thing,” Sandra said. “And it is a great tourist experience for foreigners. A true adventure. They also like our hospitality. This is why they like to come to our conferences.”

In fact, the place for a conference is chosen based on its attractiveness for the foreigners. It has to have a nice hotel, beautiful surroundings and it has to have a number of good ethno *kafanas* with good *ćevapčići*. These are the key criteria on where to organize a conference. Since all conferences last for several days (and nights), a different *kafana* is chosen every night.

“This is how the most important projects on AOB were born,” Sandra told me. “This is how one of our researchers managed to become a part of the LSST team. He befriended one of the researchers from LSST over *kafana* and secured collaboration.”

The LSST project is important, and it was presented as the highest achievement of AOB. Even journalists, who generally ignore the Observatory and its work, wrote about the project. All of this is attributed to *kafana* and project leaders social skills.

It is not unusual for researchers to stay up the whole night, singing and drinking. Some project leaders' weight is jokingly attributed to frequent *kafana* outings. The group is sometimes divided by age, but never by gender. Senior researchers and "big shots" go to exclusive ethno *kafanas* with project leaders. Younger researchers often skip the *kafanas* and gather in their hotel rooms to throw a party. "It is just like kids on a field trip," Sandra said. "This is what creates the strongest bonds."

The biggest party is the held on last night of the conference, and it is attended by everyone. They bring a great orchestra to play, and everybody dances *kolo*. "Foreigners get crazy for that," I was told. All the old men and women, renowned international scientists, jump to their feet and dance. Nobody knows how to, and *kolo* gets pulled to the sides, but it does not matter. The bond is made; collaboration is secured.



Image 14: AOB researchers demonstrate Serbian hospitality through food and drinks

There is a lot of emphasis on giving guests proper Serbian hospitality. Serbian hospitality is an important source of pride in Serbia; being a good host is something that is seen as an imperative. It involves accommodating guests and providing them with plenty of food and drinks. In the case of eating out, the host is the one paying for the meals, no questions asked. Guests are not allowed to bring their own food or to pay for it at a restaurant; this is considered

rude and as a rejection of hospitality. In the case of conferences that AOB organizes, foreign scientists are seen as guests, and AOB researchers are the host; there is a very strong host/guest dynamic formed that is not to be negotiated. AOB researchers make sure that the guests have plenty of food and drinks, music and a good time. AOB researchers pay for everything directly from the budget money. These outings are seen as an integral part of work and project money is invested into it⁶².

Conferences are the most important opportunities for networking and securing collaboration for scientists around the world. It is interesting to note that this collaboration is typically secured through the informal means: people chat, invite each other for a drink and gauge their personal and research compatibility (Melin 2000). In this sense, “the Serbian way” of securing collaboration is no different; the main difference is the *degree* of socialization that is seen as needed. Serbian scientists emphasize the social dimension and they initiate interaction that goes beyond work talk. What passes for informal and social in the West (chatting about research over a drink) is considered borderline formal and official in Serbia.⁶³ Serbian scientists see this as a great advantage of Serbian culture over Westerners. In short, Westerners are stereotyped as people who do not know how to socialize, so they use what little they know, which cannot measure with the richness of Serbian socialization. “Foreigners don’t have *ćevapčići*,” one person joked.

AOB researchers believe that Serbian hospitality and bonding is what wins people over. Sandra recounts a situation during her research visit in Germany: there were official dinners during conferences, but “not like this.” “Nobody made so much effort for us. But this is a difference in people, between how we are and how Germans are. There is a huge difference in mentality. We do this not just for foreigners, but because we are the ones who like these things. We do it like it is for our friends and not for a gain: we did it with some Greeks, even though we knew we wouldn’t have any gain from this; and they did the same for us. We take money from the project for that, this is how we do things. We like this, it is in our blood: friendship, *kafana*. We

⁶² It may sound expensive, but all those outings are within the budget limits of what AOB has.

⁶³ Interestingly, presentations and lectures are more formal in Serbia. My informants repeatedly questioned and ridiculed Western scientists who make an effort to have “fun” lectures or who start lectures with a joke. “We are here to hear your science, not silly talk. We are not children,” they said. “There is no need to ‘amuse’ us in this way. Just get to the point.” Personal anecdotes are equally seen as unnecessary. These are equally shunned in social sciences and humanities in Serbia, such as anthropology.

use it to conduct business, but we don't do it out of gain. We truly enjoy it to the fullest. We just know how to use these things that we do and love to form connections that also bring, in some situations, business benefits in the form of collaboration.”

In the era of #MeToo, socializing during conferences is under more scrutiny in the West. These concerns are not expressed by anyone at AOB, not out of disrespect for victims of harassment but because harassment does not even register as a potential consequence of conference socializing⁶⁴. With a high emphasis put on informal outings, bonding and socializing by AOB team, it is possible that this sort of events are attractive to international guests because these events are relaxing and outside of the norm for academic conferences. In other words: AOB conferences might prompt some international scientists to go to Serbia, if not for the event alone, then for an affordable and fun vacation.

Vignette – Ko to Tamo Peva Outing

Serbian Conference of Spectral Line Shapes in Astrophysics was a conference organized by Miroslav's group in 2007. It was held in picturesque Sremski Karlovci in Vojvodina. Sandra was in the organizational committee. Miroslav had assigned her to organize accommodation for participants.

Sandra found it was stressful for her to be part of the organizing. This was during her early years at the AOB and she had to juggle accommodation for 45 people. However, the field trip part of the conference was enjoyable and full of anecdotes.

As part of the conference, the group organized a field trip to Serbian Orthodox Monasteries. However, the bus that was supposed to take them was late. This situation was used for joking about the unreliability of the Serbian transportation. When the bus finally arrived, it was a wreck. Instead of the climatized bus that they have ordered, there was an old bus that had holes in the floor and a sheet instead of a window. The AOB researchers compared it to the famous ruin of a bus from the cult film “Ko to Tamo Peva.” (1980) (“Who's Singin' Over There?”)

The foreigners seemed scared but climbed aboard the bus anyway. During the trip, the AOB researchers joked about the movie and explained the situation until the foreigners started

⁶⁴ Indeed, there were no incidents reported and no gossip talk about any problems of this kind during conferences or socializing events.

making jokes with them. “It was embarrassing, though,” Sandra said. “But they kind of liked it. It was exotic to them, like they went to Bangladesh. We used it for bonding later.”

A South Asian country is evoked to symbolize the idea of exoticism and to imply that, in the Western eyes, there is no difference between Serbia and such countries. This is not because AOB researchers believe that “Bangladesh” is an appropriate symbol of what Serbia is like. On the contrary, it is meant to evoke the embarrassment for being perceived like “Bangladesh” and the implied belief that Serbia is, or should be, viewed as more civilized and less exoticized. I talk more about these issues in Chapter 7.



Image 15: Scene from Slobodan Šijan’s film “Ko to Tamo Peva” (1980)

Bonding Through Complaining

People at the Observatory complain about money. The bad economic situation was a central topic of my conversations with researchers. Even with another subject of conversation, it all came back to money and problems related to it. This was not reserved for my interviews; scientists often complained to each other about the bad situation at the Observatory. Most of the time, the informants did not need any prompting; the issue of the bad economic situation would

find its way into conversations. At times, I had to struggle to make them talk about something else.

I had expected this to be the case before I conducted my research. Complaining and “whining” is a common thing in Serbia, something to be expected in all areas of life (Zivkovic 2011). No matter the subject of a conversation, there can always be something to complain about. Typical topics include bad economic situation in the country, the Government (president Vučić is a common theme⁶⁵), price increases, low salaries, bad bosses and rude clerks (“šalteruše”). This complaining is a moment of bonding through joined misery; we all suffer through the same problems, and we all know those in power are to blame. These sorts of laments are common in post-Soviet Russia and reflect similar concerns (Pesmen 2000; Ries 1997). People are generally eager to engage in this sort of talk, during coffee breaks (*kafenisanje*), phone calls, with checkout clerks in supermarkets, on the bus or while waiting in a line at a bank. Complaining of this kind is “talking about the weather” for Serbians. This is a casual, yet profoundly bonding moment for friends, acquaintances, or even strangers. It is casual because it does not really require added anger or worry; it is part of everyday frustrations that people live with. “We Serbs are nervous, and frustrated because of all that is going on,” an older female researcher, Milenka, told me one day over a coffee. “You can’t blame us, with all that is going on.” This is a typical assessment of the current situation in Serbia, and it has been for almost thirty years. Complaining of this kind is a ritualized type of conversation, one that has unspoken rules for the speaker and the audience (Ries 1997). Complaining about the situation in the country is an everyday thing, so it can be shared even with strangers. Receiving a nod and acknowledgement from the other person that yes, it is bad, makes a bonding moment or even a conversation starter. These conversations often use fatalist and catastrophic language to describe events and situations, and they always include some sort of a commentary about the world, society and the overall chaos of everyday reality (Ries 1997). Ries recognizes Russian laments as a specific oral art form, in which episodes are told in the form of shocking stories to which the audience is compelled to respond with indignation⁶⁶ (Ries 1997). These stories and

⁶⁵ Government and politicians have been a popular theme ever since the collapse of socialism. Differences in opinions can lead to heated arguments, which makes some people reluctant to discuss politics. Nevertheless, this subject remains a common “bonding through complaining” theme.

⁶⁶ Serbian complaining is very similar to “Russian Talk” (Ries 1997) in this regard. A notable difference, at least in the case of AOB researcher complaining, is that both men and women shared a similar type of stories. Ries

complaining are a way for people to come to terms with the absurdity of their everyday lives, but are also an opportunity for the speaker to assert moral superiority over the system and to praise one's coping skills (Ries 1997). It is also a type of a psychological release for accumulated frustration. Bonding through complaining does not solve problems, but it does make you feel a bit better, and it does validate your position.

This sort of complaining is so normalized in Serbia that makes an invisible, everyday cultural pattern. I had been completely unaware of it before I came to Canada. An experience of a different culture made this pattern visible, which helped me notice it among researchers at the Observatory. Without it, I would have been aware of their complaints about money and the Ministry of Science, but I would not have understood the context of bonding through these conversations. It is therefore not surprising to hear this sort of complaining everywhere, including both the casual and more formal conversations with scientists at AOB. It is also to be expected that some of this complaining is done mechanically, almost as a conversation starter and a “must have” ingredient of all interactions. As a result, complaining becomes inevitable, even in moments that might not warrant it. That is not to say that scientists at AOB have no right to criticize the Ministry or that their working positions are ideal. The complaints they expressed are very real and do convey a genuine sense of uncertainty and dissatisfaction at the Observatory. However, these complaints often lacked context about the wider situation in Serbia and how they fare on the misery scale.

Scientists are generally unsatisfied because of the overall political and economic conditions in the country. When one looks at what is going on in politics, in economy, “all the chaos,” as researchers called it, one “has to feel nervous and dissatisfied.” “You feel this, no matter who you are, from a cleaning lady to someone with a PhD. This affects everyone,” Sandra told me.

Researchers talk about politics often and very openly. A lot of friendships at AOB were made through trashing the president Vučić and talking about politics. Many times, scientists play each other funny clips about politicians. Most people share this attitude. There are people supporting different political views at AOB, but most of them bond over their shared hatred for

recognizes notable differences between male stories (mischievous, ironic) and female ones (serious, moralistic). AOB researchers used all of these forms in their stories of complaining regardless of gender.

Vučić and the government. Office gossip often involves politics talk and recounting bad things that the government has done.

“Of course we are all against them. Nobody could be for them who has 3g of brains. Vučić and his people are regarded as morons. I don’t know anyone on AOB who is for Vučić. Only people who are in the government and in their party can be for Vučić. But we don’t have people like that at AOB,” Jasna said.

A lot of these attitudes come from a simple belief that the “situation” in the country (the government, transition and overall chaos) are to blame for people’s problems. This is a widespread belief, and it is not new. It is also not unfounded, at least to a degree. People in Serbia like to complain that it is the government’s fault. Bonding through complaining is cathartic, and it reaffirms the belief that there is a common enemy to blame. In capitalist (Western) countries, this sort of complaining is not socially acceptable because people are considered to be in charge of their own financial and other conditions; it is their own fault if they have it bad (Assari 2017; Brooks Olsen 2017). Obviously, there is a lot to say about the truthfulness of this belief and systemic power imbalance and discrimination that exist. Serbia’s case is the opposite: people are free to whine and bond through this whining because problems are seen as politicians’ fault.

Bonding through complaining and collective whining has its own rhythm. It often starts small, through an immediate thing that happened to someone (the price of bread was increased; the bus was late; the administrators asked for another document, etc.) and it goes back and forth from there. The person complains and swears, if needed; then the others agree and offer their examples of the unfairness they faced concerning a similar topic. This goes for some time, getting more and more heated, often with loud voices and harsh words about the government, politicians, chaos, country or whatever is blamed at the moment. This reaches a boiling point, often exclaimed through angry slamming of the coffee cup on the desk or its ceramic plate. This moment is cathartic, and this is the moment when it is concluded that everything is bad, everything is absurd, and “where do we live? It’s a nuthouse” comments are made. This is where it explodes and then deflates; in this moment, it is concluded that it’s fruitless to get angry about it or to invest energy into it. The anger evaporates and people relax, reaffirming

their ties through this bonding moment. The whole cycle repeats the next time someone has a story of a complaint to tell.

“I can’t with them, I can’t,” Jasna said one time. “When I start to talk about them, I want to explode. It is a never-ending cycle. But what can you do? *It is better to laugh than to cry* about the whole thing.”

In those moments, often shared over a coffee, I would be shown a humorous clip or a meme about politicians, which prompted laughs and would make situation more relaxed; indeed, it is better to laugh about it than to cry, which is a common Serbian saying (“*Bolje da se smejem nego da plačem*”), the approach that my informants would commonly use in their day to day interactions. Since I lacked any clips of memes to show them that they were unfamiliar with, I would often offer a change of subject: “let us talk about something nicer, if you prefer⁶⁷.”

Sometimes, the informants wanted to continue talking about problems. Other times, a change of subject was welcomed.

⁶⁷ This sort of address works much better in Serbian context than approach: “Would you prefer if we talked about something else?” I realized, if I asked them, they would try to accommodate me and what I thought would be appropriate to talk about. By offering (but not demanding) to change subject from time to time, I positioned myself as a friend, as someone who was close enough to realize what “we both need”. I was able to use this with younger researchers, and with older researchers who approached me with a dose of informality. However, I did not feel comfortable doing that with researchers who were more formal with me. In those cases, it was not unusual that someone else in the room throws a joke or suggests a change of subject.

Chapter 6. Women in Science

The topic of women in science in Serbia was one of the main questions that I wanted to explore. I outlined some of my problems discussing the subject of gender in science in the Introduction. Most of my informants struggled to provide answers to questions about it, not because they were reluctant to talk, but because they did not have much to say. They all seemed enthusiastic about helping, but they seemed to struggle with answers because they did not see any issue about women in science. “There are many female scientists at the Observatory” or “There are no differences in treatment between male and female scientists” was a typical answer. Women seemed more enthusiastic about discussing their good position and treatment at the Observatory, particularly in contrast to the treatment of female scientists in the West (Chapter 7). It seemed that this is one topic nobody had anything to complain about, which is one of the reasons why answers were often short and uninspired.⁶⁸ It was not unusual to start talking about gender but for conversation to quickly slide into issues of funding and other problems my informants wanted to complain about.

What is a problem with the interest in female scientists? For the most part, my Serbian informants found the question irrelevant, even borderline offensive. Whenever I tried to open up a dialogue about women in science, I was met with confusion. Sometimes, an open eye roll would follow. “Yes, I know why *they* ask about it,” more than one informant said. “*They* have a problem with that. There are not many women scientists in the West,” one (female) informant said openly. During my research, it became clear that scientists working at AOB recognize a gender disbalance as a problem in the West, but not in Serbia.

For the most part, the numbers are on their side. According to UNESCO Institute for Statistics (2018), women make 48.4% of researchers in Serbia. This is not unique for this country: similar results can be seen in the entire post-socialist and/or post-Soviet sphere (Glover 2005; UNESCO Institute for Statistics 2018): Eastern and Central Europe, Russian and former Soviet

⁶⁸ I need to emphasize here that the answers were not short or uninspired because the informants refused to talk about gender. When presented with a subject they did not want to talk about (instances of *veza* at the Observatory, signing each other’s names on papers or one’s party affiliations), the informants reacted either by claiming that “this does not happen here at AOB, but it happens at X,” or “I don’t know anything about those things.” Answers about gender were simply treated as a non-issue; as something that can be openly talked about but there is not so much to say about such a non-subject.

republics, Central and South America. These areas are known for gender balance in STEM and consistently have high percentages of women working as scientists (and medical doctors). While gender balance itself is not enough to proclaim that there are no gender disparities, and while this is a more complex issue, it is important to note that it does paint a picture very different than the one in areas where “less than 35% of people in STEM are women” (European Commission 2001; National Science Board 2010; UNESCO Institute for Statistics 2018). The issue of women in science proved challenging for my Serbian informants to talk about because they did not see it as a problem. Female scientists in AOB never had an experience of being the only woman in the room; none of them reported ever hearing that “science was for boys” while growing up. They never had to go through their studies without seeing accomplished women as instructors, professors and researchers. In more generalized terms, they grew up in a place where half of the doctors were women; where working mothers were a norm and where science was not predominately a male domain (OECD 2015). This creates a very different experience and expectations for scientists of all genders, and poses a specific problem when trying to bring this subject into view.

Indeed, how to talk about something that is not recognized as a problem? Particularly since it is posed as one of the most important topics by the intended audience? For the most part, my informants were willing to talk about gender because “we know it is important for *them*,” but did not have much to say except: “there are equal numbers of men and women working at AOB” and “women are treated equally.” Of course, saying this might not necessarily make it true, but it does pose a methodological problem. This issue was one of the most challenging for my research and, at times, I felt forced to go back to it because I knew it was expected of me to make it a part of my thesis in order for it to be relevant for my audience. At the same time, digging deeper did reveal certain gendered attitudes at the AOB, often in unexpected ways. Since these social roles are proved to be extremely important for a success in science, researching the gender divide proved to be fruitful. However, it is important to note that this was by far the most challenging aspect of research.

On the other hand, I was encouraged by some of my informants to ask questions about gender. “Most people at AOB are pro-West. They appreciate this Western approach, meaning: questions about gender and the like,” Sandra told me. This comment revealed a common

attitude I encountered at the Observatory: questions about gender and similar topics are something that “the West” is interested in, even if it does not make much sense in the context of the Observatory.

Others were dismissive of these questions and would visibly roll their eyes:

“Gendered? It’s nonsense,” Ivana told me. “There are no differences between male and female scientists. We are all treated equally.”

Some researchers tried to guide me towards larger institutes, with more scientists to provide a better statistical sample.

“Does it really have to be astronomy that you research? Because you should go to Institute in Zemun. They have many more women employed; in case you need a bigger sample. There is too few of us for you to build reliable a statistics about women in science,” Ivana said.

The Numbers

Finding out the exact number of female scientists at AOB was not easy. Because of the staff changes (people retiring and new people being hired), I was warned not to take the official AOB website as accurate in terms of employees. According to my informants, the AOB currently employs about 25 people with PhDs, “plus or minus a few people.” There are also some people who are retired, like professor Stojković, but who are still very much part of the Observatory research. In addition to these, there are also PhD students who are not always listed on the website, but who work on projects as junior researchers.

“There are maybe 30 people with a PhD in total. I believe that there are more women in AOB at this moment,” Ivana said. “These are small numbers and even one person can change the percentage for 3 to 5 percent. But it tends to be equal, and I dare to say it is more women at the moment.”

Another problem was the small number of scientists working at the Observatory. The entire staff includes around 40-45 people, which is not enough to draw any statistical conclusions. However, I counted 21 women by name, which compromises 47% to 52% of all scientists at the Observatory. This number is not fully correct, because some male and female scientists are officially retired but still conduct research at the Observatory, but it can serve as an illustration

of the overall trend. In short: there is gender parity at AOB. Women are represented in a large percentage; half of all scientists working at the Observatory are women. This is in line with general trends in Serbia (UNESCO Institute for Statistics 2018). Women make up roughly half of researchers across most disciplines, from natural sciences (51.8%) to agricultural sciences (50.1%) and social sciences (52%). In some fields, women make the majority of researchers, such as medical and health sciences (60.1) and humanities (57.2%). The only lower percentage is in engineering and technology, in which women make 39.2% of all Serbian researchers (Huyer 2015; UNESCO Institute for Statistics 2018)⁶⁹. These percentages are above world averages. According to the UNESCO Institute for Statistics (2018), only around 30% of world's scientists are women. In the USA, around 27% of researchers in science and technology are women (National Science Board 2010).

Position of Female Scientists at AOB

Most informants, male and female, expressed the opinion that the position of female scientists at the AOB is “excellent.”

“I’ve never felt that I was discriminated as a woman or a second-class scientist. I was treated equally,” all female researchers I talked to shared this opinion.

“I think the treatment of female scientists is great,” Sandra said. “I can be sure for AOB, and it is the same in other institutes that I know of.”

“From my female angle, I would say I don’t feel discriminated at all. I don’t feel disrespected. We don’t have that problem here,” Ivana said.

Female researchers agree that juggling family responsibilities in terms of child care often slows women for a few years. For example, male researchers such as Nenad and Petar are already stepping into more responsibilities at AOB. These responsibilities do not necessarily reflect in their higher titles, but in the tasks they perform during research and paper production. They are often named as the younger scientists who take it upon themselves to successfully choose a topic for further research. Their female colleagues of the same age are often unable to do so, since many of them, such as Sandra, Ivana and Petar’s wife, Teodora, have small children to

⁶⁹ Available at <http://data.uis.unesco.org/>

care for. These scientists are all in their mid to late thirties; many of them have pre-school or elementary school children. Child care and child illnesses are considered tasks that need a mother's presence; because of this, female researcher's careers "slow down" during the years when children are young. This slowing down is not described as significant in terms of salaries or even getting elected into higher titles; it is down to factors that are more difficult to measure, such as the ability to choose a research topic.

The female scientists insist that this is "their choice" and that they will all have a chance to catch up with their male colleagues in the future, when children are older.

It is interesting to note that some male researchers were unable to talk about the situation realistically. Petar provided a particularly interesting point of view when asked about potential differences between male and female scientists:

"Women seek security, because they need a secure job; they need something concrete. They would go to work at a bank, for example. With the same knowledge and education as men. While men go into science. This is just a difference between men and women. Men also like extreme sports, not just because they are pragmatic. They do them because they like them," Petar told me.

This reveals a curious attitude: Petar seemed to be convinced that his job as a scientist at AOB is dangerous and full of insecurities. Simultaneously, he mentioned banks as a secure job option that women choose. Needless to say, the reality of the situation in Serbia is quite the opposite: a government-funded job at AOB is infinitely more secure than any job at a bank. In the chaotic transition period starting in the early 2000, the majority of the former Yugoslav banks were privatized. In general, the private sector offers much less job security (Vuković 2014), and many times, private businesses are guilty of ignoring labor laws and maternity leave for women. There are common stories about women being forced to sign a form stating that they would not get pregnant during employment, or being fired when they get pregnant (Drakulić 2015). Such a situation is common in private businesses of all kinds, from small privately-owned shops to large companies, such as banks (Stanković 2016). Job security as a scientist at AOB is almost unparalleled in Serbia and is reminiscent of the old socialist job security in SFRY.

Petar was also the one who insisted that there are fewer female than male scientists:

“How many women scientists have children and families? Statistically, the most successful female scientists don’t have families and children. Be it because they were late to have kids, or they are married but they don’t have children,” Petar said. “I know that the most successful women don’t have families. There is just not time when you have children. They worked and worked and worked – they couldn’t afford to have a child. Because everybody knows that they have to pause for several years when they have a child. Even if you freeze your status, you get out of the loop. What I know of women that they have their projects, their project leaders in the world – none of them have families and children,” he said.

“But is this true for Serbia?,” I asked.

“No, not in Serbia. I am talking about internationally,” he was quick to say. “For us here, statistics is wrong, because they also count women at universities who have a much better status and can’t ever lose their job. You can’t take statistics at face value.”

I did not want to remind him that two minutes before, he emphasized the importance of statistics for accessing this matter.

Other male researchers shared their female colleagues’ opinions on women in science, although some of them were surprised that they were asked about it.

“Here, I believe women are equal and very present in science. Here with us, and at the faculty, at the department; women are in majority,” Stojković said. “But I think you should ask the ladies this question. They should give you the full information about how they feel.”

In the words of female scientists, things at AOB are organized in such a way that produce great job satisfaction. Women praise accommodating project leaders and heightened collaborative aspect of work that makes everyone feel included. Collaboration in STEM is said to help women mitigate some of the exclusion present in the West (Vardi and Smith-Doerr 2014), and this is absolutely true in the case of AOB. Women are not excluded from any news and opportunities. For example, promotions are done on an automatic basis as soon as the researcher reaches the agreed number of points, provided that the Ministry has started a new

project cycle. It is clear why Ministry, and not gender differences, are the main obstacle for promotion at AOB for both male and female scientists.

The fact that AOB community is very close knit and sociable ensures smooth flow of information between all members of the staff: both men and women are quick to hear about new projects, opportunities for collaboration and (rare) sources of funding. Small talk and socialization are excellent sources for learning about opportunities, which is actively used by both male and female scientists at AOB. If people hide opportunities or do not want to talk, this is considered bad. There are cases of it, but people who practice that sort of behaviour are not viewed favourably. Similarly, the entire code of conduct at the Observatory helps new people to rely on the older colleagues for help and learning the ropes, which is beneficial for younger researchers regardless of gender. There are no male informal networks from which women are excluded (Roberts and Ayre 2002); when male informal networks exist, they are used for the benefit of all researchers as a team. A lot of this is achieved through familiarity and informality that are so present at the Observatory. Women are believed to be disadvantaged in organizations with higher levels of informality and where communication goes through informal channels (McGuire 2002). As noted above, this is not necessarily true for Serbia. In general, women from the former Yugoslavia are excellent at navigating informal situations and informal communication. This makes a distinctive approach directly tied to the collective nature of Serbian culture. While individual researchers want their work to be known, a lot of emphasis is given on securing advantage for team as a whole. Informal networking is there to serve all. This is in stark contrast to the ideal of “radical individualism and masculinity” present among STEM researchers in the West (Lindsay 2008). It is not a rarity for scientists all over the world to value freedom and flexibility over bureaucratic rules (Roth and Sonnert 2011), so Serbian researchers are no different in that regard. The difference is that this flexibility can often hinder newcomers’ success, particularly women, who are low in the hierarchy and not part of the informal networks (Roth and Sonnert 2011). This is not the case in Serbia: familiarity and informal address are equally embraced regardless of gender and the hierarchy level.

Part of the reason women are not excluded is the attitude towards competitiveness. While individual success is praised, Serbian researchers typically do not display fierce

competitiveness among themselves and against their direct colleagues at AOB. Male scientists abroad often use individual competitiveness to advance their career, for example, by approaching important scientists at conferences or by choosing more competitive research topics (Sonnert and Holton 1996). In Serbia, research questions are chosen by the project leaders; while individual researchers have freedom to pursue their own research questions, women are not excluded or left to their own devices; they are included in the overall research program of a particular project. Their research becomes as relevant and as competitive as the rest of the team's, regardless of gender. Authorship and assigning credit are similarly treated with informality and on the team basis. The issue of authorship and giving researchers proper credit is an important one in international science (Wray 2006). This topic is rarely mentioned in Serbia; even when formal guidelines exist, the informal road is followed. It operates under the honour system, which produces problems when is not followed, but operates just well most of the time, judging by comments from AOB researchers.

All these factors improve the position of female scientists at the Observatory. According to my informants, this approach has a long tradition at AOB, which is one of the reasons why the Observatory has always had a large percentage of female scientists on the staff, at least after World War II. The number of women was lower before that period, during the time the Observatory was founded and up to the mid 20th century. However, there were always at least some women employed at the Observatory for specific tasks:

“Women were often employed at AOB when it was founded to do calculations, because they were very meticulous. During the founding, they paid attention at who will handle the time service and calculations. Those are highly mathematical tasks, that are today done on computers and clusters. Typically, people were chosen for those tasks if they were very meticulous. Many women were employed there,” Valentina said.

“The founder of the Observatory, Nedeljković, employed all of his family: his wife and his children. People would say that it's nepotism today,” Valentina said. Both she and Stojković laughed at this. “But his wife was important. She was really involved in building AOB; she was a lady in the court, and she was really invested in it.”

“You can see how gender ratio was changing over the years,” I was told.

After the World War II, the number of female researchers quickly jumped to present levels. “We always had 15-20 women, out of 35-40 people. It was about half and half. It is true that half of scientists are women in Serbia,” Valentina said.

“This is all a result of socialism. The same was in USSR. Because education was free. I am not sure what would happen now that education costs. I have an impression that in former socialist countries, if someone wants to go to university, they go. This is not true in the West, because they require money. In South America, men go to make money, and women study what they like. This is why they also have so many female scientists,” Stojković said.

Socialist Heritage

Socialist heritage is often mentioned in passing, but I find it crucial for contextualization of gender in science. It is not a secret that socialist countries tried to promote the equality of workers (Pascall and Manning 2000) and appreciating a worker regardless of gender. While much of this was part of ideological speech (Einhorn 1993; Funk and Mueller 1993; Galligan et al. 2007), the truth is that women found employment in numerous professions during socialism. Working mothers being a norm (Bodrova and Anker 1985) and women working in a wide range of occupations was also prevalent. This was a definite trend in former Yugoslavia. Natural sciences, medicine, even engineering: women in the former Yugoslavia scored high percentages in all these areas, similarly to women from other socialist countries (OECD 2015; European Commission 2001). This trend is also true for women university professors and women in social sciences and humanities (Blagojević 2009). This trend was largely helped by the state’s approach to maternity leave and social security. A year of paid maternity leave and affordable day care for children⁷⁰ (Ramet 1999) allowed women to work, and to find employment in same professions as their male colleagues. Some authors have criticized the social policies of equality for being in the service of the ideology and the party and from making “emancipation from above” (Funk 2014). However, it is important to note that these policies, along with socialist women’s groups that existed at the time, worked towards the

⁷⁰ Another point about affordable childcare: A cultural norm in former Yugoslavia, which is still maintained in today’s Serbia, is for grandparents (particularly grandmothers) to take care of children while parents are at work. Needless to say, this childcare is free: no grandparent would ever take money for caring for their own grandchild. Furthermore, multigenerational homes are still common: adult children bring their spouse to their parents’ home and start their family there. It means that grandparents do not even have to travel to do childcare.

improvement of the lives of women, albeit using a socialist lens to do so (Popa 2009; Ghodsee 2015).

Socialist countries had a larger percentage of female workers than the West: in the mid 1970s, 43.7% of workers in Eastern Europe and 49.7% in the Soviet Union were women, compared to 37.4% in North America and 32.7% in Western Europe (International Labor Organization 1985). While some women in socialist countries found paid work burdensome, others embraced it readily and saw it as a source of empowerment (for the case of Romania, see Massino 2009). For example, one survey among in USSR found that 80% of women would prefer to work even if their husband's salary was high enough to support them (Du Plessix Gray 1990). The work allowed women more financial independence and changed some of the patriarchal gender relations. Socialism made women dependent more on the state than individual men (Verdery 1996; Gal and Kligman 2000), which erased some of the power imbalances between genders. Of course, socialist state was not fully successful at erasing gender differences and patriarchal gender roles, but it did start a trend of normalizing female paid employment. This legacy can still be observed in Serbia, particularly in government-funded institutions such as AOB.

These factors readily contributed to the influx of women in science. Coupled with free university education for all (Blagojević 2009), the social climate was favourable for women to enter STEM fields, or, at least, not to be discouraged from going into these fields. This is a trend that can be observed in most post-socialist countries of today (European Commission 2001), including Serbia . In short, women make up 50% of scientists in Serbia because there is a history, a tradition of women in these fields. Women scientists are normalized in today's Serbia, just as they were normalized in former Yugoslavia. Today's generations remember their mothers, who worked in large numbers, often in one of the STEM fields. If one's own mother did not work in a STEM field, a child likely knew an aunt or a neighbour who was a scientist. If nothing else, a child would encounter female doctors during regular examinations or when ill; such a child also encountered female teachers and professors⁷¹ of mathematics, physics,

⁷¹ To teach in high school (students aged 15-19) and in the higher grades of elementary school (students aged 11-15) one needs to have at least a bachelor's University degree from the subject they teach. Mathematics, physics, biology and chemistry are mandatory school subjects in higher grades of elementary school and in high school. All those people were taught in the same Universities and often in the same departments as scientists working in institutions.

chemistry and other STEM subjects during schooling. To be a woman scientist was nothing unusual; consequently, to be in science did not mean one has to be a male.

This is an important point to emphasize. In international (Western) literature, it is common to view STEM fields as being strongly gendered male (Etzkowitz et al. 2000). Parts of efforts in bringing more girls and women to STEM fields is unpacking this “maleness” of science and questioning it. Sciences in Serbia (and former Yugoslavia) are not coded male; these are not considered to be “male occupations.” There are occupations that are considered male and that are strongly gendered in Serbia, such as truck drivers, bus drivers, taxi drivers, construction workers (or any occupation demanding a person to lift heavy weight), garbage men, postmen, janitors; more controversially, male coded careers include policemen, soldiers and, to a lesser degree, politicians. Also, the idea of a “boss” as a leader and an employer is often coded male. The idea that “boss” is gendered male is hardly specific for Serbia; similar sentiments exist around the globe (Buchanan et al. 2012; Delgado-Iglesias et al. 2019). That not to say that there are no women in Serbia who occupy these positions (particularly in politics), but there is a strong gendered angle. Similarly, occupations such as a nurse,⁷² kindergarten teacher, language professors (or languages in general), librarians, office assistants, hair stylists and cashiers are generally coded feminine. Sciences are, for the most part, treated as gender neutral, although some STEM fields have a higher percentage of women than the others. This is not just a number: the large percentage of women in these occupations goes hand in hand with the prevalent normalization of these occupations as being “for both men and women.” Generally speaking, people in Serbia still hold strict ideas about what kind of jobs are suitable for women and what kind of jobs are suitable for men. The fact that female scientists are accepted as a norm is not so much of a sign of open-mindedness and progress but a result of normalization of these occupations for women in socialism. For people in Serbia, even the more conservative ones, a woman scientist is nothing unusual nor “out of the norm” in the way a woman taxi driver would be.⁷³

⁷² Nursing is strongly coded feminine in Serbia, the way it is in many other countries. However, medical doctors are not coded masculine in Serbia; indeed, there are equal numbers of male and female doctors.

⁷³ I must admit I still notice female bus drivers and road workers in Canada, because this is a sight I am not used to.

That not to say that certain traits that scientists possess are not coded masculine or feminine. For example, the idea about women being patient and meticulous (Sonnert and Holton 1996) still resonates today. Sandra recounts the first tasks that she was given when she started volunteering at AOB. Miroslav assigned her a subject that does not require a lot of programming, but a lot of 'manual work'. Manual work in this context refers to tasks that require a lot of repetitions, to open one by one spectrum, to change it and do that sort of a job. She later learned that Miroslav gives a similar sort of work to female students when they first arrive. On the other hand, male students often get programming as their first task. When asked why, Sandra said that it is because men dislike those sorts of manual tasks and do not have the patience to perform them properly.

"They hate it. 'I would not be caught dead doing that', they say," Sandra said. "But the thing is that many of them are not good at it. They are not so meticulous. There are exceptions, of course, but this is something that I have noticed. Whenever a project needs a task that requires patience, and when you need to be precise, with a lot of focus, Miroslav always assigns those tasks to women."

However, Sandra insists that this is not something that prevails in terms of male vs female research. This refers only to the lowest level and the first type of assignments that new students are given:

"I wouldn't say that this divide always happens, and it is not so important. It just something I remembered because you asked about differences. Nobody prevents a woman from taking programming tasks if she wants to, even on the lowest level. And many do. It is more that men are not good at tasks that require so much concentration, and they whine about not wanting those tasks."

Being patient and meticulous is coded feminine, at least in this context; men are often perceived as not being good for tasks requiring these skills. This might sound like a slight against men, but it seems that some male AOB researchers are the ones actively rejecting these tasks as "boring" and "tedious." The unspoken idea is twofold: it relies on the gendered "truth" that women are more meticulous and precise with calculations; at the same time, men are given a pass for rejecting those tasks. When I enquired deeper into this subject, my informants were adamant that this does not happen often, and not with all people; generally speaking, this is

something that occurs only at the first (lowest) level of tasks when one is starting out. Also, nobody, regardless of gender, expressed negative feelings about this arrangement. Men did not want to talk about this at all (this is something I learned from women), and women said that they liked this sort of introduction into work because it allowed them to learn their apprenticeship step by step.

This is another curious attitude: younger men I talked to, in general, never mentioned completing this apprenticeship. They talked about “their research,” and “starting to work on such and such project,” while women referred to the same stage of career as “being mentored” or “learning the job.” Through my conversations with supervisors and project leaders, I have learned that both men and women go through the same apprenticeship, in which they gradually learn their work tasks and how to conduct research. Project leaders spoke about both men and women going through these steps. It is interesting to note that female researchers have recognized this stage of their careers for what it was, while many men failed to do that. What I want to say here is that men might have skipped some tasks as “boring” and exercised more confidence in their research skills (at least in front of me), even though they were also subjected to the same treatment and had to learn how to conduct research basically from scratch, just like women did. The main difference is that women were open about it.

Soon after completing their first assignments, all students and new PhDs are given different types of tasks, regardless of gender. Sandra and other women on Miroslav and Nenad’s projects claim that there is a clear apprenticeship for new students, and project leaders instruct students in the same way, regardless of gender.

“Miroslav is very good at assigning tasks and adjusting them for the person. He openly asks you about your interests and what kind of work you like,” Sandra said. “He doesn’t underestimate women. If a female students wants a complex task, she gets one. Remember when he wanted to make that new student the first author and she messed everything up? She overestimated her knowledge, but it could have been a male student in the same situation.”

“A good thing about starting with manual jobs first is that you learn step by step,” Sandra said. “I quickly figured out that I can make a program to do that manual job for me. So, now I automate all those manual tasks.”

This may also be a peculiarity of this specific project. Other women I interviewed said that they got to do programming immediately, because their projects focus on programming only. This is particularly true for astronomers: almost all of the tasks they perform for their research is programming, and these groups have a higher percentage of women.

This is an interesting thing to note. While natural sciences are not specifically gendered, there is a subtle difference between the way astronomy versus astrophysics is perceived at the AOB. Astrophysics is “for everyone” and generally has the same number of men and women working on those projects. Astronomy, on the other hand, has more women. I would not claim that it is coded more feminine, but it seems to attract fewer men. When asked about it, none of my informants had any idea why; some realized for the first time that there are more women in astronomy. A further research might be needed to shed a light into this. I suspect this might be a combination of astronomy being a bit “old fashioned,” without so many cutting-edge research studies, and a consequence of circumstances: there are not so many supervisors in astronomy, and not many people go into this field. While astronomy is far from being a “dead” field, astrophysics is very much “in” and a “cool” kid at the AOB. Another possible gendered thing about astronomy is that it is perceived to include a lot of that precise, meticulous calculation work. While this might have been true in the past, all of those calculations are done on computers today. In fact, and paradoxically, most of astronomy today is programming, which is exactly the type of tasks that men in astrophysics prefer.

Goran was critical of what he called a “positive discrimination” in the West. According to him, international conferences insist on including a specific number of women. “Some people agree with this, while others believe that this is a disservice to women, because people would say that the only reason she was invited or accepted somewhere is because of a quota,” he said.

This lack of belief in quotas is common in Serbia, probably inherited from socialism, where quotas were commonly used in various domains, often to satisfy ideological criteria (for equality) (Markov 2001).

Goran had spent some years abroad on numerous projects and understands the situation with female scientists in the West. He is not against quotas altogether and sees them as useful so that young women and girls would see other women in those positions and think: “yes, we can do

this, too.” However, this approach is not applicable for Serbia, because half of the scientists are women.

“Imagine conferences paying only for women from Serbia to go,” he said. “This would be unfair, because nobody here has money to visit international conferences, regardless of gender. We are all in the same boat.”

Others agree with this assessment. Female scientists have mentioned that being solely invited to international conferences would be unfair to their male colleagues.

“They don’t understand,” Jasna said, with “them” being Westerners. “Why would I get the money to go while my male colleague couldn’t? They don’t understand that we are all equal here: equal as scientists, and equal in problems. Nobody has money. Half of the scientists in Serbia are women, and nobody has the money to go. Inviting only women would truly be unfair. But they don’t get it. They don’t get our situation.”

However, this sort of a talk is “more theoretical,” I was told. In practice, foreign conferences rarely pay for full expenses. Since Serbia is not in the EU, AOB researchers do not qualify for any funds or scholarships. Some conferences offer money for students and young researchers’ travel, but it is not enough to cover all the expenses. As a result, younger researchers rarely get to go to conferences, unless they are relatively cheap (meaning: they are organized in the region).

“In this situation, questions about gender are irrelevant. You can’t think of those things; these are not important at all to you. To any of us. What is important is: how will I survive? When will I find money for rent, for groceries? This is something both men and women face,” Sanja said.

Some AOB researchers are critical of wider Serbian culture in terms of gender relations.

“We were, and we remain, a very patriarchal culture,” Goran said. “We never even question the ideas of gender roles, gender behaviour, etc. Science is lucky in this regard because of socialism. This is a tradition with us. Young boys and girls always know some women in science: female doctors, professors, etc. These several generations that I’ve been in contact with during my studies, there were always the same numbers of male and female students. So,

there are very different roles for men and women, but this equality is a product of socialism. It looks to me that there is equality, at least in astronomy and physics. If it's not completely equal, then the difference is not as drastic as it is in other places.

It is important not to mistake the idea of a patriarchal culture as being directly related to gendering of science (Lucht 2006). As described above, science is, for the most part, gender neutral in Serbia. However, many (dare to say, most) tasks in Serbia are strictly divided into "male" and "female," which does follow traditional patriarchal ideas (Duhaček 2015). This is very much true for domestic work, cooking and other household tasks, which are strongly coded feminine (Gal and Kligman 2000b). This was, and continues to be, a big source of double shift (burden) for Serbian women (Blagojević 2009).

"It is true that we are gender balanced in astronomy and astrophysics," Milica agreed. "Let me see: there were five men when I arrived, and four women including me, and we have a new woman who has joined recently. So, it is five: five ratio. But yes, I have noticed that there are fewer women in international circles, but never here. There is always an equal number of men and women. I can see that it is a trend to talk about it, but I've never thought about it before people asked!"

She is also critical about this question and sees it as a Western problem that is imposed from abroad. She remembers a seminar she attended as a student about women in science and problems of gender balance. The seminar was organized by a foreign organization and was, in her opinion, "tone deaf": "This is something brought up from the West, these questions about the number of men and women, because they have that problem. And when something is problem in the West, it is seen as a universal problem. So we all have to discuss that and talk about that."

This is important to note: it is true that many problems present in the Western, "First world" countries are of more interest to people in those countries. The ideas of Western feminism are a good example of that (Busheikin 1997). It is also not uncommon for these problems to be perceived as universal, if not by experts, then by general population. I have observed this in Canada: the main interest about my work, both formally and informally, focused on the subject of women in science. I understand this: it is an important issue and a problem present in Canada and other Western countries.

Furthermore, it is not uncommon for reactions to go along the lines of assuming that, if things are bad in the West, then they must be worse everywhere else in the world. If there is a lack of women in STEM fields in the “First world,” then it must be even worse for other countries. As I demonstrated above, this is not necessarily the truth. Feminist and gender problems are not identical across cultures (Tlostanova et al. 2019), and it is not always easy to study a situation in one part of the world with approaches from another. In short, Western (feminist) approaches cannot be necessarily applied to the case of women in Serbia. Similarly, the fact that there is a lack of women in science in the West is not necessarily applicable to Serbia.

“We have so many problems here, problems that we all face, regardless of gender,” Jasna said. “It is pointless to focus on gender and forget about the true problems we have, at AOB and in Serbia as a whole.”

“Here, they never make a question over whether to hire a man or a woman. We never looked if it’s this or that. We hire based on interests and research. This was never a problem with us. I am not sure about the non-research staff. I mean, you can’t hire a woman to be a janitor. That job requires so much heavy lifting. This is not a job for a woman. But other than that, we have equal number of women and men,” Ivana said.

My informants generally agree that the socialist legacy is the most important factor for achieving gender balance in sciences. Some were quick to say that they are not “Yugonostalgic” (Luthar and Pušnik 2010) or that they do not support socialism as an ideology, but that it is an important factor that should not be overlooked.

Researchers also agree that a lot depends on factors that are not directly related to science. Ideas about family and child care, domestic work and who is responsible for those, are important. Some women have noted an improved situation in this regard compared to their mothers’ generation. There is more equality in the home, so it is not just women doing domestic work or taking care of children.

What About Western Women?

“Maybe in the West you can pay someone to take care of your children, but not here,” Milica said. “It is mainly grandparents who take care of children if both parents are working.”

“The West” is often evoked in these discussions. Despite not displaying a lot of knowledge about the life in the West, this is one area in which AOB researchers had a lot to say and seemed to have correct information. They knew about low percentages of women in science in Western countries. “Horror stories from the West” about the treatment of female scientists are common and were often mentioned in our conversations about gender.

“In the West, women are openly prevented from practicing science properly,” Sandra told me. “I’ve heard stories. For example, our women going to the West and coming back because they wanted to be both scientists and mothers. For example, in Germany, a female colleague was asked to sign a contract that she would not get pregnant in the next two years. In Japan, a woman who works as a research simply cannot be a mother. There is no official rule stating this, but there is simply no time because they work all day long. Those are real obstacles.”

Other women at AOB agree:

“I heard that they get 3 months maternity leave at most, including the month when you give birth. I believe there is no discrimination for jobs, but women simply cannot withstand that. This is particularly true if they want to have children. They have to give up science when they want to have something else in their life,” Sanja agreed.

“Here, you don’t have to change jobs; there you always have to change jobs. There, you always have to change jobs, every year or every other year. You can’t have a family like that. So, many women go opt to work outside of science,” Jasna said.

“There are not enough women in science in the West because there, science is a cutthroat business. There, they don’t have any discriminations against women as women. But the problem is that they are completely equal with men, even in things where there are differences. For example: they don’t care if you have a child; this is your own problem. So, you are expected to do exactly the same things as a man. If you are willing to do it, then there is no problem. But a problem is if you want to have a family and children. Children are your private business, and nobody cares about that,” Ivana said.

Stojković claims that astronomy and astrophysics has a long history of women researchers, even in Western terms. However, these women are often forgotten or sidelined because they

worked as part of the team with male supervisors, and only the man is credited for their discoveries.

“I remember Edward Pickering and his ‘harem’, as they called them. He only employed women in his team, because they were cheaper and you could save money on employing them,” Stojković said. Valentina laughed at the word “harem.” (For a note on Harvard’s computers, see Geiling 2013).

Gender is almost completely ignored as a category in one of the rare articles about astronomy students: a 2009 report dedicated to the first 100 graduates in astronomy From the university of Belgrade (Milogradov-Turin 2009). The report does not specify how many male and how many female graduates were among those 100. The only thing that is highlighted is the fact that early female graduates rarely opted for work at the Observatory because it required work at night, which was at odds with childcare and family life (Milogradov-Turin 2009, 365).

Maternity Leave

When talking about an excellent position of female scientists in Serbia, a lot of informants choose to frame it through maternity. This is generally voiced as the only difference between male and female researchers, albeit an important one. This difference, and what it means for one’s career is never seen as a discrimination point. It is considered to be a basic fact of life and biology. All informants who talked about the position of women at AOB choose to illustrate this through the possibilities it allows for motherhood. At AOB, I was repeatedly told, one does not have to choose between maternity and career. Long, paid maternity leave and understanding supervisors at AOB create a favourable atmosphere for female scientists so they can realize themselves both as mothers and as scientists. This is also often noted as something that Westerners need to change if they want to have more women in science. For all the negative comments about Serbia and government, this is one thing where it is recognized that they are doing it right. (Or not as badly as in other places). The issue of children and maternity leave is often one of the main obstacles female scientists face in the world (Fox 2005): long working hours are seen as incompatible with raising a family; women with children are often perceived as being disinterested in the career (Roberts and Ayre 2002). This is not an issue for female researchers working at AOB. Good position of female scientists and good treatment of female staff were often explained through the ability to be both a mother and a scientist.

“Women have an opportunity to realize themselves as mothers; to go on one year maternity leave. There is a high understanding by bosses even after the maternity leave, when a child gets sick. I spent almost all last year on leave when my child was sick, and there was a full understanding for that. All of this is tolerated without a problem. There is a high understanding for mothers at AOB. This is why there are so many babies at the AOB lately. Almost all of the young women at AOB have children and became mothers after gaining employment at AOB,” Sandra explained.

One-year maternity leave is fully paid (Zakon o Radu 2017) It is often cited as one of the best laws that help female scientists realize themselves in the role of mothers without sacrificing their career. It is not just about the salary: the year of the maternity leave is essentially “frozen” in terms of the points system. The year spent in maternity leave does not count when it comes to calculating a woman’s salary and the number of papers she has published. The salary stays the same and the woman is not penalized for not publishing during this period.

“My salary was even higher than while I was working. Because Vučić cut salaries for 10% when I was already on maternity leave, but mine stayed the same as at the beginning, because the law says you receive the same salary as the one you start your maternity leave with,” Sandra told me.

“The influence of those years on maternity leave is neutralized so it won’t work against you in terms of points and salary. Although they don’t do this point count years back anyway, because they threw science in the trash can.”⁷⁴ So, I am not sure what is going on,” Sanja said.

The official rules state that the woman should leave for the maternity leave one month before the childbirth, and they need to go back to when the baby is 11 months old. However, women are often able to score a longer maternity leave: they agree with their gynecologist to get a note that they have a high-risk pregnancy. That way, they are able to go on a full-paid maternity leave as soon as they get pregnant. Many women working in government institutions use this trick. Those who work in private companies are not always awarded this luxury. “They should be happy if they get to keep their jobs when they get pregnant,” I was told.

⁷⁴ This refers to the prolonged project cycle that was supposed to end in 2014 but is still ongoing.

They do not have this problem at AOB. The institution follows the law in terms of maternity leave, and the Directors and project leaders tend to be accommodating above these requirements. Sandra recounts a moment when she told the Observatory Director that she was expecting her second child. He congratulated her and showed her pictures of his own children. He jokingly told her that Ivana should be her role model: she has 3 children and works at AOB. “Basically, he was elated and encouraged me to plan my third child,” Sandra said.

Since work hours at AOB are not demanding, and since many things can be done remotely, AOB researchers tend to start their maternity leave officially: one month before the childbirth. In reality, many work until they are 7 or 8 months pregnant, and after that, they stop going to the Observatory and perform their work from home. Young female researchers say that they are happy that this informality is allowed, with the blessing of the Director and project leaders.

The same informal approach is granted once a woman goes back to work and her child gets sick. This can be a problem for young mothers, because small children often get sick. There is only a limited number of sick days that can be taken officially. The law mandates that the sick days lower one’s salary, which is a problem for a woman with small children. Luckily, the AOB does not require a woman to officially take sick days: they are allowed to simply phone the Observatory and say that they are not coming to work that day. Everyone is full of understanding.

So, they are officially signed as working, while in reality they take three days there, two days here. As a result, they get to keep their salaries intact. Female researchers who mentioned this agree that they are lucky to be working at AOB, with so much understanding and informality. However, nobody sees this as cheating. “The law is bad,” I was told.

“I do think that women need to be there for children. Small children need their mother more than a father. This is why female scientists don’t have time when their children are small. But they catch up later,” Sanja said.

I also heard of a situation in which a man took maternity leave. This was for a female colleague who was on Danilo’s project. She works on an AOB project but is employed at the University. Her husband took the leave instead of her. She had to continue to work, because she is a

professor at University, and it is not easy to find a new professor. So, they organized it like this that he took a leave.

The situation at the University is a bit more difficult because of these constraints; generally speaking, there is one professor and one assistant teaching a group of courses. It is rare for a new person to be hired, and sessional instructors are unheard of. However, I was told that most women working at the University enjoy similar rights in terms of maternity leave: it is respected, and they receive a full pay. “It is mainly in the private sector that it’s shit,” I was told.

It is important here that mothers are mentioned; never fathers. This is not a coincidence. Childcare, particularly when the child is young, is seen as a female domain. It is something that is very much still understood as a mother’s role (Simic and Simic 2019), particularly during the time of breastfeeding. Mother’s duties transcend this: for example, it is assumed that the mother should be the one taking sick leave to be with the child, not because her career is less important than the father’s,⁷⁵ but because she is considered to be more important and more knowledgeable about childcare. A young child needs a mother more than a father, it is the understanding. As a result, maternity leave, sick leave and the main burden of childcare are understood as a mother’s role (Đurić Kuzmanović 2002). This is naturalized to the point that many of my informants, when asked “why doesn’t the father do it” looked at me as if I said something morally wrong. “It is natural that way,” I was told. It was assumed that I would understand why the mother has to be the one. If not the mother herself, then a woman in the family (typically a grandmother): this is understood to be a highly gendered, female task. (Simic and Simic 2009).

That is not to say that women are the only ones affected by these gendered roles. The retraditionalization of gender norms has generated new pressure for men: in this arrangement, they are expected to be the main breadwinners and capable of supporting their families (Novikova 2012). In the situation of increased unemployment and insecurities, this ideal is difficult to achieve for many men in Serbia. This proves to be a source of great frustration for

⁷⁵ I had more than one man joking that he is jealous of his wife because she gets to stay at home, or to work for home, and he must come to work. The overall sentiment is that having a legitimate excuse (such as a sick child) not to come to work is a positive thing. However, even those men had to agree that all AOB researchers generally have freedom to work at home and not to come to the Observatory.

many Serbian men. However, just as there are women who do not subscribe to new retraditionalization of gender norms, there are also men in Serbia who work toward sharing of domestic responsibilities and who do not subscribe to the dominant stereotype of Balkan masculinity (Dumančić and Krolo 2017).

Despite being adamant that small children need mothers and nobody else, many AOB researchers claim that they share child care responsibilities with their spouses. Many AOB scientists have spouses who are also scientists; some work at the Observatory, while others work in the University or other institutes. Household and child care responsibilities are divided, not completely equally, but the things are slowly changing:

“Our fathers didn’t do anything around children. Our mothers worked and then when they came back home, they had to cook and do domestic work. Our fathers would come home, legs on the table and read newspaper. That was normal back then. Today, it is not like this. Today, even men from Bosnia⁷⁶ help with household and children,” Sandra said.

She divided child care responsibilities with her husband: she focuses on their younger child because she still breastfeeds, and he is with the older child. He also does some household chores, but not cooking; this is her responsibility.

Married couples at AOB typically work on the same project. Working on the same project help dividing work and childcare responsibilities. Petar’s wife, Teodora, is also a researcher at AOB. They have two children and work on the same project. “Realistically, I don’t know how else we would be able to organize. This way, I can say: you jump into this project part while I take care of the kids, and then we switch. It would be impossible otherwise.”

“In science, work is not just what you do when you go to your workplace. The life of a scientist is a lot about: kids are asleep, let us work now. I ended up sleeping for one hour last night. This is how we have to do it. There is no other way around,” Petar said.

Today’s fathers are more involved with childcare (and household tasks) than their fathers (Novikova 2012; Blagojević Hjuson 2013). I had more than one male researcher at AOB talk about caring for his children, and how these tasks are divided between fathers and mothers.

⁷⁶ People from Bosnia, regardless of ethnicity, are stereotyped in former Yugoslavia as highly patriarchal.

Also, I had female researchers talk about the same topic. Nobody used the dreaded word “helping with the kids”: grandmothers and other relatives were mentioned as helping. Women and men called father’s childcare for what it is: a parent taking care of his child. Nobody seemed coy about men doing these tasks; it was mentioned casually and as something that is considered to be “normal,” even though it is recognized that it is still not a norm in today’s Serbia.

How did these changes came to be? Instead of presenting it as a conscious fight that woman had for their rights, AOB researchers describe these changes as “spontaneous.”

“It was a simple evolution: it was seen that it couldn’t go like it was before, for woman to work at her job and then to work at home, while the man works at his job and relaxes at home,” Sandra said.

They also agree that their experience might be biased and reserved to highly educated women in Belgrade.

“I doubt it is like this in rural areas and among women who only have high school diploma. For example, I know my friend from Niš,⁷⁷ her husband doesn’t do anything. She told me that once he saw their baby uncover herself during the night, and he woke her up to cover the baby. He wouldn’t even cover the baby himself,” Sandra said.

The division between urban and rural life is an important one. In Serbian context, “urban” always refers to life in the large cities (primarily Belgrade and Novi Sad), while “rural” refers to life in smaller towns and in villages. This is an important dichotomy with varying meanings. “Urban” signifies culture, education, open mindedness and cosmopolitanism; “rural” signifies lack of culture and education, conservatism and traditionalism. These are persistent stereotypes in the Serbian imaginarius (Zivkovic 2011) that are frequently evoked. The attribute “rural” is often used as a slur for everything that the person finds lacking in taste, attitude or behaviour. It is not surprising that these changes in gender roles are attributed to

⁷⁷ A city in southern Serbia. While one of the largest cities in Serbia, it is considered more conservative and part of the “rural” mentality.

cosmopolitan, urban way of life in Belgrade and are considered not to exist in the rural areas of Serbia.⁷⁸

However, even in the instances in which a father had a role in childcare, people insisted that the mother should be the one to stay home with a sick child or with a very young child. This directly ties with the issue of maternity leave as an important factor allowing women to have a career in science. It is assumed that a woman should be the one taking maternity leave, sick leave and majority of childcare; the only way to keep a successful career is for these things to be freely allowed and accommodated.

AOB researchers also agree that it is “easy” for them because nothing serious depends on their research; even when numerous team members are on maternity leave, as often happens in the past several years, there are no high consequences. Yes, there might be a few less papers published, but nothing alarming.

“At one point, there were three of us on maternity leave,” Sandra said. “Miroslav’s project lacked so many key researchers. People from the outside joked about it and told Miroslav: ‘I heard your project is breaking’. They laughed, and Miroslav laughed with him. Because it didn’t matter in the long run. We are the last Mohicans of the old system.”

The “old system” is, of course, socialism.

Female researchers at AOB are well aware of the fact that they would not be able to enjoy this treatment if they worked in the private sector.

“I would have to sign that I wouldn’t get pregnant, or I would get sacked when I get pregnant,” Sanja said.

Private business owners are described like slave owners. “It is horrible out there. Yes, the law is the same for everyone, but private business owners don’t care (*“boli ih uvo”*). Private business owners find loopholes, or they have a *veza*.⁷⁹ So they don’t follow the law about

⁷⁸ It is true that rural Serbia tends to be more traditional and conservative in terms of gender roles (Hofman 2009; 2011; Blagojević Hjuson 2013), but what matters for these conversations is the views informants expressed and their opinions on changing genders roles in Belgrade vs rural places in Serbia and former Yugoslavia. Note: Bosnia, as a whole, is generally understood as “rural” in this context.

⁷⁹ Business owners who want to ignore the law find creative ways to get away with it. The more powerful ones have *veza* among the inspectors or politicians, so they are untouchable. Other resort to bribes if caught. Many inspectors will not enquire further into the irregularities if they are offered 100-200 euros to look the other way.

maternity leave. Or they don't employ you permanently, ever. There are also blank letters of resignation that women are forced to sign when they are hired. If they get pregnant, the employers fire them and make it seem like they resigned on their own free will. Many don't pay taxes and what is required by law. Many don't pay attention to work time, but not like us, the opposite: you have to stay for much longer," Jasna complained.

Vignette – Milica's Friend

Milica describes the situation her friend faces while working at a grocery store for a private owner. Milica's friend, Anica, is in her late twenties and a Belgrade native. She has graduated from the Faculty of Agriculture and is unable to find a job in her own profession, or any job requiring university education. The only types of job she could find are minimum wage jobs in retail and similar places. She currently works at a small, privately owned grocery store. Her work time is 8 hours per day, but she often stays for much longer. The grocery store is opened seven days per week, typically until evening, and it is understaffed. Overtime is not paid. The pay is slightly above minimum wage, but her employer does not pay for mandatory benefits (health and pension insurance). Anica works "*na crno*" (unregistered work) because her boss does not want to pay for benefits. Since it is illegal to do this, the grocery store is at risk of inspection. In the case an inspector comes, Anica and her colleagues are instructed to lie and claim that they have only started working "a few weeks ago." The law mandates that it is permissible for a business owner to offer probationary work that does not require a worker to be officially employed or receive health care and pension. If they want to keep their jobs, Anica and her colleagues have to agree to lie to inspectors. "What else she can do?" Milica says. "Of course she lies. It was difficult for her to find this job. She has been working there for six months and the boss is fair about the salary." "Fair about the salary" in this context means that the salary exists, is of the verbally agreed amount, and arrives without much delays. Sometimes, her salary is late so Anica has to borrow money from her parents and friends. However, she claims that the delays are not so frequent.

Smallest private owners try to find loopholes in the law, by pretending that all of their workers are on a probationary work. Some people are repeatedly "hired" on 3-month cycles, while other business owners fire their workers after this period and hire the new ones. To their end, private business owners cite that they are forced to do these things and that they cannot afford to pay for workers' benefits. Just like everyone else, they blame the government for "unfair and greedy laws" that require them to pay this much for workers' benefits.

She is not satisfied with this arrangement, but she is aware that it is difficult to find a job, even like the one she currently has. Anica considers herself “lucky” because she got to work in the same job for six months; many other workers in the grocery store are hired and fired on a monthly basis. She does not expect to be officially employed anytime soon; the only person officially employed is the boss’ niece who does not even come to the store. Her employment is fictional: it is done as a favour for the niece, so she can get her benefits, pension and years of employment going without actually working. Anica currently struggles to complete her Master’s, which is difficult to balance with a full-time work. Taking exams is particularly problematic, because she has no consistent days off; she needs to change shifts with her colleagues. Luckily, the colleagues are understanding, and the boss allows for this. Anica’s motive for finishing a Master’s degree is to “do something”; she is aware that the added degree will likely not change her job prospects, but she wants to do this for herself. “She has no *veza*,” Milica explains. Anica lives with her parents and a younger brother, who is a student.⁸⁰ Anica’s father is retired, and her mother got laid off during privatization of the company she worked for. Anica’s mother supplements their household budget by cleaning other people’s apartments. Her parents have no connections, at least not those that would ensure Anica could get a job. At the same time, the family is not financially prosperous enough to buy her a job.⁸¹ “Maybe I can join a political party,” Anica says. “But even this is not as easy as it used to be.”

The “wild capitalism” (Upchurch and Marinković 2011) has already left its mark. More and more people work in private companies, which is generally seen as a worse option than a government employment. AOB researchers who know about this situation were quick to point out a visible change in terms of gender: fewer and fewer women working in highly paid jobs in private institutions. “You see more and more women being just cleaning ladies or working in low positions like that,” Milica told me.

As a result of these factors, more and more women decide not to work and to be housewives. This retraditionalization of gender roles is a trend in today’s Serbia and other post-socialist countries (Lobodzinska 1996; Gal and Klingman 2000a; 2000b; Rudd 2000; Ghodsee 2004a, 2004b; McLeod 2013; Hassentabet al. 2015), which is very different from the previous

⁸⁰ A student is generally not employed; parents often provide support, and there are not (m)any jobs a student can find that would allow for enough time for studies. Part time jobs and flexible time are rare or non-existent.

⁸¹ Paying for employment is a thing. Prices range from 2000 to 10 000 euros.

generations' reality. In fact, these young women who choose to be housewives typically had working mothers in socialism. Women in Yugoslavia were granted voting rights 1946 and were recognized as both workers and mothers (Deiana 2018). Socialist years were marked by an increased percentage of women in the workforce (Ramet 1999); two working parents (spouses) were a norm (Blagojević Hjuson 2013). This was particularly true in large cities across Yugoslavia but was a general trend that marked what people described as the normalcy of living in Yugoslavia. This is very much the trend that many people today remember from their childhood. A typical Yugoslav family had both parents working. Such a family lived in a government-allotted apartment,⁸² the size of which was determined by the number of children and their sex. For example, a family of three would get a one-bedroom apartment (with the assumption that the parents would sleep in the living room and the child in the bedroom). A family with two children of different sex would be allotted a two-bedroom apartment, and so on. Despite the ideology of equality, some had it better than the others: prominent party members and high military personnel were given larger and more luxurious apartments (Mandic 2010). Many families were extended, typically including the father's parents. Often times, these families lived in apartments or houses that belonged to the father's parents; he never moved out and instead started his own family in the same household. Again, these situations were common across all income levels. I deliberately stay away from labels such as "working class" or "middle class"; these labels do not accurately describe the reality of living in former Yugoslavia, at least not in the way they work elsewhere. Middle class existed, but it was more tied to family's education level and aspirations, and the type of family culture practiced. Income level was not the main determinant factor of this.

What is important to remember is that working mothers were a norm across all of the levels of Yugoslav society, no matter how these levels are defined (through education, income or the fluid notion of "family culture"). As noted before, many of these women, and many of these

⁸² The allotted apartments were owned by the state; the family received one for use indefinitely. Most of these apartments were bought by their users during the crisis of the 1990s well below the market prices. For example, it was possible to buy out a one-bedroom apartment in the elite city centre area in Belgrade for 2000 Deutsche Marks (around 3000 CAD). Smaller apartments and those further from the city centre could be bought for under 1000 Deutsche Marks, sometimes for as low as 100 Deutsche Marks. These prices still proved to be too high during the time of hyperinflation, where average salary was often not worth more than 10 Deutsche Marks. However, people managed. There are family stories about how money was found, often through savings from before the crisis, sometimes through funds earned on the grey market. In any case, most people in Serbia managed to buy out these apartments during the early 1990s.

mothers, worked as doctors, scientists and professors. A typical family had two children, with families with one child not being a rare occurrence (Flere and Klanjšek 2013). Furthermore, daycare was affordable and made to accommodate the norm of two working parent families.

The life of a typical Yugoslav family was not luxurious, but the standard was better than many people in today's Serbia can afford (Greenberg 2011). A typical family had one car, and using public transportation was the norm for those who did not drive. Employment in socialism allowed for about a month of paid holiday time. Most people used summer holidays to go to the seaside in Dalmatia (Duda 2010). Swimming in the Adriatic sea during family holidays is many people's fond memories of those days.

With the standard of life like this, could families afford that only one parent is working? This depends on the income and type of jobs; some families needed both working parents, which was a reality in many socialist countries (Kocourková 2002). However, it is not possible to say that this was needed for everyone; people with better income could support their families with one salary, especially when it is taken into account that housing, education and health care were free. The fact that working mothers were a norm in socialism cannot be easily explained through the sheer economic need; it might have started out that way in the years immediately following the World War II, but it quickly became a norm. Women worked because this is "something you do," once you complete your education. The government's promise of jobs for everyone was too idealistic and not always true in practice; getting a good job in socialism often involved waiting and pulling out *veza* networks. However, the requirements of these *veza* approaches were not as strict, and most people managed to find secure, permanent jobs that allowed them to work in the same workplace until retirement. Jobs generally did not offer many opportunities for advancement, but security was high. One year paid maternity leave allowed women to continue working after they had children. There was no particular reason for women not to work; this was simply not a norm in Yugoslav socialism.

This situation resulted in changing approaches to gender roles in certain areas. Women before World War II were often housewives; the socialist woman worked. Many of these women were employed in positions requiring high education and skills; many had high salaries.⁸³ On the

⁸³ Salaries were always calculated based on two factors alone: education level and years of employment. These were the same for men and women.

other hand, this family arrangement did not change domestic gender roles (Einhorn 1993). Yugoslavia had implemented numerous policies to help women, such as equality at work, legalization of abortion and social benefits. However, these measures were not successful at erasing patriarchal gender norms; the policies mainly focused on the public and work sphere (Simić 1999) and did little to change private sphere and the existing gender norms. Women in Yugoslavia, just like in other socialist countries, were subjected to the double shift (burden) (Einhorn 1993; Gal and Kligman 2000; Černá 2006; Ghodsee and Mead 2018): they worked both in their jobs and in their homes. Socialist ideal was that of a “superwoman”: an excellent worker and a devoted mother (Einhorn 2006). Household chores, cooking and childcare remained firmly rooted in patriarchy and seen as exclusively female tasks (Đurić Kuzmanović 2002). A typical image was that of a man and a woman coming home from work at the same time: he puts his legs on the table to read newspapers; she rushes to the kitchen to cook dinner.

This was a socialist reality that many people remember in today’s Serbia. People in their 30s remember these times from their childhood, while youngsters hear stories about life in Yugoslavia. With the changing times and post-socialist transition, the above image is slowly changing. The road to retraditionalization could be observed soon after the breakup of Yugoslavia and during the wars; women were contextualized as “mythic mothers” who give Serbia their “brave sons” (Papić 1999; Lukić 2000) to die for the nation. This trend can be observed throughout former Yugoslavia (for Croatia, see Pavlović 1999; for Slovenia, see Jalušić 1999).

The nature of work is completely changed, often overnight: government-owned companies were sold to private owners; heightened privatization and chaos of transition saw the rise of small and big private business owners. There are still government institutions and jobs, but fewer and fewer people work in these positions. The security of the state job is not a reality for everyone in today’s Serbia. Even worse, there is a crisis of the job market. Many people, young and older, cannot find a job; unlike in socialism, jobs can be easily lost no matter how good they seemed at the first glance. Salaries in private companies are often higher than in the public sector, but this refers only to the positions higher on the hierarchy, and it does not come with job security. Many private business owners refuse to follow the labour law; not hiring workers officially and constant firings are a norm for many people. In these situations, it is more and

more difficult to find a job in Serbia today. These days, *veze* need to be particularly strong to work; often, money is requested as a bribe for employment. Many younger people cannot find any kind of a job, not even minimum wage, let alone something semi-secure or well-paid. It is not unusual for families to be supported by pensioners: the generation of people who worked in socialism has earned their state pension that might not be high, but it is often the most secure source of income. Grandparents supporting their children and grandchildren is a reality in today's Serbia (Roberts 2003; Blagojević Hjuson 2013).

In these circumstances, families with two working parents (or spouses) are becoming less and less of a norm. Many people are happy if one person manages to find reliable work (Blagojević Hjuson 2013). In addition to this, the post-socialist years have brought a notable shift towards nationalism and traditionalist ideas (Todorova 2004). The rejection of socialist ideology, coupled with nationalist movements during the break of Yugoslavia, have resulted into a rapid re-traditionalization of values. This includes a return to religion (in Serbia's case, Eastern Orthodox Christianity), "tradition" (often elusively invoked than explicitly named), and patriarchal values (Drezgić 2009). These realities are slowly producing a re-traditionalization of gender roles in Serbia. A similar retraditionalization of gender roles is also present in the former USSR (Zdravomyslova 1995) and other former socialist countries. In the situation when finding a secure job after high school or university is difficult, more and more young women choose not to even pursue it. Instead, young women are more and more seeking marriage instead of employment (Lobodzinska 1996). Life goals in this arrangement include being a housewife and raising children. A typical couple of this kind is generally supported by the parents (on both sides of the family), and often lives in the groom's family home with his parents (a trend that is also present in some other post-socialist countries; for Bulgaria, see Ghodsee and Bernardi 2012). This move toward re-traditionalization is not all encompassing, but it something that can be noted as a life goal for more young women living in today's Serbia. The post-socialist period is marked by decreased employment of women across Eastern Europe, while the rates of working women are at rise in the Western Europe (Motiejūnaitė 2008). All of this had a negative effect on women's economic status (Sperling 1999). (For increased unemployment of women in Czech Republic, see True 2003; for Macedonia, see Nikolski and Adnett 2015). Unlike socialism, the new system does not promise jobs back after

the maternity leave, which is yet another factor that prompts women in former socialist countries to become housewives (Saxonberg and Sirovatka 2006).

What is important to note about this re-traditionalization is that these women are rejecting the lifestyle their mothers had; their mothers worked, and some of them are old enough to remember the time when two working parents were a norm. This tradition is not their family tradition; the return is to a time of several generations before. In many families, there is likely no one who remembers the “traditional” time before World War II. This re-traditionalization is a rejection of socialist values and ideology more than a return to an established tradition. Young women (and men) who subscribe to this patriarchal view will sometimes cite ideas about strict gender roles, such as “traditionally, a woman’s place is in the home,” or “it is normal for a man to work and for woman to stay at home with children,” but these ideas are not part of tradition for so many people who lived in socialism. An established pattern was that of the double shift, not of housewives. This is a new phenomenon that requires further research in the future, particularly if the percentage of working women keep dropping, or if shift toward “traditional housewife” lifestyle becomes even more prominent. However, it is not possible to claim that all women subscribe to this return to conservative values. Many women continue to hold strong feelings of equality inherited from socialism (Stoilova 2010).

What does this mean for women working at AOB? For the most part, they are not personally affected by these changes. The Observatory is a state-funded institute, and it follows types of employment, maternity leave and other rules almost as if it were still socialist. The women working at AOB do not have to worry about privatization or re-traditionalization of gender roles,⁸⁴ unless they worry for a family member and friends. For the most part, they are shielded from the chaos of transition.

It is undeniable that AOB researchers credit maternity leave and accommodating superiors as the main reason for their good position: these are the factors that allow them to realize themselves as both mothers and scientists. Every single person, male or female, with children

⁸⁴ Of course, one might ask what it means for the double shift. The solution to this problem is not “let’s make women housewives”; the road to solving this issue is the change of gender roles. As noted in this chapter, some of these changes are happening, although they are still far away from making household chores and childcare equal between spouses.

or without, mentioned these factors as important for women in science, and as a reason why female AOB researchers can be satisfied.

This is a key point, but it is also important to remember that my informants focused on motherhood as the main female experience and difference. Women without children were not even mentioned in this equation. Many informants assumed motherhood for women as a natural life path, and many female researchers talked about having children and being a mother as the most important thing in their life. Some openly said that they would choose motherhood if they had to choose between science and children. Most did not state this openly but emphasized how cruel and inhumane it is to make a woman choose between the two, or for punishing a woman (by salary lowering or being let down at work) for wanting to become a mother. Indeed, this is something emphasized as an unfair treatment in the West, and one of the reasons many of them did not even want to start a career there. They see Western women as being forced to choose between science and motherhood and being punished for having children. My informants view this as a serious violation of human rights.

At the same time, I do not want to imply that my informants equated femininity and being a woman with motherhood; they mentioned, from time to time, female colleagues without children. However, these women were understood to be the same as their male colleagues; by lacking children, they lacked the main difference separating male and female researchers. A woman who does not have children or does not want them is seen as not having a horse in this race. While some informants implied that they would not think highly of such a person, or that such a woman is not “how a woman should be,” this was not the main focus of conversation. Instead, what interested me was the idea that motherhood is the *only* difference between male and female scientists (or basically the only that matters). In the absence of maternity, a male and female researchers were seen as identical. Offhand comments about women being more meticulous aside, my informants did not see any gender divide nor differences among scientists. Topics such as glass ceiling, pay gap, sexual harassment or gendered discrimination did not even register.

Since maternity was the main (and, often, the only) gendered factor my informants mentioned, discovering other instances of gendered behaviours and gender divide were more difficult to

research. I was particularly interested in the glass ceiling effect and the specific gendered expectations for men versus women. I describe these in the following section.

The Glass Ceiling

The glass ceiling phenomenon is often used as one of the main ways to gauge (in)equality in the workplace, and one of the main parameters to discuss discrimination of women at work (Valian 1999; Baxter et al. 2000; Cotter et al. 2001). It is also used to gauge women's role in the STEM fields. A common complaint is that the number of women in STEM goes down for each step on the hierarchy: there are not as many women on the highest positions in STEM fields (Rosser 2004; Bordons et al. 2006). The general trend observed around the world is that women are more numerous on lower positions, while the percentage of women higher on the ladder is lower (Committee on Science, Engineering, and Public Policy 2007). The lack of women in higher positions is often blamed on the strongly hierarchical nature of the institutions that prevent the advancement of women (Fox 2001). One of the key parameters in the glass ceiling phenomenon is the power imbalance that this creates. Women in the lower positions have lower salaries and less decision-making (or any other) power compared to men. In this way, even if a company or an institute employs many women, their income and power are well below that of men.

The situation at the Observatory seems to support this model. There are many women working at AOB as researchers and the basic gender balance is achieved. However, there are fewer women who have the highest title (full research professor) than there are men. With the small number of people at the Observatory, this might not be used as a definite trend; like my informants like to remind me at each opportunity, those are too small numbers to have definite importance. Indeed, the situation is better at the University, where the number of female and male full research professors is equal (for the Department of Astronomy and Astrophysics at least).⁸⁵ I say "equal," but it is important to remember that, at the moment, there are only two full professors at the Department of astronomy, one man and one woman, with the woman being the Department chair. Due to the small size of the Department, there are only three to four people maximum who hold the full research title at any given moment. There are people

⁸⁵ Department of astronomy web page.

<http://poincare.matf.bg.ac.rs/katedre/astronomija/beta/index.php?lang=cyr&dir=about&page=1999-2018>

retiring and new people are being elected into the title. With such a small group, one person can seriously change the gender ratio in the group. A similar situation is present at the Observatory: some of the senior women have retired in the past several years, and the new generation is not yet at this stage of the career. Similar trends can be observed in the case of project leading: out of seven projects at the AOB, only one is led by a woman. This woman, Olivera, is the only female full research professor working at the AOB.

At the first glance, this trend confirms the glass ceiling model. However, the situation is made more complicated by the ongoing generation switch at the Observatory. There are many younger female researchers steadily climbing through the hierarchy, but their generation is not at the point of the career where they can become full research professors (the same can be said for their male colleagues of the same age).

Since the Observatory researchers make a small group (as do professors at the Department of astronomy), it is worth looking at the wider Serbian trends about gender ratios at the highest research and University positions. According to the official statistics at the Ministry of science,⁸⁶ female project leader ratios in the current project cycle are as follows: physics: 20.5%; chemistry 50.8%; mathematics, computer science and mechanics: 33.15%; medicine: 51.3%; geosciences and astronomy: 11%; languages and literature: 63.1% and social sciences: 25.4%. It means that women make 42% of all project leaders across STEM disciplines. This is less than half, but makes more than international averages for women at the highest research positions.⁸⁷ For example, in the USA in 2010, women made 44.5% of all researchers, but only 33% on the Doctoral level (17.6% researchers in astronomy; 11% on the Doctoral level)⁸⁸

Similarly, women make around 27% of senior level staff (full professors) at Universities.⁸⁹ In the EU, the percentage of female full professors at Universities is 21% across disciplines and 13% in STEM (Manić et al. 2018). According to the same statistics, women make up 38.6% of full professors in the University of Belgrade.⁹⁰ Again, this percentage is less than a half and

⁸⁶ <http://www.mpn.gov.rs/tehnoloski-razvoj-2/projekti/>

⁸⁷ Also, and contrary to the international trends, there are more female leaders in STEM than in social sciences, languages and humanities (36%).

⁸⁸ <https://www.nsf.gov/statistics/>

⁸⁹ <https://www.nsf.gov/statistics/seind14/content/chapter-5/at05-15.pdf>

⁹⁰ It is interesting to note percentages for different fields. In natural sciences, 44% of full professors; 49.8% in medicine and 25.4% in engineering in technology, which puts the percentage of total STEM female full professors

does demonstrate a degree of gender imbalance at the highest levels. However, the percentages are better than the international trends, which shows that women in Serbia are more present at the highest levels at Universities and research institutes than the women abroad.

This trend is something that my informants have noticed, but they mostly explained it through random circumstances than as a systematic gender problem. The main difference people noticed in terms of gender is that there are fewer women on the highest positions (full research professor) and among project leaders.⁹¹ This is sometimes explained as a generational issue: full research professors are the oldest generation at the AOB; those are people in their 50s or older. My informants explain this situation with the fact that the older generation of senior researchers did not have as many full research professors, at least not those who would be interested in becoming project leaders. However, with a great number of female researchers in their 30s and new PhD students, AOB researchers believe that this situation will change in the future.

“I expect most of us to be full research professors and project leaders in the future,” Jasna said. “There need a lot of time to pass after you get your PhD to reach that level. I believe many of us will be project leaders in the future, but it also depends on projects. And project cycles tend to arrive in unexpected moments.” She then started to complain about the prolonged project cycle that was supposed to end in 2014 and is still ongoing. The time dedicated to the answer about gender is short compared to the time dedicated to things that she perceives as problems: prolonged project cycle and lack of funds.

“I don’t know what to say about gender. I don’t see any difference between men or women. I don’t even see that anyone prefers men to women to be project leaders. I saw that project leaders are chosen based on seniority. The title is the most important, but also seniority in age: who is the oldest on the project, they are the leader. They do get some additional money on their salary, but they have so much additional job. They have to write some things every day,

at 39.7%. These percentages are lower in social sciences and arts than natural sciences and medicine. In natural sciences, 51% of all professors are women: 56.7% assistant professors, 51% of associate professors and 44% of full professors (Manić et al. 2018). So, there is a degree of vertical stratification, but it is not so pronounced as abroad. Also, the degree of stratification is not so pronounced for natural sciences compared to other fields, which is another trend different than abroad.

⁹¹ One needs to have a full research professor title in order to qualify for a project leader.

they need to be in regular contact with the Ministry. Even worse for the Director of the Observatory. There are a lot of administrative jobs,” Milica said.

Another explanation for the lack of female full research professors was motherhood. “This is nothing about the system; it is simply about the fact that you cannot publish as much once you become a mother. It means that the road towards reaching that highest position is slower,” Sandra told me.

“The only real problem I can see is women with small children or who are pregnant, they might not want to take this responsibility for a whole project. This is the only reason I see why women might not want to be project leaders. There is no other limitation,” Goran said. “But children grow up, and those women could be ready to become project leaders in the next cycle.”

This difference is not seen as a hindrance for women or as a sign of inequality. It is assumed that women want to be mothers, and that a workplace that values women need to be understanding of that. Women at AOB praise the Observatory for being understanding and compassionate when it comes to working mothers. The fact that this slows down your career progress is seen as a basic fact of life that comes with motherhood. The emphasis is on “slower path” to the full researcher position, not on “impossible path.” Women at AOB agree that it is possible to achieve this status, and most of them have expressed an ambition to reach this stage later in their career. The fact that a male colleague could reach this status sooner is not viewed as unfair nor as much of a problem.

However, many scientists agree that the situation is slowly changing, and that it will be different for the younger generations of women. “Once their children are grown, and once there is not so much work over that, these women will continue to publish” is a common sentiment. Another point are the changing roles of parenting and a greater involvement of fathers in childrearing.

“I believe many of women in my generation will reach the highest level of full research professor. This is a title that you cannot reach before your 50s anyway, regardless of gender. This is the high point of your career when you are older,” Sandra said.

Sanja has described her thinking process:

“I both like and dislike some things. On one hand, my job is beautiful, but on the other hand, I don’t like to feel like I don’t know what I’m doing. You can work for six months and not know what you are doing. So, it is fun to a point, but from a point, it’s not fun anymore. And once you solve it, you are happy, but then another question opens: ‘what is the next thing I don’t know?’ I keep thinking: ‘solve yourself!’ This can be frustrating, so I envy a bit people with normal jobs. Many people have this problem. Only people who are very confident don’t have this issue. I talked to many people, and most say the same thing. I only met a few men who don’t have a problem with this, and not a single woman. Or maybe they just won’t admit that they have the same problem. I know more women who question themselves. And this perhaps influences their work and the way they approach science. While some men, not all, but there is a type of a man who will never admit this. But not knowing, as frustrating as it is, is a normal part of the job. To a point, not knowing can be fun and can be exciting, certainly more than to just sit and write something every day, without thinking.”

Her experience matches what I have witnessed at AOB: this sort of attitude is very common among scientists, even the best ones. Senior researchers are not shy about describing their thought process in similar words. Both men and women have described their approach to solving research questions in this way. However, there were some researchers: always younger ones, always male, who expressed more confidence and lack of this sort of questioning.

Sandra says she would love to become a full research professor one day. She believes she will be able to collect all the points and to fulfill other criteria to become eligible for this position, even with her maternity leaves throughout the years. However, the prospect of being a project leader and securing collaboration does not appeal to her, at least not at this point of her career.

“The main problem is that you have to have your team and to lead them. I am not ready for this yet. You need to decide what is worth researching, to lead PhD students and to be the boss. I don’t see myself as doing this, not at this point. However, I can see myself doing that in my 50s.”

Some female researchers of her age agreed with her, while others claimed that they were ready to take students and to start with leadership positions. Interestingly, no male researcher of the same age has admitted to not being ready; they all confirmed that they are in positions to be leaders, regardless of their present results. Some of those men have a worse publishing record

and demonstrated research abilities than the women, but they have still claimed to be ready for bigger responsibilities.

If there is one difference between male and female informants, it is this unfounded boasting and a certain degree of bravado (Traweek 1988,75). I cannot say that it is a “male AOB researcher thing”; indeed, most male scientists did not express their views in such a way. However, some younger male researchers were quick to point out this confidence that was not present among their older male colleagues. Older men talked about doubts, about insecurities and complexities of science. This is also what women of all ages talked about. Some of the young men were different in this regard, with a noted confidence and authorial voice that was not backed up by actual results. These were typically the same people who failed to acknowledge the slow and gradual apprenticeship at the Observatory. I do not want to imply that this is something true for younger male researchers in general, but it is something I have noticed because of the sheer lack of otherwise gendered speech and differences of opinions. In this case, I dare to say that those who spoke about doubt were more realistic than those who tried to project authority, particularly if their boasting could not be backed up by actual results.

It is also important to remember issues of the power imbalance discussed in Chapter 5 that are significant for discussing gender. A lot depends on the informal power that a person possesses in Serbia, often through social connections and *veza*. This informal power is not something that can easily be measured through the official parameters such as salary level, education or place in the official hierarchy. Like so many other things in Serbia, what is official is less important than the informal. In this situation, the official number of women, their places in the research hierarchy or their salaries cannot adequately illustrate power relations at the AOB. This is particularly true because researchers themselves, including female researchers, do not see themselves as being discriminated against in any way. The low number of current female full research professors and project leaders cannot be taken at a face value. It would not be adequate to use it as an example of the glass ceiling effect. Numerous cases of female full research professors at the Department of Astronomy and Astrophysics, as well as researchers’ attitude towards women who reach this rank show that this is something that my informants do not see as a gendered thing. To be a full research professor and high in the science hierarchy is not a “male” thing. In Serbia, when something is seen as a “male” or a “female” thing, it is openly

labeled and discussed as such. Nobody has any doubts that these things are gendered. This is never the case with higher positions in science.

However, there is one highly gendered concept that prevails at the Observatory. The idea of a “boss” has a strong gendered implication in Serbia (Kolin and Čičkarić 2010). A “boss” is strongly coded male. There are stereotypes, prejudices and general hatred for female bosses that are similar to gender prejudices that exist about female leaders across the globe. Women in these positions are often seen as “bitches” or incompetent,⁹² which is in par with Western stereotypes (Heilman et al. 1989). This refers not so much on their expertise in their field, but in the ability to properly “boss” their team. This double standard relies on the idea that leadership is incompatible with femininity (Johnson et al. 2008). However, that is not to say that any man can be a good boss. Such a person has to possess very specific traits and skills, many of which are social skills. A boss needs to know how to navigate *veza* networks and informal socialization with people around him. While it is not inconceivable for a woman to be great in those things (indeed, many women are excellent in building *veza* networks), the way a woman does it (or should do it) is not so often coupled with being a boss at work. Many women who successfully navigate these social relations and *veza* building, do that from the officially lower positions, the ones that do not give them so much responsibility.

This is an underlying issue at the Observatory. Since project leaders are bosses of their teams, their position is, at least in part, gendered. This gendered aspect does not refer to the science itself or the ability to be a good scientist; it is more related to the idea of a “good boss.” The issue of female project leaders is often related to idea of “being a boss,” skills and obligations that come with it. These obligations refer both to the official, formal obligations that a project leader has, as well as informal skills such a person needs to possess.

Currently, there is only one female project leader at AOB, Olivera. I have tried to secure an interview with her, but I was unsuccessful. I did not even get to meet her during my time at AOB. Olivera is the only female full research professor at the Observatory who is not officially retired. She is also a potential candidate for the next Director. This is an interesting case, because the AOB might soon get a woman at the highest position (and the highest paid

⁹² It is true that female private business owners often mistreat their workers, but this is true for male business owners as well.

position). However, since the position of the Director is not necessarily something that people want, and since it takes people away from science, it is clear that this does not equal power. If anything, it only demonstrates the principle of official things being less important than the informal ones.

This is why a bigger problem for women reaching the highest-ranking positions at AOB is the requirement to lead a project and its team. One needs to be the boss of a number of people, go on business trips and secure collaboration. “There is a high engagement that is not compatible with the motherhood,” Sandra told me. “This is why many women stay at the level before that (associate research professor).” However, she emphasized that the associate research professor level is in no way a low position in the hierarchy. It is considered very high in itself, but it still allows for more free time because of fewer obligations.

The implication is not just time commitment, but the type of obligations one faces as a full research professor. My informants often talked about official obligations and tasks one has to perform as a project leader. However, the informal side was also acknowledged. If a project leader’s important task is to secure collaborations, how is this achieved? As discussed in Chapter 5, a lot of successful collaboration is about informal, social aspects of the work. Yes, having good science is necessary, but not enough, especially in Serbian circumstances (lack of money to attend important conferences). Informal skills in socialization are seen as the key for being a successful project leader in terms of securing international collaboration. The whole story about singing in *kafanas* and bonding over *ćevapčići* and *šljivovica* is a perfect illustration of these skills. This is yet another gendered aspect of being a project leader at the AOB, and of being a good boss. In this context, a good leader is a good *domaćin* (host): this is a role that is highly important and almost ritualized in the Serbian context. A good *domaćin* is the one who greets his guests and takes care of them.

Domaćin is a gendered term that does not have a proper female equivalent. The feminine version of the word, “*domaćica*” means “housewife” and has completely different connotations. *Domaćin* is the head of the household, the position that carries great weight in traditional Serbian culture. In the context of hospitality, he can also be understood as the “master of ceremony.” He has an important protective role for the house and for the guests (Čajkanović 1973). He is the patriarch of the home, the one who takes care of everything. A

good *domaćin* is a man with specific virtues: he is trustworthy, honest and taking care of any potential problem. He is the one offering help and advice to both the guests and members of his household. During great celebrations and when having guests in the home, *domaćica* is the one who is expected to prepare food, clean the house and serve the guests. She is appropriately appreciated and thanked for this. However, the main host figure is *domaćin*: he is the one who is the head of the house, the one with the most power, and the one credited with hospitality that the guests receive. His role differs based on the celebration or hosting in question, but he is the figure in charge of guests' wellbeing and pleasant time. Serbian hospitality highlights the importance of gifting the guest, mainly in the form of food and drinks. On the other hand, the guest has obligation to accept the offered: anything else is considered offensive and a rejection of hospitality (Čajkanović 1973:72). Feeding a guest is not simply about attending to one's physical needs; this has to be followed by socialization and bonding. Dale Pesmen (2000) describes a similar attitude she encountered in Russia: hospitality is a process that needs to be seen and performed in a certain way to count (Pesmen 2000, 162). While the food and feeding are female domain when greeting guests in one's home, a lot of attending to guest's needs are directly tied to the role of *domaćin*. This is particularly true for the socializing and protective role of hospitality ("taking care of guests"). Hospitality creates an illusion of abundance; of a world more exciting and carefree than the real one (Pesmen 2000).

There is a lot of this sentiment coded into the role of the project leader. In many ways, project leader is *domaćin* to his team; paternalism and relationships built with the team often carry these connotations, to everyone's approval. The project leader serves as a *domaćin* when greeting international guests: he is the one organizing and overseeing everything, from accommodation to outings. He is there to offer help and show guests a good time. These tasks are highly gendered and male.

It is therefore not surprising that this is where gendered aspects of AOB are the most apparent. This gendering does not refer to science; scientific work and research are understood as gender neutral and as something that both men and women can do. However, being a good boss and a good *domaćin* is something that is understood as inherently male. This gendered aspect is not something that the informants explicitly talked about; for the most part, their approach to gender at AOB reflects the belief of gender equality. This belief is not unfounded, at least when

it comes to science itself. AOB researchers, for the most part, reflect the idea of science as a gender-neutral domain in Serbia. The huge emphasis on maternity as the main difference between men and women illustrates this belief: for the most part, AOB researchers do not perceive any differences in treatment between male and female scientists. Women themselves report high job satisfaction and call themselves “lucky” for being able to realize themselves as both mothers and scientists.

However, this does not mean that gendered differences do not exist at AOB. In general, these differences are not related to science, but to the overall ideas about male and female roles that exist in Serbia. Science might be gender neutral, but to be a *domaćin* and a boss is to be male. This is present in tasks and situations not directly related to scientific work, but that are equally important for the success of said work. In the highly informal context of Serbian culture, these things are of utmost importance.

Chapter 7. Us and Them

In this chapter, I explore attitudes that AOB researchers have about themselves and Serbian science on one hand, and Western science and Western researchers on the other. This includes opinions about the role and status of science in Serbia, particularly in terms of government attitudes toward science and scientists. The role of government is important in analyzing knowledge culture (Knorr Cetina 2007) that can nurture or hinder scientific process, so it is important to discuss the ways AOB scientists are treated and what kind of measures exist to help science in Serbia. The chapter also focuses on AOB researchers' view of Western scientists and their position, and the ways Western science is perceived to be in the eyes of Serbian researchers.

7a. Position of Scientists in Serbia: What is Science For?

Researchers believe that nobody actually knows what science is for in Serbia.

“Science is used as an ornament, not as a thing that matters in any way. Science in Serbia today is an ikebana,” Sandra said.

Many AOB researchers are of the opinion that the government includes science in its budget simply to satisfy the EU criteria. It is not done for the improvement of the society. “All reforms and everything that the government has implemented, is done just because of EU,” researchers told me.

“It is for nothing, let me tell you,” Petar said. “They use us when it suits them, and then forget about us. It is expected of us to provide results and then they are proud, but they do nothing to help us.”

Indeed, it looks like nobody at AOB has an optimistic view on the role that science (not astronomy and astrophysics in particular) plays in today's Serbian society. My informants are disillusioned: they feel they are constantly neglected by the Ministry of science, forgotten and sidelined. They exist, they tell me, because there is a tradition of having science institutes, so they are being kept “mechanically,” because they are already there, and because this is something that “we should have.” There is no care nor interest in actually developing science or finding funds to support it. On its part, the government does a few things here and there, such

as forming the Center for Promotion of Science,⁹³ but this is not seen as adequate. My informants explain that the Center is more of a “smoke screen” institution, formed “so they can say that they are doing something, while doing nothing.” The Center’s activities are mainly focused at children and do not promote (nor help) Serbian scientists, which is the main criticism that my informants voiced.

In this section, I will discuss the position of scientists in Serbia, particularly in the light of the Ministry’s treatment of scientists, and in contrast to the idealized idea of what role science should have in a society.

What Should Science Be?

AOB researchers have a very clear idea what science’s role is, and what it *should be* in a society. Most researchers share an enthusiastic, almost idealistic view of the role that science can have for the world; at the same time, they are quick to point out that this is very much the opposite of reality, at least in Serbia. They all share the opinion that science is a vital component of a country and world as a whole:

“Society needs science to develop, to improve. This is how we got to the Moon and we go to the stars. Dinosaurs were once the lords of the planet and they never looked at the stars. Science helps us not to be like them,” Stojković said.

This was a theme that made my informants light up. Many smiled when they talked about what science can do, and how astronomy and astrophysics can make the life richer for the human race.

“Humans always wanted to know. We always posed questions, and tried to answer them,” Danilo said. “We left the caves and looked at the stars. There was something inspiring out there, something that caused awe and wonder. By doing science, we are engaging in something deep, something almost instinctive for humans as a whole.”

This romantic view of the prehistoric humans (“cavemen”) looking at the stars might be too simplified and idealized, but it has been repeated often enough by different people, and with

⁹³ <http://www.cpn.rs/>

little differences. I felt traces of Carl Sagan's "Cosmos" in those words, and, indeed, the enthusiasm my informants showed for this topic was palatable. I found myself, more than one time, compelled to nudge the conversation towards this topic if the informant seemed too drained out and miserable (at their own accord) from talking about problems with the Ministry. Talking about science and what it can do, only if societies let it, was not the only topic of this kind, but it proved to work in numerous cases.

"Society without science is a technological colony, nothing else," Stojković warned one day, with Valentina nodding as she drank coffee from her cup. "It is true. Science develops like this: first you have an inventor, or a team of scientists. Then, if it can be used in any way, it gets military or industry application. Once it gets there, it is not open anymore. This can be a big problem. If we don't have scientists of our own, we depend on what we are given from the others. This is how we become a technological colony. This is why it is so important for us, and not just us in Serbia, but for every society, to have its own scientists" Stojković said.

This was one important mention of practical implications that sciences have, and practical use of sciences. However, most researchers preferred to focus on ideas about enhancing human spirit through science, which might not be surprising, concerning the fact that their own science falls into fundamental research and does not have, for the most part, a practical use. I will talk more about this in the next section.

Many researchers liked to compare sciences to arts, in a positive sense. In a similar enthusiastic and idealistic tone as the one evoking early men and stars, AOB researchers talked about science enhancing the human spirit like arts do; in that sense, they saw sciences equally important as the arts. They emphasized the science's ability to enhance people's lives and how it is essential for encouraging spirit:

"It is the same thing as asking: why do we need art? It is a completely same thing, and a completely same attitude. The problem is that society is slowly moving to a society oriented toward money. But we need art, and we need scientists," Miroslav said. "To me, the job of an artist is very similar to a job of a scientist. For example, there is a sculptor. He goes to his studio and thinks for one whole month about what to do. He doesn't do anything in that time; he just thinks. It is the same thing as me, I am constantly thinking about what to do, and then I do it once I figure it out. There is no much of a difference between a sculptor and me,

programming on my laptop. There is often one month, two, three, where I don't do anything in practice; where I just think, trying to solve some questions. And I do think: 'what am I doing in here? I can't solve this.' But this time allows you, like it allows an artist, to evolve some ideas in your mind. There is the same doubt, and the process is the same. The main difference is the end project, but the rest is very similar to what artists do."

"This is like when you walk into a room, and you see a beautiful painting or beautiful artwork, beautiful ambience, and it encourages you to feel something. This should never be vulgarized. Science is like this. It can inspire similar feelings. And similarly, it should never be vulgarized," Stojković warned.

This is an important stance to discuss, because it reveals these senior researchers' appreciation for the arts. While the arts are sometimes frowned upon by the younger crowd of AOB researchers, the older and more experienced scientists showed their appreciation for the arts without a problem. Stojković himself is an avid reader and writer of poetry; he dedicates a spot to writing, arts and humanities⁹⁴ in most of the conferences he organizes. His preferences in this area make him an eccentric in some researchers' eyes, but not many dare to use his love for poetry against him as a scientist; after all, Stojković is the most prolific AOB researcher, with numerous proven results in the hard science area. This proven quality in the scientific area *allows* him to be interested in poetry. A younger scientist who still wants to prove themselves wouldn't have the luxury to do so, at least not openly.

This condescending attitude towards arts (and also, humanities, or any discipline that does not fall under the "hard science" label) (Mathieu et al. 2008) is hardly something that only Serbian astronomers share. There is a feeling of clear hierarchy among disciplines (Cole 1983; Smith et al. 2000; Simonton 2006), and in most AOB researchers' minds, hard sciences take the top. Engaging in arts and poetry could be seen as "embarrassing" or something that can ruin a scientist's image. The intellectual objectivity and rationality that is so believed to be the defining force of science would collapse under the sheer chaos and subjectivity that things such as poetry or art can bring.

⁹⁴ Poetry, writings and arts dedicated to astronomy.

On the other hand, the arts are often evoked by AOB researchers as being compatible with science on a deeper level. Arts were used as a metaphor for science to signify human core needs for something spiritual (not in a religious sense), enhancing, philosophical; something that satisfies our curiosity, feeds our imagination and elicits deep feelings that make us grow as human beings. AOB researchers who compared arts and sciences were quick to point out that there is a huge, essential difference between the two, rooted in objectivity versus subjectivity; laws of nature vs human creativity. They all emphasized these differences, and they all seemed compelled to let me know that yes, there is a difference in objectivity; and that objectivity and rationality are the paragons of science. Nothing could make them abandon this belief. However, many loved to compare arts and sciences because of the noted similarities described above. Nobody expressed this openly, but the reason why arts and sciences were compared so often was also more practical: neither is profitable, at least not in the Serbian context.

In fact, one of the main things that arts and sciences share in Serbia is their utter unprofitability. Neither can be used to generate money, and both are practiced by enthusiasts and dreamers who like it so much, despite the obvious monetary obstacles. Of course, Serbian researchers are aware of the fact that science (particularly applied science) can bring money “in the West,” just like they are aware that the expensive pieces of art are sold abroad for high prices. But just as an artist in Serbia cannot hope to sell their painting at the prices a Westerner pays for a famous painter’s work, AOB researchers cannot hope that their work can bring funds even on a small fraction of scale that it happens “in the West”.⁹⁵

But therein lies a difference. When Serbian scientists evoke arts to compare it with science, it does mean something. Despite the condescending attitude that hard scientists often display towards the arts, there exists some level of widespread respect for the arts and sciences in a wider Serbian society. Arts and sciences are recognized as something that people need to enrich themselves; something that, indeed, improves us as human beings. This idealistic attitude might not be fully realized in practice, but was very much an openly stated cultural ideal in the socialist Yugoslavia (Ristić 2013). We need scientists; we need artists. They are seen as intellectuals and experts in their fields that do not bring money, but they bring something else:

⁹⁵ The fact that “the West” does not necessarily shower their scientists with money is something that often escapes AOB researchers. I talk more about this later in the chapter.

knowledge, aesthetics, imagination. It was well recognized that there are professions and fields that are not profitable, and that was all right; these fields have a different role in a society. Intellectuals, university professors, prominent writers, artists, scientists: these were recognized as a type of a cultural elite (Hodges 2013b, 175), people who can bring something important to society. The “elite” here does not necessarily have a class connotation; the traditional class divide in former Yugoslavia (and, in many ways, in today’s Serbia), is relatively weak compared to many other societies. With free education, even on the highest levels (University education, even PhDs) people in former Yugoslavia had an opportunity to gain education even if they came from working class and poor families. At the same time, prolonged childhood and a norm to live with your parents (and to be supported by your parents) well into 20s meant that many people could gain high education without needing to work or support themselves.

With the breakup of Yugoslavia and the changes of social ideals that followed in the 1990s, this status of intellectuals has eroded significantly. However, it is true that highly educated people, scientists, writers and artists still enjoy some measure of respect. This is a direct result of the attitudes inherited from socialist Yugoslavia. People in Serbia today will likely say that it has eroded completely and that intellectual elites were destroyed along with the middle class in the breakup of Yugoslavia (Kojanic 2015); this is often listed as a part of erosion of values and “things that matter.” All of this is true; there is less respect for these groups of people, along with a heightened popularity of businessmen and money-making schemes (Zivkovic 2011).

Stojković jokingly referred to this situation: “Here, nobody is respected except certain people, mainly politicians. Here, they all respect you, until you ask for money.” Everyone present laughed in agreement.

However, traces of the respect are there, and these traces, no matter how small they might be in practice, are still part of the ideological narrative that Serbia subscribes to. Sciences and arts are still officially recognized as something important, something that society needs to thrive. They are recognized as something that enriches the spirit and is beneficial, despite their lack of profitability. In fact, these fields are so divorced from profitability that it seems almost vulgar (the exact term my informants used) to bring money into the conversation. There is an idea of purity around sciences and arts, something that should not be contaminated with dirt such as money or practical use. Again, these are very much ideals. However, regardless of how true

these ideas are, it is important to note that they exist. In that sense, Serbia does recognize arts and sciences for their importance as themselves, and not as something that has to be profitable or to bring practical use. They are allowed to be impractical and unprofitable, because they give something important to people. As much as AOB researchers claim to be neglected by the government, and as much as their accusations are founded, it has to be noted that Serbian government does recognize, at least nominally, the importance of both the arts and sciences. These fields are listed as “important,” and I do not agree that they are recognized just for the EU criteria⁹⁶. Serbia prides itself in its long history and tradition in arts and sciences; it is not a coincidence that Nikola Tesla is one of the greatest figures of Serbian national pride. Tesla is an embodiment of this genius spirit focused on enriching people’s lives while rejecting monetary gain. His opponent, Edison, is seen as an embodiment of the opposing principle.

This appreciation for sciences and prestige are not unique for Serbia. There is a long history of prestige that sciences (and arts) enjoyed in Russia and the USSR (Graham 1993; Lubrano 1987; Swafford 1987). In the USSR, science was promoted as important for future of the people and country, and high prestige of sciences was emphasized (Lubrano 1987). This emphasis of science is sometimes viewed as a reflection of socialist ideology and socialist “program” (Graham, 1987, 1993; Lubrano 1987). This prestige was not necessarily linked to utilitarian purposes, or at least, not only to those: arts and sciences enjoyed high prestige because these fields were seen as something that enriches human spirit and strengthens national identity (Franklin and Widdis 2004) With the collapse of the Soviet Union, this prestige has eroded but not completely disappeared (Aage 1996). Similarly, university professors still enjoy high respect; the prestige of this occupation had diminished compared to socialist days (Swafford 1987), but it does bring respect, even when it is not adequately rewarded with high salaries (Aage 1996). This is a similar situation to one that exists in Serbia: arts and sciences still enjoy an aura of intellectual prestige.

In the light of these circumstances, it is clear why Serbian government would want to voice its support for arts and sciences, despite their unprofitability. Of course we need arts and sciences; this goes without saying. On the other hand, it is true that this support is in word only. Due to

⁹⁶ Clumsy attempts to fulfill the EU criteria on how much of a national budget should be dedicated to these fields is another story. These attempts are done specifically because of the EU requirements.

the small national budget, not much money is invested in these fields. This is why Serbian astronomers feel both neglected by the government and why they compare themselves to arts, in more ways than one.

“There is No Practical Use to Us”

Astronomy and astrophysics are completely fundamental sciences. There is no possibility, particularly in Serbian terms, to devise research that would have any practical use in these fields. Many AOB researchers emphasize that science is more than applicable research. Fundamental research has its place, even if it could never bring money. The idea about mixing money and science is frowned upon; it is seen as a vulgarization of a noble profession:

“It is not possible to say: we only need applicable research, we only need engineers. Fundamental science is there to discover secrets of the universe, of the world. It takes humankind forward,” Stojković said.

Some researchers were quick to point out that fundamental research often leads to unexpected discoveries that do have a practical use. Lasers are named as a great example of that. Nobody knew what lasers could do and what kind of application these could have when they were first invented. The core was basic research.

“People should be able to make an invention and then go to industry and make a patent. This is how it should go. This is how it goes in France. All research; not just applied. Lasers were fundamental research, not applied, in the beginning. Nobody knew it would have a great application! But this is why all research should be encouraged. We don’t have this mechanism in Serbia. If this person gave money to Pera Perić, and Pera Perić didn’t do anything, then it’s his fault. We have some of projects like that, but not many. There was with military, in the past. But with us, it is more along the “friendly” lines: I work on this project, let sign here to say that it’s important. I worked for the military: lasers that would come in handy during bombing. We had technology to do that. But this work sat in drawers during the whole bombing,” Stojković said.

“Without fundamental research, such as mathematics, science can’t go on. But this needs professors, teachers. Astronomy, one would think it is not applicable at all. But during

bombing, when those were markers on the sky, they thought Mars or Venus to be markers. So you never know,” Stojković added.

“Everybody forgets that any practical research of today has a basis in fundamental research,” Petar said. “To name Faraday about the discovery of atom, when they asked ‘what is this for?’, he said: ‘I don’t know, but I am sure that someone will put a tax on it one day’. And another example, Einstein and his general theory of gravity: he, or anyone else, never even thought that it would be so important for GPS satellites. His corrections are used for it. There is a lot of spontaneous overflow from fundamental to practical and applied research. For example, CCD chips that are located in cameras and mobile phones, they are all first developed for astronomy. Or, roentgen and MRI, many of those things were first developed for astronomy. So, there are many examples of that.”

However, AOB researchers are quick to point out that potential practical use of fundamental research is not the main importance:

“I don’t think the overflow from fundamental to practical research is the right approach to defend fundamental science,” Petar said. “I think the real reason is that, simply, fundamental research is good for us, as a civilization, to understand how world around works. It gives us physical safety, and improvement of the quality of life and medicine, and the more we diminish what we don’t know, we diminish our fears that are the roots of all other fears.”

AOB researchers agree that fundamental research and theoretical projects like theirs are good for the government, because they do not demand much money. There is a general consensus in the government that “science must exist,” but it is just nominal and minimal. Research such as one done at the Observatory is “safe” in the government’s eyes: it is cheap, it doesn’t require much effort on the government’s part, and it produces politically-neutral results. “Everybody is happy,” researchers joked.

The fact that their work does not have practical use actually works in AOB researchers’ favour. They do not ask money for expensive experiments, and they do not produce patents that someone would need to invest money in. They sit in their corner, doing their neat little calculations or gazing at the stars. This is very close to what Polanyi (1962) describes as “the

republic of science”: science as a pure domain not affected by government control and not motivated by monetary gain:

“The thing with astronomy is that we are science for science. Our research is never ‘important’ in practical terms. Nobody cares about what we do,” Sandra said. “This actually gives us a certain freedom. Nobody cares what you do for your research, so you can do whatever you are interested in.”

The projects are proposed and written for other scientists (as AOB researchers call them: “our colleagues”). The projects are not written for a funding body, because there is no practical use to AOB research. In other words, you need to prove to other scientists that your research is important: not to the government, not to funding agencies and not to the tax paying public.

“There are only a few of us and nobody cares,” is a common sentiment I have encountered at the Observatory.

“Astrophysics is not in any way in a worse position than any other sciences; it can even be said that we are in a better position,” Sandra told me.

Why a better position? It was explained to me that the fact astrophysics rarely produces practical results is an advantage. The lack of government care for results does not hinder projects or their success. Researchers working in fields that could have practical results, such as patents, are in a worse position because their contribution is ignored. There is no interest from the government to invest in any of it. As a result, many of those researchers choose to sell their patents to foreigners, a move that is highly criticized as unpatriotic by the public. Similarly, there are no local companies that could invest into these patents: the strongest private companies in the Serbian market are foreign (Kojanic 2015), and Serbian ones are described as either corrupted or uninterested in investing into Serbian inventors’ patents.

This lack of interest from the government, companies and the general public allows AOB scientists a great deal of freedom. When nobody is interested in what you do, and when you are not required to provide practical results, you can engage in a type of research of your choosing. AOB researchers need to demonstrate results through publishing and points collection, but the actual content of their research can be anything they see as important. It does not have to have any practical gain, and it does not have to be justified to anyone, save for the scientific community.

AOB scientists never have funding bodies breathing down their neck; they never have to justify the importance of their research to get money. The question: “what does Serbian tax paying public get from AOB research” is never on anyone’s mind (this includes Serbian public). It is understood that science is important for itself, and this is good for everyone. If scientists do not require a lot of money, even better! They can be left alone to do whatever they see fit, and the government gets to say that it has scientists.

This is not so bad position to be in, all things considered. Some AOB researchers are aware of this freedom, and a few of them know that this is not a luxury that their colleagues necessarily enjoy around the world.⁹⁷

Of course, this does not mean that there are no limitations to what Serbian astronomers and astrophysicists can do. Their research is limited by their budget constraints and inability to travel regularly to conferences. Miroslav has described a fine line one needs to walk when devising a research topic:

“We should always do what is relevant, and also what is within our capabilities. If I had access to Gemini telescope, I’d know what to do. But I don’t, so we have to manage.”

Research, at least among the most successful groups, is carefully devised to be relevant in international terms, but something that can be done with the infrastructure and funds that are available to AOB researchers. Also, a chosen research topic has to be something that is possible to research (and to produce a paper) in a few years, and maximum in one project cycle (four to five years). All of these are serious constraints, and I do not want to imply that AOB researchers have freedom to do anything. Still, it is true that Serbian scientists, in general, do not have to justify their work to anyone in the government. They receive their funding regardless of what they study. This allows them a certain scientific and intellectual freedom despite all of the obstacles they face. I even argue that this gives them more freedom in this area than is granted to their Western colleagues, who do need to justify their work to the funding bodies and taxpayers. AOB scientists can focus on research that is completely abstract

⁹⁷ I say “a few,” because AOB scientists, in general, know very little about the situation abroad. I talk more about this later in the chapter.

or theoretical without endangering their future funding, and this is an important freedom to have in scientific research.

Government Does Not Care About Scientists

Despite being “good for the government” because they do not require much money, all AOB scientists agree that the government does not care about scientists.

“Our scientific community survives despite, not thanks to, the government,” Goran said.

“These scientists work despite all the obstacles and manage to do science that is relevant in international terms. We have nothing to thank to the government. They create nothing but obstacles.”

The harsh situation and neglect on the government and societal level is blamed for problems in parts of Serbian scientific community. While AOB researchers pride themselves on performing successful research, some Serbian scientists are said not to be up for the task. They are blamed for never truly learning how to do science in international terms, so they still struggle.

However, these people (never named, and rarely implied to exist at AOB) are not blamed for the situation. Instead, these things are considered to be a direct consequence of political and social problems.

“These problems in society reflect on science and scientists,” Sanja said.

AOB researchers blame the government for not organizing a new project cycle properly. This prevents new projects to be formed and new people to be hired; it also prevents the existing AOB staff from being elected in higher titles (and higher salary brackets) based on the previously collected points. The Ministry of Science is seen as a joke; the positions are believed to be regularly taken by random people who know nothing about science. Some AOB researchers went even further and claimed that the Minister does not care about science and that he is completely unfit for the job. The current Minister, Sarcević, is described pejoratively as a “businessman from a private school.” This label is supposed to tell me everything I needed to know about his incompetence and lack of knowledge about science.

The government is described as completely incompetent in other areas of science outside of AOB. According to researchers at AOB, the Ministry does not care even about projects that have a potential practical use and that could be used in the industry. “Our scientists around

Serbia produce so many patents. But the government doesn't care about that and buys expensive machines from Japan or who knows where," Sandra said.

I was reminded of a specific case from the Faculty of Technology: people publish minimally to get enough points because the government doesn't care about people's patents and practical implications. Projects are never chosen based on usefulness and practical gain; they seem to be chosen randomly.

"The government is tone-deaf when it comes to these things. The government doesn't care about anything that would bring good to the people and the country; the goal is to always get a cut in a deal with someone and get personal gain," Sandra said.

The government is criticized for not caring about scientists, even though scientists make a minority of working people. I was told that out of 7 million people in Serbia, there are around 18000 scientists. This is less than 1%. "And they have the nerve to claim that our salaries are too much pressure on the budget. They make people fight each other at institutions. They make people go abroad. It might make sense in a country like Denmark, where 80% people have university education. But not here. Instead of having people united because there are few of us, they degrade us and even make us compete with each other. Not to mention compete with those who bought their diplomas or have diplomas from bad universities. And those diplomas are ranked in the same ways as ours," Petar told me.

"I think that everywhere exists a problem of lack of understanding for the importance of fundamental research and fundamental sciences. This is also true for us. We are officially labeled as expenses in the Ministry budget. It is more along the lines: everybody has this sort of research, so let us have it, too," Jasna said. "And it is not understood that there is an actual importance to us."

During one of our talks, Sandra described the overall atmosphere at AOB as "dissatisfaction": "There is a lot of dissatisfaction because of the way the country treats science, and, of course, dissatisfaction with the whole situation in the country."

AOB researchers agree that the country is chaotic in general and without any strategy in other areas, too. I was told that the government has no strategy for medicine, for law, or any other field. This is considered to be part of the general chaos in the country. The period of insecurity

and transition seems to be stretched forever, and the country does not seem to be able to recover from the crisis. Many people claim that “it has never been worse,” which might be an overstatement, considering that the period of war and embargo is not a distant past. The blame for economic problems and instability is placed on the government and the current president Vučić. His Ministers are seen as incompetent at best and corrupted at worst. It is not surprising that AOB researchers are not satisfied with the overall situation in the country. As government employees, they blame the government for things such as lack of money or strategy.

Some AOB researchers are critical of the Ministry because they feel the system is pitting them against each other. “The system is against science. They use something that is natural to scientists: to be competitive. This is our second nature; we all want to be the best and do the best. They are using this. “You rank yourselves, and we will take your money away based on that.” Nobody is worse to a scientist than another scientist,” I was told.

This competitiveness comment was not often repeated. While AOB researchers agreed that science needs a healthy dose of competitiveness to thrive, they also believed that their unity is what keeps them going in the troubling times. In fact, most of the people at AOB have adopted the mindset of “us against the Ministry.” That is not to say that the Observatory didn’t have its share of internal conflicts and animosities, but that people generally felt that the Ministry was the common enemy. There was a marked refusal to play by the Ministry’s “unfair treatment,” and the actions I have observed at AOB do support this mindset.

“They are imposing their ridiculous rules, and we are resisting,” I was told. “There is nothing else you can do, really. We are in this together and we better act together, because it affects all of us.”

Unity and solidarity in the face of the common enemy (the Ministry of Science) is often repeated as a “fair thing to do.” This solidarity was repeatedly mentioned concerning many different things and aspects of work. Competitiveness was often contrasted with solidarity and almost treated like a dirty word. While some of the scientists mentioned their “natural” competitiveness, this was always understood in playful, fair terms: “We all work to be the best we can; at least those who do their work fairly focus on this,” Goran told me. “When we see the others performing good research in our field, it makes us want to be better.” This is described as a fair competitiveness, the sort that takes no victims, so to speak. In this picture, everybody

works as hard as they can, and other people's results push researchers to do better. However, nobody loses in this arrangement; they all work to be better, and the science is improved in the process.

On the other side of things, there is a "bad competition," often described to me as the "unfair" one. This is what they had in mind when they said that the Ministry tries to pit scientists against each other. Once they start competing for points, money and resources, it is seen as not being fair anymore. This is one of the reasons why many AOB researchers are against the entire points system, and why even those who are for it (and profit from it) still find its flaws. The sort of competition that leaves some researchers without fair salaries for their education and years of employment is not seen as the best option. This becomes even more criticized in situations that are perceived as scientists working against each other for advancements. This is seen as wrong and unethical, something that is unfair for the researchers and something that vulgarizes science.

"They don't let us do our job in peace," was a common sentiment about the Ministry. In these circumstances, unity and solidarity against the Ministry was seen as the morally right thing to do, regardless of personal success with the points system or political opinions. "Us vs Them" mentality is posed as an ideal that all researchers openly support.

This is a marked stance among AOB researchers, and one that warrants more attention. The way they perceive competitiveness as often bad and unfair is in contrast to the way scientists approach this issue in the West (Merton 1957; 1968; Hagstrom 1974; Feller 1996). More funding for selected successful scientists is a norm and competing for these resources is seen as a norm in the field (Anderson et al. 2007). This is very different from the way AOB researchers approach the subject. Competitiveness is tolerated or wanted only if it does not disadvantage anyone. The idea of competing for funds with their colleagues is seen as extremely unfair, and something that is blamed directly on the government.

On the other hand, this picture is clearly posed as an ideal, but might not always prevail in practice. I have heard of instances (without anyone wanting to name any names) about "other researchers - not from the AOB, but in general" not wanting to act in this collective goal. This is univocally seen as a bad trend and a sign that something is changing for the worse.

“Unity was better in the past. In the past, it was more along the lines of: ‘oh, you are working on that? I work on this, let’s work together!’ Today, they see each other as competition. ‘Don’t look at my laptop!’ Or when they learn that they study a similar thing, there is immediate conflict (*pičvajz*). And that is bad, there are so few of us, we shouldn’t fight each other, they shouldn’t pit us against each other,” Nenad said.

Whether the unity against the Ministry was always true in practice is not so important to me; what I found crucial was that this sentiment was clearly posed as an ideal. “Scientists against the government” was clearly one of the stories AOB researchers “tell themselves about themselves” (Geertz 1973). This was generally true even in the case of researchers who welcomed the points system and rankings. Those who openly went against this sentiment were often deemed suspicious and accused of having ulterior motives that pertained to *veze* and corruption.

“The Ministry’s rules were often implemented through personal interests. Those in charge actually wanted the budget money to go to private institutions, private institutes and also to private universities. Only after all of these, the rest of the money would go to government universities. This was made so certain people in power can use the situation to advance their own interests,” I was told.

Private institutes and universities are often cited as the places benefitting from this unfair system. People working in these institutions are seen as unqualified for the positions and clear exploiters of the *veze* and corruption system in Serbia.

“Private institutes and universities are recognized as equal,” I was told. This sentiment was provided without further explanation, clearly with the assumption that I understood what it meant. I did. Private universities and institutes are a relatively new phenomenon in Serbia. The first ones appeared after the fall of socialism and are generally associated with everything that is bad about “wild capitalism”. Private institutions are often accused of being populated by unqualified people and serving as a quick way to buy diplomas. The fact that many of the current ministers and government people have their education credentials from private universities is often used to illustrate the poor state of Serbia’s government. To equate such institutions to “real” universities and institutes is an insult to researchers who have their educations come from government-funded universities.

These attitudes reveal several important things. First, AOB researchers expect the government to take care of them in the financial sense and are disappointed because this is not happening. That is not to say that scientists at the Observatory are surprised by this treatment; people are generally disillusioned and expect nothing good from the government. Their main attitude is that nothing can come from the government except the endless string of disappointments. Still, this attitude reveals how AOB researchers feel that it should be: the government *should* be able to take care of them financially and to provide salaries that are fair according to their level of education and years of service. This is exactly what scientists enjoyed in socialism: while the salaries might not have been excellent, they were enough to support a middle class lifestyle that many people in SFRY enjoyed. While I argue that AOB researchers generally enjoy more security and have better salaries than an average person in Serbia (more about it in a moment), it is clear that they feel the government is not doing what it *should* be doing. Many researchers remember socialism; some worked during those days and even the younger ones remember it from their childhood and their parents' experiences with work. Before the chaos of the 1990s, the vast majority of jobs were state-funded; the job security was good, and salaries arrived on time. This is what Serbian people often refer to "normal life" (Jansen 2009): not socialism itself in an ideological way, but the kind of life so many people in SFRY enjoyed. The 1990s brought an "abnormal time," and people still try to get back on track after it. Regardless of the numerous political changes over the last twenty years, Serbia is still not back into "normality." Serbian people, including AOB researchers, often refer to this normality versus abnormality of life; the general consensus is that there is still no normal life in Serbia.

This is clearly reflected in AOB researchers' attitudes towards the Ministry. It is letting them down because it cannot provide them with aspects of normal life (a decent salary) in a way they believe is fair. While not many AOB researchers feel nostalgia for socialism as an ideology, they all feel nostalgia for the normal life (Rausing 2004; Yurchak 2005; Jansen 2013; Dzenovska 2014). As mentioned in the section about the past, AOB scientists expect government to "take care of them." This is what was praised about the Yugoslav approach: "back in the day," the government cared: science was recognized as important, and it was nurtured "from above." For AOB researchers, this is how things "should be," and are frustrated and disappointed that this is not happening. This is the main reason why the Ministry is seen as the "common enemy": it is not so much about the current government's ideology or politics,

but the fact that it does not do what it is supposed to be doing: nurturing science from the above. This is what the state is for; to be the “mother” who provides everything. In this sense, AOB researchers achieve Polanyi’s republic of science (1962) unintentionally: the government’s role is to guide science, but since it fails in that duty, scientists are free to pursue their interests uninterrupted. AOB scientists enjoy this freedom while simultaneously being disappointed in the government. The Ministry repeatedly fails to provide something that is seen to be its duty; even more, it often introduces unfair measures that are seen as pitting scientists against each other.

This is another important point that needs to be addressed: attitudes towards competition. While this is seen as an integral part of life for many professionals, including scientists, in the West, it is seen as a morally wrong and unfair thing to impose in Serbia. Often described as a bad aspect of transition, the insistence on any sort of competition (except the one in which nobody loses), is seen as the “sign of bad times.” This is yet another thing that provokes laments for the good old days and the ideas about normal life. Even more, this sort of competition is directly tied to money, which is seen as a vulgarization of the noble science profession. This view of sciences as a noble, non-utilitarian pursuit is very similar to the way arts are perceived in Serbia (Živkovic 2018b): a romantic pursuit for the human spirit and enrichment. Chasing profits or forcing scientists to chase their own salaries at the expense of their colleagues is seen as morally depraved and deeply unfair. It is not surprising that “competition” is most often used as a bad word at AOB, particularly when money is involved.

All of these attitudes are important particularities of Serbian scientist approach to funding and the idea of competition at its core. It is different than what is present among scientists in the West. While my research included only one institute in Serbia, this attitude is not limited to AOB only. My informants have mentioned their colleagues in other institutions sharing the same attitudes. This opinion can be seen in media, and it is not necessarily limited to scientists. It would be interesting to research the attitudes of scientists in other post-socialist countries to see what their opinion on this subject is. In the case of Serbia, it is clear that things such as competition and government that does not provide for scientists are seen as unfair and morally wrong.

Other Complaints against the Government

Another thing that government is blamed for is the lack of science promotion.

“We have zero of it,” Petar said with a laugh. “What we have is promotion of science education, not science.”

According to him, a proper science promotion would mean promoting scientific results made by Serbian researchers. “They should promote it so everybody in the world know that we did it.”

This is unheard of in Serbia. If they are lucky, someone from national television RTS will come to the Observatory and make a five-minute coverage. “And nine times out of ten, they will get it wrong,” Nenad said.

The reason is not simply lack of funds. AOB researchers claim that those who are in charge simply do not know about it. People at the Ministry of Science are described as “managers who know nothing about science.” There are small projects here and there, targeted at promoting science to children, but this is just one aspect of science promotion. Another effort that is made by the government is to build a museum of science. All these efforts are seen as valuable, but the most important thing is missing: to promote researchers’ results in the world.

“The lack of promotion is not just about us being ignored. It means that young scientists don’t have a clue something is happening in Serbia. They think: Serbia doesn’t have anything. If I want to do science, I have to go abroad. But we do have science! We have results that are relevant in international terms, but nobody knows about it, because we don’t have science promotion,” Petar told me.

While this reply ignores economic realities of why young scientists choose to go abroad, it does illustrate AOB’s dominant opinion on the lack of government’s care for science.

Science promotion, in practice, boils down to scientists attending conferences and promoting themselves, AOB researchers told me. However, that is the most expensive part of the job, and also time consuming. It is highly effective: a scientist goes to a conference; Westerners see them, see their results and realize that the work is valuable. However, there is no money for

that. “Everybody thinks that scientists get to travel and have a good time and see foreign countries. People think that this is why scientists travel and nobody wants to give money for that. Nobody wants to pay for our holidays,” I was told. “People simply don’t understand why conferences are so important.”

AOB researchers have admitted they sometimes feel guilty about accepting money for traveling, on a rare occasion that it is provided. “I feel bad taking money so I can travel. I don’t feel comfortable. It is a different thing when someone from abroad pays me to attend a conference. This happens, but not often, and mainly for older scientists. If this happens, I am happy to take their money,” Petar told me.

“For us, conferences is where you promote your work. And that is expensive. Just like any advertisement is expensive, so is this one. The most money is wasted when you send someone on a conference who doesn’t have a significant paper to present. But he goes because he had a *veza* in the Ministry or somewhere. This is the biggest waste of money, and this is the most common case. When you take a look, who travels the most? Those who are involved in politics. If they only redistributed this evenly, there would be more money for scientists, and it would be fair,” I was told.

“Science, astronomy can be used to promote Serbia in the world. But this is not happening. Only highest science can be used for promotion. India, for example, has many Nobel Prize winners, even though they have fewer scientists per capita than us. It is a similar situation in Hungary. But they invest in the best of the best. In Germany, they all put people in Western Germany in charge. But here, it is different,” Stojković said.

“I will say something to relate to this, in a typical female manner,” Valentina jumped in. “When it comes to astronomers, they are all a family, around the world. We all know each other. There are not so many of us. And this is why it’s important to travel. People ask: why do you need to travel? Why can’t you write? No. Nothing can replace a spoken word. This is better for exchanging ideas, for communication, for better understanding,” Valentina said.

“The more you travel, the more you are invited. But we don’t have that mindset here. In the past, this would be considered suspicious, to travel that much,” Stojković said.

The problem, I was told, is that there is no specific person employed at AOB to do science promotion. Researchers themselves do not have time because they have science to focus on. However, the government does not have money to pay for a PR person at the Observatory or someone whose job would be to promote science.

“Foreign institutions have money and have specific people, journalists, or PR person, or a whole group of people. And whenever someone publishes a paper, they contact journalists and write an announcement for the public,” Goran said. “I had this experience when I worked in Chile. They prepare journalists a few days before, so they are ready, they receive announcements, pictures, they come to interview you and to cover the story. It is different than here. It all boils down to someone’s enthusiasm. There is no money for this.

Senior researchers also complain about government’s ageist policies and approach to older scientists. Professor Stojković contrasted the situation in France in Serbia:

“My French collaborator is in her 70s but she still has her office at the research center and she receives salary. This is not possible here. They don’t give us salaries, only pension. And we have so much knowledge, we have so much to give. It is assumed that we are not productive anymore. I can’t be in a PhD student’s committee once I am over 68. But I was in a committee in France to one PhD candidate this year; they called me and it was their honour for me to be there. They even paid me to go there. But I am not allowed to be this for my own candidate. That is absurd,” Stojković said.

“So, what are you allowed?” I asked.

“I am not allowed anything. I am allowed to die. As some pensioners joke, I am allowed to be a patriot: to die and remove myself from the government’s back.”

The labour law in Serbia, similar to one in former Yugoslavia, is not keen on older people who wish to continue working. Once a person is retired, they receive their government pension and it is assumed that they will not continue to work. This is on par with a traditional life story common in former Yugoslavia: one works until the age of 60 something (the laws are constantly changing about the exact age of retirement) and after that, they enjoy their retirement. For many people in former Yugoslavia, the idea that they might continue to work after they are retired is strange and unfamiliar. For many, pension is a much-awaited moment

that they do not want to postpone. The changing laws in Serbia that moved up the age of retirement in the past decades (Bernaciak et al. 2011) are often met with dissatisfaction. In order for a person to earn a full pension, they need to collect either 40-45 years of employment or to meet age requirement (Službeni glasnik 2018b). In many cases, it is not possible to retire early. The idea of wanting to work once you are retired is strange to so many people in Serbia. Jobs are scarce as they are, and old age is seen as rest from the working age. Time away from work in general is seen as important, which is a socialist legacy (Luthar and Pušnik 2010). Retirement is when a person should enjoy their old age and not to be forced to work. In fact, working as an old people has strong negative associations in Serbia: it is a sign that something is not right; it is a sign that this person is forced to work and not able to enjoy their retirement, as it should be. It is a sign that something is wrong, either with their pension (non-existent or too low for basic necessities, in which case it is seen as the government's fault), or with their family (children who do not want to help their parents, in which case it is seen as the fault of the children or the new age in which parents are not respected). (Blagojević Hjuson 2013) To be a healthy, happy person with a decent pension who still wants to work even in retirement is seen as an anomaly and a strange case.⁹⁸ What is wrong with that person?

In these circumstances, people such as professor Stojković do not have many options. There is often no legal way for retired people to continue to work, and it is often impossible for them not to go in retirement. Once a person starts receiving state pension, there are limited possibilities for them to also receive a salary. There are possibilities,⁹⁹ but not likely something that the government wants to pay for. This is why it is difficult for professor Stojković to continue working at AOB, even without a pay. He is welcomed at the Observatory because the Director is keen to have him there; he shares the crowded office intended for four researchers with six or seven other people. The AOB Director and his colleagues are happy to have him at the Observatory and accommodate Stojković as a respected colleague. He is granted everything informal that is in their power to give. However, they are powerless when it comes to the

⁹⁸ There is a famous Yugoslav film "Majstori, majstori" (1980) directed by Goran Markovic, that describes a similar situation. A female school principal is shocked when she is told she has to retire. "But I want to work!," she protests, to no avail.

⁹⁹ Technically, a retired person can be employed. Such a person can receive salary without the employer having to pay for certain benefits, such as health care and pension, since these are already provided. This is why some private businesses hire pensioners on purpose: it is cheaper to hire such a worker because not paying benefits to them is legal. Some private owners are quick to use this trick.

formal, official things, such as a salary or permission to be an official supervisor to new PhD students. Stojković violates the clear work/retirement dichotomy and is punished for that.

“In France, my collaborator has to show her results every three years or so to the national committee. So, if she is active, productive, if she has results, nobody cares how old she is. In the Paris Observatory, the oldest member who has satisfied those conditions is 89,” Stojković said.

“In Russia, an academic working at an Observatory, very respected, involved in so many things is allowed to work at an older age. But not here. Generally, here, you have to retire at 65, and if you have a special permission and you are voted to remain working, you can do so until you turn 68. This is all about electing people, re-electing people. Stojković is one of the most prolific astronomers not just in Serbia, but in Europe. He works, publishes, includes younger scientists. And yet, he is not allowed to work,” Valentina said.

“I retired in 2012. Since I had retired, I have authored 48 papers. In these four to five years, I have published more papers than needed for a full research professor. But I can’t work here. I can work in France; I have an office there and everything. Here, I don’t have this. It was only a good will of an individual who allowed me to come here to work, even though I am retired. I wasn’t like that in mid 70s. I remember seeing people who were retired but still working,” Stojković said.

However, this was not always the case. Valentina recounts her father’s experience: “It was better back then, but it all depended on people in charge. They didn’t let my father work. The committee didn’t vote to allow him to work for free, even though he wanted to. So, it was not always happening.”

This is a situation directly inherited from former Yugoslavia: one either works or is retired. During the time of SFRY, this logic might have made more sense, but in the uncertain economic climate of today’s Serbia, one might not be able to rely on the pension alone. Still, with fewer job options, there are even less of those willing to take a retired person. This system relies on the cultural assumption about children taking care of their elderly parents and providing for them. This is even more problematic, because pensions are among the rare secure sources of income in Serbia today (Blagojević Hjuson 2013); many families are supported by

retired people who provide for their adult children (and often, grandchildren) because it is difficult for younger generations to find a secure job that pays regularly. This is not a problem that AOB researchers face; their salaries are regular and consistent, compared to the average person in Serbia. Still, the labour law and attitudes towards retired people reveal a lot about cultural assumptions in today's Serbia.

Staying Relevant Despite Problems

If dissatisfaction and anger towards the government is one thing that unities AOB researchers, enthusiasm towards science is another. All my informants agree that they love their job; they love science and they want to dedicate themselves to it as much as possible. There is heightened enthusiasm expressed about astronomy and astrophysics. This enthusiasm is directly credited as the sole reason they keep going, despite all of the financial problems they face.

"This job is beautiful. I don't ever regret going into science," Sanja said. "If only we had higher paychecks, we would be the happiest people in Serbia."

"One needs to keep the enthusiasm, or else they are done," Miroslav said. "What do you have in science, if not enthusiasm? Nobody chooses this profession for money. We are here because we love science. This love keeps us going."

Asked about younger people and the problem of brain drain, he said:

"We are managing. We are trying to preserve people. But we can't always achieve that. Whenever a young person comes, we try to provide some guidance and training," Miroslav said in a sad voice. "Training, not in terms of being a boss, but showing them what this is all about. To realize how serious science needs to be done. Our goal, and this is what I wanted to achieve is to shake students up, make them work. Don't sit here and think you are a great scientist. Go out in the corrida and see where you stand. See if you can compete, if you are capable of doing this. You should always see what others are working on. Science is something that is alive. See what is a problem that is relevant at the moment. You can't do the same thing for a million of years; you need to evolve; your research needs to evolve."

Often times, this road reveals how much enthusiasm one has for science. Those who cannot withstand this, choose to go abroad. “The West promises more money, so many people go,” Jasna said. “But they don’t know it is not so great there. I am glad that I stayed. Everyone who stayed here, did it because of sheer enthusiasm.”

This is how they are trying to stay relevant with international research, despite hardships. “You have to be on the first line of research in the field if you want to stay relevant. Or, even better, to anticipate what will become relevant in the following years and to be the first one. You do it before anyone, along with selected international colleagues,” Nenad told me.

“We manage to stay relevant only because of enthusiasm,” Nenad said. “We all love what we do so much that we forget about lack of funds. Most people who decide to become astronomers, do this for love. Nobody decides to go into astronomy because of financial benefit. You go into managers or something like that if you want money. People go in astronomy because of love, and because we were interested in this science. This can speak a lot about us as people, about our character. This is who all of us are, what our priorities are: material or spiritual. But of course, it would be great if we are not just all idealists, we also need money to survive.”

Heightened enthusiasm and narratives about succeeding despite the obstacles are common. This is one of the main ways that AOB researchers contextualize their results: “things are hard, but we stay relevant because of enthusiasm.” Personal troubles are understood as collective issues (Millerant et al. 2014): AOB researchers always construct a story of troubles imposed “from above” (the Ministry) and either overcoming it through enthusiasm or not being able to overcome it because the external factors (lack of funding, Ministry’s ever changing rules) were too harsh. This is the dominant way AOB research talk about challenges. They use this approach under the assumption of narrative familiarity that I share (as a member of the same nation) to contextualize their experiences and their stories.

Scientists as Ambassadors

Everyone at AOB agrees that science in Serbia has no purpose in the government's eyes; they understand that they are almost invisible to both the government and general population. However, there is one positive application of science in Serbia that my informants signed out: to possibly promote Serbia in international terms.

“We all have inferiority syndromes and we all want to be the ambassadors of Serbia and promote Serbia in the world. But this is not how government should position itself. This is not what is supposed to be the government's official stance on ‘what science is for.’ They should not leave it to individuals to promote Serbia or to do as they please with no control or input,” Jasna told me.

When a Serbian scientist makes a discovery, even abroad, there are always titles: “A Serb discovers this or that.” However, AOB researchers recognize that this is a universal approach that is not limited to Serbia. Goran recounted an experience in Chile, about journalists always asking whether specific research included Chileans or Chilean equipment. “Some attractive topics, such as black holes, didn't need this angle,” Goran said. “But for other research, they always tried to frame it as a Chilean discovery in one way or another.” If nothing else, it was always emphasized that the discovery was made on a Chilean telescope, even though the telescopes were not Chilean; they are just located there.

This tendency is very popular in Serbia, and AOB researchers are aware of it. They understand their role of potential ambassadors of Serbia. In general, they do not mind. In fact, most have expressed their satisfaction at being used in this way.

“It is nice when there is some positive news about Serbia in the world,” Sanja told me. “For people to read that Serbian scientists made a discovery or have done some research. It doesn't need to be groundbreaking, but it is nice for people to know that we have good science, and that we are doing good things.”

There is a heightened tendency in Serbia to claim scientific achievements as culture's achievements: this is what we gave to the world. Again, this tendency is hardly limited to Serbia, but it has a profound meaning in this context.

The problem of Serbia's image in the world (the West) is something that many AOB researchers worry about. This is an issue that is true for Serbia in general: after the breakup of Yugoslavia and the wars in Croatia, Bosnia and Kosovo, the image of Serbia was exceedingly negative. Many people feel that this bad image still follows Serbia and Serbians, and this is an issue of many conversations. Indeed, I was often asked about it. "How do Canadians see us?" "What do they know about us?" I told them that I am seen as white in Canada, and that I am often mistaken for a local before I speak. This is not enough of an answer; my informants wanted to know what Canadians think of Serbia in particular, and what their stance is about the recent wars and the country's image. I tell them that Canadians I have met know very little to nothing about any of it. Typical reactions to this were: "of course, *they*¹⁰⁰ know nothing about anything" and "it is good; it's better that they know nothing, than to think we are monsters." "Thinking that we are monsters" is a common fear among my informants. While some are quick to reject Western opinions, they are all aware of the bad news stories about Serbia. By doing their science and achievements, they see it as a direct promotion of Serbia. It is seen as doing your work to "show the world what we really are" and to improve the (wrong) image that the world has of Serbs.

AOB researchers say that they do their share of promoting Serbia in the world. The best way to do it, they all agree, is through science itself and successful research results. Profesor Stojković is cited as the most prolific scientist at the AOB, and an author of an important model for the Stark's broadening, the so-called "middle empirical formula," which he had developed with "big shots" from the Faculty of Physics. I was told that all of these researchers are well-known in international circles; they are well-respected and even famous in their subfields.

"This is considered our, Serbian achievement," I was told. "Professor Stojković's whole career is to apply this formula on real life objects. His model is well-known, but it is not the only one. He often compared his model with someone else's and demonstrated that his model is better: it describes the real world better than another model. If someone uses another model, they would

¹⁰⁰ "They" here refers to North Americans in general; it is a reflection of the belief that Americans (and Canadians, who are seen as "basically the same" as Americans) have a poor education and are uninterested about the rest of the world.

get different results that might not be precise enough. So, this is important legacy,” Sandra told me.

Other scientists agree that their work is relevant:

“Our work is important in international terms. This is not just about Serbia. Our research is part of the world scientific community. When we publish research findings, anyone from anywhere in the world can comment on it. This is how we discuss, and this is how we improve our solutions. Many of these things go slowly; those are very precise observations, then how to analyze data, then how to use a physical model. But it all goes in a global scale,” Danilo told me.

Security vs Insecurity

The Serbian scientific system is set up in a way to encourage people to go higher up on the hierarchy. It is not highly competitive in that regard; because of the points system, all who collect the given number of points can steadily climb through the research titles all the way to the higher ones. It is expected for a person to climb this way throughout their career. Not to climb into this ladder is more an exception to the general rule. When a young person is accepted after graduation, they stay there until they retire. The system keeps you; some people leave, but only on their own wishes.

This opens up the question about relative job security versus insecurity. What do AOB researchers think about this topic, and do they see their job as secure?

“It depends on what you mean by ‘secure job’. It is secure because we have job permanent jobs. But the salaries are not adequate, unless you are in the highest brackets,” Milica said.

“It is secure, yes. I wouldn’t be able to say that it’s a 100% secure job. What is secure? This is capitalism, and liberal at that. We don’t have it like our parent generation had it: you get a job, and then you get an apartment and all. Those times are gone. But I’d say it is secure enough,” Jasna said.

“There is more security here. Once you are accepted, you are here, in Belgrade, and you know you will stay, and you know you will work for years. That is a secure thing. It’s not like you know that you will have to chase a new position after two years, three years. It is a very good

thing here, despite all of the problems that we face. So, there is some security. But the problem is with other things in Serbia, the whole political and economic situation,” Goran said.

“Here, if only salaries were 50% higher, we would all be the happiest people in the world. This is a secure job, and all people who employ you are too nice to ever fire you. Now, this is bad for science because it keeps people who are not good. But other than that, this is a very secure job. You don’t even have to come to the work; you can stay and work from home,” Sanja said.

“I’ve met so many people from Italy, America, Australia, Russia at a conference in Italy. They were all dissatisfied with their situation. They all had scholarships that were 1000 euros or so. They told me: you have more benefit from your 400 euro salary than we have it with this. It is a good thing for us here, we are still clinging to the old system a bit. Some institutes are closed, others are being sold. But some stayed. We are in transition for the last 17 years. They sell and close government institutions. Although, they can’t sell everything. AOB is not interesting to them. We are small, and not important for that. So, I believe we will stay. This is a good thing for us, and a lucky thing for us who work here,” Milica said.

Some AOB researchers are of the opposite opinion: they see their position as extremely uncertain in terms of security and longevity. Since their salaries come directly from funding assigned to projects, if there is no project cycle, they would effectively be out of job. While they all have permanent job contracts, the fear is that the Ministry will stop projects at one point instead of finally starting a new project cycle. Also, because of the nature of project cycles, their salaries are guaranteed only for those four or five years of the project cycle.

“I believe the only case in the world, that your salary depends not only of your position but also your productivity,” Petar said.

This is, obviously, not true. I would argue that it is unusual practice in Serbia, but not in the world. This also refers to the impact and worth that published papers and citations can bring to a scientist (Diamond 1986). Petar’s comment and attitudes are shared by some other AOB researchers, and these are often the direct consequence of not being able to travel. Most AOB researchers do not really know how things are “in the West,” so they cannot make adequate comparisons (more about this in sections dedicated to Western scientists).

Those who are more realistic and aware of the overall situation in Serbia do have a different concern: the ever-changing rules about how many points one needs for reaching the higher salary bracket.

In general, AOB researchers do face hardships and some insecurity regarding to the chaotic state of government. The prolonged project cycle and ever-changing rules often keep them on the edge of their seats because everything is so confusing and unpredictable. Despite these problems, AOB researchers enjoy a remarkable job security. They are among the rare people in today's Serbia that still enjoy job security that was present in socialism: to find a job in your own profession right after graduation, and to be able to spend your whole working age in the same institution. This is a sign of security and "normal life" for people in the former Yugoslavia. To change jobs means that something went wrong in the old one, typically at your own fault. Temporary jobs for students and the like are changeable; but not the one where you are admitted as a permanent worker. Especially in the case of a respected job that is in one's own profession. This is a luxury that AOB researcher enjoy even today. Furthermore, whatever they say about their salaries, the truth is that the salaries arrive on time, and that they are above the national average. Those who produce more papers do have higher salaries, but even those who do nothing (sometimes, literally; there are a few people who do not even show up for the job) receive a salary that is above the minimum wage. AOB researchers also receive health care and pension benefits that are guaranteed by law to all workers; however, many employers in today's Serbia do not pay these mandatory benefits. This is particularly true for private businesses. As a government-funded institution, AOB researchers do not have these problems. They enjoy a very secure job compared to most of the other people in Serbia. I even dare to say that they enjoy a better job security than Western scientists: while their salaries are much lower than those in the West, AOB researchers do not need to apply for funds and they do not need to engage in job hunt frequently.

Which brings us to the next question: do they know how lucky they are?

Do They Know How Lucky They Are?

What is interesting to note is that many of the AOB researchers are completely unaware of their privileged position. They do not seem to know about the hardships the average person in Serbia has to face: "As you can see, our jobs are extremely insecure, while those at universities have

extremely secure jobs. And that's the money of the same source – the government,” Petar told me.

That is not to say that complaints expressed by AOB researchers are unfounded; there are financial problems on the government level that cannot be ignored. At the same time, it is clear that many AOB researchers are unaware of how lucky they actually are to be employed at the Observatory. Many of them felt that they are not given enough, especially in terms of their education. This is a fair attitude, because AOB researchers are among the most educated people in the country. However, the fact that many of them have secured this employment right after graduation, made them oblivious to the realities of living in early 21st century Serbia.

The ongoing transition and “wild capitalism” (Chelcea and Druta 2016) have made jobs extremely scarce (Ghodsee and Mead 2018). The number of private business owners who do not adhere to the law (Kogan 2011; Koettl 2013) and who treat their workers badly is an ongoing problem. People, including those at AOB, often cite that you “need *veza* for everything,” and this is certainly true for finding a good job.

Some AOB researchers seem to be completely unaware of this ongoing problem. I even heard the attitude: “only those who don't want to work can't find a decent job,” which cannot be further from the truth when it comes to the reality of job seeking in Serbia. Others focus so much on painting their position as precarious, that they ignore the fact that they have what is many Serbians' biggest dream: a permanent job at a public institution (Bernaciak et al. 2011).

I was honestly surprised by the complete ignorance of the way a typical person in Serbia lives; it was one of the first things that made me view AOB and its people as living in a perpetual bubble that shields them from Serbian realities.

I must also say that this attitude was not true for all the researchers. Some of them, particularly the younger ones and the ones at the lowest levels of hierarchy, were quick to point out how lucky they are to have secured this job. “The money is not good, but I am doing so much better than most of my friends,” Milica told me. “There is so much insecurity all around. The stories I hear about things that private business owners do to their employees... It's horrible.”

Also, I find it important to point out that women are the ones who tend to be more realistic about the situation. Women were more likely to point out how great the employment at AOB is,

compared to other potential workplaces in Serbia; how secure this employment is, despite lack of funding from the government; and how good their overall position is, despite all the hardships. This was often expressed through the praise about long maternity leave and the ability to practice both science and motherhood. However, it was not strictly related to women as mothers: many female scientists were generally more aware of how their position as a researcher at AOB is much better than that of a typical person in Serbia. Women were also more likely to express how lucky they were to land this sort of employment. In general, I can say that women expressed more job satisfaction than men; while all scientists showed a great deal of enthusiasm for their job and research, women were generally more satisfied with work climate and their overall position.

7b. Dog Bites a Westerner: Attitudes Towards Foreigners

In early 2010, the AOB organized one of their yearly international conferences. Some of the lectures were held at the Observatory ground. International researchers arrived at AOB to attend the lectures when an incident happened. One Western scientist was bitten by a stray dog in front of the Observatory's grounds.

My informants did not remember the details of the incident, but they said that the injuries were superficial and that nothing serious had happened.¹⁰¹ However, they all remembered clearly the shame and embarrassment because of the incident. If only, the common sentiment went, the dog had bitten one of the Serbian researchers! I have heard people express this openly. What was not so openly stated, but heavily implied, was the sentiment that the dog could have bitten one of the Russian, or Indian scientists attending the conference with less shame. But alas, it bit a Westerner!



Image 16: Stray dogs on the Observatory grounds

A Serbian scientist being bitten by a stray dog would understand that it was in no way a reflection on AOB and its people; a Serbian scientist would know that there are many stray dogs at Zvezdara (and Belgrade in general). A Serbian scientist would know *Serbia* and how things are. None of this would reflect negatively on the AOB staff as hosts.

¹⁰¹ As far as I know, the scientist didn't need medical assistance and no authorities were notified.

Similarly, the idea that a dog biting an Indian or a Russian would have been less embarrassing is not presented as anti-Indian or anti-Russian per se;¹⁰² colleagues from these countries are simply regarded as more understanding and similar to Serbian researchers in hardships and circumstances. The same goes for scientists from the region or other non-Western nations. While Serbian researchers do not identify themselves as people of colour, the idea is that these people share similar chaotic conditions in their institutions and that they “know.” They know “what is like” and they should be able to understand it.¹⁰³ But not Westerners. Westerners are a specific class of humans that inspire both awe and hatred in equal measure, and often simultaneously.

In this chapter, I will discuss the complex attitude AOB scientists have towards “the West” and their own position on the periphery of Europe. Serbia’s attitude towards the West is ambivalent (Volčič 2005), particularly in the light of post-socialist, nationalist shift after the 1990s. In many ways, Serbia is painfully divided between “nationalists” and “cosmopolitans,” and their attitudes towards the West are very different. However, more complexity comes from Serbia’s own liminal position on the political, geographical, historical and cultural map of Europe (and the world). In many ways, Serbian people see themselves separate from what they consider to be the West, but this does not necessarily mean that they accept themselves as the East, either. The European Union might be rejected by the nationalists in Serbia, but even those people see Serbia as belonging to the European cultural sphere more than any other.

Furthermore, the complexity is heightened by the socialist legacy. During the years of Yugoslav socialism, the region enjoyed relative peace and good relations with both the Eastern and the Western block. Yugoslavia’s own involvement in the Non-Aligned movement allowed it to distance itself from the sharp Eastern/Western blocs divide during socialism. For the most part, socialist Yugoslavia enjoyed more freedom of movement and international respect from both sides than other socialist countries. For many people in today’s Serbia, this period is remembered as “the time when we were part of the *world*.” “The World,” in this context, signifies civilized, developed world; it is not a synonym for the West, exactly, but it is

¹⁰² That being said, anti-Indian or anti POC attitudes are not necessarily excluded. Russia is a different case altogether; Serbs in general see Russians as a brotherly nation, a sentiment that is not commonly shared by Russians.

¹⁰³ Obviously, we have no proof that a non-Western scientist would be full of understanding. It is also worth noting that the Westerner in question did *not* make a fuss.

definitely a label that removes people from the “under-developed,” “uncivilized” parts of the world. This moniker is implicitly white; race is not an often-mentioned concept in Serbia, but Serbian people, like those in other post-socialist countries, do understand themselves as white people (Imre 2005). Also, regardless of the rejection of the EU that some people express, people in Serbia generally see themselves as belonging to the vaguely European or, for the more nationalist inclined individuals, Russian or Eastern Orthodox cultural sphere. This cultural sphere is never Eastern, never non-white and never “developing” or “The Third World.” It could be said that while some people in Serbia reject the West, and while Serbs, in general, do not consider themselves to be Westerners, they definitely do not see themselves to be Easterners, either (Bakic-Hayden 1995).

The socialist legacy and the respect that SFRY enjoyed are part of the “normal life” narrative that many people in Serbia remember. During that time, we were part of the world, and we were respected. This respect is often contextualized through the freedom of movement and the famous red Yugoslav passport (Jansen 2009).

It all changed after the breakup of Yugoslavia. Suddenly, Serbia was labeled as a chaotic, barbaric and genocidal nation. Even those who were against Milosevic’s regime and the war in Bosnia and Croatia (and many people were against those) did not agree with the new label and the bad image. This label and bad image are sometimes blamed on Milosevic and his regime, but also on the West itself. Suddenly, people in Serbia were not citizens of the world anymore, in both literal and metaphorical ways. Literal, because the embargo significantly restricted the rights to travel, which is something that plagues Serbian citizens to this day. While citizens of Serbia are allowed to travel to Schengen countries without a visa (Greenberg 2011), they are not part of the EU and need visas for many countries around the world. Staying in lines for visas and applying for the right to travel are seen as humiliation to many people; the idea of “begging” to be accepted into countries that the previous generation travelled to so freely is, for many, a symbol of everything wrong that has happened in the last 25 years. The issue of travel is just one of the many, but it is a powerful symbol of the changes for people in Serbia over the last couple of decades. It is a clear sign that they are not “citizens of the world” anymore, and that they are seen as second-class human beings.

Obviously, this does not sit well with people in Serbia, regardless of their political opinions. This is one of the reasons why the idea of the West evokes such ambivalent feelings (Zivkovic 2011). On one hand, the West is blamed for many things that are wrong about Serbia today, particularly in terms of removing Serbia from “citizens of the world” list and putting it on the “developing world” list.¹⁰⁴ Needless to say, this is not where Serbian people see themselves. As Jansen (2009) pointed out in the paper about the red passport, Serbian people do not reject the idea that there should be a hierarchy between nations and people in which some are seen as more civilized or developed than the others; the problem they have is that, suddenly, they are placed lower on the hierarchy than they think they belong. After the relative respect in Yugoslavia, Serbian people are pushed down, among the nations and people they see as inferior. It is not unusual to hear complaints along the lines of: “they see us as Africans” or “they think we are some uncivilized tribe.” These ideas clearly show that Serbian people see themselves much higher on the hierarchy than they are placed, and that they do not see other nations in the similar situation as “one of their own.” Many of these attitudes are racist and subscribe to the imperialist point of view, but it is not about the skin colour itself. Indeed, Serbs tend to see many other post-socialist, Eastern European nations as being unfairly placed higher on the hierarchy than themselves. Nations such as Bulgaria and Romania are seen as being even more chaotic and underdeveloped, with a common comment about how “we were West to them” during socialism. The fact that these nations are accepted in the EU and Serbia is not, is seen as an insult. This is not to say that all Serbs would want to be invited in the EU; indeed, half of the population rejects the EU with a passion. However, the feeling is that we should be considered *equal* with EU nations,¹⁰⁵ and not treated like “Africans” or other people deemed inferior or less civilized.

In the light of these complexities, it is not surprising that AOB researchers have a peculiar and complex attitude towards the West. On one hand, they insist on their own equality and even brilliance; “we are no less great than they are” is a common sentiment. In fact, a lot of research efforts at the AOB are done with the intention of proving themselves worthy “in international

¹⁰⁴ In truth, Serbia is not considered a developing nation. It is often considered part of the former “Second world” and something in between the developed and developing nations. However, these details are of no much importance to people in Serbia: they know they are not seen as “people of the proper world” the way they were seen, or thought they were seen, during the time of Yugoslavia.

¹⁰⁵ Or, perhaps, invited to EU with an opportunity to reject the invitation.

terms.” They are proud to be able to produce research that can parallel or even rival that of the Western science. This is in line with common Serbian belief of national superiority over the West: Serbs often see themselves as being more talented, cultured and brilliant compared to the “more civilized” nations (Zivkovic 2011). Serbs understand that they are seen as inferior, even barbaric by the Westerners. One of the strategies to fight these views is to contextualize “Balkan primitivism” as being inherently vital and more “real” than “the Western ways” (Zivkovic 2011:68). This belief is rooted in the idea of a “barbarogenius” (Micić 1993): an “embodiment of the idealized Balkan spirit as a rejuvenator of decadent Europe” (Zivkovic 2011:262). For the most part, AOB researchers stayed away from these comparisons: they made it clear they did not see themselves as barbaric, and they wanted their Western colleagues to perceive them as equals. At the same time, there were traces of the “barbarogenius” beliefs: many researchers subscribed to the idea of Serbian intellectual brilliance and superiority. A particular source of pride is that all of that is achieved with no funds and no infrastructure – the idea of producing great things through enthusiasm. This approach is often invoked through the metaphor of “*štap i kanap*” (literally: stick and rope), to signify how one is able to produce results even with cheap (stick and rope) resources, or, more symbolically, through lacking what the Westerners have.

The West is recognized as the developed world, the one where money is, and the one that can set up certain standards of what science is and what science should be. Not all AOB researchers agree that “the West knows the best,” but they do understand that it has the most power to push science in different directions and to lead what is considered cutting edge scientific research.¹⁰⁶ The West is seen as the judge and Western scientists are the ones that one needs to be impress above all others. This belief comes not so much out of admiration for Western scientists themselves, but from understanding of the power imbalance. This is where the negative attitudes towards the West come from. Scientists at the AOB are very well aware of the power that the West has and are concerned with the bad image Serbia and Serbian scientists have. Serbian scientists understand that the Western opinion or rejection can harm them in many ways, from not being cited and recognized in the scientific community, to be completely ignored as citizens of Serbia. Even outside strictly scientific work, AOB researchers feel the

¹⁰⁶ Indeed, some AOB researchers singled out Russians as the best scientists, but they recognize that the West has the most power to decide on directions of scientific development.

weight of Western opinions and consequences that this can have for Serbian people in general. All of those things make the West an important factor at AOB in several ways: through possible funds and collaborations coming from the West, to the potential harm that can come from the West. These are the same concerns often expressed by scientists in Latin American countries (Ciocca and Delgado 2017; Kreimer 2019), so these problems are not specific to Serbia or post-socialist, Eastern-European context.

The West

“The West” is a concept that is commonly used in conversations, so it needs to be defined. None of my informants bothered to talk about what “the West” means to them; it was assumed that I understand the meaning through the shared cultural code. Indeed, I did; the idea of “the West” may mean slightly different things to different people, but it adheres to certain common parameters.

“The West,” broadly defined, includes Western European countries (not EU – there are EU countries that are not considered to be the West); North America (USA and Canada), Australia and New Zealand. Generally speaking, Australia and New Zealand are too far removed (geographically and politically), so not many people think about them. Most of the time, “the West” is seen as Western Europe and “America” (USA). Canada is understood to be “basically the same as USA,” although many people in Serbia have more sympathetic attitudes towards Canada than the USA, because of perceived (but not factually true) lack of Canadian involvement in the NATO bombing of Yugoslavia in 1999.

This West typically evokes ideas about the most powerful of the countries in this sphere, such as Germany, the UK and USA. Serbian people understand that this is not a complete list of “the West,” but these are seen as the ones that can do (and are willing) to do the most damage to Serbia. Countries known for “anti-Serbian propaganda,” such as Netherlands are also often invoked with the label “West.”

On the other hand, the West does not include Russia and former Soviet republics, nor the former socialist countries such as Czech Republic, Slovakia, Bulgaria and Romania. The status of Hungary is ambivalent; it is not actively rejected from the idea of being a Western country, but it is not typically thought about when discussing “the West.” The same goes for countries

such as Italy and Spain. Former Yugoslav republics that are accepted in the EU (Slovenia and Croatia) are not considered the West “no matter how much they want to be.” There is a strong opinion in Serbia that these countries do see themselves as superior and more Western than the others, but that they are “no better than us” and that they deserve to be labeled in the same way Serbia is.

In many ways, “the West” is defined through the power it has. The power imbalance is something that is implicitly understood in Serbia. Serbian people, for the most part, do not contextualize things in terms of power imbalances; the contemporary politics of identity and representation is not something they know much about. Serbian people do not talk about the West in terms of power imbalance over Serbia, nor about colonial aspects of Western politics. However, this power imbalance is understood, and was proven through the sanctions, NATO bombing and political attitudes towards Serbia in the last decades.

Culturally, the West is seen through an Occidentalizing (Carrier 1995) lens. All of these countries are seen as “basically the same.” People in Serbia know that “the West” includes many different nations, languages and places, but this is not of particular importance. They are defined by their antagonistic attitude towards Serbia, and are culturally seen as being very similar to each other. Serbs do not concern themselves with potential differences between, say, UK and USA. Needless to say, they are very offended when Westerners see Serbia as “basically the same” as other Balkan countries or other Eastern European countries. This is true even outside of Western countries. They get extra offended when someone cannot tell a difference between them and Croats or Albanians but are the first ones openly stating that “Japanese and Chinese are all the same.” These attitudes are not surprising and are common, but it is important to be mentioned here because Serbian people believe they *do* know what “the West” is like. In some ways, this is true: due to globalization, media and rapid exchange of information, Serbs are familiar with Western products, ideas and values more than the West knows about Serbia. This is on par with the power imbalance and modern-day imperialism: the most powerful nations do extend their influence in numerous ways (Babones 2008). Serbs tend to be familiar with Western music, films, politics and other aspects of life in countries such as

UK and USA.¹⁰⁷ At the same time, they believe the West knows nothing about Serbia, save for the bad propaganda about “bloodthirsty Serbs,” an image that is offensive and a burden for people in Serbia, and also something that Serbs desperately want to get rid of.

For the most part, these general ideas are true for my informants at the Observatory. However, it is important to note that many of them consider themselves experts on the West, or at least see themselves as very knowledgeable about the “Western ways.” Many of AOB researchers talked about the situation in the West with great certainty, both in general terms (life in the West) and science (researchers in the West).

In some instances, they seemed to have correct information. However, they also displayed certain wrong impressions and beliefs about the life in the West, or about scientists in the West. Even in these situations, they seemed to be certain that what they are talking about is true. For example, on more than one occasion, they tried to argue with me about situation in Canada despite never having been in Canada or in the US. This is one of the main issues: due to lack of funds (at the AOB and in Serbia in general), many AOB researchers never travel. Some do have experiences with Western countries and Western people, but many scientists, particularly the younger ones, never had a chance to travel. This is a strong limiting factor for them, both as scientists and as people. Still, many of them are confident about their views on the West and “Western ways.” In the rest of this chapter, I discuss some of the most important views and opinions about the West, particularly in terms of scientific work.

Differences Between Serbia and the West

Since so few of Serbian scientists get to travel and experience Western countries firsthand, it is not surprising that they share numerous misconceptions about these countries. One common opinion about Western countries, often cultivated by Western countries in the form of stories we tell ourselves about ourselves, is that of order. In the West, the narrative goes, there is order,

¹⁰⁷ This is not a new thing. Due to relative openness that Yugoslavia enjoyed in socialism, Western products and ideas were present in Yugoslav mind if not in Yugoslavia itself. Coca Cola, the Beatles and Hollywood films were popular in socialist Yugoslavia, often thanks to Tito’s great enjoyment of Western products (particularly Hollywood cinematography). He invited great Hollywood stars to Yugoslavia during the height of their popularity and was generally in favour of Yugoslav people consuming these Western products and media.

and there is money. Things work. There is no chaos. People do not need to resort to resourcefulness and tricks.

I remember telling AOB researchers an anecdote from University of Alberta. The heating was broken on the 15th floor, so all graduate students had to move and use one small heater. A similar problem happened again a few years afterwards, when people from three offices on the 13th floor had to share the same heater. The anecdote was met with surprise and disbelief. I had to swear several times that the story was true.¹⁰⁸

“But how?” I was asked. “That is Canada!”

Canada is, of course, part of the West. Heating problems and people being left with one heater to share Do Not Happen in the West.

Another common belief about the West that is shared among AOB researchers (and Serbian people in general) is that the West is the land(s) of plenty. There is money; a lot of money. Everything is new, and everything works. This is one of the main reasons why I had so many problems in the beginning, when I wanted to take pictures of the Observatory and the offices. People were reluctant to let me capture old windows, desks and chairs; many have attempted to clean up before my arrival or have requested only “respectable” (for perceived Western eyes) parts of the Observatory to be displayed. They were particularly embarrassed about the stinkbugs finding their way through the windows and into the offices.

I remember recounting this anecdote during the Frucht lecture at the University of Alberta in March 2019. The lecture was held in the Institute for the Prairie Archeology in the HUB mall, built in the 1970s. While much younger than the Observatory, the building does show its age. It was interesting to talk about Serbian researchers being embarrassed of their old offices while standing *in* an old office; the room has its charms, but the furniture and windows could not be called “new” by any stretch of the imagination.

Needless to say, when I told Sandra about this, she just shook her head: “Nobody would believe you about that.” She was only half-joking.

¹⁰⁸ It is.

Obviously, the issue is more complex than this straightforward story. There is a lot to say about differences in funding between STEM and humanities in the West (Barrett 2016). Comparing anthropology in Canada with astronomy in Serbia is not the best way to build an argument, even anecdotally. However, it is an important illustration of the principle: AOB researchers view the West as rich in general; problems such as old buildings or lack of funding should not exist there.

“I was shocked to learn that so many Westerners don’t have passports or money. We as people like to whine, and we always think that others have it much better. Only when we go abroad, we see that they also have problems. We can even see that they lack some things that we have here,” Jasna admitted.

The money is often seen as the main, and crucial, difference between Serbia and the West. This extends to scientists and funds available to them. AOB researchers define themselves through the lack of funds; the Serbia/West dichotomy defines Western scientists as having plenty of money. This is not necessarily seen through personal wealth, but through the money invested in scientific research.

“The main difference between us and them is the amount of money in science. I don’t even mean on salaries. It’s not like they have super high salaries out there. For example, I know a colleague from CALTECH; his wife had a much better salary in a bank than him, and this is in the US. No, I meant on huge amounts of money to do your project. You get all this money and you have to produce results. If you don’t do it, you won’t get money for the next project, and you will get fired,” Petar said.

Western countries are imagined as responsible towards their scientists. Their governments “have money” and invest said money into science. This is reflected through large funds available for scientific projects, as well as better infrastructure and equipment available at Western institutes. There is an open envy among AOB researchers for the type of funds and infrastructure available to Western researchers. However, this envy is mixed with pride, because “we get to do so many things with so little money.” More than one AOB researcher openly stated: “Imagine what we could do with all that money,” but also: “see what we can achieve without funds.”

Staying relevant while facing problems such as lack of money, chaotic situation in Serbia and constant struggles is a great source of pride for AOB researchers. They do complain about money, and they do blame the government, but there is a prevailing notion that the lack of money builds spirit and imagination. In some ways, the prospect of lavish funds seems suspect to AOB researchers (because of the inevitable misuses at the level of Ministry and elsewhere), and also borderline corrupting. Science, the way they understand it, is a noble profession; this is something you do for love, not for money. If there is a lot of money in science (be it in the form of salaries or funds for research), the thinking goes, there would be a risk of different kinds of people going into science. People who might be there for money, or people who would want to “play managers,” as Danilo put it. These people are often seen as existing in Western institutions: people who decide where all that money goes and to what kind of research.

“Money gives opportunities, but also takes them away,” Nenad said. He explains that big money always involves expectations. Those giving these funds want results, and often very specific types of results (Braun 1998). “This can limit scientific thought,” Nenad said. “That is the problem with money.”

Luckily, then, that AOB researchers do not have that problem to worry about. Generally speaking, AOB researchers would want bigger paychecks, but they do not really dream about thousands and millions of dollars/euros that they perceive Western scientists to have. “This is not for us. We are not used to that kind of money,” Jasna said. “Our people are fighters; we learned to get by with nothing.”

“Getting by with nothing” and “*stap i kanap*” approach can be contextualized through another Balkan form of informality: “*budženje*”, a term that could be translated as “jury-rigging”, although it takes wider connotations beyond makeshift repairs (Zivkovic 2014). “*Budženje*” is mainly reserved for cars and apartments, but it finds its way into other areas of life (Zivkovic 2014; 2018). It refers to practices of resourcefulness and “making do” in situations where the official system and infrastructure are not adequate (which is an everyday situation in Serbia). There is a pride in this resourcefulness, coupled with laments about the necessity of such measures (Zivkovic 2018a). AOB researchers know that they can “get by with nothing” but are nonetheless frustrated by the lack of normality in their lives. This is at the core of the “*stap i kanap*” pride: this is how Serbs do science; with no money, fueled by sheer enthusiasm and

knowledge. This is the myth of a noble scientific genius who works for the wellbeing of the humankind and not for the money, so well embodied in Nikola Tesla. Tesla is a perfect figure of this sort of thinking, and how Serbian scientists often see themselves: working for knowledge, for curiosity, for making the world a better place; working without money and without profit as a goal.

For many AOB researchers, this is the core of what makes a good scientist. The corrupting power of money can ruin science, my informants agree. This is more than the sour grapes opinion; AOB researchers do agree that they have less money than is ideal, but that Western scientists have it “too much for their own good.” Without going into how realistic and true this view of Western science is, it is important to emphasize this as one of the things that are almost universally viewed as AOB as “not so great for Western scientists.”

Horror Stories from the West

Speaking of the bad things for Western scientists, AOB researchers tend to emphasize lack of proper human connection among researchers in the West. Again, this view is more anecdotal or even based on stereotypes more than a proved reality, but it does reveal what is important for Serbian scientists and how they define themselves through differences between them and Western scientists.

Teodora and Sandra remember their research trip to Germany. They were just visitors, and younger researchers at that (“we were not important visitors,” they said), but they were given a large office just for the two of them, each with their own desk. This sort of luxury is not something they enjoy at AOB. They also had access to the equipment and libraries at the research centre in Göttingen. On the other hand, they regarded the lack of hospitality on part of their hosts: they were given access to things, but people were nowhere to be found. They made no friends with German colleagues, and they were left to their own devices. It was a cold welcome, not in terms of scientific work (they did not have problems with that), but in terms of socialization and hospitality that they are used to in Serbia.

“They have everything out there,” Sandra told me. “Everything they need to work properly. No need to decide who gets the chair like we do. No crowded offices.” Despite large loan for

(un)necessary equipment, it is agreed that Western researchers have much better work conditions in terms of resources.

But:

“It all so cold, soulless out there,” Sandra and Teodora commented. Cold and soulless how? There is not much interaction between people. They quickly understood that they cannot expect Serbian hospitality in Germany, but they were also surprised by the way German scientists interacted with each other. There was not much informal talk, and no extensive socializing at work. People would talk here and there during lunch breaks and official dinners, but this was sporadic. Sandra and Teodora were particularly surprised to see many scientists eating alone or not socializing with anyone. This is seen as a downside to having large offices that host fewer people: not enough human interaction. It did seem that most people focused on work and did not behave like friends, even when working on the same team. Sandra and Teodora mention brief chit chat and casual talk, but this was too sporadic and not friendly enough for their taste.

Ruthless work culture is believed to prevail in the West, which is not seen as a good thing. Even worse, science in the West is seen as a business, which is a complete misunderstanding and misuse of science and scientists, according to AOB researchers.

“In the West, there are inhumane conditions. You have to work all day,” Jasna said.

“Everything is treated like business there, including science. It is merciless. You get enormous amounts of money to do the job, but you need to give them results back. If you don’t, they cut the money supply, even if it wasn’t your fault. You can’t always have good results; science is unpredictable in that regard. But they don’t care. You need to produce results, a product, and science is seen as any other product. Nobody cares about how science works. Results and profit are the only thing that matter.”

This comparison between AOB and the West highlights the purity of science (Polanyi 1958) and the ability of Serbian scientists to focus on science without concerns about profits or potential applications of their work. AOB researchers admit that they are lucky not to be treated like this. The fact that there is no money in Serbia saves the purity of science. There is no risk of science being vulgarized or turned into a product because money is not involved. They enjoy their republic of science (Polanyi 1962) uninterrupted. AOB researchers know that the

government does not even invest into things that would be good, such as patents and applicable research, let alone into “bad” things, such as treating scientific results like a product. There is a clear difference between patents and products: patents are something that is seen as benefitting society as a whole, something that should be given to Serbian people. Applicable technology should be given freely; unlike “products,” there should be no profit involved. This technology can be sold to foreigners, so “our researchers and institutes can earn some money,” but not to people in Serbia. Products, on the other hand, are seen as part of capitalism and rejected as something that honest scientists should not involve themselves with. Again, Tesla and Edison differences are evoked as symbols of two different ways of thinking. As explained previously, AOB researchers understand that the lack of money and the lack of Ministry’s interest in their work gives them freedom. This is not something that Western scientists necessarily enjoy, and some of the AOB researchers know about this.

Is it Easier for Western Scientists?

Generally speaking, AOB researchers can be divided in two groups in terms of understanding the “Western ways”: those who think that it is easy for Western scientists, and those who recognize that scientists in the West face certain challenges that they do not need to worry about.

The idea of “carefree” Western scientists persists among some researchers at AOB, often in the form of: “it is easy for them; they don’t have to worry about the money” beliefs. In this image, Western scientists have a luxury to worry about their research alone, unbothered by problems with funding or misunderstanding from the government.¹⁰⁹ This image is, obviously, contrasted with the one of a Serbian scientist: always worrying about money, plagued by insecurity of their job and in constant struggles with the Ministry.

However, many AOB researchers understand that this image might not be a reality for scientists in the West. As noted in the previous section, some AOB researchers understand that great money means great pressure to produce results, and often just specific types of results. A project leader made a good example of this when describing science wars between proponents

¹⁰⁹ Most AOB researchers consider only Western scientists working at government institutions as “real” scientists. Private sector is shunned and too much into the domain of “product and profit” to be considered proper science, which should be open for all, honest and altruistic.

of the Dark Matter versus those who favour the Modified Theory of Gravity. With so many funds invested into dark matter; the pressure is to provide results (Moskvitch 2018). The implicit expectation is to prove that the theory is true.

Furthermore, some AOB researchers know that Western scientists need to apply for funds. This is not a universally known fact at AOB; indeed, some of my informants were shocked to learn that Western scientists need to write proposals and (in their words) “beg for money.” Proposal writing happens in Serbia, too, but it is either related to side projects and collaborations, or it is done pro forma (when applying for a project in a new cycle for the Ministry). AOB researchers understand the seriousness of proposal writing, and many engage in this periodically. However, project writing and asking for funds is never part of their core assignments. Their basic work and salaries never depend on this. As mentioned previously, proposal writing during a new project cycle is only nominal: the Ministry knows it has to pay all those scientists, so all projects are accepted. There is a guaranteed salary for everyone, even the ones who do not produce any results. This is not something that is guaranteed to scientists in the West, at least not in the same way. The money involved in science in the West is obviously much higher, but the access is more limited: not everyone can get funds (Laudel 2006). This produces constant struggle for Western scientists: they need to develop proposal writing skills in a way that Serbian scientists do not need to worry about. Proposal writing and explaining one’s research in a way that will satisfy the funding body is often a crucial step for scientists abroad, not to mention issues such as making research relevant for the taxpayers or certain research being ignored because it is not deemed profitable or relevant enough. None of this is on AOB researchers’ mind; these issues are not something they need to worry about.

Those who understand these struggles are willing to admit that it might not be easy for scientists in the West, despite large amounts of money invested in science. Interestingly, many AOB researchers believe that it is generally more prestigious to be a scientist in the West than in Serbia.

“The government doesn’t care, and people don’t understand what we work. I don’t feel we are respected at all,” Ivana said.

Despite these very real complaints, I do argue that being a scientist in Serbia is more prestigious than in many other parts of the world, including North America. While the changes

in the 1990s saw erosion of values, there is still a certain respect for educated people in Serbia. This respect extends to university professors, scientists and experts in their fields in a way that is not necessarily true abroad. Educated people such as scientists carry certain authority and respect regardless of how much money they make; a lot of this respect is eroded, but traces of this belief prevail. Science, and by the extension, scientists, still carry certain authority and importance in Serbia by the virtue of their knowledge and education. This is a complex issue that is not easy to navigate; indeed, there are many situations that prove that nobody, but politicians or businessmen are respected in Serbia. Still, there is a bit of aura of respect and authority that persists, and the same thing cannot necessarily be said about scientists “in the West.” If nothing else, Serbian scientists do not need to prove their work or results to anyone and are not judged by the usefulness or potential application of their results, which is a common requirement for Western scientists (Hackett 1987).

The fact that Serbia has something to offer that the West cannot is proven by the fact that there are some researchers who choose to come back. Despite a significant brain drain (European Commission, 2001), there are people who come back to Serbia after completing their PhDs abroad. This is not a general trend; the reality is that at least half of each generation from the Department of Astronomy and Astrophysics goes to pursue a PhD abroad and never comes back. Nobody is particularly surprised when this happens, but the fact remains that there are people who do come back.

“There are surprisingly many people who come back. From America, Germany and other countries,” Milica said. “There are different reasons for this, but there are many people. This is a very interesting subject, because it is a difficult situation in Serbia, and yet they decide to come back. I don’t even know why. Nobody wants to openly say why. [To me] Maybe they would tell you. This is a personal subject.”

The reason someone chooses to come back is one of those subjects that is not openly talked about. To come back is seen as a failure, or as a person’s inability to succeed in the West. Coming back to Serbia is seen as a definite downgrade, so it is not surprising that people are not so eager to talk about their reasons. I have heard about several of these cases at the AOB, but I only managed to talk to one person who decided to come back to Serbia after completing her PhD in Germany.

Maja is one of those people currently working at AOB. She attributes her decision to come back to the “soulless atmosphere” in Western science and unapproachable supervisors. “There is rarely any human contact,” she told me. “Your supervisor is unapproachable, because they are always busy chasing collaboration or securing times on telescopes. Nobody has time for you as a student.”

She says she was successful in the West; her decision to come back was not that of absolute necessity. “I simply realized that it is not a good surrounding for me,” she said. “I didn’t like the atmosphere, and I didn’t like work conditions. I couldn’t imagine having to move every two or three years to a different institute to work. It was too much for me.”

Maja’s motives for coming back might not be universal, but they do highlight the importance of human factor for AOB researcher on one hand, and that of security on the other. Maja was aware of how difficult it is to find a permanent job in science in the West; at the same time, she knew how easy would be to achieve that in Serbia. Lower paycheck was not of particular concern: her references from leading journals (published while in Germany) guarantee her the highest salary for her title. This salary is well above Serbian average; with this salary, she can have a better standard than she could have in Germany. This, coupled with a better security and a more enjoyable work atmosphere in Serbia, was enough to make her come back.

Indeed, some AOB researchers recognize that their job security is not something Western scientists enjoy:

“There is more insecurity in that world. There are not so many permanent positions; there are many temporary post doc positions. You are lucky if you get a post doc for three years. Because you first lose a few months while you get used to the new environment, and you need at least one year to secure a new post doc. It means you have maybe six months to produce something and publish a paper. And then you have to change the institution or even a country. This can be exciting when you are young, but not when you are a family person. So, the whole community is more focused on smaller projects and quick results. This is not a thing in Serbian astrophysics. We don’t have post doc positions in Serbia,” Goran said.

“When I was at a conference in Italy, they all told me: ‘good for you, good for you’. They were all PhD students and they are on scholarships,” Milica said. “After their PhD, they will lose

their scholarship, so they have to chase a post-doc. And after one post-doc, another one. And you can't have unlimited numbers of post docs. So, they all thought that I was really lucky to have a permanent job."

Job security is one of the top priorities for Serbian scientists. It is an imperative inherited from socialism, when job security was great for most people. This is such a sharp contrast to the wild capitalism of Serbia today, and people understand what they are missing. The idea of working your whole career in the same place is one of top priorities for people in Serbia. This is the luxury that guarantees security, peace of mind and pension in the future, which was guaranteed to previous generation but so difficult to find in today's Serbia. It is not surprising that a job that guarantees that, such as a place at AOB, is so attractive to people in Serbia. Furthermore, AOB allows its researchers the luxury to focus on science as science, without the push to produce any specific results. It is clear how these prospects might be attractive to someone who might dislike the lack of security in the West.

Another reason for coming back is a better situation for women in science in Serbia:

"We have it better here, that's for sure," Sandra said. AOB researchers agree that science in the West is ruthless towards women. "You cannot have children; you cannot have family if you do science. It is impossible to achieve" Jasna said. As explained in Chapter 6, AOB researchers see the West as hostile towards female scientists. They might not cite the same reasons as Western women, but they do agree that a woman scientist might have better work conditions and higher satisfaction in Serbia than in the West.

Bulgaria and Romania: Not "Really" West

AOB researchers are quick to point out differences between situation in Serbia and other former socialist countries that were not part of SFRY. The general consensus is that these countries had it better after the fall of socialism, but they can never count as West; some things in Serbia are regarded as better than in those countries.

For example, Bulgaria and Romania are in EU, but their scientists are very badly paid. AOB researchers cite Bulgarian and Romanian salaries are "around 300 euros per month." That is horribly low, so they have to constantly search for additional funds. Czech scientists are in a similar situation. Another problem in these countries is that there is a frequent one or two year

gap between project cycles, and scientists are left with no salaries during this time. Greece is also said to be in chaos. I was told that Greek astronomers received a fund to buy a telescope like the one at Vidojevica; like Vidojevica, Greeks were also supposed to provide money for the infrastructure. They managed to collect all the needed money, and a contract was prepared. However, this is when the financial crisis hit (Higgins and Klitgaard 2011), and the EU refused to grant the money.

The EU situation is often regarded as unfavourable, because scientists from all around the Europe apply for the same jobs at institutes. People in countries such as Italy and Greece often have a problem to secure employment because people from Germany or the UK apply to these jobs and are chosen. This never happens in Serbia. In fact, this situation cannot happen in Serbia because there is no law that would allow AOB to employ foreigners. Danilo told me of a scientist from Max Plank institute in Germany, who was interested in coming to AOB to do research. However, it is not possible to gain employment without a Serbian ID number (JMBG). The same situation happened to a Czech researcher who wanted to work at AOB and who even knew Serbian language. The fact that foreigners cannot be employed at AOB is seen both as a problem and a good situation: if foreigners could be employed at the Observatory, it would make it more difficult for Serbian PhD students to gain employment at AOB.

Bulgaria and Romania are particularly mentioned as being “filled with chaos.”

“We are West to them. We have always been. They can get into EU one hundred of times, I don’t care. There is more poverty; they are at least 20 to 30 years behind us. And it’s 20% to 30% worse than us. You simply feel this difference. They had it much worse when it comes to socialism. There are worse conditions in science, too. Bulgarians do have one serious telescope. They got a good telescope from Russians in the 80s. That is a bigger than Vidojevica, but when you go there, it’s all a ruin,” Ivana said.

This is a common sentiment inherited from former Yugoslavia. Since Yugoslav socialism was “different,” the country enjoyed more freedoms and respect from both the East and the West. The socialism was laxer than in other Eastern European countries (Zukin 1975), along with a looser economic system that emphasized workers’ self-management and less centralization (Service 2007), compared to countries such as Romania and Bulgaria. The memory of those days is still clear in Serbia, and the idea of superiority over neighbouring countries is present

among scientists at the Observatory. When we talk about the West, we never talk about Romania, Bulgaria, ‘and the like’.

Memories of Yugoslav exceptionalism are still alive in many people’s minds. Times when being “between the East and the West” signified a successful navigation between two powerful spheres (Petrović 2010) and not a chaotic position in liminality. In many ways, Yugoslav socialism was different, and people remember that. Western popular culture was present in Yugoslavia (Goldsworthy 2013), and so was open travel. For example, shopping trips to Trieste in Italy were social events (Luthar 2010) in the days when citizens of other socialist countries had very limited opportunities to travel. That was a more peaceful time without chaotic insecurities of transition (Hofman 2009). This is a stark contrast to the situation observed in Hungary: people yearn for the normalcy of West European middle class lifestyle that was impossible under the abnormal circumstances of socialism (Fehérváry 2002). The yearning in Serbia is the same, but the Yugoslav standard and way of life is seen as a normalcy that is aspired to.

These issues, along with ambivalent attitudes towards the West and immediate neighbours, tie into concepts of Balkanism (Todorova, 1997) and nesting Orientalism (Bakic Hayden 1995). Balkanism is a concept crucial for understanding both the outside and inside perspective on the Balkans and its nations. The concept of Balkanism is, in many ways, close to Edward Said’s Orientalism. They both describe attitudes toward the “Other” made by the West. When applied to the Balkans, this concept reveals complex attitudes about the region, its place in Europe and its liminal status. Some authors, such as Milica Bakic-Hayden (1995), see the phenomenon as one variant of Orientalism, applied to the Balkan case. I will not go into discussion of the validity of either terms; for the purpose of my research both are valid and I will use them both to refer to stereotypes about Balkans and the ways Serbian people view their place in the Balkans, Europe and the world.

Todorova defines Balkanism as a discourse that creates various stereotypes of the Balkans, which are used to highlight the superiority of the West and to define Balkans as the “otherness” compared to the rest of Europe (or, in this sense, “real” Europe) (Todorova 2009.)

Geographically, the Balkans belong to European continent, but the region is typically seen as more of a bridge between “true” Europe and Asia, between the East and the West. This liminal

status focuses not only on geography but, even more, on culture – the Balkans is a bridge between different stages of growth and development (Todorova 2009, 15-16.) In this scheme, West and “true” Europe represent progress and civilization, while the Balkans is the uncivilized, barbaric and backwards. One of the main reasons for this perception is the Ottoman legacy. Ottomans conquered the Balkans during the Middle Ages and remained in the region until late 19th and early 20th century. The Ottoman period has left significant traces on the region, which can be observed in the Balkan cultures as well as Western perceptions of the Balkans (Todorova 2009.) This Ottoman legacy, which is perceived as foreign and not European, “tainted” the Balkans, making it something other than fully European. In fact, the Ottoman elements are usually the ones used to invoke current stereotypes about Balkans (Todorova 2009, 12.) As such, the Balkans are always seen as “less than” and not European in the full sense of the word. Western perceptions and stereotypes about Balkans, however, make only one side of the complex issue. The Balkan peoples, too, have their own attitudes toward the Ottoman legacy and their own place in Europe. In the eyes of its inhabitants, Balkans are often perceived as a bridge, so living in the region means living in the state of liminality. Most of the Balkan stereotypes perpetuated by the Westerners are shared among the people in the region, even though their internal attitudes toward the Balkans vary. Generally speaking, the Ottoman legacy is seen as a burden and a “source of primitivism;” nevertheless, numerous traces of Turkish culture are accepted and treated as a part of one’s own culture, as long as nobody mentions their Turkish origins (Zivkovic 2011.)

The region’s complex attitude toward Balkans can probably be best illustrated through the case of “nesting Orientalism,” as defined by Milica Bakic-Hayden (1995.) In this essay, Bakic-Hayden explains attitudes found among various Balkan nations as a series of Orientalisms: “a pattern of reproduction of the original dichotomy upon which Orientalism is premised” (Bakic-Hayden 1995, 918.) In this pattern, regions that are perceived to be more “Eastern” are seen as the “otherness” and thus stereotyped as inferior and backwards.¹¹⁰ For example, Asia itself is more “Eastern” than the Balkans, so it is seen as inferior – but the gradation is then applied to the Balkan nations themselves: those perceived to be more “Eastern” than the others are seen as lower on the civilization hierarchy level (Bakic Hayden 1995, 918.) In such a hierarchy, the

¹¹⁰ There is also the North-South axis to factor in: those perceived to be “Northern” are seen as superior to those seen as “Southern”.

westernmost parts of former Yugoslavia (Slovenia and Croatia) strongly associate themselves with the West and strive to be perceived as part of Central Europe and not the Balkans. This is, in part, validated by the fact these territories were under the Austro-Hungarian Empire and not the Ottomans, which makes Slovenes and Croats claim their Western legacy and distance themselves from the Balkans (Bakic-Hayden 1995, 924.) Those Balkan nations that do not fare so high on the hegemonic Western scale in turn find their own “Easterners” and “others,” those who are perceived to be even lower on the hierarchy. Thus, Christian nations on the Balkans that were under the Ottomans: Serbs, Montenegrins and, to a degree, Macedonians, focus on their (Orthodox) Christian background and contributions to European heritage, as well as discontinuity created by the Ottoman conquests. In such a scheme, these nations see themselves ranking higher than the Muslim peoples of the Balkans, Bosniaks and Albanians (Bakic-Hayden 1995, 924-925.) The reproduction of these “nesting Orientalisms” is clear: it is focused on finding those who fare lower on the Western hierarchy and then applying all of the usual Balkanist/Orientalist stereotypes onto these nations.

Such attitudes and stereotypes are prevalent in contemporary Serbian culture. “Eastern” in the sense of “Asian” or “Ottoman”¹¹¹ is rejected, and those who are perceived to belong to this sphere are seen as backward and uncivilized – as being “worse than us.” That is not to say that West itself is universally accepted as ideal. Serbia’s attitude toward West is complex. On one hand, the West is seen as more civilized than the East, and also more powerful, which is one of the reasons why Serbs often try hard to impress the West. On the other hand, West is simultaneously perceived as morally depraved, shallow and lacking in cultural and spiritual power compared to Serbia (Zivkovic 2011.) As a result, Serbs find themselves in yet another state of duality: they experience both the superiority and inferiority complex in regards to the West. Of course, individual attitudes vary and often largely depend on one’s position in the nationalist/anti-nationalist dichotomy and situated positioning (who they talk to.)

These attitudes are of utmost importance for researching sciences in Serbia, since scientific practice, as a cultural product, follows similar attitudes present in the wider culture. For

¹¹¹ “Eastern” in this sense never means “Russia,” even though Russia might be viewed as East (and, therefore, the opposite of the West) in another context. In Serbia, Russia often carries positive connotations, particularly among the nationalists. While anti-nationalists disagree about this, even they view Asia/Ottoman East in inferior terms. The Far East is not seen as inferior.

example, this is what prompts Serbian physical scientists to try to “impress the West” with their work to prove the relevance of Serbian science. At the same time, Serbian scientists are always urged to promote their work as a specific Serbian contribution and Serbian heritage. One of the purposes of my research was to examine these mechanisms and see how physical scientists navigate their place among different spheres: Serbia (building a national school of science?), Balkan (is there a rivalry between various Balkan nations to prove whose science is the most successful?), Eastern Europe (which highlights ties to Russian science) and Europe/World (scientists on the global scene.)

Serbian Scientists in Western Eyes

Ideas about the West and Westerners that exist among Serbian scientists are not purely theoretical. AOB researchers understand that the West has power over them and can make situation potentially unwelcoming for Serbian scientists. This was best illustrated during the 1990s, when Serbian scientists were prevented from publishing papers and participating in international scientific circles. As described previously, this was considered a profound humiliation and violation of moral principles. AOB researchers fought against this unfair treatment, burdened by the complex feelings of fighting to be accepted in scientific circles among people who shunned them away.

There is a lot of burden, imagined or real, that AOB researchers carry in terms of their own position in relation to Western scientists. There is a lot of worry about Serbia’s negative image and potential lack of respect that Serbia and Serbs have in international circles. This sentiment is not unfounded. While AOB researchers like to emphasize that science is universal and that all scientists around the world are their colleagues, they also recognize some harsh hierarchies. They are painfully aware of their low position in this hierarchy. AOB researchers point out how unfair the global scientific system is. “For astrophysics, eastern scientists don’t exist in the West. It counts only if you are from the US, or England. Maybe France and Germany,” I was told. US scientists are said to be particularly harsh about these things. “They even go as far as the elitism of: you don’t exist if you are not from Harvard or some big research center.” The problem is even more heightened when it comes to the highest-ranking journals, such as “Science” and “Nature.” “You can’t even dream about publishing in those if you are not from there,” I was told.

According to AOB researchers, it is not a problem to publish in a decent journal; a problem is to be cited, to be noticed.

“They treat us as if we don’t exist,” I was told.

“What does ‘treating like you don’t exist’ mean?” I asked

“It means that they will ignore your paper and your work. They will not cite you. Nobody values our papers and work. It is ignored.”

Researchers at the Observatory are particularly critical of Serbian scientists working in the West for subscribing to the same sentiment.

“Our people in the US are behaving worse than Americans when it comes to this, but it is a problem with our mentality,” Peter told me.

“What kind of mentality,” I asked.

“Well, when you know there is someone in your field out there, you write to them and say, ‘hey, man, we did this, we wrote this, with our own hands and with little resources that we have; we were successful and we published a paper’. They will reply you politely but will never cite you in a paper. So, you write to them again, and say: ‘hey, we did this new thing, we published again but you didn’t cite us.’ After this, they don’t reply to our emails. I’ve had so many situations like that.”

“Here is a concrete example: we made a discovery. There were only a few significant discoveries at AOB since its founding, and this is the oldest institute in the country. And we made one of those significant results. We made a discovery where we discovered the first massive double black hole. And this discovery is welcomed in the scientific community. But when it came to people who are at the top in the field in the world, they ignored us, because they are our competition. And fine, yes, we are a competition, but you should cite results out of respect. We cite them when something like this happens and when they discover something first. It is a matter of respect. But then this happens to you, and they don’t cite you, and it is our man (from Serbia) who is a project leader who ignores us, then you feel even worse,” Petar told me.

He admitted feeling gutted about the Western result from CALTEC being treated as more significant than what was done at AOB, even though it was “on a lower level and with more holes in the analysis.” The news of the discovery went as far as New York Times and treated as a significant result.

“But nobody knows about our result, and we were first. We even wrote to NYT and talked about it, but nobody cares. We made our discovery in 2012 and they made theirs in 2015. They never mentioned us,” Petar told me.

When recounting this particular case, Petar tried to hide the details of the case so it couldn't be identified but ended up telling me the whole story. “I tried to avoid talking about a specific case, but at the end, I couldn't keep it inside.”

He even remembered an unpleasant situation at a conference, where the man in question attended Petar's lecture and left halfway into the talk. Petar didn't understand what happened and realized only later when the other scientist's paper was published. The feeling of betrayal is strong and resentment is palpable.

This sort of rejection hurts more if it comes from a fellow Serb. AOB researchers make it clear that some sort of loyalty is expected, and the fact that it is rarely received is attributed to “Serbian mentality.” By “Serbian mentality,” he meant the ungrateful behaviour and lack of loyalty. One thing that Serbs criticize each other for, is the lack of loyalty and inability to “stick together” abroad. The dominant thinking prescribes that “sticking together” is a moral imperative that should be done, but that Serbs often fail to do so. This “sticking together,” in this context, means helping other Serbs from abroad. If one is lucky enough to go to the West and do something, the moral imperative is for them to help not only their family but also other Serbs. This sort of ethnic loyalty, in this context, means helping colleagues in Serbia. The colleague who works in the US is not someone AOB researchers knew personally, but this is not important: he is still expected to help “his own” in Serbia. In this case, by promoting AOB researchers' work, citing them in journals or forming collaborations. The lack of interest for these things is seen as a moral failing and a betrayal of the unspoken rules. This betrayal is not seen as something uncommon for Serbs living abroad (hence the comment about “Serbian mentality”) but is still seen as a violation of moral principles worthy of criticism.

Despite these obvious differences, AOB researchers insist that “science is science.” It is objective and does not differ around the world.

“There are no essential differences between the work abroad and here,” Goran said. He has experience doing projects in Belgium and Chile. “They have more expensive equipment and infrastructure, but the science is the same. We only need our laptops to work. Luckily, we have that in Serbia and we need nothing more. Science functions similarly here and abroad. The main difference is our situation, mainly the lack of strategy and lack of funds.”

Obviously, the lack of funds is an important issue, but this is not so much about science itself. AOB researchers see these differences more as distractions from what science is, at its core. They work hard to prove that their work equals that of Westerners and that they can produce research that is relevant in international terms. The fact that they manage to publish in renowned Western journals prove that they produce good science; not even Western stereotypes can deny this.

To go back to the dog that bit a guest researcher. Why was so important that it was a Westerner, and not someone else?

“A foreigner (Westerner) is seen as being worth more than we do. We have this complex. We have a very ass kissing attitude towards foreigners. Not to all foreigners: just Westerners. We know that they see us as worms, so we try to present ourselves in a better light,” Sandra said.

Her colleagues agree with her. The incident was embarrassing because, in AOB researchers’ eyes, it confirmed the harmful stereotypes about Serbia as a wild, uncivilized place. The incident also violated the principles of being a good host to your guests, which is an important role that defines all of conferences that AOB scientists organize. The fact that the Westerner in question did not make a fuss (legally or in any other way) did not matter much. The harm was already done; the dog had embarrassed everyone.

A similar way of thinking provides context for the infamous episode with a broken window. AOB researchers pleaded for window to be fixed because of the upcoming conference. They did not mind so much working in an office with a hole in the window; the concern was that this is the first office visitors see when approaching the Observatory building, and the first thing the Westerners will see of the Observatory. “We embarrassed ourselves,” Sandra said. “The

Director could not make janitors fix the window, so all the visitors saw that ugly hole when arriving to the Observatory. Has anyone of the guests comment on it? No, but that is beside the point; AOB researchers knew about the hole, and that was enough. The broken window and inability to fix it in time are seen as humiliating; they present Serbia in a horrible light; in just the kind of horrible light of the uncivilized, unorganized people that Serbia is stereotyped as. After working so hard to prove that they are equal to their Western colleagues, the incident with the dog and the broken window shatters this image in their own eyes.

A lot of these sentiments directly relate to people's views on the place Serbia has in Europe and in the world. The stark difference between where Serbia ought to be, where it belongs, and where it is placed in the post-1990s is something that Serbs worry about. AOB researchers subscribe to these worries: they feel that Serbia's image in the world is still far from positive, and that the country is unfairly placed with the uncivilized and with the backwards. Doing everything they can to improve this image is an imperative for AOB researchers, regardless of their political opinions and attitudes towards the EU. They know the West is powerful, and they know a lot depends on Western opinions. While some AOB researchers hate the "ass kissing" attitude some people have toward the West, they know that West cannot easily be ignored.

These complex attitudes towards the West reveal AOB researchers' attitudes toward Serbia's place on the historic, political and geographical world map. This can be contextualized through the discussions of the core and periphery. In this arrangement, Serbia is placed firmly in the semi-periphery (Blagojević 2009): not belonging to the core, but not fully stuck in the realm of the periphery, either. As a European, post-socialist nation, it is firmly in between these two spheres, sharing characteristics of the both, but not belonging to either of them. This is a similar case to many post-socialist nations: they are not categorized as the developing, post-colonial nations because of different histories and circumstances but are not "fully developed" either. The sphere of the semi-periphery is a peculiar one, because it is characterized by constant struggle to catch up with the core and not to fall "down" into the realm of the periphery (Blagojević 2009). This is a liminal sphere full of ambivalence and, plagued by the constant struggle to play catch up.

Semiperiphery denotes a place between the "center" and the "periphery," an in-between, hybrid state. Semiperiphery, in this sense, contains the characteristics of both the center and the

periphery, and can be seen as a social hybrid. It is shaped by the two opposing forces: on one hand, the effort to catch up with the core and, on the other, to resist the integration into the core, which would mean losing unique cultural characteristics (Blagojevic 2009.) Being in the semiperiphery is always unstable; it offers the possibility to catch up with the center or to be pushed further into the periphery (Blagojevic 2009, 34.) I would add the third possibility: to remain “stuck” in the liminal state of semiperiphery for a long time, which seems to be the case for Serbia (Blagojevic 2009, 33-34.) Geographically and culturally, it is easy to decipher what “center” and the “periphery” mean in this context: center is the West (be it Western Europe or West in the broader sense of the word), while periphery is typically understood to be “the Third World.” This puts the Balkans and, in this context, Russia, into the semiperiphery, with all the connotations this place carries. For the purpose of my research, it was important to see how this notion of semiperiphery plays out for Serbian science, both symbolically and practically. The notion of semiperiphery can also be useful to situate my research within the context of anthropology of science: my work does not focus on Western science, but it is not post-colonial, either; instead, it focuses on a specific semiperiphery, post-socialist, “Second World” example, which is a poorly researched field.

Unlike the true periphery, Serbia’s semi-peripheral position does not allow it to completely reject the core as “foreign”; on the contrary: it is made to feel that this is where it belongs. Even more, people in Serbia believe that they were not so long time ago, part of the core, at least in a broader sense of the world; while socialist Yugoslavia was never “the West” in true sense of the word, it did have its place that was considered respectable enough. This place managed to successfully navigate the curious position of being “between the East and the West” and not belonging to any of the blocs. The in-betweenness does not work so well these days. Instead of successfully navigating the geo-politics and being respected by both the East and the West, Serbia’s position is that of liminality and uncertainty. The in-betweenness prevents the nation from anchoring itself and, as a result, it seems that it does not belong anywhere.

Chapter 8. Conclusion: Preserving the Legacy of “Normal Life”

This thesis explored the realities of work and life of scientists in a localized community in Serbia, the Astronomical Observatory in Belgrade. At the beginning of the thesis, I made a goal to examine three crucial aspects of scientific work in Serbia: scientific practice, the effects of post-socialism and gendering of science. Unpacking the intersection of these factors proved to be complex; therefore, issues were presented individually, which might have obscured some of the complexities and interconnections between varying factors. My approach to conducting interviews was to assume that the informants themselves know what is important for them, and that those subjects are to be explored. Therefore, the research followed themes of importance for AOB scientists themselves. The only exception to this approach was the issue of women in science, which I insisted on exploring despite informants' lack of interest. For example, the actual scientific practice was largely hidden from view due to the nature in which it was performed: typing on the keyboard or working from home. Instead, the main themes of interest proved to be scientists' strategies at overcoming hardships imposed by transition: how to do “proper science” and stay relevant in international terms despite lack of funds, and how to keep their little republic of science (Polanyi 1962) unaffected by larger socio-political changes.

As such, themes that relied on discussing current circumstances and the reality of living in post-Yugoslav Serbia have influenced most of the conversations. However, that does not mean that AOB researchers were necessarily focused on all the themes of interest for today's Serbia. For example, issues of heightened nationalism that are recognized as an important aspect of life in post-socialist Serbia (Jansen 2005; Zivkovic 2011) did not factor much in the conversation with scientists, nor the everyday life at the Observatory. There was a certain pride in “Serbian science” and viewing themselves as the ambassadors promoting Serbia, as well as a concern about the bad image that Serbia has in international terms. However, none of this was contextualized through ethnic lines or through a typical Serbian nationalist rhetoric about tradition, ethnic pride or Serbian Orthodox Church. I have no doubt that AOB scientists have personal attitudes towards these themes, but they did not bring any of it into conversations. A research exploring these topics might be needed to improve the understanding of nationalism and science in post-socialist Serbia.

This thesis offers a contribution to laboratory studies in the former “Second World”, which is a neglected subject. The intersection of natural sciences and post-socialism offers an opportunity to examine sciences at the semi-periphery: scientists that work and live outside of the core, Western countries, and outside of the periphery (often defined as “the developing world”). As such, this thesis contributes to the literature of the science outside of the West (Abraham 2000, 2006; Anderson 2002, 2008, 2012; Anderson and Adams 2008; Harding 1998, 2008, 2011; Lin and Law 2015; Mcneil 2005; Seth 2009), but outside of the post-colonial context, which is a poorly examined subject. The thesis also provides an insight on sciences that are not regulated by the government or the funding agencies; doing science as a pursuit of knowledge and not out of material or any practical gain, which is close to what Polanyi has described as “the republic of science” (1962). Finally, the thesis contributes to the existing literature on gender in socialism and post-socialism (Blagojevic 1991, 2004, 2009, 2010; Einhorn 1993; Funk and Mueller 1993; Gal and Kligman 2000a, 2000b; Galligan et. al 2007; Ghodsee 2004a, 2004b, 2011, 2015; Ghodsee and Mead 2018; Lobodzinska 1996; Massino 2009; Papić 1999; Rudd 2000), particularly in terms of women and work.

In addition to providing more insight on sciences in post-socialism, this thesis can serve as an analysis of sciences in “mid-range” countries: those that are not considered “peripheral” enough to fall into the group of the “developing nations”, but also not “developed” enough to belong to the centre and the “First World”. This is particularly true for sciences in numerous Latin American countries (Kreimer 2019; Kreimer and Vessuri 2018): while socio-political circumstances in these countries are different than the post-socialist realities in Serbia, there are notable similarities. Countries such as Argentina, Brazil and Mexico (Kreimer and Vessuri 2018) have an established scientific tradition and scientists who struggle to stay relevant in international terms. Their problems (particularly in terms of funding) and strategies to overcome hardships are very similar to strategies used by scientists in Serbia. For these reasons, my thesis can serve as an addition to the corpus of literature focusing on sciences in the “semi-periphery” and “mid-range” countries regardless of specific region or socio-political circumstances.

AOB: An Island for a Republic of Science

In many ways, the Observatory is a bubble against the prevailing transition and chaos in Serbia. It is an island of “pure science”: a place where researchers can focus on their intellectual pursuits and perform science “for science’s sake”. The questions they choose and topics they focus on are, for the large part, free for them to pursue; the government does not intervene in any way. This happens due to the Ministry’s lack of interest and care in science, which AOB researchers see as a bad thing. At the same time, this situation offers a curious (and unintentional) case for Polanyi’s republic of science: AOB is an island where pure science lives unaffected by damaging forces such as funding demands or potentials for practical applications. This is why Serbian astronomers are free to pursue topics of scientific interest without being regulated by an outside body, which is a luxury that they are aware of, and something that scientists in the “core” countries (the West) do not necessarily enjoy. At the same time, it is important to emphasize that this effect is unintentional and slightly paradoxical: Polanyi’s ideal of the republic of science is directly opposed to state control and totalitarianism (Nye 2011), while most AOB researchers expect government to have some plan and control over science. However, this plan and control that Serbian astronomers expect from the government mainly refer to financials and recognizing the importance of science, not to scientific freedoms. In fact, they are content in being free to choose topics of their research and to perform scientific work without any limits imposed “from the above”. In this sense, AOB does represent an island of the republic of science, albeit an imperfect one.

The ideal of Polanyi’s republic of science is not completely achieved: AOB researchers do choose their topics based on what they *can* do, given their limited funds, and they try to position their research in a way that maximizes their success in the international scientific community. Also, AOB researchers, and Serbian scientists in general, do not have any influence on the larger society. If certain aspects of the republic of science are achieved, it is due to the complex, and often damaging circumstances: the lack of government strategy for sciences and limited funds invested in science. Still, these circumstances, even if unintentional, do allow AOB researchers certain freedoms to pursue scientific interests freely and without outside control.

Epistemic Culture of the Observatory

Epistemic culture(s) present at the AOB are shaped by two factors: the demands of the discipline (epistemic cultures of international astrophysics communities) and the realities of post-socialism. This intersection creates a specific blend of practices, beliefs, attitudes, expectations and relationships (Knorr Cetina 1991). In this thesis, I described the main practices, attitudes and relationships that exist in Serbian astrophysics. AOB researchers often praise the objectivity and rationality of science; they claim that their scientific work is “universal” and the same one that is produced “anywhere in the world.” On the other hand, scientists at the Observatory are aware of the different circumstances and problems that they face as researchers working in Serbia. In terms of “knowledge cultures” (Knorr Cetina 2007) recognized on the national level, it can be said that they hinder scientific progress more than they help it: factors such as inadequate funding, modest infrastructure and lack of strategy for science are often cited as serious challenges.

As a field, astrophysics displays an epistemic culture rooted in big telescopes and the data they provide. These telescopes unite a web of people and data in international networks. A connected web of telescopes is a necessity born out of the realities of Earth’s rotation: in order to completely cover the night sky, it is important to have telescopes positioned around the globe. At the same time, there is only a limited number of telescopes and data they can capture. These necessities encourage wide data sharing in astrophysics (Zuiderwijka and Spiers 2019) and international collaboration between teams. Wide sharing of data is beneficial for scientists with limited resources, such as AOB researchers, which is why Serbian astrophysicists succeed in joining the interconnected networks of international science. The new Vidojevica station is an attempt to improve their presence in these interconnected webs. Praised as “one of the last dark spots in Europe,” Vidojevica mountain is claimed to be an excellent opportunity to add another telescope to the network. If successful, this station will improve Serbian presence and importance in the astrophysics web. The main criticism is that the telescope might be too small to “actually matter,” but the proponents of the project are optimistic about its use. Regardless of the actual usefulness, Vidojevica station is a symbolic proof of Serbia’s place in the international astrophysics networks. Another area in which AOB researchers try to leave their own mark on the international astrophysics networks: many research papers produced at the

Observatory use models developed by the members of the staff. As such, research produced by AOB researchers has a bit of a “local flair” and uses Serbian scientific achievements. These models are openly published and available for the international community to use, as an attempt to showcase achievements of local scientists and to encourage wider use of Serbian models.

Data sharing and web of relations between telescopes-data-people is very in line with AOB researchers’ understanding on how science should be: nurtured through sharing and openness. Free data allows everyone the same starting point; the quality of specific teams is valued through scientific competence alone, and not through the amount of funds and resources they possess. AOB researchers see this as a fair point and an egalitarian aspect of astrophysics. On a more practical level, free data sharing allows them to participate and “show what they’ve got.” In the case of restricted data that prevents them to participate due to the lack of money, informal means are employed to gain access through personal connections. This is a preferred strategy in trying to “catch up” and mitigate the lack of resources. In general, AOB researchers nurture the collective spirit of science: sharing, teamwork and openness; heightened individualism and fierce competitiveness are frowned upon. That not to say that individual achievements and ideas are neglected; individual researchers are encouraged to pursue their own research and interests. However, the emphasis is put on fairness “for all” and equal opportunities for everyone. One’s own success should not be achieved at the expense of the team. This is one of the main reasons why government’s rules about the points system and ranking of scientists are seen as “unfair.” This is seen as pitting scientists against each other and encouraging unhealthy competitiveness over small resources. AOB researcher regard this as an unethical measure imposed by the government, something that goes against the principles of fairness and equality that they believe in.

These opinions tie directly into the other key factor that shapes scientific work at the Observatory: the realities of post-socialist Serbia: economic problems, lack of government strategy, the liminal position on the semi-periphery of Europe and never-ending attempts to “catch up” (Blagojevic 2009). These realities of today’s Serbia hinder scientific progress, which is something that AOB scientists feel and recognize as their main obstacles. To mitigate these obstacles, AOB researchers resort to informal measures that are strongly favoured (and

seen as more effective) than any formal paths. For example, instead of trying to become more competitive in accessing international funds by training in grant writing and workshops, AOB researchers turn to informal connections and resourcefulness of a “Serbian way.” Access to restricted data and international collaboration are secured through socialization and building informal bonds, which is generally regarded as the most effective way of doing things, even with foreigners.

Problems felt at the Observatory are a direct consequence of wider socio-political challenges. Today’s Serbia is plagued by escalating unemployment and chaos characteristic for many other post-socialist countries (Berdahl et al. 2000; Milanovic 2014). People in post-socialist countries are struggling to adapt to the new ways of living that clash with moralities inherited from socialism (Mandel and Humphrey 2002). The rules are changed, but not all people know how to deal with the new situation. Some have adapted, through small businesses (Vasilevska et al. 2015) or by embracing liberal capitalist ideals to the extreme (Smith and Rachovská 2007). However, for many people, the loss of security granted in socialism remains a serious challenge to this day. In these circumstances, people resort to informal means to access resources and opportunities; *veza* and other forms of informality, such as “*rad na crno*” (unregistered work) (Ognjenović 2018), bribes and corruption. Informalities create a specific form of power and inequalities in Serbian society that do not adhere to the usual parameters of gender, class or nationalities (Bojicic-Dzelilovic 2013). Those who have *veza* prosper; those who do not have it are at a great disadvantage.

What does this chaotic life in post-socialist Serbia mean for scientists at the Observatory? For the most part, they manage to shield themselves from these problems. Despite all challenges that AOB researchers experience in their professional and everyday life, the Observatory manages to shield them from many of the problems experienced by the general population in Serbia. Even with chaotic government changes and lack of proper funding, the Observatory is a source of a secure employment. Similarly, as a government institution, the Observatory adheres to the labour law in terms of health and pension benefits, holidays and maternity leave. Salaries are above the national average and they arrive on time. In many ways, AOB researchers enjoy more security and a better standard than average Serbian population. For the most part, they are shielded from the adverse effects of the Serbian post-socialism.

Contextualizing Gender at AOB

Being shielded from the worst effects of Serbian post-socialism works particularly well for female scientists. In keeping with the socialist tradition, women make up half of the researchers working at the Observatory, and they report great job satisfaction. Talking about gender issues proved to be challenging, mainly because none of the informants saw gender as an important subject. Instead, AOB researchers, male and female alike, preferred to talk about financial problems or issues with the Ministry, which is something that Serbian scientists face regardless of gender. This tendency to downplay gender issues is not surprising. The fact that gender equality was nominally proposed “from above” in socialism meant that women in former Yugoslavia did not arrive to these rights through fight and effort. This made many of these rights, such as long maternity leave, affordable childcare (kindergartens) or the right to abortion, seem like something that is “natural.” These rights are not seen as part of a fight for equality or feminist efforts. This fact is one of the reasons for the so-called “gender blindness” that many women in Serbia display. Feminist issues and gender equality are not recognized as important issues in contemporary Serbia (Ignjatović and Bošković 2013). There are negative stereotypes about women who declare themselves to be feminists, since this label carries ambivalent and negative connotations (Milić 2004).

At the same time, women in Serbia are conscious of general struggles that affect citizens in Serbia regardless of gender. This is yet another tendency inherited from socialism: women display solidarity with men who go through similar problems, such as financial troubles or being wronged by the government. This belief is present among female (and male) researchers at the Observatory: more than any gender differences, they see all their colleagues as going through the same problems. However, rather than attributing this to “gender blindness,” I interpret this tendency as an honest belief in joined troubles that affect both men and women. After all, it is important to remember that there is gender parity achieved at the AOB, and while this does not necessarily imply total equality, it does matter. Women at AOB are never the only woman in the room; they are not treated as an oddity or “not a real scientist” because the science is not strongly coded male in the Serbian context.

The high number of female scientists in post-socialist countries is sometimes explained through the low-status nature of science. Lack of funding, bad working conditions and lack of prestige

are seen as an explanation for the low status of science in Eastern Europe, which in turn explains higher percentages of women in science (Blagojevic 2009). While it is true that post-socialist countries lack funds and resources available in the West, I disagree with this view. First, it needs to be remembered that scientists receive good salaries by Serbian standards and they enjoy job security that is not available to so many people in Serbia. Another important factor is a relative prestige that many professions in STEM enjoy. For example, medicine enjoys a high prestige in Serbia; medical doctors have a high status in society. And yet, medicine is a field with a high percentage of women. While Serbian scientists believe they “do not matter” and do not enjoy any status, it is undeniable that high education and a status of an intellectual still matter in Serbia. The respect that educated people enjoy has eroded significantly in the past decades, but traces of this belief, inherited from Yugoslavia, still exist. Being a scientist is something that many people in Serbia do not understand, but the profession still carries a certain aura of respect (Hodges 2013b). It is also important to define what “high status” and power mean in Serbian terms. As demonstrated by the anecdote about mischievous janitors and the administrative worker who needs to be bribed by beer, “power” in Serbian terms cannot be easily gauged through official parameters such as salary, class or the position in the workplace hierarchy. As with so many other things, informal is the key to understanding power in Serbia. People who earn high salaries or who are high in a hierarchy *might* have a lot of power, but this is not a guarantee; similarly, someone who is seemingly low on the hierarchy can have strong *veza* connections and informal social capital. Because of this, the fact that scientists in Serbia do not have much resources or do not earn as much as their Western colleagues is not detrimental to status. All these factors demonstrate that science cannot be seen as a low-status job. The fact that there are so many female scientists cannot be explained by the lack of prestige.

Instead, the high percentage of women in science that exists in Eastern Europe should be seen as a socialist legacy. High number of female scientists in former socialist countries is sometimes seen as a “residue of the communist regime” (Glover 2005, 232). This is a tendency that can be observed at the Observatory: half of all researchers at AOB are women. Despite a recent push for retraditionalization of gender roles, working women are still a norm in Serbia. Women employed in science and medicine remain to be normalized, which results in high number of women in STEM. Post-socialism was not kind to women; capitalist transition put an

end to numerous rights that women enjoyed in socialism (Gal and Kligman 2000). The rare places in which women enjoy the same rights and benefits inherited from socialism are public organizations and institutions. The fact that STEM positions in Serbia are typically government-funded means added security for women: they know that they will receive maternity leave guaranteed by law and other benefits not necessarily granted in private companies. It is not surprising that women choose science as a profession in such large percentages, which does not necessarily mean a feminization of science. The percentages of men in STEM are consistent throughout the years; men continue to be interested in science and make up half of all scientists in Serbia.

That is not to say that there is an absolute gender equality at the Observatory. Despite large number of female researchers, they rarely occupy the highest levels (full research professor title) or project leader positions. Part of this problem might be due to circumstances: there is an ongoing change of generations at the Observatory: many researchers are either seniors or beginners. Scientists in the middle of their careers are not numerous, and they are only now starting to advance through the hierarchy. There are many women in this cohort, so it can be expected that the number of female scientists at the highest levels will increase in the future. After all, while there is an observed gender imbalance in these highest levels among Serbian researchers across disciplines, these numbers are higher than the EU or North American averages (Manić et al. 2018). However, it is important to note that there exists a gendered component at the Observatory. Large numbers of male project leaders tie directly into the gendered idea of what a “boss” is, and in paternalistic ideals of a leader. Similarly, the informal aspects of networking and hospitality are strongly gendered and play into the idea of a *domaćin*, which is coded male. While women are considered to be great in numerous informal activities and *veza* building, these specific aspects of informality (paternalistic leader and *domaćin*) are strongly gendered male. In situations where so much emphasis is put on securing collaboration through informal means, it is clear why men are preferred for the task. It can be concluded that science itself is not gendered at the AOB, but gender inequality and traditional gender roles prevail in other domains. Since a lot of work and life at the Observatory is organized through those domains, certain gender differences and inequalities exist, despite of relative equality in the scientific domain itself.

Socialist Approach Normalized

One of the defining aspects of work and life at the Observatory is a strong reliance on beliefs, attitudes and practices inherited from socialism. This tendency is not necessarily conscious, and very few researchers chose to contextualize their experience in such a way. Post-socialism and post-Yugoslavism are important for understanding the lives and work of scientists at the Observatory. Socialist Yugoslav past is still a staple of what people in today's Serbia see as "normal life." That is not to say that people are always open about this, or that they display a degree of socialist nostalgia. Ideologically and in many other ways, socialism is frowned upon, which is something that my informants at the Observatory were quick to point out. Nobody openly laments for the days of Yugoslavia or its ideology. While many AOB researchers are critical of the work atmosphere in socialism ("*radio ne radio, svira ti radio*"), they all agree that times were better. This belief is in line with post-communist nostalgia common around Eastern Europe (Todorova 2010). This nostalgia is practical and focused on the lost aspects of everyday life; it is a nostalgia born out of frustration and disappointment with present day circumstances (Boym 2001). This yearning for Yugoslav normalcy is not ideological nor political: people simply want their normal lives back.

The idea of normality and what makes a "normal life" takes a lot from the Yugoslav past, even if people do not openly define it in those terms. The much desired "normal life" is the life that awards people with comforts they enjoyed in Yugoslavia: secure employment, affordable housing, long maternity leave and month-long holidays at a seaside. Some people recognize these as the achievements of socialism, while others deny it, citing bad aspects of socialist ideology and political problems that plagued former Yugoslavia. Still, even those people who ignore or criticize socialism have ideas about "normal life" that is modeled on the Yugoslav past.

My informants at the Observatory did not often mention socialism or Yugoslavia explicitly, except when asked about what changed over the past several decades. Still, the yearning for "normal life" and Yugoslav standards is present in all conversations about the harsh life in today's Serbia. Nobody yearns for socialist ideology or unified south Slavic state, but they want a normal life that Yugoslavia had provided to them or their parents. They would not complain

if those things could be achieved under the new capitalism of today's Serbia, but this is not happening. It is an endless source of frustration.

Socialism made people reliant on government for their basic needs; as a result, economic and other problems are typically blamed on the government. This dependency on state and lack of the concept of individual responsibility are not unique for Serbia. (For Macedonia, see Markovikj 2015). Many AOB researchers are quick to blame the government for not providing them with that they see as basic needs and a "normal standard of life," which is another Yugoslav legacy that is not necessarily recognized as socialist.

However, the socialist legacy is very much alive at AOB, which influences the way researchers approach scientific work. This is particularly evident in the case of researchers' attitudes to the government and its role. The socialist approach is seen as a "normal" way of doing things: the government should nurture science from above and has a defined strategy on how to help scientists. This approach "from the above" is not seen as limiting or detrimental for scientific freedom. On the contrary: it is seen as a sign that the government cares and that it recognizes the intellectual importance of science. Of course, this "nurturing from above" also assumes that the government does not dictate what scientists should research, which is for the most part true. Due to the non-applicable nature of astrophysics, scientists enjoy freedom to explore any questions they deem important, without any involvement from the government, funding bodies or external influences. It is not surprising that this is the only aspect of the government that AOB researchers do not criticize. This ties to another assumption inherited from socialism: that sciences are important as intellectual pursuits regardless of their practical use or profitability. It is not a coincidence that AOB researchers compared science to art: they are both seen as products of the human mind that serve to enrich humanity; trying to put a monetary value on such pursuits is seen as a vulgarization. This is particularly true in the case of fundamental research such as astrophysics. On the other hand, the government is strongly criticized for not caring about applied research; AOB researchers made it clear that they expect the government to invest into this research and to develop a strategy that would benefit Serbian industry. All these beliefs are consistent with the view of the government as the main source of benefits or problems. AOB researchers expect things to be arranged "from the above" and are frustrated and disappointed when this does not happen.

This approach “from above” is replicated on the lower level, among the research teams. The project leader serves as the power “from the above” whose job is to take care of his team. This strongly paternalistic view of the project leader is seen as an ideal. A good leader is the one who will take care of his team “as a father” and who will nurture the collective spirit in the team while allowing individuals to thrive and pursue their own research. A good leader will use his skills at navigating informal networks to gain access to resources and opportunities for his team. This is one of the reasons why a project leader is a gendered role: it relies on paternalistic relations between the leader and the team. This approach is also evident in the case of prolonged apprenticeship and help provided to younger researchers. It follows Serbian cultural ideas about parenting: even as adults, people in Serbia are often reliant on their parents’ help and resources. This dynamic is replicated in the case of a research team: a project leader is the father that “takes care” of his researchers and provides them with benefits acquired through informal networking. Heightened socialization and informality help with bonding, so team members know each other well and are ready to help each other in performing tasks “as a family.” This is why teams are able to quickly organize themselves in times of need and this is why nobody complains about working overtime when there is a need for it.

Caught in the chaos of post-socialist changes, AOB researchers do everything they can to keep the socialist bubble of normalcy going, in order to resist the changes as much as possible. This does not refer to ideology or approach to scientific work itself; indeed, many scientists are eager to adopt the latest approaches to research and some praise the points system that awards productivity. The resistance mainly refers to changes that threaten their security. AOB researchers are angry at the lack of care from the Ministry and the lack of security and respect that it should provide. Often unknowingly, they try to keep the socialist legacy and knowledge cultures inherited from socialism alive. They cling to the remains of the past: security of employment, maternity leave, periods of idleness and work, relaxed atmosphere, in order to shield themselves from realities of post-socialist Serbia. They do everything they can to keep up their bubble of security and maintain the “normal life” as they understand it, criticizing anything that tries to shake that up.



Image 17: Empty coffee mugs left after *kafenisanje* at the Observatory

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