

Háskóli Íslands  
Hugvísindasvið  
Hugmynda- og vísindasaga

**Communication with  
(Extra)Terrestrial Intelligence**  
*Soviet Radio Astronomers, Scientific Internationalism  
and Outer Space Imaginary*

Ritgerð til MA-prófs í History of Ideas and Science

Gabriela Radulescu  
Kt.: 240489-3769

Leiðbeinandi: Prof. Emeritus Einar H. Guðmundsson  
January 2020

# Abstract

In the early 1960s, the prospect of contacting extraterrestrial civilizations became a scientific concern for radio astronomers. The Soviet contributions in this field have been largely overlooked by historians so far. More particularly, little attention has been given to the international collaboration in which the Soviet Union was active in the 1960s and up until 1976 - and which came to be known as '*Communication with Extraterrestrial Intelligence*' (CETI). This dissertation research investigates this episode of scientific internationalism in the history of the Cold War. The main question it seeks to answer is how were Soviet conceptualizations of extraterrestrial intelligence and of intelligent radio signals entangled with or informed by the ways in which scientists cooperated beyond state borders?

In order to probe into this question, I have worked mostly with the following written sources: conference proceedings, scientific articles, as well as (auto)biographical accounts of the era together with some publications from the 1980s and 1990s. The record attests for a bottom-up process in which Soviet scientists were able to initiate surprising discussions considering the historical context of that time. By envisaging a communication with the Extraterrestrial Other, Soviet scientists facilitated a space for the political imagination to unfold. These findings reveal how the first real international scientific attempt to imagine the possibility of interacting with non-human intelligence beyond the limits of the Earth was articulated in the context of modern empirical science (radio astronomy). Additionally, this dissertation aims to contribute to the non(exclusive)-Western history of outer space imaginary.

# Ágrip

Snemma á sjöunda áratug 20. aldar varð möguleikinn á því að hafa samband við vitsmunasamfélög úti í geimnum að vísindalegu umhugsunarefni útvarpsstjörnufræðinga. Hingað til hafa þó sagnfræðingar að mestu litið framhjá framlögum Sovétmanna á þessu sviði. Einkum hefur lítil athygli beinst að alþjóðlega samstarfinu, sem Sovétríkin tóku virkan þátt í á sjöunda áratugnum og fram til 1976 - og varð þekkt sem Communication with Extraterrestrial Intelligence (CETI). Rannsóknarverkefnið, sem þessi ritgerð fjallar um, tekur fyrir þennan þátt vísindalegrar alþjóðahyggju í sögu kalda stríðsins. Meginspurningin, sem reynt er að svara er sú, hvernig sovésk hugmyndavinna um vitsmunalíf úti í geimnum og hugsanlegar útvarpsbylgjusendingar frá þeim, tengdist og naut góðs af samvinnu vísindamanna þvert á landamæri.

Til þess að kafa dýpra í spurninguna hef ég mest unnið með eftirfarandi skriflegar heimildir: Fundargerðir og vísindagreinar í viðbót við (sjálfs)ævisögulegar frásagnir af tímabilinu og öðru efni frá 9. og 10. áratug 20. aldar. Heimildirnar sýna neðansækið (botton-up) ferli þar sem sovéskir vísindamenn áttu upptökin að sérlega áhugaverðum samræðum, sérstaklega þegar tekið er tillit til sögulegs samhengis þessa tíma. Með því að sjá fyrir sér samskipti við óþekkt vitsmunalíf utan jarðarinnar, bjuggu sovéskir vísindamenn til rými fyrir frekari úbreiðslu hins jarðbundna pólitíska ímyndunarafls. Þessar niðurstöður leiða í ljós, hvernig fyrstu alþjóðlegu vísindalegu tilrauninni til að sjá fyrir möguleikann á samskiptum við vitsmunalíf í geimnum var lýst innan reynsluvísinda nútímans (útvarpsstjörnufræði). Að lokum, þá er þessi ritgerð hugsuð sem framlag til sagnfræði, sem snýst ekki eingöngu um vestrænar hugmyndir um geiminn.

# Table of Contents

<b>Abstract</b>	<b>2</b>
<b>Ágrip</b>	<b>3</b>
<b>Table of Contents</b>	<b>4</b>
<b>List of Abbreviations</b>	<b>5</b>
<b>List of Figures</b>	<b>6</b>
<b>Acknowledgements</b>	<b>7</b>
<b>Introduction</b>	<b>8</b>
<b>Chapter I: Preliminaries</b>	<b>11</b>
1. The Moebius Strip of Communication with Extraterrestrial Intelligence	11
2. On the Footsteps of CETI through the Historical Record	13
3. Epistemology and the Discursive Regime	19
4. Krushchev's Thaw and Scientific Internationalism	27
<b>Chapter II: Byurakan 1964</b>	<b>33</b>
1. Byurakan I: Communicating Across Borders	33
2. Scientists Dare to Imagine	35
3. CETI among other Discourses	50
4. New Possibilities, New Questions	56
<b>Chapter III: Post-Byurakan I</b>	<b>60</b>
1. Between Byurakan I and II	60
2. Byurakan II: Content Analysis	68
3. The Metamorphosis of CETI	74
<b>Discussion</b>	<b>81</b>
<b>References</b>	<b>85</b>
Primary Sources	85
Secondary Sources	87

# List of Abbreviations

*IAA* - International Academy of Astronautics

*IAF* - International Astronautical Federation

*IAU* - International Astronomical Union

*IKI* - Institute for Cosmic Research (the Soviet Space Research Institute)

*CERN* - European Organization for Nuclear Research

*CETI* - Communication with Extraterrestrial Intelligence

*SETI* - Search for Extraterrestrial Intelligence

*STR* - Scientific-Technical Revolution

## List of Figures

Cover of the first edition of '*Intelligent Life in the Universe*' from 1966, by Iosif Shklovskii and Carl Sagan (p. 21).

Portrait of Viktor Ambartsumyan (p. 39).

Portrait of Iosif Shklovskii (p. 45).

Nikolai Kardashev as a young student (p. 48).

Iosif Shklovskii together with Nikolai Kardashev (p. 49).

Carl Sagan and Iosif Shklovskii at Byurakan, 1971 (p. 69).

First Soviet-American Conference on Communication with Extraterrestrial Intelligence, held at Byurakan in 1971 (p. 71).

# Acknowledgements

First I must thank my supervisor Einar H. Guðmundsson for revealing the universe to terrestrial intelligence. His patience and trust have helped me transform both my enthusiasm and curiosity into solid ideas worth of the public record.

I also want to express my gratitude to the History of Ideas and Science studies program, for the opportunity this master represents. I am deeply indebted to Björn Þorsteinsson and Ragnheiður Kristjánsdóttir.

Additionally, I wish to thank my teachers in Berlin who showed me many paths for seeking knowledge.

My friends are present in this dissertation in ways that I cannot disclose. They shall remain unnamed, yet their good influence reverberates beyond the imaginable.

It goes without saying that my family who raised me is the reason why I am here today. Through infinite gratitude, I hope to compensate for that.

More broadly, this dissertation is the outcome of my encounters with the kind souls I have had the honour to cross paths with, in Iceland. Therefore, it is dedicated to them.

# Introduction

The body of literature on the history of the Outer Space Imaginary since the Second Revolution in Astronomy from the mid-20th century is vast. Nonetheless, it is only recently that the concern to move beyond a North-American-centric view of this outer space has gained momentum. Notably, the historian Alexander Geppert has been contributing in the last years to a refocus on Europe's role in space science and exploration<sup>1</sup>, while the work of Asif Siddiqi has helped understand the roots of the Soviet and Russian cosmic enthusiasm<sup>2</sup>. My research draws on this new scholarship in order to research on the role of Soviet radio astronomers in shaping ideas of extraterrestrial intelligent beings, as well as of the role of “human civilization” in the universe.

The intention thereby is to reexamine ideas related to extraterrestrial intelligence developed in the international cooperation program in which Soviet radio astronomers were involved from the early 1960s until the first half of the following decade and which bore the name *Communication with Extraterrestrial Intelligence* (CETI). Historians of science emphasise the existence of a window of opportunities for scientists from the Eastern Bloc to collaborate with the West in this era<sup>3</sup>, which corresponds to the preliminary findings of my research. One of the questions I raise is how this window of opportunities for international cooperation played out in the case of Soviet radio astronomers looking out for signs of intelligent beings in outer space. Nonetheless, by following the motif of communication, my inquiry explores how knowledge transfer across the Iron Curtain accompanied a joint terrestrial effort to contact extraterrestrial civilizations.

One particularity of the discussions within the framework of CETI was the advancement of various philosophical and environmental issues, as indicated explicitly in the official documents. Even more exciting perhaps is the inclusion of such topics as fiction, language, or cybernetics in the conversations between radio astronomers. In an attempt to conceptualize what constitutes an extraterrestrial civilization, scientists were implicitly engaged in conceptualizing the notion of “human civilization”. As such, addressing crises in human development at the time became an explicit concern for some of the scientists with

---

<sup>1</sup> Geppert (2015; 2018).

<sup>2</sup> Siddiqi (2001; 2011; 2016).

<sup>3</sup> Graham (1993), p. 167.

broader concerns beyond the technicalities of communicating through radio astronomy in outer space. My research inquires into some of the boldest ideas that were put forward, as well as into the logistics that enabled an outer space imaginary to be thereby created. Therefore, it focuses on both levels of analysis in order to account for the ways in which Soviet conceptualizations of extraterrestrial intelligence and of intelligent radio signals were entangled with or informed by the ways in which scientists cooperated beyond state borders.

The structure of the dissertation is built around these two dimensions - the *factual* and the *discursive* -, for whose interaction I suggest the image of a Moebius strip, rather than a strict ontological dichotomy. The first chapter starts with an introduction of this approach as well as with laying out the levels of scientific internationalism. It then explains the two dimensions and how they are tied within the very fabric of the theoretical prerequisites I employ. It also reviews the sources in relation to the process of tracing the historical episode considered. The literature review occupies a large space due to the scarcity of academic research on CETI so far. However, I have restricted this section by taking into consideration solely the sources that have shaped the vertical spine of the dissertation. The additional ones are referred more specifically once the exact ideas extracted from them are placed in relation to historical facts.

The second chapter expands on the *discursive* level and focuses on the first Byurakan conference from 1964 (Byurakan I). It places the CETI discussions in relation to both changes in the larger societal context of the time, as well as to other discourses. As such it argues for some important similarities with the latter. The third chapter probes into the internationality of the CETI project - its rather *factual* side, by reviewing the aftermath of the Byurakan I conference. As such it gravitates around the multidisciplinary Soviet-American conference at Byurakan from 1971 (Byurakan II) and considers the period afterwards, too. The dissertation closes with a discussion that draws on the main conclusions in order to open up the space for further examination venues.

The focus on the discursive analysis is relegated to the chapter in which I talk about Byurakan I because the change at the discursive level took place in the early 60s, therefore preceding or intersecting with the time of the conference (1964). Similarly, as the internationality of CETI was coming to a halt in the early 70s with the reclosing of the Iron Curtain<sup>4</sup>, the second Byurakan conference marked this turning point through both its

---

<sup>4</sup> Friedman, in Shklovskii (1991), p. 17.

happening and the discursive components. It is in this sense that the Moebius strip structure of the two epistemic levels is rendered visible. Between the CETI discourse and the factual interactions there was a mutual (re)inforcing.

# Chapter I: Preliminaries

## 1. The Moebius Strip of Communication with Extraterrestrial Intelligence

The historical record attests to the internationality of the Soviet initiatives in reaching out to extraterrestrial intelligence during the period of 1960s until the mid 1970s. In looking at the sources, I have identified three levels of the knowledge exchange involved. A first aspect of the Soviet internationalism in the question of extraterrestrial intelligence and radio astronomy has to do with a joint Soviet-American publication initiated by the Soviet side. In 1962 Soviet radio astronomer Iosif Shklovskii<sup>5</sup> published a book on the subject entitled *Universe, Life, Intelligence (Vselennaia, Zhizn, Razum)*, and during his correspondence with Carl Sagan, sent his whole manuscript to him<sup>6</sup>. This resulted in a co-authored edition appearing in the West under the title *Intelligent Life in the Universe* in 1966 which became a landmark work with regards to the question of extraterrestrial life in the 20th century.

The second and more complex aspect of CETI's internationality takes place at the international institutional level. From 1965 CETI found itself on the agenda of the International Academy of Astronautics, with formal activities taking place: symposiums and meetings were organized, as well as a study group and later an organizing committee were being established. Additionally, two CETI conferences came to realization due to the efforts of Iosif Shklovskii and his former student, Nikolai Kardashev inside the Soviet Union, both at the Byurakan Observatory in Armenia where Viktor Ambartsumyan<sup>7</sup>, a prolific radio astronomer with good political credentials was in charge. In 1964, the all-union conference united Soviet radio astronomers in the field, followed in 1971 by the "Soviet-American"<sup>8</sup> one,

---

<sup>5</sup> The choice for this particular transliteration of Iosif Shklovskii's name (Иосиф Шкловский) in this dissertation was decided on grounds of historical accuracy. More precisely, this version of transliteration was used at the time in most of the primary historical sources consulted here. The transliteration of other names, mostly of Russian and Armenian origin, present in this thesis is motivated by a similar reasoning.

<sup>6</sup> Shklovskii & Sagan (1966), p. vii.

<sup>7</sup> Between the two transliteration versions of the name Ambartsumian and respectively Ambartsumyan, the latter was chosen due to historical accuracy reasons. See footnote 5, previous page.

<sup>8</sup> In which also other nations also took part: Czechoslovakia, Hungary and U.K. See chapter 3 of this dissertation.

which adopted a rather interdisciplinary approach. As such, these conferences can be considered a third layer of the scientific internationalism in CETI, since they were organized independently from the IAA activities, and initiated by individual actors inside the Soviet Union - mainly Iosif Shklovskii and Nikolai Kardashev<sup>9</sup>.

It is from the perspective of the latter, the Byurakan conferences, that my research investigates the history of CETI. This dissertation looks at the period in which CETI developed (from the early 1960s until 1976) when these intense exchanges took place. The main question driving the dissertation research is how did the outer space imaginary and scientific internationalism influence each other during this time within the framework of CETI considering at the same time the existence of these levels? With this question in mind, this master's thesis places the Byurakan conferences in the historical context as well as with the other CETI activities.

In answering this question, my research suggests combining two ways of looking at the Communication with Extraterrestrial Intelligence project: from a *discursive* point of view, and respectively, from what can be called a *factual* one. The *discursive* stands for ways in which Soviet scientists involved in CETI have talked or written about their ontological object(s) (extraterrestrial intelligent radio signals/ beings) and other related ideas that fell outside of the strict technical details. For this purpose, conference proceedings, official documents and (auto)biographical accounts that are available for the larger public in state libraries in the West represent the sources on which the claims are made. The *factual* designates what the historical record shows to have happened, beyond or behind the words being spoken, and sometimes, - which will be part of the argument advanced by this thesis, by the very words being spoken. By creating a conversation between what scientists said when they met, on the one hand, and what "happened in the real world of facts", on the other one, the main question can be reformulated as follows: What did putting forth a certain idea enact, and, conversely, what pragmatic realities around the scientists may have played a role in producing and circulating certain ideas?

This chapter has four sections. In this first section, I have addressed the main question, stating the theoretical tools employed. I will continue in the next section by briefly explaining the methodology, as well as reviewing the sources and addressing some of the limitations, before situating this study in relation to the literature drawn from various fields.

---

<sup>9</sup> Shklovskii (1991), p. 254.

The literature I will review comes from the history of the Soviet Union, history of science and of scientific internationalism, as well as from the anthropology of science, anthropology of outer space exploration, and lastly, historical anthropology of the Soviet Union. Along with the presentation of the literature, I state my contribution to these fields and how my argument relates to the relevant arguments already made in these studies. Afterwards, I will also be introducing the approaches of the other two chapters of the thesis and then address the limits of the research. In the third section of this chapter I explain anthropologist Alexei Yurchak's terminology and thesis with regards to the change in the discursive regime during Khrushchev's time, and I exemplify how it has been integrated into my research and placed in relation with other studies on various Soviet discourses that share similarities with CETI. In the fourth part of the chapter, I elaborate on the concept of scientific internationalism and the form it took during Khrushchev's time and explain how it has been used in research on the CETI phenomenon.

## 2. On the Footsteps of CETI through the Historical Record

Some of the sources were easy to find, due to their quick publication and translation into English at the time, and their dissemination afterwards. The text of the first Byurakan conference has been published in 1965 and two years later translated into English by the Israel Program for Scientific Translations<sup>10</sup>. The full proceedings of the event were for this purpose edited by radio astronomer and member of the Armenian Academy of Sciences G.M. Tovmasyan, from the Byurakan Observatory. Tovmasyan had also participated in the conference with his technical presentation suggesting a ring telescope for the search for extraterrestrial intelligence. Consulting Mark Sheridan's previous research on SETI<sup>11</sup> has contributed substantially in tracing the transformations and inferring some of the influences that the Byurakan texts have undergone. Below I will cite one of the clues he provides which have helped me find further sources:

---

<sup>10</sup> Tovmasyan (1967).

<sup>11</sup> Sheridan (2011).

At Byurakan-I the Soviets expressed the view that SETI was an interesting idea requiring more rigorous formulation. During the following five years various Soviet scientists, in accordance with the resolutions of the conference, prepared papers on a number of the key problem areas identified at Byurakan-I. S. A. Kaplan, from the Institute of Radiophysics in Gorky, edited a volume of these papers. It was a seminal text in the new and rapidly expanding portion of the ETI discourse that considered the nature of ETI and related issues. More importantly for our purposes, the Kaplan anthology offers a clear insight into how the Soviets thought about the nature-based problems of a SETI-style search.<sup>12</sup>

The text by Kaplan, just like the text by Tovmasyan is publicly available. For the second Byurakan conference, Mark Sheridan's research indicates that two documents were issued, the English-language edition by Carl Sagan, as well as the Russian-language one, that Sagan points to in his publication<sup>13</sup>. Following Sheridan's example, I have only consulted the English edition, nonetheless agreeing with him that consulting both in the future could bring new interesting insight. Additionally, articles from the astronomy journal *Icarus* have provided dense summaries of the Soviet activities in the 70s like for instance an article from 1972 entitled "First Soviet American Conference on Communication with Extraterrestrial Intelligence (CETI)"<sup>14</sup>. A second article published in *Icarus* in 1975 and entitled "The Soviet CETI Program"<sup>15</sup> is a translation of an original text published by the USSR Academy of Sciences, received by the American counterparts in June the same year. The same text appeared in *Soviet Astronomy*<sup>16</sup> and reproduced in the NASA archives<sup>17</sup>. Particularly, this text provides information on the containment of CETI inside the Soviet Union in the aftermath of the rich international activities from the 1960s.

For the historical perspective and more contextualization of CETI highly important has been the *Acta Astronautica* publication, the official scientific journal of the International Academy of Astronautics. The fact that IAA has established review sessions on CETI (later SETI) very early in the process, namely in 1972 and published its first conclusions quickly

---

<sup>12</sup> *Idem.*

<sup>13</sup> See footnote 159 in Sheridan (2011).

<sup>14</sup> In *Icarus*, Vol. 16, pp. 412-414 (1972).

<sup>15</sup> In *Icarus*, Vol. 26, pp. 377-385 (1975).

<sup>16</sup> *Soviet Astronomy*, vol. 18, no. 5, March-April 1975.

<sup>17</sup> SP-419 SETI: The Search for Extraterrestrial Intelligence: <https://history.nasa.gov/SP-419/s3.11.htm>.

thereafter in the following year has facilitated investigating the historical record. Moreover, in 1979 the entire Volume 6 of *Acta Astronautica*, was devoted entirely to CETI, reflecting the rich activities of the CETI review committee which had been established in 1974 under Rudolf Pešek's from Czechoslovakia chairmanship, joined in 1981 by British Physician John Billingham, employed at NASA's Lyndon B. Johnson Space Centre, as co-chairman<sup>18</sup>. From the 1979 edition of *Acta Astronautica* on CETI edited by both Pešek and Billingham, the articles that have supported the research are all the passages authored by each of them, as well as an article by Nikolai Kardashev. Additionally, IAA has richly worked on documenting and critically reviewing the CETI activities, and although the relevant archives are presumably too old to be included among the others in their generous website database, the website offers insightful general information for further references.

As secondary sources, I have used the version by Soviet astronomer Vitaly Ginzburg of his edited talk at Byurakan II with some additional brief reflections published in the 6th edition from 2001 of the original 1985 book *The Physics of a Lifetime. Reflections on the Problems and Personalities of 20th Century Physics*. Also the review by Lynn Margulis (1975) in *The Quarterly Review of Biology* on Sagan's conference proceedings publication has provided a short but very useful information in the triangularization of the impressions on the scientific exchange. For opinions in the 1960s on extraterrestrial intelligence in radio astronomy in the Soviet Union and other liminal scientific circles, the article by Soviet radio astronomer N.T. Bobrovnikoff<sup>19</sup> published in English in New York in Wukelic, G. E. (1968). *Handbook of Soviet Space-Science research* has constituted a rich source.

As far as (auto)biographical accounts are concerned, the historical source in the closest proximity to CETI consulted was Iosif Shklovskii's autobiographical work, published posthumously in 1991, *Five Billion Vodka Bottles to the Moon: Tales of a Soviet Scientist*, seconded by a couple of other autobiographical works by the American physicist Freeman Dyson<sup>20</sup>, and Soviet physicist Roald Sagdeev<sup>21</sup>. What distinguishes Shklovskii's autobiography from other similar works by Soviet scientists published in the early 90s is that

---

<sup>18</sup> See the website of the International Academy of Astronautics - SETI Permanent Committee: <http://www.setileague.org/iaaseti/pesek.htm>.

<sup>19</sup> Despite the current transliteration of the name as 'Bobrovnikov', I have chosen the one in use at the time. For a more detailed explanation, see footnote 5, page 10.

<sup>20</sup> Dyson (1993/1971), pp. 285-295.

<sup>21</sup> Sagdeev (1994).

Shklovskii wrote his thoughts in the early 80s (1981-1984), secretly, according to Friedman<sup>22</sup>. Regardless of whether one is to take with a grain of salt Shklovskii's lack of hope that his autobiographical notes will be published, it remains a fact that he did not enjoy the attention and freedom of a defector to the West, or of a detractor of a previous system (like Sagdeev). For this reason, Shklovskii's impressions have undergone arguably less, if any, dramatic transformations than in such cases.

Roald Sagdeev was the director of the Space Research Institute (IKI) of the USSR Academy of Sciences between 1973 and 1988 where Iosif Shklovskii worked from late 1960s until close to his death in March 1985. Nonetheless, Sagdeev's few remarks as an outside observer of the radio astronomers and on Shklovskii are to be noted. He describes Shklovskii as an "outstanding and unusual character" and specifically points to the latter's extreme straightforwardness in expressing his professional views<sup>23</sup>. One particular aspect narrated by Sagdeev had to do with the divide between astronomers interested in studying "deep space" such as Shklovskii himself and the proponents of the local "environmental" science. The latter inclined to send their instruments on every spacecraft in an attempt to collect information for what was explicitly considered by Shklovskii an ephemeral science, in his own words "nothing but a <<caliph for an hour>>"<sup>24</sup>. Understanding the sociology of outer space science in the 1960s in general as well as during the early 1970s Soviet Union particularly inside the Space Research Institute is relevant in giving insight into how science and outer space exploration had worked in this concrete political and intellectual context.

Moreover, if one is to grasp on how the outer space imaginary more generally was shaped by Soviet scientists, an insight into differences of opinion and how these played out helps to contextualize the possible stakes in CETI. Especially considering the difference of opinion between Shklovskii and his student Kardashev: In his autobiography, Shklovskii criticized Kardashev's eagerness to experiment with putting up receivers and listening to possible extraterrestrial radio signals, while Shklovskii himself prioritized the working out of the theoretical framework which included by necessity more than the purely empirical scientific details:

It [Kardashev's approach to CETI] is based on faith in human society's unbounded

---

<sup>22</sup> Friedman, in Shklovskii (1991), p. 36.

<sup>23</sup> Sagdeev (1994), p. 160.

<sup>24</sup> Idem.

progress and places exaggerated emphasis on the radio-technological prospects for extraterrestrial communication, while ignoring both the humanities and biological aspects. To my mind, this is inadmissible. In brief, from the beginning, I have been convinced that the problem of extraterrestrial civilizations is in essence and effect *complex*.<sup>25</sup>

This points back at Shklovskii's reluctance to the experimental approaches inside Sagdeev's institute. This depicts a criticism from Shklovskii's side to the deterministic idea that underlie Khurshchev's Scientific-Technical Revolution and according to which the advancement of science was supposed to lead to the solving of other problems (social, for example). How different actors in CETI viewed the official political doctrine of the time is a crucial element in understanding the relationship between the scientific and the political imagination.

Dyson's recollection of his trip to Armenia for the conference, although scarce on the content of the talks discussions with which he does not engage, serves as well for contextualization purposes. Even if this account does not engage with the scientific ideas it does attest to the effect the second Byurakan conference had beyond its purely scientific purpose. It places as such CETI in the historical context to which it belonged - when the "press was obsessed with everything in orbit"<sup>26</sup> - and raises the question of how much CETI news were spread outside of the insiders' circle, how they were viewed, as well as how they influenced other events. Foreign scientists visiting Armenia got to know the relative autonomy of this political region, one of them being the 1965 victory of the Armenians' demonstrations, which were a result of the Soviet Union not allowing the commemoration of the Armenian genocide<sup>27</sup>. This attests to the privileged status of Armenia, to which the rather affluent position of the Byurakan Observatory's director, Viktor Ambartsumyan is added. His lifestyle strikes Dyson who mentions Ambartsumyan living in a huge house near the telescope and who has made the observatory grounds nearby into an idyllic garden<sup>28</sup>. One can only wonder in what way the facing of the living conditions of Ambartsumyan impacted Western scientists at that time. Even more, how did these material circumstances contribute in informing this extraterrestrial space imaginary possibly inhabited by intelligent beings? In

---

<sup>25</sup> Shklovskii (1991), p. 253.

<sup>26</sup> Sagdeev (1994), p. 154.

<sup>27</sup> Dyson (1993/ 1971), p. 288.

<sup>28</sup> *Ibid.*, p. 290.

configuring the exchange of ideas between the two worlds, and to its further legitimacy?

The history of the Soviet CETI programme and the international exchanges it has been embedded in from its inception<sup>29</sup> has barely been researched by the scholarship in history. A couple of exceptions exists, nonetheless. The already mentioned Mark Sheridan's thesis looks at how the history of ideas in SETI has changed throughout time and includes a chapter on the Cold War collaboration across the Iron Curtain. Mark Sheridan's work is a critical history of SETI - the Search for Extraterrestrial Intelligence, the name of the project that developed a decade after CETI, in the United States. He is the only historian who dedicates such a comparatively large attention to CETI, in his chapter on the differences between the two scientific pursuits on the opposite sides of the Iron Curtain to reaching out for extraterrestrial intelligence. His insights have proven very good starting points for my remarks and research questions, including the emphasis on "communication to" in difference to the "search for" extraterrestrial intelligence. Though it remains not fully supported by enough evidence, one of the ideas that I merely advance later in the dissertation is that the term communication in CETI reflects some of the changes at the discursive regime and the Thaw. How the term gave way to the "search" is a further question that demands a separate research.

Nonetheless a sign that scholarship is developing in this area of focus is the incipient work of astronomer Rebecca Charbonneau who has just started her doctoral degree in 2018 dedicated exclusively to this subject, while having already done preliminary research for her MA thesis in this direction<sup>30</sup>. Hopefully, more research will be done soon since the sources are becoming more and more available and especially considering that time pressure is crucial in interviewing the CETI actors<sup>31</sup>.

There are certain limitations derived from the attempt to divide the information from the sources according to the epistemological dualism employed in this study. Firstly, the Russian sources were consulted in their English translation, and it is not clear what has been lost, gained or transformed through this process. Secondly, as far as the documents that were produced originally in English directly, their nature is various and further research is needed

---

<sup>29</sup> Pešek, in Billingham & Pešek (1979), p. 4.

<sup>30</sup> The work of R. Charbonneau was pointed out to me in a personal discussion with Prof. Dr. Leonid Gurvits, who holds the Co-chair for the International Academy of Astronautics Permanent Committee on the Search for Extraterrestrial Intelligence.

<sup>31</sup> Considering the more recent passing away of Nikolai Kardashev during the writing of this thesis, on the 3rd of August 2019.

in understanding the intellectual development of CETI scientists' ideas as well as the reasons behind the mere written words, both from official documents and, perhaps even more subtle, from personal accounts. This is firstly due to the scarcity of official archives, since CETI was a bottom-up process.<sup>32</sup>

Another reason that adds to the difficulty of historian in studying CETI consists in the restrictions on both Soviet and Western scientists in their exchanges with the “other” side. For instance, Audra Wolfe’s recent study on exchanges in biology<sup>33</sup> reveals the nature of these restrictions and how they impacted the outlook of the exchanges. She reveals how the political project of thought underlied scientific exchanges between the American and the Soviet intellectuals, with the former advancing a certain idea of “free” American science, but being themselves subject to restrictions in the ideas shared with their Soviet counterparts. How this political program of thought underscored exchanges in astronomy is not known yet to historians, despite the rich interactions that have taken place during the same period of the Cold War, that scholars like Wolfe point at. As Wolfe notes, “historians of science have greatly misread the uses of apolitical science in the Cold War”<sup>34</sup>. In an attempt to address the impediments identified above, I will next explain the meaning of the *discursive*, as purported by Yurchak.

### 3. Epistemology and the Discursive Regime

The discursive-factual dualism, as it has been explained so far, represents an epistemological artifice in order to help divide the primary historical source material. When going through reports, personal accounts, conference talks transcriptions, from both sides of the Iron Curtain, one is faced with the dilemma: what “happened”, what was documented on what happened and how did the documenting go about the very things being documented? While making a distinction between things and words has been in itself the conundrum of

---

<sup>32</sup> This fact has been confirmed in a personal conversation I had with Prof. Dr. Leonid Gurvits (see footnote 26, p. 16).

<sup>33</sup> Wolfe (2018).

<sup>34</sup> *Ibid.*, p. 13.

philosophy, I leave this ontological and metaphysical problem on the side and take what can be employed on a strictly functional level. More specifically, in order to approach the discursive element, I draw on Russian anthropologist's Alexei Yurchak work which claims that the conditions of language use in the Soviet discourse have undergone a particular change in this era that created the possibility for new meanings and new possibilities to be conceptualized<sup>35</sup>. As such, the main argument I put forward is that this change can be seen in the CETI discourses and is mirrored by the CETI happenings.

According to Yurchak, with the post-Stalinist period, a shift was registered in how Soviet subjects related to the ways language was employed by them<sup>36</sup>. During Stalin's era, self-expression and language had been harshly regulated, leading to a strict canon which reinforced the official ideology and had to be respected. Yurchak argues that during Krushchev's time, the canon prevailed, but Soviet actors, in further reproducing the discursive forms, created in fact new meanings<sup>37</sup>. Arguably, Yurchak's point can be interpreted as following: just like in the case of the reproduction of biological genes, when a modification intervenes leading to a new sequence and therefore to a mutation because there is no rule that forbids that "random" mutation, the same in the case of post-Stalinist era, the mere reproduction of the ideological language canon allowed space for novelty to happen.

The research on CETI brings Yurchak's argument in relation to the international cooperation that was taking place. In the preface to *Intelligent Life in the Universe*, Shklovskii's opinion on USA's reasons of laser development as stated in the Russian original of *Universe, Life, Intelligence* is exemplified as a point of disagreement between him and Carl Sagan: "Shklovsky's belief that lasting world peace is impossible while capitalism survives and that lasers are only being actively developed in the United States for their possible military applications alone"<sup>38</sup>. This opinion of the Soviet radio astronomer falls within the dominant Soviet ideological discourse of the Cold War in which the two superpowers accused each other of military use of technology which in turn legitimized a defence measure on the accuser's side.

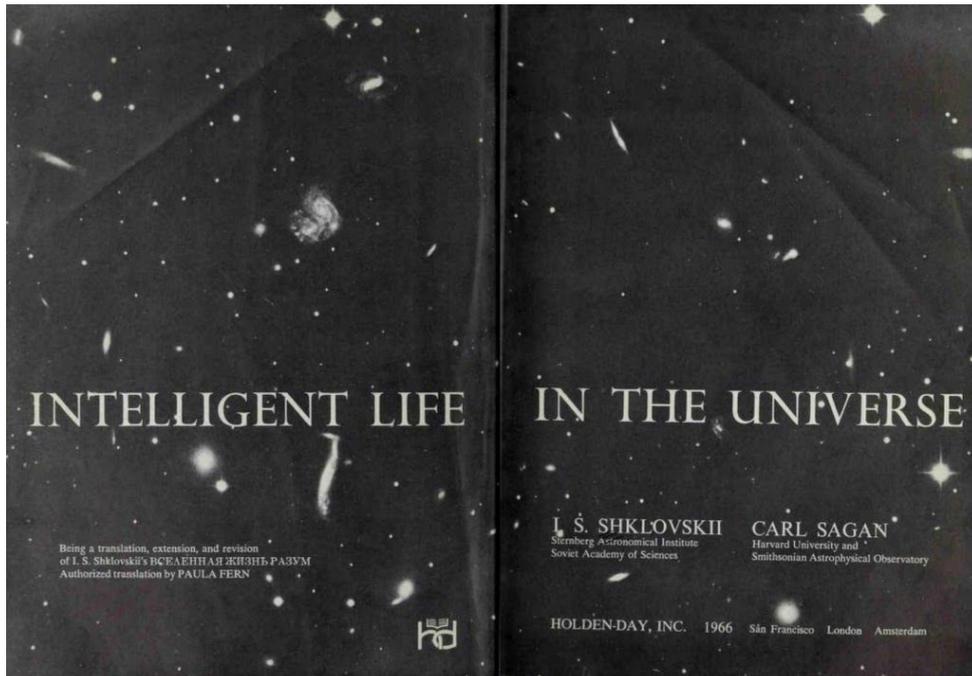
---

<sup>35</sup> Yurchak (2003).

<sup>36</sup> Ibid. p. 481.

<sup>37</sup> See Yurchak (2003).

<sup>38</sup> Shklovskii & Sagan (1966), p. viii.



*Cover of the first edition of 'Intelligent Life in the Universe' from 1966, by I. Shklovskii and C. Sagan.<sup>39</sup>*

However, measured against some other affirmations of Shklovskii, the initial statement reveals something unpredicted. In his autobiography, Shklovskii mentions that part of his motivation to have the book ready for the Sputnik anniversary lied in the fact that he knew there was not enough time for the manuscript to be reviewed properly by the authorities in order to modify it according to the ideological discursive canon: “The months would fly by, the editor’s briefcase would be empty, and mine would be the only manuscript handed in on time to meet the deadline of the fifth anniversary on October 4, 1962”<sup>40</sup>. This lack of time weighted less than the importance of the book to be published as a celebration for Sputnik in the eyes of the power, since the manuscript successfully passed censorship ultimately. The affirmation on laser technology seems in any case too far from the subject of extraterrestrial life and one would wonder what its role would ultimately have been in Shklovskii’s publication. It is in this sense that, if one is to take Yurchek’s argument at face value, the censorship’s responsibilities must have been editing passages like this one. The result is a visible juxtaposition, where the discursive universe is fragmented. In other words, the ideological statement created an artificiality effect in this case.

<sup>39</sup> Credits: Gindilis & Gurvits (2019).

<sup>40</sup> Shklovskii (1991), p. 249.

One can nonetheless argue against this point, by saying that this juxtaposition became visible only in the American translation of the manuscript (and from the vantage point of the present), where Sagan's comments and the preface were added, and moreover the inverse and adverse political context resignifies the Soviet ideological statement to the point of rendering it absurd. While this argument cannot be completely dismissed by the underlying research here, due to language limitations, it can be at least challenged by a softer version of the original point it argues against. More precisely, an international dialogue became possible between two strong ideological powers that contradicted each other. This dialogue underscored the text of *Intelligent Life in the Universe*. But this mere dialogue would not have been possible before Stalin's death not only because of the explicit restrictions on the actual communication but also because the ideological statements would have stood in a different relation to the subjects emitting them. As such, whoever and however authored the affirmation attributed to Shklovskii with regards to laser technology in the USA, pragmatically reproduced the Soviet ideological discourse, and by this very reproduction, a distancing takes place from the semantic role of language. This is the subtle movement that takes place, according to Yurchak, from the semantic to the pragmatic use of the discourse in the post-Stalin years. And solely based on it the further juxtaposition can result.

One of the questions that arise when one looks at the CETI discourse itself in the conferences is what other particularities underpinned it and how they stood in relation to this pragmatic reproduction that Yurchak conveys, as well as to one another. Before going further with the analysis of language in the case of the Byurakan conferences, there is one clarification to be made. In the book by Shklovskii, the discourse around CETI lied at the intersection of science and fiction. His autobiographical statements indicate that he did speculate or enjoyed being at least a bit inventive while writing this book: "In it [...] I would indulge in a bit of futurological speculation. [...] The futurological aspects of the book were much easier to deal with: I could use my natural bent for fantasy"<sup>41</sup>. Indeed Shklovskii's personality is pointed at a few times by his contemporaries as at least controversial in the sense that one does not know what to take seriously: "50 percent of Shklovskii's ideas are brilliant, but no one can tell which 50 percent they are"<sup>42</sup>.

---

<sup>41</sup> Shklovskii (1991), p. 250.

<sup>42</sup> Friedman, in Shklovskii (1991), p. 29.

Nonetheless, Shklovskii was a reputable radio astronomer, whose works were very much appreciated internationally<sup>43</sup> and it would be an exaggeration to argue that the whole CETI discourse or even his original publication preceding CETI would have constituted a sort of a hoax. Whether a hoax was intended or achieved partially and to which extent, it can only be revealed by looking deeper into the sources. In his autobiography, Shklovskii states: “They (the futurological aspects of the book) weren’t just a joke - even then I was giving serious thoughts to the fabulous possibilities of intelligent life in the universe”<sup>44</sup>. Meanwhile, the language analysis in CETI is meaningful because it comes from engaged subjects in science and society, regardless of the main figure’s controversy. Probing down into these very discursive uses can only help a further study investigating even a partial or micro hoax intention.

The unpredictable in the discursive realm results from the two components of the words and the factual interactions in an international context. The scientists that are taken as main actors in the history of CETI this dissertation presents have (re)signified two things at the same time: the outer space imaginary, as well as the terrestrial one. As I will show in the chapters on the first Byurakan conferences, by addressing things like the limits to growth, the environmental crisis, the limits of language, and other rather existential issues grounded in the political reality of their time, CETI scientists facilitated a space for the imagination, not the least the political imagination. This observation refers to recent research in the anthropological study of outer space exploration where scholars looked at the shaping of the future and outer space imaginary informs social practices<sup>45</sup>. Moreover, some of these studies also note the further links of this imaginary with a renewed sense of environmental consciousness<sup>46</sup>. Similar observations can be inferred with regards to the historical episode marked by CETI, and as such the research for this thesis addresses the corresponding gap in scholarship and opens up a possibility to examine it.

One of the special aspects of the outer space and future imaginary shaped by CETI was its development in an international context that united the Soviet Union with the West during the Cold War in its full bloom. It is as such the first real international scientific attempt to imagine the possibility of interacting with non-human intelligence beyond the

---

<sup>43</sup> For a brief review of Shklovskii’s legacy, see Kardashev & Marochnik (1992).

<sup>44</sup> Shklovskii (1991), p. 250.

<sup>45</sup> Valentine (2012), p. 1051; Messeri (2016), p. 17.

<sup>46</sup> Valentine (2012), p. 1053, 1062.

limits of the Earth on the basis of modern empirical science (radio astronomy). It is even more surprising since this internationalism was possible between two superpowers with competing ideologies, sustaining two very different political and economic systems. The fact that the CETI scientists met and discussed together this imaginary was an act that transgressed the conditions that produced CETI, including the earthly conditions. It is here that the gist of the main argument in this thesis lies: the *fact* that these scientists could meet and discuss such ideas was coextensive with the *discourse* itself. Two sides of the same coin showing how actions and discourse synchronized in CETI and challenged the political status quo of their time. In other words, the discursive level is an entry point into and part of the factual aspects of history.

Yurchak's thesis is placed in relation in this paper with scholarly studies on Russian science fiction, *nauchnaya fantastika*, whose relation to power that Birgit Menzel's research<sup>47</sup> has shown to have had, I have found similar while looking at CETI. Menzel argues that *nauchnaya fantastika* was the only literary genre "officially exempted from the demands of realism"<sup>48</sup>. In this sense, CETI has proven to be the only genre officially exempted from the pressure other sciences due to the fact that astronomers were known to have enjoyed a certain special status in the Soviet Union. As the nuclear physicist and political activist, Sakharov put it in a conversation with Shklovskii: "You, astronomers, are happy people: the poetry of facts is still intact in your field"<sup>49</sup>.

Nonetheless, Shklovskii was not fully safe from political restrictions. He had been many times prevented from travelling abroad<sup>50</sup>. In spite of this, there is no hint in his autobiography that the content of CETI talks in Byurakan would have been strictly controlled by the propaganda organs. Also, neither does Dyson in his autobiographical notes on the second Byurakan conference mention anything in this sense. Lastly, this is confirmed by the only completed study that looks into detail at the philosophical content of the Byurakan conferences, namely Mark Sheridan's thesis. His study probes into some of the philosophical assumptions behind CETI and SETI and dedicates a chapter in this context on the Soviet perspective at Byurakan 1964 as well as to a comparison between the Soviet and the American perspective visible at Byurakan in 1971.

---

<sup>47</sup> Menzel (2005), pp. 117-150.

<sup>48</sup> *Ibid.*, p. 117.

<sup>49</sup> Shklovskii (1991), p. 244.

<sup>50</sup> Friedman (1991), p. 15.

However, Sheridan's study does not take into consideration that between Byurakan I and Byurakan II changes in society and politics that distinguish the two events from one another, and mostly considers the ideas in a political vacuum, especially since his study is based solely on written materials of that time that has been made available in that era. With these constraints in mind, without a further Soviet contextualization of a more specialized historical and anthropological studies on Soviet society and politics, Sheridan's in vacuum analysis validates the hypothesis of a certain freedom of expression in CETI.

A few arguments strengthen this hypothesis. The very fact that scientific and philosophical ideas stripped of the political conditions of their production could be discussed between scientists across the Iron Curtain inside the Soviet Union, be it Viktor Ambartsumyan's Byurakan Observatory, attests to a special status of the CETI project. And even if is not to be ignored that astronomy had its share of purges in the 30s including at the Pulkovo Observatory where Iosif Shklovskii had worked, and astronomy had served during that time as a "vehicle for Soviet and anti-religious propaganda"<sup>51</sup>, in the 1960s, it progressed very quickly and largely independently from political constraints<sup>52</sup>.

In the second chapter which focuses on the second Byurakan conference from the vantage point of the discursive level, the argument for the special status is built upon some of the features of the conference talks in relative to the international context. There, different juxtapositions like the one expressed in Shklovskii's book are exemplified and interpreted as such, with the pragmatic use of language in the sense advanced by Yurchak in perspective. There, another point with regards to fiction is made. Namely, the explicit mentioning of adventure and fantasy literature from the West (such as Arthur Conal Doyle, for example) which may be surprising as it comes from Soviet scientists talking about radio astronomy in an international context. But this is however not where the surprises in CETI talks cease.

While I will leave the discussion of the fantasy and fiction and how it intersects with CETI more precisely for the second chapter, it is worth mentioning here that such an analysis can be and is integrated into a larger study on the merging of fiction and non-fiction as well as of the scientific and non-scientific genres in the Cold War era, especially during Khrushchev's time. As such, just like Russian science fiction itself was the only literary genre that bridged science and humanities, CETI was probably the only scientific field per se

---

<sup>51</sup> Kragh (2012), p. 7.

<sup>52</sup> Idem.

that legitimately performed a similar operation. The proximity of both *nauchnaya fantastika* (Russian science fiction) and CETI to “the Soviet utopian project” are also important nodes of analysis where the discursive and the factual intertwine, especially as the utopian vision moves in time towards dystopian<sup>53</sup>.

At least two other discursive modes can be further compared with CETI. Firstly, an important element in the analysis in the second chapter is given to the rational-religion dichotomy and the instantiation it takes during Khrushchev’s time in popular science publications<sup>54</sup>. This attests to the fact that during the early post-Stalinist years, a rebirth of scientific enthusiasm accompanied at times the critique of (Stalinist) irrationalism. Secondly, the spirit of the time also gave rise to the genre of scientific prose in which the research by Kuchment<sup>55</sup> probes. Although it only presented science in a positive light rather than “critically assessing scientific phenomena”<sup>56</sup>, scientific prose nevertheless represented a merging of the scientific and writers/ humanities culture<sup>57</sup>, testifying to a general propensity of the Soviet culture and society of the era. CETI intersected with all these domains through its discursive practice and all of them relate to Yurchak’s thesis whose underlying assumption is that dialogue is by definition situated<sup>58</sup>.

Another theoretical starting point for the research here has been Anne Dippel’s research in the anthropology of physics. In looking at the physicists working at CERN, Dippel has observed how ontological notions from cosmology and politics intertwine and inform one another. Especially in the second chapter, some of her notions have proven substantially of help in framing the conversion of scientific discourse into other forms of human activity and vice-versa. Due to relating to different contexts in both space and time, I have taken the liberty of adapting her notions accordingly. In these cases, an explanatory frame is offered.

Before introducing the instantiations of the *factual* element in CETI, another epistemological caveat has to be made on the terminology applied in this dissertation. More specifically, the employment of the discursive-factual dualism translates into a meta-question about what kind of ontological objects does the historian consider and (re)construct when

---

<sup>53</sup> Menzel (2005), p. 118 as well as Siddiqi (2011).

<sup>54</sup> Andrews (2016).

<sup>55</sup> Kuchment (1990).

<sup>56</sup> *Ibid.*, p. 340.

<sup>57</sup> *Ibid.*, pp. 325, 339.

<sup>58</sup> Yurchak (2003), p. 484.

writing a history of ideas. The first decadal of CETI narrated here considers jointly the ethereal world of science and ideas (*the discursive*) that made their way onto the agenda from the Soviet side and the fact that scientists met in a certain historical context, namely the Cold War period (*the factual*). The main *fact* that is being considered here is precisely the international dimension of CETI, the *fact* that the possibility of reaching out to extraterrestrial intelligence through radio waves created a context for intellectual exchange across the Iron Curtain during Khrushchev's Thaw. The distinction between what is part of a discourse and what is a fact serves a dialectical purpose: dividing reality into two categories and showing how the relationship between them plays out, in order to describe the historical episode. Rather than a reductionist dualism, it creates the conditions for a wide spectrum of nuances to be observed, articulated and discussed upon. More specifically, the nuances that correspond to the many ways in which scientists related to what they were saying and how the conditions of their lives informed the discourses. In return, the discourses played, at least partially, a performative role, as I will suggest.

#### 4. Khrushchev's Thaw and Scientific Internationalism

Two main elements play a key role in situating the richly international CETI activities in the context of the Cold War and Soviet history. One has to do with what has been called Khrushchev's Thaw and referring to the immediate period following the death of Stalin in 1957 and ending at the beginning of the 70s. This period was characterized, among many changes for science at the top level<sup>59</sup>, in leniency in exchanges with the West which also allowed for relatively intense scientific exchanges<sup>60</sup>. However, it remains an understudied area (and only relatively recently constituting a more explored focus of research) to how intense from both sides the scientific exchanges were in fact as well as the international relations in science<sup>61</sup>. The second element is what Kojevnikov has termed "the main paradox of Soviet Science": the *fact* that despite facing a strongly repressive regime, Soviet science

---

<sup>59</sup> Ivanov (2003).

<sup>60</sup> Lalli (2017).

<sup>61</sup> Doel (2008), p. 310.

did not end in a general decline<sup>62</sup>. The 60s seem to have temporarily saved the paradox: a decade of strong cooperation reboosted science. By establishing communication with (the) other terrestrials, the Soviet scientists helped build the foundations of communicating with extraterrestrials. I argue that the Communication with Extraterrestrial Intelligence project (CETI) represents a valuable and surprising momentum in the Soviet history of ideas and science when it comes to USSR-Western cooperation.

Not only did CETI managed to bring together first-class scientists from both “sides”, but it also circumnavigated some of the Cold War narratives and complications. CETI could have easily come to a close call considering the international context. According to the report on the activities of the International Academy of Astronautics CETI committee, the symposium that was supposed to take place September 1968 in Prague is postponed several times “for different reasons”<sup>63</sup>. In August 1967 the General Assembly of IAU meets in Prague and Pešek (the Czechoslovakian radio astronomer in charge of the focus group on CETI inside the IAA) meets Kardashev, Shklovskii, and Sagan to decide on the list of participants for the upcoming CETI symposium. On April, 25th 1968 the Presidium of the Czechoslovak Academy of Sciences authorized the CETI symposium in Czechoslovakia and agreed to meet the costs. In October 1968 the CETI Organizing Committee meets in New York and agrees on a tentative schedule of topics for the Symposium<sup>64</sup>. It looks almost like a miracle that the international dimension initiated by the Soviet Union succeeded to barely be affected by events such as the Prague Spring. In other words, even taking into consideration the Thaw and its advantages, this period of CETI still distinguishes itself from other Soviet-American or East-West of the Iron Curtain exchanges.

When it comes to the history of astronomy in the Soviet Union, scholars have pointed out to a few particularities. Firstly, astronomers enjoyed a certain special status which translated at the international level<sup>65</sup>. A frequently cited argument for this is that IAU was the only international scientific union of which the Soviet Union had been a member continuously, including during the Stalinist purges<sup>66</sup>. Despite this privilege, astronomy had

---

<sup>62</sup> Kojevnikov cited in Kragh (2012), p. 2. See also Graham (1993), p. 169.

<sup>63</sup> Pešek (1979), p. 8.

<sup>64</sup> *Ibid.*, p. 7.

<sup>65</sup> According to Kragh (2012), p. 12: In 1958 the IAU General Assembly convened in Moscow, largely undisturbed by the Cold War.

<sup>66</sup> This has been pointed out to me while talking to historians of scientific internationalism and of the USSR.

been affected as well by these purges and Shklovskii had lost some of his colleagues during this time. The Stalinist era meant for astronomy also that the scientific papers of radio astronomers such as Iosif Shklovskii and Vitaly Ginzburg (who also took part in CETI and at Byurakan) written in the second half of the 1940s and early 1950s with “their work totally based on Western data, had no influence in the West until the mid 50s”<sup>67</sup>. The research on CETI supports the idea that certain privileges were enjoyed by astronomers, as well as that they had “caught up” with the West by the late 1950s. The work of Woodroff III T. Sullivan cited here has documented radio astronomy history on a global level, and though focused mostly on the technical aspects, it serves nonetheless to ground CETI in relation to radio astronomy.

Another branch of astronomy, apart from radio astronomy, played a key role in CETI, namely cosmology, the theory of the nature of the universe itself. The existence of extraterrestrials was not incompatible with dialectical materialism<sup>68</sup>, but to talk about how the radio waves propagate in the cosmos based on empirical data, it required an up to date notion of the universe. The 1959 paper in radio astronomy by Cocconi and Morrison was written on the basis of the up to date radio astronomy, but there was little chance of it to have been taken seriously and accepted in the Soviet Union without the disappearance of strong ideological control over cosmology. The ban on the latter had meant that the “universe” conveyed a very different meaning in the Soviet Union before Krushchev’s Thaw<sup>69</sup>: as the relativistic model was rejected on the basis of the fact that it represented capitalistic ideology, without even being discussed by Soviet scientists. Consequently, during the Stalinist era, one lived in two different universes.

It was not that the consistency of the ideas of Cocconi and Morrison<sup>70</sup> required an expanding universe in order to be applied. The propagation of radio waves in the cosmos was a functional scientific field in the Soviet Union during Stalin’s era. Moreover, the works of Shklovskii and Ginzburg from the late 40s and early 50s, who both became preoccupied with CETI later in the 60s, had been entirely based on Western data<sup>71</sup>. There was no incompatibility at the level of radio astronomy between the Soviet Union and the West, rather

---

<sup>67</sup> Sullivan (2009), p. 216.

<sup>68</sup> Graham cited in Sheridan (2011).

<sup>69</sup> Kragh (2012), p. 7.

<sup>70</sup> Who first popularized the idea of reaching out to extraterrestrial intelligence through radio astronomy in late 1950. See Cocconi & Morrison (1959).

<sup>71</sup> Idem.

only improper communication between scientists internationally. This is attested by the fact that the very same papers by Shklovskii and Ginzburg were unknown to the West up until the late 50s, though both American and Soviet scientists would have richly benefited from exchange in radio astronomy during that time<sup>72</sup>. As such, the fact that CETI took off so quickly was the result of radio astronomy being not cut off as much from the West, quite on the contrary, but being almost synchronized, at least from the point of view of the flow of papers and findings from the West making their way into the Soviet Union.

This half or secret (from the West) synchronization during the Stalinist era made it possible for Soviet radio astronomers, once Krushchev's Thaw was in place, to reestablish communication quickly with their Western counterparts - it seems that it was rather a matter of Soviet scientists getting their ideas across the Curtain. This idea is compatible with the observation in one American report from 1981 on knowledge transfer between the two superpowers<sup>73</sup>. According to the same source, the main obstacle for American scientists to access and absorb knowledge from the Soviet Union had been the language barrier. For the Soviet scientists, of course, getting physical access to the knowledge itself was the main reason<sup>74</sup>. Also here the eagerness and engagement in exchange from the Soviet scientists' side were attested by the quick publication of translations of the Byurakan proceedings, as well as by providing a high-quality live translation service through Boris Belitsky<sup>75</sup> at the second conference in 1971.

Not only the access itself, but the problem of defending the ideas "from the capitalist West" was a challenge. This was the situation of cosmology. While observational astronomy might have had it easy, cosmology barely existed as a science during Stalin, deprived of all the debates that were taking place in the West and revolutionizing our view of the universe for good. The works of Loren Graham<sup>76</sup> and the more recent one of Helge Kragh have documented the changes that cosmology underwent during the Soviet era. By the late 40s, cosmology per se was practically banned from the Soviet Union and it existed only in the form of philosophy completely subservient to dialectical materialism. Cosmology belonged to the scientific theories directly suppressed by the regime and recovered only in the 60s<sup>77</sup>.

---

<sup>72</sup> Sullivan (2009), p. 221.

<sup>73</sup> Bricker (1981).

<sup>74</sup> Idem.

<sup>75</sup> Shklovskii (1991), p. 258 and Dyson (1993/ 1971).

<sup>76</sup> See Graham (1987).

<sup>77</sup> Kragh (2012), p. 9.

CETI shows that there is a flip side of the coin of the preceding ban on cosmology, reflecting also in the status of the more general theoretical astronomy. They both had served as a vehicle for Soviet anti-religious propaganda in the early years of the regime<sup>78</sup>. Precisely because they had served an ideological purpose before and had distinguished themselves from a natural science per se in this sense - less and more at the same time - a precedent had been established in advancing ideas that were not based on empirical research or mathematical truths. In my research, I explore the discourses in CETI and argue that this precedent was an additional condition of possibility for a cosmological discourse (CETI) to speculate on things beyond science itself. The point of this comparative detour through different types of discourse is to verify the degree of CETI's compatibility with them, while it engaged with more than scientific - arguably philosophical - presuppositions.

Before this thesis goes into the historical data, I will briefly clarify the nature of the philosophical implications that a discourse based on the pragmatic use of language achieved in CETI. This observation in scientific internationalism and the factual side of history relates back to science fiction and science in the CETI discourse, in an additional way to the one already emphasised. While looking at the CETI discourse, my research has found that the non-scientific, fictional or what historian Michaud has called "unconscious factors operating in the arguments" of both Soviet and American scientists<sup>79</sup>, play a key role. While I draw on Michaud's documentation of the SETI history, my argument is rather that these factors were not necessarily unconscious at least in the case of the Soviet scientists - it was not that Shklovskii was unaware of the boldness and sometimes lack of ground for some of his affirmations.

More specifically, Shklovskii states at Byurakan I that the time scale for technological development for (extra)terrestrial civilizations is "well known" to be short<sup>80</sup> without giving any further arguments. The assumption of the similarity of nature and therefore the possibility to quantify and evaluate a non-human extraterrestrial civilization by the same categories that apply to humans is taken for granted apparently. It is in the advancing of such courageous, even absurd ideas, that a certain space was being opened at the discursive and imaginative level, as Yurchak would agree. By working under an assumption that is explicitly stated, the

---

<sup>78</sup> Idem.

<sup>79</sup> Michaud, (2007), p. 5.

<sup>80</sup> Shklovskii, in Tovmasyan (1967), p. 8.

ontological move from necessity to contingency is being performed. In other words, by overly claiming a fact that one took for granted during that context and shouting it out loud in the forum for ideas on ETI, the fallacy at stake is being exposed. Consequently, the time scale for technological development does not have to be short not even for humanity.

This move from the necessity to contingency underlines the change in the discursive regime and is also reflected in other types of discourses at the time that have engaged with the border between science and fiction, between the “two cultures”: science and the humanities. While in the previous section I have pointed to the importance of this *mélange* between the two cultures to the CETI discourse, in this section I have reviewed the main features of the scientific internationalism circumscribing CETI. The following chapter invites the reader to the 1964 Byurakan meeting of Soviet scientists involved in communicating with extraterrestrial intelligence.

# Chapter II: Byurakan 1964

## 1. Byurakan I: Communicating Across Borders

This chapter explores the discursive regime of outer space culture in the Soviet Union in the 1960s through the Byurakan I conference. The event took place over the course of four days, between the 20-23th of May 1964, under the name of the “First All-Union Conference of Extraterrestrial Civilizations and Interstellar Communication”. The volume of the proceedings edited by the radio astronomer Tovmasyan, who was working at the Byurakan Observatory, was published, in Russian, in Yerevan (formerly known then as Erevan) in 1965. It made its way to the West through the Israel Program for Scientific Translations who published the material in Jerusalem in 1967, as a result of a “Published Pursuant to an Agreement with the National Aeronautics and Space Administration, U.S.A. and the National Science Foundation, Washington, D.C.”<sup>81</sup>. The link with the Israel scientific community is not as surprising considering Shklovskii’s Jewish origins - for which he was never a full member of the Russian Academy of Sciences, only a corresponding one<sup>82</sup>. The fact that the translation passed through this channel suggests that the attempt to communicate with the terrestrial “other” came as a bottom-up initiative. As such, it may well have bypassed some of the official channels for regulating scientific knowledge transfer.

In order to understand how the CETI discourse was intertwined with the political consciousness, I propose looking at some of the claims made during this first Byurakan conference in the next section of the current chapter. In the section afterwards, I extrapolate from the scholarly literature on the Space Race, the Cold War science in order to further integrate CETI into its era. Then I move forward with observations as well as with more additional lines of inquiry that become possible on the basis of the analysis presented here. Before the content section of the chapter, I briefly introduce below the conference’s outline, based on the afferent proceedings.

The speakers were mostly radio astronomers with a few exceptions. Viktor Ambartsumyan, the director of the Byurakan Observatory, opened up the ceremony, followed

---

<sup>81</sup> As mentioned on the title page of the original document, namely Tovmasyan (1967).

<sup>82</sup> Friedman, *Introduction to Shklovskii* (1991), p. 14.

by Shklovskii holding the main talk. A discussion between Shklovskii, G.A. Gurzadyan (Byurakan Observatory), Ya. B. Zel'dovich and B. V. Kukarkin and D. Ya Martynov took place afterwards. The next session was opened by Nikolai Kardashev. While the first three speakers had engaged with both technical and philosophical concerns, the following three were deeply dedicated to radio astronomy. Yu. N. Pariiskii, from the Main Astronomical Observatory in Pulkovo, focused on the particular observations on two “peculiar” radio sources. V.L. Slysh, who shared the same workplace as Shklovskii, namely Sternberg Astronomical Institute in Moscow, examined the empirical findings on the “radio-astronomic artificiality criteria of radio sources” as conceptualized by Kardashev: spectrum, angular size, and variability in time of the signal and outlines the stages of the search following these criteria. I. L. Gudzenko, from the Physical Institute I. N. Lebedev together with B. N. Panovkli, Radio Astronomy Council, both from Moscow engage with the difficulties in receiving intelligent signals due to the “dispersion by the scattering of radio waves by free electrons of the interstellar medium”<sup>83</sup>. This second session was concluded through a large discussion with most of the participants contributing.

In the last part of the conference, A.V. Gladkii from the Institute of Mathematics, at the Siberian Department of the USSR Academy of Science in Novosibirsk, expanded on the question of “cosmic linguistics”. He was the only speaker representing the field of linguistics in the question of communication between civilizations from different planets. Unfortunately, the proceedings of the conference only reproduce a very short synopsis of Gladkii’s talk. In the same document, there is no mention of a following discussion session. The proceedings end with two pages of subsequent resolutions.

---

<sup>83</sup> Gudzenko & Panovkli, in Tovmasyan (1967), p. 44.

## 2. Scientists Dare to Imagine

The excerpts chosen here do not exhaust the philosophical milieu of Byurakan I, as even in the “purely” technical talks, there is plenty of philosophy to be extracted. However, the content I am engaged with, in the following, refers more specifically to the philosophical or societal concerns that can be placed in relation to scientific communication across the Iron Curtain. As such, it stands for a dialogue on the political status quo of the time and for relevant proof to verify Yurchak’s argument on the discursive regime.

The “basic premise” on which the conference rested was the “multiplicity of the inhabited worlds”<sup>84</sup>. Part of the claim in this chapter is that the multiplicity of extraterrestrial worlds can be interpreted as a Freudian slip (not so slippery after all) into the terrestrial multiplicity. If one can imagine non-terrestrial domains in which intelligence organizes itself and the environment around it and that differs from us, that difference has to be addressed. Or how else would one address difference other than by proxy? I put forward the idea that CETI discourses skipped a rather direct explicit terrestrial critique only to include it in the extraterrestrial one. The mirroring of the extraterrestrial communication imperative by the terrestrial one is supported by other affirmations in the conference. For instance, a caveat made in the introduction page is that the best “course” was to start simultaneously to transmit and receive messages<sup>85</sup>. Further, in the third discussion session, Kotel’nikov also is of the opinion that transmission represents “a must”<sup>86</sup>, while Khachikyan affirms that one should “start transmission”<sup>87</sup>. Other scientists agree accordingly during different moments of the conference, and even if they do not explicitly advance the idea of transmission themselves, they do not oppose it directly, either. It does not seem far from historical fact to imagine how this cosmic imperative was underpinned by the one grounded on the planet, where communication happening in both directions - transferring knowledge from the Soviet Union to the West, as well as “receiving” knowledge from the West into the USSR - echoed a common feeling of Soviet scientists at the time.

---

<sup>84</sup> See Tovmasyan (1967), p. v.

<sup>85</sup> *Idem.*

<sup>86</sup> *Ibid.*, p. 90.

<sup>87</sup> *Idem.*

The international terrestrial communication between the communist and respectively, the capitalist worlds rested on a condition of possibility: a common language and ontology in astronomy. The fact that all civilizations coexisted in one and the same universe is to be found in Tovmasyan's preface. He states that "all the findings of modern astrophysics indicate that the fundamental laws of nature hold true within the confines of the visible Universe"<sup>88</sup>. Modern astrophysics here stood for the astrophysics that had a common denominator: dialectical materialism did not prevent anymore Soviet astrophysics from accepting Western theories. What during the Stalinistic era had counted as capitalistic pseudoscience from the West had by now been integrated into Soviet science, resulting in both the West and the Eastern bloc agreeing that the universe was expanding and that the best explanation for this expansion were Einstein's cosmological field equations<sup>89</sup>.

Moreover, while under Stalin, ideological restrictions had made it impossible to "extrapolate local laws of physics, such as relativity theory and thermodynamics, to the universe at large"<sup>90</sup>, it was now possible to live under the same sky - a sky regulated by the very same rules of physics as on Earth. Earth's laws were now accepted as the same across geo-political divisions. Stalinist ideology's effect on cosmology and astrophysics in the Soviet Union had ended in 1958, when the IAU General Assembly convened in Moscow, which led to the acceptance in the Soviet Union that the expanding Universe was not an "ideological enemy" any more<sup>91</sup>.

Stating the sharing of the commonality of matter and its laws at the cosmic level invariably rests on the commonality of it between astronomers on Earth. The unification therefore of the Soviet cosmological view with the Western one also created the conditions of possibility for civilizations similar to the one on Earth to exist. And even if dialectical materialism was already compatible with the existence of extraterrestrials, what the unification did - together with the paper from 1959 by Morrison and Cocconi - was to align the discourses from the two political blocs. The necessary linchpin for a common Universe possibly inhabited by intelligent interlocutors and conceptualized in a similar vein was now in place.

---

<sup>88</sup> Ibid., p. vii.

<sup>89</sup> Kragh (2012), p. 6.

<sup>90</sup> Idem.

<sup>91</sup> Ibid., p. 14.

In the same line of argument, Ambartsumyan continued, there were “no special reasons for singling out the solar system” as the only place in the Universe where intelligent life may reside. Not singling out humanity implies the existence of a concept of (unified) humanity in the first place. The fact that this humanity was not a purely Soviet one is proved by the fact that cosmology had caught up with the West. The articles cited in the Byurakan I conference are the latest discoveries in the field from both the West and the Soviet bloc, which supports the idea that the exchange in intellectual ideas manifested relatively intensely contemporary to the Byurakan I time, underpinning a common ideatic ground.

A general state of highly advanced terrestrial science, implicitly unified across political divisions, is stated further:

The recent advances in astronomy and biology permit a reasonable, scientific approach to the question of multiplicity of inhabited worlds in the Universe. The present-day state of radio engineering makes a long-range interstellar communication quite feasible. Radio astronomers have become highly proficient in the detection and analysis of radio sources in space, up to distances of billions of light years. The development of cybernetics, general theory of language, and modern mathematical techniques provide the necessary tools for tackling the general features of information transmission and reception between civilizations and for an objective analysis of coded signals; the subject of cosmic linguistics is also beginning to be approached scientifically.

To sum up, communication with extraterrestrial civilizations, which has remained unfeasible until lately [sic], now appears to justify the application of concerted scientific and technical efforts for its realization.<sup>92</sup>

The enthusiasm for the communication across the cosmic space was based on the sudden possibility of its actual realization. Radio signals offered this new means, but not only. Linguistics, cybernetics, mathematics, all could converge in serving the new scientific endeavour. Moreover, these sciences were, even if not completely separated from dialectical materialism in the Soviet, a conversation between scientists on the two sides. This could be carried now with substantially less ideological influence on the purely scientific content. Because of the diminished role of dialectical materialism over science, a terrestrial subject -

---

<sup>92</sup>Tovmasyan (1967), p. vii.

humanity or human civilization - could be conceptualized and as such this subject was further imagined as an interlocutor for extraterrestrial intelligence.

The fact that the laws of matter on Earth applied to the whole Universe meant that also science on Earth was a legitimate candidate to enable scientific pursuits in outer space, and that there was something universal in unified human terrestrial science. Nonetheless, Sheridan notices that a particular difference between the two events can be accounted for through the first words announced by Ambartsumyan. While the participants in the Green Bank did address the probability of life - intelligent or not -, as well as asked “how communication could be effected”, the issue of language and transmitted information was left unattended<sup>93</sup>. In contrast to the Green Bank, Ambartsumyan clearly announces the three goals of the conference:

(a) the existence of EC [extraterrestrial civilizations] in the light of the astronomical notions on [sic] the evolution of life and civilizations in remote planetary systems; (b) the detection of EC and communication between them, primarily the problem of establishing communication between the Earth civilization and the alien intelligences; (c) the problem of language and the transmitted information.<sup>94</sup>

This difference raises many questions in relation to scientific internationalism. Did the deprivation of communication with the West that the Soviet scientists had experienced before the cosmic reunification made the Soviets comparatively more aware of the problem of language? Or, alternatively, in a different manner? Did this particular social and political constraint reverberate into the scientific imaginary enough to mark a difference between scientific assumptions in the lookout for ETI? How much did Soviet scientists relate to the lack of the third issue being present at Green Bank? While the historical record indicates that from the East to West, ideas were being passed in the field of CETI not lastly through the Tovmasyan and the Kaplan texts, but also through the international range of the CETI project at the level of IAA later, there is not much evidence to how much Green Bank ideas had made their way to the Soviet Union in the same proactive way.

The talk by Viktor Ambartsumyan offers insight into how the drive for extraterrestrial communication was mirrored by the terrestrial one. In his quality as the president of the

---

<sup>93</sup> Sheridan (2011).

<sup>94</sup> Ambartsumyan, in Tovmasyan (1967), p. 1.

conference, Ambartsumyan states that “We all feel, however, that science, and in particular Soviet science, cannot bypass the question of the existence of intelligent life elsewhere in the Universe and the problem of interstellar communication”<sup>95</sup>. And while the American event equivalent to the Byurakan I conference - the Green Bank conference - did not make its proceedings available to the public<sup>96</sup>, Soviet CETI-ists did not delay in communicating their latests insights to the other side of the Iron Curtain what they unanimously felt - or what the historical file documented as a unanimous agreement. In other words, establishing interstellar



communication involved not delaying interhuman *interideological* communication. This further testifies to the terrestrial transmission imperative from the Soviet side.

*(Left) Portrait of V. Ambartsumyan.*<sup>97</sup>

With regard to the receiving of terrestrial Western scientific knowledge, the mere fact of the first search to already had been made in the West - namey, Frank Drake’s Project Ozma -

seems to have impacted the goals of CETI:

[..] The rapid growth of scientific literature on the various aspects of extraterrestrial civilizations, the ever growing participation of scientists of different specializations in the study of this problem, and, finally, the first practical steps which have been taken in the USA in the direction of actual search for intelligent signals from space - all this indicates that the question of establishing communication with extraterrestrial civilizations has reached a stage where it can be regarded as a topical scientific problem which deserves regular attention.

2. It follows that a systematic experimental and theoretical investigation of the problem should begin.<sup>98</sup>

---

<sup>95</sup> Idem.

<sup>96</sup> Sheridan (2011).

<sup>97</sup> Credits: The Bruce Medalists, <http://www.phys-astro.sonoma.edu/BruceMedalists/Ambartsumian/>.

<sup>98</sup> Ambartsumyan, in Tovmasyan (1967), p. 97.

Even if the Byurakan I speakers cite works from the 60s published by Western scientists, it is not known the exact circulation route of these publications. For example, radio astronomer V.S. Troitskii cites the anthology edited by Cameron “Interstellar Communications” from 1963<sup>99</sup>, which includes some of the most recent contributions from the West from the field. Others cite different references, and relate to ideas from the West to a fair extent. It is however rather later, during Byurakan II, that a clearer perspective on the entanglement in ideas related to the quest for extraterrestrial intelligence between the two blocs is offered.

A striking feature at Byurakan I is the role that biology plays - and at the same time does not - in the talks. The question of the biological constitution of extraterrestrial civilizations is intriguing, not lastly as there were no biologists speaking at the conference. Ambartsumyan briefly states that an intelligent extraterrestrial civilization might or not be a biological organism, and then he quickly switches the focus again to astronomy as a tool to identify life in the universe:

[...] biological evolution is a prerequisite for the development of a civilization, regardless of the peculiar forms the civilization may take later on. The question of astronomical proof of the existence of EC is thus primarily a question of the range of astronomical conditions which are adequate for the evolution of life and the subsequent gradual evolution of intelligent beings and civilizations.<sup>100</sup>

The lack of biological aspects per se being discussed - none of the other participants engaged with this subject -, points to the potential reasons behind the absence of biologists at Byurakan in 1964. Research so far on Cold War scientific internationalism reveals that biology was subject to more restrictions than other domains<sup>101</sup>. Furthermore, since this professional environment had been divided between Lysenkoism and non-Lysenkoism in the Soviet Union, the possibility of biologists to engage in courageous scientific imaginary was diminished out of more reasons. Firstly, the physical presence of thinkers that might challenge the regime was scarce in the immediate post-Lysenko era<sup>102</sup>. Secondly, if radio

---

<sup>99</sup> Troitskii, in Tovmasyan (1967), p. 71.

<sup>100</sup> Ambartsumyan, in Tovmasyan (1967), p. 2.

<sup>101</sup> See Wolfe (2018).

<sup>102</sup> 1964 marked the year in which Lysenkoism started slowly, but gradually, to be criticized, according to Graham (1993), pp. 133-134.

astronomers would have wished to engage with the subject, they would not have known whom to trust in the field of biology. Thirdly, if the ideas presented at Byurakan speculated on many issues that overarched terrestrial organization of life, the intervention of other actors would have proven problematic. This seems is even more justified if, fourthly, the transfer itself of the proceedings to the West was meant from the beginning to be performed through a different channel than the international institutional framework for astronomers.

Even if Lysenko was a more isolated event than early research in Soviet studies have presented it, the post-effects of Lysenkoism can not be ignored when it comes to addressing political criticism from within the discipline of biology. In short, if the hypothesis of political criticism is to be supported, then inviting biologists would have made things more complicated and arguably would not have allowed for such an unleashing of freedom of the imaginary. In the same line of argument, Shklovskii had previously sent his own manuscript for his previous book across the borders to the West to Carl Sagan partially due to the latter's expertise in biology<sup>103</sup>, and at the same time did not seem to collaborate with any biologist from inside the communist bloc on the subject. Astronomers and biologists in the Soviet Union did not make good allies in challenging either scientific or political borders, at least through the CETI project. This fact also is compatible with the observation of more scholars that Soviet astronomers enjoyed numerous advantages, comparatively to their colleagues from other fields.

The difficulty of including Soviet biologists in the CETI activities also rests on another reflection at the time, as reported in Western sources. More precisely, Bobrovnikoff notes that the debate seemed to have played at the time between, on the one side, the more skeptical biologists, and, on the other one, the (experimental) radio astronomers, the latter more inclined to make efforts in reaching out to extraterrestrials: "Astronomers are in general more optimistic, while biologists knowing something of the complexity of life on earth, are more cautious". He goes on, noticing that "speculations on non carbon life are not that often in Russia, as in the West"<sup>104</sup>.

While the biological arguments were circumnavigated by the Byurakan I attendants, the already mentioned linguistics weighed in on the agenda:

---

<sup>103</sup> Shklovskii (1991), p. 250.

<sup>104</sup> Bobrovnikoff (1968), pp. 456-457.

[...] our aim is therefore to obtain rational technical and linguistic solutions for the problem of communication with extraterrestrial civilizations which are much more advanced than the Earth civilization.<sup>105</sup>

What Sheridan has observed is that Gladkii did raise the possibility of different types of mathematics, in difference to Sagan and later the SETI project, which assumed that human mathematics is universal<sup>106</sup>:

We must, however, remember that different civilizations may command different knowledge, and that the differences may be pronounced even at the most elementary level. A priori, we cannot exclude the possible existence of a highly advanced civilization whose mathematics is essentially different from our fundamental mathematical concepts, or which has no analogous discipline at all. [...] languages specifically designed for the purpose of communication with other civilizations [...] [are] intended for communication with intelligent beings which are mentally not unlike man; it will hardly do in cases when the thinking processes and the fundamental concepts of the recipient are entirely different from ours.<sup>107</sup>

What Gladkii's approach shows is that even if the biological differences were not considered per se in detail, the possibility of different "thinking processes" can be interpreted as a difference in biological features as well. This hypothesis is further supported by dialectical materialist idea that thought is deeply dependent of matter<sup>108</sup>, therefore differences in nonmaterial features correspond to differences in the material world. However, biological differences being left out of the discussion at Byurakan I was interpreted in the West as a choice of a different sort, as a positive adhesion to the known terrestrial life, rather than

---

<sup>105</sup> Ambartsumyan, in Tovmasyan (1967), p. 3.

<sup>106</sup> Sheridan (2011).

<sup>107</sup> Gladkii, in Tovmasyan (1967), p. 95.

<sup>108</sup> See, for example Ilyenkov's interpretation of relativity theory, thermodynamics and cosmology through Hegel's dialectical materialism, in his early text from the 1950s (Ilyenkov, 2017). The text is a speculative writing from the early stages of the integration of the debates in theoretical astronomy and cosmology from the West into Soviet science and thinking. More research is needed to explore to which extent such philosophical ideas at the time made their way into the CETI actors' thinking and the imaginary they choose to represent, especially in their communication with scientists from the West. As such, the question of how ideas circulated "back and forth", or rather entangled is a rich subject on its own, not yet enough explored by research on the Cold War production and transfer of knowledge.

participatory hindrance of biology to the debate: “[Soviets] are committed to life based on hydrocarbon”<sup>109</sup>.

There are other two ideas put forward by Gladkii that shine through the proceedings. The first one refers to the structure of a “cosmic language” which had to be highly formalized and unambiguous, for the communication to succeed. Here Gladkii agrees with Freudenthal who had developed already LINCOS, the first attempt in this sense, but only a “moderately formalized” language, as Freudenthal himself described it<sup>110</sup>. What Gladkii suggests is that “an explicit description of syntax should preferably be included in the message”<sup>111</sup>. On a metalevel though, this leaves the conundrum of how successful communication can be initiated “for the first stages of decoding”<sup>112</sup> as well tied as a Gordian knot. In other words, how to start a communication with beings of whose material and mental features humans have no previous knowledge, was just being addressed, and stood far from an actual scientific progress in the Soviet Union in 1964. Nonetheless, the possibility of alternative representations to language, was taken into consideration:

This proposition is based on the assumption that the use of language is the most probable common feature of civilizations which have reached the stage of mutual communication.

Other approaches of course are also possible: the first message may contain, say, images, and not concepts.<sup>113</sup>

The second idea in Gladkii’s presentation is the general concern for language studies on Earth, that the theory of language itself “without particular application to the problem of interstellar communication”<sup>114</sup> was a precondition for the cosmic endeavour at stake. In the same line of argument, Ambarstumian’s comment emphasizes that Gladkii also raised the problem of learning. Unfortunately, since the synopsis in the proceedings only reproduce little more than one page from Gladkii’s presentation, it does not reveal as such how these ideas were in detail put forward and how they reverberated into the Byurakan gathering.

---

<sup>109</sup> Bobrovnikoff (1968), p. 456.

<sup>110</sup> Gladkii, in Tovmasyan (1967), p. 95.

<sup>111</sup> Idem.

<sup>112</sup> Idem.

<sup>113</sup> Idem.

<sup>114</sup> Ibid., p. 96.

What shines through is nevertheless an interrogation of the sky that reflects back on the uses of language in the terrestrial universe.

The most revealing in terms of futuristic discourse and exercising the political imaginary at its most is Shklovskii's talk by far. After the introduction, the conference continued with Shklovskii reviewing the first issue announced by Ambartsumyan, the existence of extraterrestrial civilizations. He introduces the problem by emphasizing the historical perspective, the fact that this problem has preoccupied humans for a long time and refers to his recent book, *Universe, Life, Intelligence (Vselennaia, Zhizn, Razum)*. He then introduces the recent achievements which had made possible the new scientific domain bearing yet no name<sup>115</sup> - a domain still unnamed till this day, the scientific community having so far failed to integrate all scientific insights from different separate domains into an overarching outer space science with a paradigm of its own. The first achievement Shklovskii introduced referred to the probability of life on other planets as evidenced by the existence of planets around nearby stars - the recent discovery that Barnard's star harbors a planet, more notably<sup>116</sup>. On the basis of this, Shklovskii concludes:

It has been established that with a high degree of probability planetary systems are a very common occurrence in the Galaxy. [...] The fact that one of the nearest stars has a planet points to the enormous abundance of planetary systems in the Galaxy.<sup>117</sup>

However, Shklovskii limits later in his talk the probability of the existence of extraterrestrial civilization, a thing for which he will draw harsh criticism during the discussion that followed, from Gurzadyan, Zel'dovich, and Kotel'nikov, in particular. In Shklovskii's own words, "Civilizations can hardly be expected to have extremely long lives" and therefore he approximates the lifespan of one to 10 to the power of 4 years. He refers to rather cultural than natural factors that potentially prevent a civilization from continuing its life. None of the discussants seem to follow his line of thought. As Kotel'nikov put it: "By all means, don't let us "<<extinguish>> extraterrestrial civilizations. Let us start looking for them"<sup>118</sup>. This underpins Shklovskii's separate status as one concerned with the humanistic

---

<sup>115</sup> Shklovskii, in Tovmasyan (1967), p. 5.

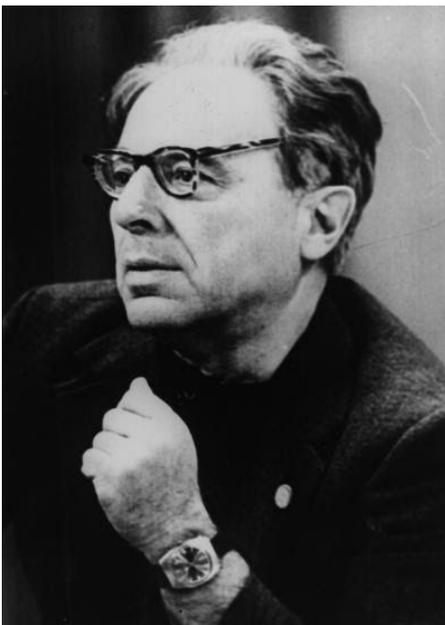
<sup>116</sup> Idem.

<sup>117</sup> Ibid., pp. 5-6.

<sup>118</sup> Tovmasyan (1967), p. 14.

concerns, and highly criticizing many of his Soviet colleagues from CETI for rushing to experiment with the search<sup>119</sup>.

The second achievement that Shklovskii points to is the development of biology and chemistry to such an extent that it promises to illuminate on the origin of life. The fact that this subject preoccupied CETI is supported also by Shklovskii's book, that is cited more times during the conference. The contrast between the active recognition of biology and chemistry as fields to contribute to the effort of communicating with ETI, and the de facto



exclusion a mirror of the political environment. Here, the scientific imaginary in biology cannot escape the real-factual political and other voices (non-biologists) speak for the biologists themselves.

*(Left) Portrait of I. Shklovskii.<sup>120</sup>*

While not surprisingly radio astronomy constitutes the third achievement, the fourth one is cybernetics. Just like cosmology, cybernetics had recently been liberated from the label of a “bourgeois science”<sup>121</sup>. By the time of Byurakan I it had become a new frenzy in the Soviet Union at that time<sup>122</sup>. The fifth one anchors ultimately CETI to the spirit of its age, “the conquest of space”:

The inexorable and systematic expansion of humanity into the [sic] outer space is in itself a vivid proof of the existence of intelligent life. This process should by right be considered as a qualitatively new stage in the development of humanity. [...] Unrestrained expansion of human activity throughout the entire near-solar space is an inevitability, culminating in the creation of an artificial biosphere some 10-15 orders of magnitude greater

---

<sup>119</sup> Sheridan (2011).

<sup>120</sup> Credits: Sternberg Astronomical Institute, Moscow, <http://comet.sai.msu.ru/radio/shklovski/100.jpg>.

<sup>121</sup> Csicsery-Ronay (2004), p. 340.

<sup>122</sup> Ibid., p. 342.

than the natural habitat of man. [...] I would only like to quote from one of Sir Arthur Conan Doyle's books, "Through the Magic Door":...<sup>123</sup>

It is in examining what he calls the "sociological" aspects of the extraterrestrial intelligence here that Shklovskii's scope extended beyond the issue of extraterrestrial intelligent life. In his view, enabled access to outer space is a criteria for intelligence itself. Communication was viewed as going hand in hand with expansion - of which the former was an instantiation. Successful expansion meant successful communication. The unrestricted nature of both was expressed as a necessity.

While the calculations of the range of human expansion is less important, and has to do with the observable Universe at that time, it is the last sentence that places the previous ones in a new light. And despite the absence of the exact quotation from Conal Doyle's book having been omitted in the proceedings, the fact that a Western book of fiction was cited of an author that had inspired him as a child<sup>124</sup> says something about the entanglement of the Western and Eastern block imaginaries. After all, there was a cultural and literary ground on which to base a discussion on the "sociological" aspects of outer space exploration. Beyond the science fiction literature of the era, there were other common reference points. Literature and not only scientific ideas from the West had already become part of the Soviet (scientific) cultural imaginary. It remains so far unexplored by scholars to which extent did such fictional constructions from the West influence scientific imaginaries in the Soviet Union.

An additional entanglement complements this open question, when Shklovskii compares in the next phrase the outer space exploration with Columbus discovering America. It has been noted by other scholars that Western scientists have been recurrently referring to outer space exploration under this terms. The fact that this motif was present in a Soviet conference addressed to an exclusive Soviet audience - but that made its way to the West under the circumstances announced at the beginning of this chapter - points to the hypothesis that some references were perhaps necessary in order to trigger the attention of certain actors from the West or were at least powerful signifiers inside the Soviet Union.

---

<sup>123</sup> Shklovskii, in Tovmasyan (1967), pp. 6-7.

<sup>124</sup> Shklovskii (1991), p. 89.

Shklovskii's scepticism with regards to finding life was expanded upon as he engaged with the question of the "duration of the psychozoic era" or the "age of intelligent life". However, seeing it as only scepticism will be misreading his ideas:

There is, however, a possibility that some civilizations, having reached a highly advanced level, will find themselves past the inevitable crises and internal contradictions which plague younger civilizations. The evolutionary time scale of these quiescent civilizations may be considerably larger, approaching the cosmogonic scale.<sup>125</sup>

Shklovskii's discourse bears the appearance of a dialectic between survival and destruction, expansion and disappearance of intelligent life. Extrapolating from the human civilization's course, he engages into a calculation of the expansion rate and other ways of quantifying, rationalizing, and establishing limits and notions of a civilization's development. Most notably,

It must be clear to all of us that serious crises are continually encountered by the evolving civilizations. One of these crises may even prove to be fatal. Some of the crises and internal contradictions of the future can be visualized even now.

- (a) Self-destruction as the result of a thermonuclear holocaust or, in general, a discovery leading to unexpected and uncontrollable consequences.
- (b) Genetic failure.
- (c) Over-production of information.
- (d) Limited brain capacity of the individuals: this may result in overcivilization and eventual degeneration.
- (e) A crisis connected with the creation of artificial intelligence [...]

Finally, a civilization may choose not to follow the path of "quantitative" expansion. It will freeze the energy resources, forbid uncontrolled space flight, and then concentrate on entirely new interests leading to a kind of "qualitative perfection".<sup>126</sup>

It is easy to see how Shklovskii's discourse balanced between the two opposites: the flourishing of a civilization and its own demise. The topic of communicating with ETI played the role of a pretext in this part of the philosophical ideas, in order to review the sciences

---

<sup>125</sup> Shklovskii, in Tovmasyan (1967), p. 8.

<sup>126</sup> Ibid., p. 12.

which could realize humanity's hope of establishing contact with other "intelligent" beings. At the same time, a Damocles sword floated over the same creative-driven humanity. Such concerns, together with the limits to growth were known to be a lively conversation and to give rise to movements and new organizations in the West, like the Russel-Einstein manifesto in 1955, or the discussions that led to the founding of Club of Rome 1968, for instance. In all of these, top scientists from different fields formulated global concerns similar to the ones put forward by Shklovskii.

*(Right) N. Kardashev as a young student.<sup>127</sup>*

The next talk in the order of philosophical ideas is the one by Nikolai Kardashev. The main difference between him and Shklovskii is that Kardashev was much more positive with regards to a civilization's faith. In his scale for classifying extraterrestrial civilizations, the main assumption is that a civilization will manifest its maximum capacity, where capacity is framed in terms of energy consumption and management: "Any system with internal sources of energy should radiate the entire output of its sources, since otherwise the temperature of the system will rise"<sup>128</sup>. Once again, this proves the integration of thermodynamics into Soviet scientific thinking and ideology as a premise to conceptualizing ETI. It points to questions on how philosophical thinking at the time was changing as it (had already) integrated scientific theories "from the West".



The scientists at Byurakan I reflecting on the "stage" of an ETI's development with which humanity might stand a chance to communicate envision it as more advanced. It is only Shklovskii that expands on the idea of what this advancement might look like from a humanistic perspective, while Kardashev formulates it as a problem of energy. The assumption of a higher extraterrestrial being represented a technical prerequisite demanded by the means of modern science at the time in order for communication to function. One of

---

<sup>127</sup> Credits: Daumann (2003).

<sup>128</sup> Kardashev, in Tovmasyan (1967), p. 19.

the most experienced radio astronomers present at Byurakan I, Khaikin, formulated the scenario in terms of two civilizations, A and B, in which A was highly advanced and B was at



least equivalent to the human terrestrials: “A knows B’s lowest level of development at which B will be able to detect the former’s meaningful signals and to decode the message”<sup>129</sup>. In the same line of argument, the “feasibility of interstellar communication” was “a product of the technical resources of the two communicants”<sup>130</sup>.

*(Left) I. Shklovskii together with N. Kardashev.<sup>131</sup>*

What the comparison of humans to other potential civilizations in outer space shows is that the prospect of communication with extraterrestrials gave rise to a particular imaginatory exercise. Reaching far beyond a concern in radio astronomy, it became visible that the comparison made sense if humans themselves overcame differences and limits on Earth. The borders represented those between different disciplines, but also between political divisions. Moreover, the two border crossing processes went hand in hand, one reinforcing the other. The scientific commonness of cosmology between the two sides of the Iron Curtain allowed for them to engage in communication. At the same time, the terrestrial conversation opened up a new space for the Soviet scientists to exercise their imaginary. The extraterrestrial realm was gaining significance, outer space became a “place”: beyond a space that is abstractly defined, a place marked by anthropic meaning<sup>132</sup>. The mere scientific discourse fulfilled a pragmatic role, as observed by Alexey Yurchak in his analysis on physicists. The terrestrial conditions were reconsidered from a new perspective. Soviet CETI-ists formulated these new issues on their agenda in explicit

---

<sup>129</sup> Khaikin, in Tovmasyan (1967), pp. 54-55.

<sup>130</sup> Ibid., p. 53.

<sup>131</sup> Credits: Daumann (2003).

<sup>132</sup> Messeri (2016) pp. 2, 8-9, 13.

compatibility with the official doctrine. However, more subtly, the implicit message suggested new meanings, as well as a critique to humanity at large.

Even if the concerted effort, as envisioned and proposed at the end of the conference, did not take place as hoped for, the ideas that were spoken out, exchanged, together with the possibilities and scenarios imagined became a reality in themselves in a different way. More arguably, they expressed a liberation that science was in dire need of and could now enjoy as it allowed the minds of scientists to cross the borders they will have to wait longer to cross fully in flesh with the fall of the Soviet Union. To which extent CETI was, from this point of view, not an isolated phenomenon will be expanded in the following section.

### 3. CETI among other Discourses

Apart from Yurchak's observations, other particularities of the language noted by historians relevant to CETI have to do with science, fiction, science fiction and other types of scientific related discourses. Particularly, the grounding of the Soviet space exploration project in fiction literature has been extensively investigated by historian Asif Siddiqi:

The discursive level of space exploration in the Soviet Union was a mix of rationalism and materialism: socialism, science, space - bringing a future based on a past legacy which included the rationalistic, science deterministic views of Tsiolkovskii and others. However, these views were manufactured to fit the discourse of the Communist idea of science, atheistic and advancing future of humanity through science and tech. The trust in science and tech was a cult that obscured the more mystical parts of the thinking of its early 20-th century prophets on which it claimed it draws some of its ideas at the time.<sup>133</sup>

The citation by Siddiqi points to more layers of the discourse surrounding science during the 60s. Firstly, during Khrushchev's time, science and technology were presented in the official discourse as the universal panacea, capable of advancing society's purported goal to achieve communism. According to the official discourse of Soviet authorities at the time,

---

<sup>133</sup> Siddiqi (2016), pp. 128-130.

social problems could be solved by technological progress<sup>134</sup>. This kind of determinism is also visible in the CETI conferences. Secondly, it raises the question of how much the mystical thinking of the early 20th-century prophets found itself in the thinking of CETI proponents. By extrapolation, two additional questions can be asked: to what extent was potentially another kind of mysticism embraced by these actors and respectively what other things/ ideas did the official CETI discourse obscure?

With regards to the presence of the early 20th-century prophets in the thinking of the Byurakan I participants, there is nothing explicit in the proceedings. Nonetheless, American sources reporting on this conference recognize the legacy of the likes of Tsiolkovskii and Tikhov, whose scientific work was informed by their visionary thinking and their futuristic imaginary, just “as in the West”<sup>135</sup>. Particularly, Tikhov was very interested in extraterrestrial vegetation and on the existence of life on Mars - he assumed that its vegetation was red<sup>136</sup>. Shklovskii, who was not a biologist, believed that “Mars had once a civilization which launched satellites, but is now a dead body”<sup>137</sup>. Previous “mystical” ideas could very well have been selectively appropriated and built upon. Because this Western source goes beyond the mere meeting at Byurakan which focused on the intelligence question and where the biological speculations were brushed to the side, it offers additional key information that can point to intersections of ideas. As Siddiqi notices, even if not directly influencing the outer space imaginary of the 60s, the cosmist views of the early 20th century Russia did indirectly accompanied it<sup>138</sup>.

It is the selectiveness in expressing (and embracing) certain ideas that were not supported by the empirical science - and that could well have been incompatible with it - that matters for the discourse analysis I am bringing forth here. What is relevant for the analysis is not what scientists de facto believed and stood for scientifically, but what ideas they advanced and what ideas ultimately did for them and for the larger context. The analysis is concerned with the instrumental use of ideas. What can be seen is that in the CETI Byurakan discourse such “real” beliefs of Shklovskii that Bobrovnikoff notices are not recognizable. Instead one deals with Shklovskii’s concerns of how a civilization might destroy itself. Why

---

<sup>134</sup> Guth (2015).

<sup>135</sup> Bobrovnikoff (1968), p. 455.

<sup>136</sup> Ibid., p. 458.

<sup>137</sup> Idem.

<sup>138</sup> Siddiqi (2016), p. 155.

were these particular ideas chosen specifically from the side of the organizers for a conference whose content was meant to be published shortly afterwards in the West? What the record shows is that political ideas envisioning a global consciousness and a global “humanity” were expressed here. Because communicating with extraterrestrial intelligence offered a space for - if not even depended on - envisioning the intelligent terrestrial subject, it could have become the channel for a multitude of ideas, including those that challenged the political on more levels, be it local, regional, global or even beyond.

Underlying Yurchak’s thesis is the assumption of language as situated activity. This means that CETI actors were acting, reacting and enacting through the discourse. A detour through the anthropology of physics can offer a revealing perspective. Anthropologist Anne Dippel in looking at the CERN scientists argues that underlying their quest is a utopian *dream of a complex endless memory* similar to those of *traces of culture*<sup>139</sup>. While CERN scientists look for the ultimate unit of the physical reality, one could argue that the CETI (and later SETI) scientists look(ed) for the proof of the universality of radio waves, as well as for the universality of intelligence - of human intelligence. If the human-like intelligence could to be found on other planets would have meant that humans were more than themselves, that something in them transcends the immediate physical reality on Earth. This already-existing proof of transcendence was *physical* - meaning translated into the (astro)physics of radio waves. It is here that the intersection of CETI and religion that anthropologists pointed to can be even further emphasised.

Anthropologist Traphagan argues that the current SETI programme lies at the intersection of science with religion because of the hopes linked to it. The further promise of this transcendence translated at the level of science itself is a return to the ontology of modern science. As Latour would argue, we have never been modern. We have not separated a pure science from the religious, political or social concerns. We have merely evacuated them and they seem to have recurrently made their way back into the scientific imaginary. In retrospective, and not surprisingly, such seemed to have been the process at work in CETI as well. Leading radio astronomers exercised their power to imagine, beyond the borders they were usually confined to, and with a general optimism.

---

<sup>139</sup> Dippel (2016), p. 2.

Scholars agree that the 60s were for the West<sup>140</sup> a time full of hope for humanity's expansion into space. CETI shows that this optimism manifested in the scientific community around it, too. While the sending of humans and objects made by humans into space - material ones would be one way of expanding there, connecting through radio waves was a different type - almost in the mirror. It would have shown that human-likeness had already resided out there. Or that humanity were further part of a bigger picture, not that it was merely attempting to make itself as such by travelling there. The fact that other civilizations might have gone through the same crisis that humans were confronting was both a hope and a warning.

At least some of the leading CETI advocates were using this platform to express alternative futures to the one previously suggested by the Soviet authorities. Khrushchev's Thaw, the period in which Nikita Khrushchev held the position of first secretary of the Central Committee of the Communist Party (1953-1964)<sup>141</sup> had allowed for a sudden moment of revolutionary revival and renewed sense of freedom of expression in art of all kinds. The observations in scholarly work on the unofficial music being created during that time, for example, reveal that though it was an explicit critique of the system, but rather the techniques were more subtle, not lastly because of fear of repercussions on one's professional career. Whether this was a general trend - of a subtle critique taking place on the basis of a revived sense of freedom - at the level of the intelligentsia, it remains to be supported by further work in the scientific community. What scholars so far have been agreeing on is that the 60s (and even late 50s) inspired many intellectuals and even some claim that Khrushchev was a precursor of Gorbachev. Khrushchev had implemented reforms that allowed for a short window of time for people to express themselves anew and to breathe relatively free culturally again. Under these conditions, the CETI discourses came to realization.

One particular manner in which this freedom of expression was manifested refers to the literature genre known as *nauchnaya fantastika*, or the Russian science fiction. During the

---

<sup>140</sup> Geppert (2018), pp. 229, 233.

<sup>141</sup> Scholars argue on the exact definition of the "Thaw" as well as with the exact period to be circumscribed by the notion. However, as the analysis of CETI extends well into the 70s, it does not contradict seeing the Thaw as correspondingly a longer period with certain freedoms being enjoyed still well into the end of the 60s. The question of how certain forms of freedom transformed in time throughout the existence of CETI is at the core of the research in this dissertation. Therefore, the reworking of the definition of the Thaw, implicitly, as well. As more research is needed to give a comprehensive picture that will define the Thaw through CETI, I will live this question on the side, and employ the simplified delimitation of the Thaw (1953-1964) and analyse the forms of freedom independently.

Thaw, the regime promoted the conquest of cosmos as the “final stage of communism”<sup>142</sup>. The Academy of Sciences took an interest in AI, cybernetics, telepathy and life on other planets, and “as astrophysics took inspiration from Verne’s and Wells’ science fiction, scientific discourse merged with the fantastic literary discourse”<sup>143</sup>. A revival of *nauchnaya fantastika* accompanied the scientific enthusiasm. However, the Thaw ending (or slowing down substantially at least) by mid-1960s did not bring a demise of this genre. Rather *nauchnaya fantastika* became a place for critique, the subtle critique that music was addressing. What CETI shows is that the scientific intelligentsia was also able to address critique by bordering science with fiction, or with the humanities. Not only can the critique in CETI and in the *nauchnaya fantastika* can be seen as a cultural movement continuum, but also as an intersection, complementing each other. Writers were doing their job in imagining alternatives, and scientists joined the conversation, bringing their insights.

*Nauchnaya fantastika* stood at the intersection of criticism and official discourse of the regime. Some scholars even claim that of all the expansively creative periods in history, the science fiction created during the Thaw had the most impact on the “public sphere, the political and the currents of mainstream literature - or was viewed as such as a potential threat by the ruling order”<sup>144</sup>. If this is true, than there are very few reasons to exclude the scientific intelligentsia from being influenced by the genre, especially astronomers. In the 1960s and 1970s, *nauchnaya fantastika* “was a habitual or favourite reading for 70-80% of the tech and arts intelligentsia”<sup>145</sup>. Moreover, a more layered entanglement between science and science fiction/ humanities is suggested by the fact that some of the scientific elite indulged into contributing to the genre, by writing - under pseudonyms.

As science fiction transformed into political critique, so did scientific discourse. Anne Dippel’s contemporary analysis in the anthropology of physics employs the concept of *cosmopolitics* in order to render visible how thoughts in physics turned into money<sup>146</sup>. In the Soviet Union they money did not have the same value as in a (today’s) capitalistic society. However, thoughts turned into politics itself - an act of politics - therefore science had the capacity to become political anytime- to return to the political dimension. It is here that the

---

<sup>142</sup> Menzel (2005), p. 130.

<sup>143</sup> Idem.

<sup>144</sup> Csisery-Ronay (2004), p. 337.

<sup>145</sup> Menzel (2005), p. 117.

<sup>146</sup> Dippel (2016), p. 5.

Latourian insight of science being more itself, once again becomes visible. Because CETI discourse had been able to manifest a highly critical capacity for political thinking during the Cold War Soviet Union, it mattered beyond the limits of the astronomical society around CETI. As such, *cosmopolitics* can be resignified as a promising analytical concept to understand the process through which CETI imaginary arguably reverberated at large.

Acknowledging the non-purity of science through a sort of intrusion of politics into it rather than showing an incapacity of a modern dream, it gave science (and scientists) a supplementary power: it engaged with the political as well as the social, while being able to switch that connection off or pretend to do so with grace. The scientific pursuit of extraterrestrial radio waves turned into a political act in the sense of the Cold War competition, as astronomers engaged their community in an imaginatory exercise. CETI shared with science fiction, and arguably with some philosophical work, of that time a flexing of imagination's muscle and therefore opened up the space for new ideas.

The common features of CETI imaginary with other realms does merely stop at science fiction. Science as the instantiation of the rational was presented renewed as fighting against religion during Khrushchev's Scientific Technological Revolution (STR)<sup>147</sup>. Scientific prose was serving this purpose by presenting science in a positive light<sup>148</sup> (and less focusing on the critical analysis of the scientific content). CETI discourses sometimes moved away from the scientific content and presented the potentiality of CETI, situating therefore the discourse at a meta-level - be it political, too - embracing a similar hopeful esthetics. Therefore, they played the equivalent role of scientific prose. CETI was from this point of view, beyond a contribution to technical details and empirical grounding of a scientific attempt to reach out to ETI, a discursive permutation at the least in the new discursive regime as emphasised by Yurchak.

The critique of Stalinist irrationalism was part of the STR discourse. But by not circumscribing an exact framework for the STR and the Khrushchev ideology - there was nothing as such - and constructing the discourse on the basis of the negation of the previous regime, the Thaw allowed for proactive, even bottom-up discourse to emerge - such as CETI or critical science fiction. What is specific to the critique embraced in CETI is that it took

---

<sup>147</sup> According to Kuchment. The definition of STR here is the one employed by Stefan Guth (2015) who traces back its beginning in 1955 with an end by 1980s, in order to account for how science was viewed and promoted as the driving force for the full achievement of communism in the Soviet Union.

<sup>148</sup> Andrews (2016).

place through the participation of the Soviet Union in a global political program. It overarched the global view on politics. Kojevnikov's point on the paradox of Soviet science - part of the reason it did not collapse was that it allowed in time (during the Thaw especially) to reconnect to debates in the West, to "catch up" with liberal science enough to allow a conversation between scientists<sup>149</sup> - gains new relevance. Moreover, beyond the "purely scientific" exchanges, what is perhaps more important is the fact that the non-scientific liberated imagination found itself on exploratory territory in CETI. If Kojevnikov is right, then this breath of fresh air was the oxygen mask that science needed to survive.

#### 4. New Possibilities, New Questions

According to Michaud, in the recent past we have relied on science fiction to disrupt the mundane, while now we rely on science<sup>150</sup>. During the Space Age, in the Soviet Union the latter had risen suddenly exponentially, wherefrom science had become able to disrupt the mundane because of its ability to engage in a certain relation to other realms of human existence. At least through the CETI imaginary as framed at Byurakan I, the special status of science was well circumscribed while it stood in a dialectical relation with something else, namely the public culture and imaginary. The episode seems to have been manifested as a larger phenomenon, where different discourses - such as the scientific prose and science fiction - combined similar elements. As science was being employed as a political tool by the Soviet regime, the record shows that other actors more or less engaged with political power, contributed to the discourse in various ways. The thereby corresponding CETI imaginary and the relationship of science (astronomy) to it can be further explored. As such, one venue of inquiry could ask how Soviet scientists themselves viewed their role in international politics through the discourse entanglement between science and societal speculative thinking.

The claims in this chapter point to the planetary imaginary, as a new concept that was emerging in the context of CETI. In order to understand the ramifications of its workings, I introduced the concept of *cosmopolitics*. Cosmopolitics defines the intervention of the cosmic

---

<sup>149</sup> See Graham (1993), pp. 167-170.

<sup>150</sup> Michaud (2007), p. 3.

imaginary and of the acts of imagining the cosmos into the “real” world, what is referred to as the factual level. The discursive level - involved in the act of imagining outer space and more specifically here, into the outer space intelligent communication - manifested a performative dimension. CETI was as such by this very function of language, an active engagement in the world outside of radio astronomy. This hypothesis raises new questions with regard to how outer space had been shaped by astronomers from the Soviet Union, as an alternative or different picture from the one painted in the so far studies of outer space imaginary, through the usual Space Race perspective.

As Sputnik’s launch increased astronomy’s profile in the Soviet space, scholars claim that by 1964 it was already becoming clear that the USA had taken the lead in the Space Race<sup>151</sup>. However, the very same year Soviet radio astronomers met at Byurakan to discuss the possibility of contacting ETI. The conferences give an overview of the more general state of astronomy at the time. They also reveal how scientists negotiated the outer space imaginary as a place where human communication is deemed relevant in a new way. The motif of extraterrestrial communication offers a view of the collective - unconscious or not - repertoire of ideas with regards to terrestrial communication with non-Soviet humans.

The discourses at Byurakan I fulfilled an eliberatory role. While in the decade after the war, there had been little opportunity for experiments to produce results of a more scientific nature<sup>152</sup>, theory was cheaper and could be more shaped ideologically. This raises the question of whether CETI was so enthusiastically embraced because it offered the scientists more empirical freedom? Moreover, since cosmology had been used as an ideological ally during Stalin’s reign, theory could not be reclaimed scientifically. Did the prospect of claiming theoretical astronomy and cosmology as a re-politicized territory tantalize the minds of the scientists involved? With a newly liberated realm of a discipline, astronomers could engage politically in a different way than before.

A further question is what other links between literature and language on the one side and communication with ETI as a scientific pursuit on the other one can be drawn? Iosif Shklovskii’s predisposition to literature, as well as Gladkii’s contribution from mathematical linguistics, show a take on “human” language in the attempt to ground communication beyond Earth. Nonetheless, a relative of Iosif Shklovskii was Viktor Shklovskii, the literary

---

<sup>151</sup> Siddiqi, in Barry (2001); see also Andrews (2016) p. 119.

<sup>152</sup> Sullivan (2009), p. 220.

theorist and writer who helped found the school of literary criticism known as Russian formalism. Russian formalism and Viktor Shklovskii had sought to revolutionize the view on poetic language and literature, emphasizing their autonomy, which attracted oppression from the political regime during Stalinism. What a historian can ask is whether the younger Iosif Shklovskii, was influenced by some of the ideas of Viktor Shklovskii, considering the former's broad views and philosophical concerns? If so, in which way and how can the past help answer this question. Ultimately, what does it say about the human "intelligence" developed in the Soviet Union in the scientific community around the question of extraterrestrial intelligence in which Shklovskii tirelessly activated? Considering Shklovskii's criticism of the Soviet regime expressed in his autobiographical work, how could his concerns for literature, language and communication in relation to CETI have contributed to a political subversion?

While many of these questions remain unanswered, some preliminary facts can be nonetheless so far established. The moment when astronomy and science more generally had reached this point where it influenced society and culture in a certain way - as a disruptive force that Traphagan noticed -, coincides with the moment when the problem of ETI could suddenly be addressed "scientifically". In the Soviet Union, it further coincided with Khrushchev's Thaw, with the loosening of the intellectual and social borders between scientists on the two sides of the Iron Curtain, as well as certain privileges or rights being expanded inside the Soviet Union.

The fact that scientists were exercising this promising scientific imaginary mirrored the political changes. These political changes were informed by the change in the discursive regime. New meanings could be articulated suddenly beyond the limits of the Earth and that reverberated in the actions scientists undertook to cross the Iron Curtain. This scientific imaginary enabled the political factual to be changed, even if (only) at the level of thinking. Additionally, the distinction between fiction on one side and science/ reality, on the other one was exploited by the CETI speakers - one could easily claim one was in the domain of the unknown and speculative and that if things are in outer space, they do not refer to Earth/ Soviet Union. Similarly, CETI could be very well carried out with the regular equipment already in use in radio astronomy <sup>153</sup>and did not demand necessarily the building of new one -

---

<sup>153</sup> "Shklovskii: no one could accuse searchers for wasting money, as the equipment could be used for conventional radio astronomy", cited in Michaud (2007), p. 44.

even if some envisioned it so. Barely claiming extra territory in the (terrestrial) material world, be it either in forms of direct anti-Soviet regime critique, or special funding, the CETI Soviet scientists did found and find a new realm for themselves.

As *nauchnaya fantastika* and science converged through the CETI imaginary, Soviet scientists engaged in an exercise of political thinking that overarched both the West and the East. By looking on the other side, in the unknown and potentially dangerous West, they planted seeds for the transformation of perspective. Suddenly, the world out there was or could be peaceful. And it was worth making one's presence felt. Because one (Soviet actors) could communicate - or had a chance to do so - one should do it. As the conditional turned imperative, communication with the Western world was also being enacted.

## Chapter III: Post-Byurakan I

The communication across the Iron Curtain had been initiated but the one into outer space seems to not have matched it. However, to which extent was the communication on Earth across political and disciplinary borders successful eventually? This chapter explores CETI from this point of view in the aftermath of the first Byurakan conference (Byurakan I). Despite the hindrances to scientific communication during the Cold War, there were some notable achievements registered. How these show throughout the late 60s and early 70s facts, in relation with some discourse elements, constitutes the focus of this chapter.

The first section of the chapter reviews the period between 1964 and 1971 - between the two Byurakan events. The second one places Byurakan II in relation to the scientific internationalism's picture at the time with a brief note on its content. The third one focuses on the changes shortly after Byurakan II, especially from CETI to SETI.

### 1. Between Byurakan I and II

Between 1964 and 1971 it is clear that CETI gained international momentum. In 1965 the Czechoslovakian radio astronomer Rudolf Pešek mailed scientists to ask them whether they would be in favour of a CETI Symposium. Until that very moment, joint initiatives between scientists concerned with the question of extraterrestrial (intelligent) life were circumscribed within the national borders, while the co-writing of Shklovskii's book as a joint publication with Sagan as the other author was still in the making. Ideas had circulated in the context of the International Astronautical Federation with "Previous lectures on CETI delivered before at the IAF Congresses by A.G. Haley, H. Strughold, A. E. Slater, J. Gadowski, R. Margaria"<sup>154</sup>. Pešek played a key role in constructing the international character of CETI:

---

<sup>154</sup> Pešek, in Billingham & Pešek (1979), p. 5.

I have thought and I still think that a search for extraterrestrial civilizations should represent efforts of all mankind. That is why the idea to organize an *international* symposium on CETI started. For this symposium, I devised the word CETI - an acronym for Communication with Extraterrestrial Intelligence. The choice is also connected with the well-known fact that Ceti in Latin is the genitive of Cetus (whale) and that Tau Ceti is a star 11.8 light years distant, rather similar in size and luminosity to our Sun. With some probability, Tau Ceti has a planetary system.<sup>155</sup>

Pešek had mailed the 50 scientists, out of which only 26 had received the correspondence in time. However, the reply was supportive with more than half of the respondents replying positively. In September 1965 - Pešek reports the replies at the Eighth Session of the Board of Trustees in Athens. The latter approves the project and recommends a Study Group to be established. The members of the group are established by the IAA President In August 1967 - the General Assembly of IAU meets in Prague - Pešek meets Kardashev, Shklovskii, and Sagan. Although Sagan and Shklovskii had co-written the book *Intelligent Life in the Universe*, they had not met in person until this moment. In September 1967 the first meeting of the CETI organizing Committee at the 17th International Astronautical Congress in Belgrade takes place. Since then, the Committee began to meet regularly.

On April, 25th 1968, the Presidium of the Czechoslovak Academy of Sciences authorized the CETI symposium in Czechoslovakia, agreeing to meet the costs. October 1968 - meeting of the CETI Organizing Committee held New York agrees on a tentative schedule of topics for the Symposium and recommend to be held in Prague in September the following year. Independently, the IAA records attests, the Astrosoviet of the Academy of Sciences of the USSR organized a CETI international conference. This was the Byurakan II Soviet-American conference, which took place in 1971. Kardashev had managed to get a binding agreement with Sagan the year before while at one of the IAU meetings. Because of the complications involved in making the event largely international, it was recommended by both organizing parties - Soviet and American - to restrain the number of participants, and participating countries.<sup>156</sup> It was nonetheless, in retrospect, highly interdisciplinary.

---

<sup>155</sup> See previous footnote. It is now known that Tau Ceti has at least 4 planets.

<sup>156</sup> Shklovskii (1991), p. 257.

The interdisciplinarity of the CETI programme was in line with the International Academy of Astronautics's core approach. IAA was itself a very young body of institution. Its establishment as part of the International Astronautical Federation had just been decided upon at the end of 1959. In the early 1960s it was still in the making, with no official stable headquarters. Its members would usually meet in Paris every spring in between congresses, where they would depend on accommodations arranged by one of the founding members of IAA. As for the Federation, it was de facto based in Bern, Switzerland. Part of the explicit agenda of the newly found IAA was to include both natural and social scientists as members, as well as from any other scientific domain deemed "of fundamental importance for the exploration of space"<sup>157</sup>. Once again, the birth of interdisciplinarity in the question of intelligent life in the universe was deeply intertwined with (particular) conditions of scientific internationalism.

After more negotiations, the Soviet Union had previously decided in 1960 to not participate in the IAA. However, this would change under IAA chairmanship of Frank Malina, elected in May 1963. In the following years, Malina managed to successfully bridge the two scientific universes by inviting Soviet contributions in the Academy<sup>158</sup>. It was under these favourable circumstances for crossing both political and disciplinarily borders that Pešek, who already held different responsibilities inside the IAA, proposed CETI under the form that it will very rapidly evolve as a scientific internationalism phenomenon. The topics suggested as early as 1965 in the survey sent to scientists were astronomy, biology, communication, linguistics, and potentially the impact (of CETI) on mankind<sup>159</sup>. Later, for the symposium originally planned for 1969 and eventually cancelled after Byurakan II, the topics recommendations had evolved as following:

- (1) Introduction to the Meeting; Astronomical Perspective;
- (2) Origin of Life and Life in the Solar System;
- (3) Evolution of Intelligence;
- (4) Evolution of Technical Societies;
- (5) Potential Sites for Extraterrestrial Intelligence; Search problems;
- (6) Signal Acquisition;
- (7) CETI and Mankind;
- (8) Prospects and Recommendations for Future Research.<sup>160</sup>

---

<sup>157</sup> See International Academy of Astronautics Public History Record:<https://iaaweb.org/content/view/154/270/>.

<sup>158</sup> Idem.

<sup>159</sup> Idem.

<sup>160</sup> Pešek, in Billingham & Pešek (1979), p. 6.

So far the historical record indicated that, until Byurakan I, Soviet scientists took the time to formulate their own approach. The transfer of knowledge to the West seems to have been initiated later once the project gained an international reach within the framework of the IAA and IAU from 1966. The same year the book *Intelligent Life in the Universe* by Shklovskii and Sagan came out in its English translation. In 1967 the translation of the Byurakan I proceedings appears in Jerusalem. Although it is not yet known to which extent exactly the ideas on CETI reverberated and continued during the 60s inside the Soviet Union, one fact can be established. Although at Byurakan I a similar conference for the following year was planned<sup>161</sup>, the latter did not take place. Moreover, the envisioned research project that would involve many other disciplines in CETI at the all-union level was also agreed upon between the astronomers at Byurakan I came to a similar fate. One decade would have passed until the Soviet authorities gave the project a go in 1974 (see the third section of this chapter). As for a second All-Union conference on CETI/ SETI, it remained never realized.

The CETI committee at the level of IAA had gathered internationally with the meeting in Prague in 1968 being postponed “several times due to various reasons”<sup>162</sup>. Despite the Prague Spring, and potentially other political events, having disrupted the terrestrial communication between CETI scientists, the international project seems to have been carried out fuelled by both sides. In the Soviet Union, it led to the publication of the Kaplan edition in 1969 and translated into English in 1971 through the same Israel Program for Scientific Translations as the Byurakan I proceedings. Kaplan’s volume refers to the Byurakan I ideas as well as Shklovskii’s, as largely outdated<sup>163</sup>. This points to a rapid development of CETI during the time between Byurakan I in 1964 and Byurakan II in 1971. When the Kaplan edition appeared, in 1969, as the “first scientific monograph of SETI [sic]”, it was a criticism to both Shklovskii’s approach and the US’s approach. The lack of a comprehensive picture being offered by the results under Shklovskii’s coordination previously was noted<sup>164</sup>.

The Kaplan volume expanded on the universality of life, and more specifically, of life as intelligent. In the introduction, it is expressed the view that “there is a high probability that civilization is a universal phenomenon” despite the surprising lack of “observed signs of

---

<sup>161</sup> The Western observers note this particular paradox at the time. See Bobrovnikoff (1968), p. 471.

<sup>162</sup> Pešek, in Billingham & Pešek (1979), p. 7.

<sup>163</sup> Kaplan (1971), p. 1.

<sup>164</sup> Ibid., p. 4.

cosmic activity of intelligent creatures”<sup>165</sup>. The answer to this conundrum, according to Kaplan, was that either the data at the time, indicating this absence, was wrong, or, alternatively, there existed “a fundamental factor slowing down the development of a civilization”. In difference to Shklovskii, who inclined to “extinguish” civilizations at Byurakan I, Kaplan inferred an implicit necessity of “intelligent life”. The hope of this intelligent life to share a substantial common ground with the human terrestrial one ran deep through this approach which evolved by this time. Therefore, it was stated that “the laws governing any field of activity of our civilization can and should be formalized and systematized to a certain extent”<sup>166</sup>. The desire for human intelligence to be deciphered by human-created intelligence under such terms points to the already mentioned paradigm of cybernetics whose importance grew throughout the 60s.

That life and civilization were coterminous with one another and could be translated in cybernetic’s language overarches the Kaplan volume, and therefore sets it apart from Shklovskii’s own approach. How life in itself was conceived as a form of intelligence is shown in the following formulation of life’s defining characteristics, namely its “tendency to gain the maximum quantity of information about the environment and about the organism itself” where life is explicitly conceived as “a highly stable state of matter capable of developing survival reactions using data coded by the states of individual molecules”<sup>167</sup>. Similarly to the mechanism at work at Byurakan in 1964 where biological ideas had been represented by non biologists, the codifying of nature into a cybernetic object of study replaces biology itself in this volume, too. In the perpetuated absence of Soviet biologists from the CETI discussion which was visible from the 1964 conference, (extraterrestrial) life had become by the end of the 60s equivalent to a process of manipulating information.

The quantifying of the information processing capability was a concern in CETI, as seen through this discourse in the Kaplan volume. Accordingly, life was not only an intelligent machine, but one that manifested the “tendency to gain the maximum quantity of information about the environment and about the organism itself”<sup>168</sup>. As life became an intelligent process, intelligent life was - in what looked like a quite neo aristotelian notion - just one of the “higher life forms”, capable of an “abstract analysis” on the basis of the

---

<sup>165</sup> Kaplan (1971), pp.14-15.

<sup>166</sup> Ibid., p. 22.

<sup>167</sup> Ibid., p. 23.

<sup>168</sup> See previous footnote.

information absorbed<sup>169</sup>. A quantitative difference - the amount of information life was capable of processing - and a qualitative one - the ability of abstracting - set the possible extraterrestrial correspondents from humans apart from other not enough intelligent life forms. This new look on CETI is presented in the Kaplan publication as the “radical new look” on the problem. Not only intelligent life was considered as a “boundary object” - an object used to describe a new ontological entity whose status has to be negotiated and is at the intersection of different fields and ideas<sup>170</sup> -, but life itself resignified as intelligence conceived in a certain way became this new “boundary object” of CETI through Kaplan’s approach / or at least the one expressed by him in this volume. This is compatible with the observation by historian Slava Gerovitch who researched on the development of cybernetics in the Soviet Union. Cybernetics was as such “an ambitious project of introducing mathematical methods and computer models into the life sciences and social sciences”<sup>171</sup>. No wonder that Kaplan’s exosociology was cybernetics transferred into these two domains.

Whether the comprehensiveness of the picture would have been brought forward through the sociological approach that presumably overarched the Kaplan monograph remains to be further investigated, beyond the scope of the present dissertation. However, what is clear for the time being is that the presence of the various actors involved in CETI on the Soviet side points to a complex web of interactions, informed by different, if not conflicting interests. Scholars point to the contradictions and lack of a centralized decision-making process in the Soviet Union, which led to the same issue to be handled at the all-union level even by various individuals, a feature of the Soviet Union that had perpetuated throughout its existence. This was not lastly due to a lack of a consistent vision agreed upon of the Communist Party on the role of science in society mirrored also by the absence of a monolithic or consistent approach in this sense<sup>172</sup>. So far the state of Soviet CETI reflected the state of affairs with regards to science in Soviet society: no unified explanation or comprehensive picture on it. This was very much the case of space exploration.

It is under these circumstances that for example the non-realisation of a Soviet CETI program at the level of the Soviet Union before the Byurakan II conference can be viewed.

---

<sup>169</sup> *Idem*.

<sup>170</sup> This term is also borrowed from anthropologist Anne Dippel, who looks at the CERN scientists and how they negotiate ontological entities at stake. See Dippel (2016).

<sup>171</sup> Gerovitch (2008).

<sup>172</sup> Andrews & Siddiqi (2011), p. 1.

Indeed the Soviet CETI Conference from 1964 had jumpstarted the initiative, but it remains so far unclear why it did not set a real precedent inside the Soviet Union. Especially considering that in 1965 the observation of a curious variability of a source, CTA-102, was published immediately and announced publicly through radio from Moscow. Due to this immediate communication of observations, the West reacted immediately and scientific communication was established quickly which led to further inquiries and a press conference in Moscow<sup>173</sup>. Meetings continued to take place regularly nevertheless under an international body, namely the IAA or the IAU, despite the domestic landscape being more fragmented, as the historical record indicates for the time being.

On a side note, it is important for the record to note that the very discipline which had gained in time the ontological legitimacy in defining the intelligent subject of CETI, namely cybernetics, represented itself the epitome of Soviet decentralization. In stark contrast to the hopes it became the projection screen in the 1960s, centralization included, the application of cybernetics stood for the opposite of these hopes. Instead of a radical optimization of Soviet production and organization of civilized (and able to work) life, the construction of management information systems in the late 60 was performed “without any coordination or connecting network”<sup>174</sup>. CETI, cybernetics, outer space exploration, and Soviet scientific projects at large shared a language and a state of affairs characterized by uncoordinated intelligence as a vicissitude of civilization.

The absence of a unified Soviet CETI programme preceding the Byurakan II conference coinciding with a rich international exchange in the same field raises several questions that remain so far unanswered. What were the dimensions of this temporal coincidence and how did the two facets influence each other: did the lack of coordination inside the Soviet Union on the one hand, create a relatively larger space for ideas to be discussed in the international context directly, on the other hand? Moreover, did it lead to a snowball effect: did the international manifestations of CETI in turn prevented even more the reaching of a monolithic or unified view on CETI at the level of the Soviet Union? As it will be shown in the following section, Sheridan presents the Soviet ideas on CETI as relatively unified, when placed in relation to the American ones. The point that I make there is that it

---

<sup>173</sup> Kardashev interviewed by Bernard Oliver in 1981, in Swift (1990). It was later discovered that CTA-102 is a quasar, having nothing to do with extraterrestrial civilizations.

<sup>174</sup> Gerovitch (2008), p. 344.

was less an ideological constraint, but rather a historical circumstance that allowed for the nature of such a difference.

How did the American and other Western actors react to the Soviet initiatives in CETI? Did they have the similar effect that Sputnik has had previously? As one historian notices, astronomy was one of the smallest sciences in the US before 1957, but the launching of the first human-made satellite into space had determined the prioritizing of it shortly afterwards<sup>175</sup>. This indeed propelled astronomy's profile in relation to space exploration in Soviet public culture, paired with the comparison to the West. Space science and exploration was a conversation between the West and the East from its very inception in the Cold War. Did the American leaders coming to know of the Soviet progress with respect to CETI effect similar reactions? In the Introduction to the English edition of the proceedings to Byurakan II, Sagan mentions that the concept of the conference had originated in previous discussions from 1967 onwards during previous meetings between scientists from both sides of the Iron Curtain having taken place in Moscow, Prague, New York and Washington<sup>176</sup>. This fervent international collaboration period did enable and inform the Byurakan II conference, despite the initial form under the Prague Symposium to have been cancelled.

---

<sup>175</sup> See for example Andrews & Siddiqi (2011), Geppert (2018).

<sup>176</sup> Sagan (1973), p. 10.

## 2. Byurakan II: Content Analysis

During the time leading to the Byurakan II event, the Soviet Union and the West came to a period that has been described during that very time - under the term “convergence”<sup>177</sup>. This term stands for the phenomenon through which the Soviet Bloc and the West, though different in their ideological and political arrangement, were getting closer in the way they perceived the world, the astronomical universe indeed underpinned the social and political one. What can the Byurakan II conference as a place where this convergence played out say about this view? The Soviet-American live dialogue was possible on the territory of the Soviet Union. Was there enough common ground to establish a communication under the same reference points between the two sides? Or was there, on the contrary, a barrier that permeated the event and prevented a real convergence point leading to a qualitative exchange? This section probes into this question, on the basis of the findings that have been explored until here, by looking at a general impression of the Byurakan II conference.

While Sheridan has noticed differences in temperament, philosophy and approach to CETI between the Soviet, and American side. Namely what Sheridan argues is that the Western scientists shared less than their Eastern counterparts. Sheridan makes also another observation with regards to the universality of certain domains - particularly language and mathematics. This is visible at the Byurakan II conference not lastly with regards to the translation or deciphering (of an extraterrestrially reaching signal) problem, when the Western/ American scientists were extremely reserved in engaging with the points brought forth by their colleagues from the Eastern Bloc. As Sheridan noted:

The Soviets raised troubling issues about a SETI-style search, both in their own meetings and then directly with their American colleagues. Specifically, the Soviets questioned SETI's ability to understand a message that came from non-humanoid ETIs. The Soviets also conceptually linked *understanding* messages to their *detection*, a link the SETI effort has not acknowledged to this day. In effect, the Soviets charged that the Drake Equation oversimplified the opportunity of using radio astronomy to search for ETIs.

---

<sup>177</sup> The CIA declassified document from 1970 I refer to is cited in the full list of references.

The Americans listened politely but shifted the responsibility for addressing these issues onto ETI, suggesting that any being intelligent enough to send us a message would be intelligent enough to make it easy for us to understand.<sup>178</sup>

As the citation above shows, it can arguably be stated that the question of translation, as a meta-problem overlooking an interplanetary communication set the Soviet scientists from their western colleagues apart. Does the fact of Soviet scientists being presumably more aware of the translation problems in messaging ETI indicate their own struggle to get their points across through the other side of the Iron Curtain? Nonetheless, some sources of the time indicate a more general observation that the main difficulty in accessing Soviet knowledge for American scientists resided in the “language barrier”<sup>179</sup>, while for the Soviets the political one constituted a primary concern. Did this barrier translate in each case into the

way each “side” viewed” communication with ETI? If convergence was to be achieved, its obstacles had to be stated first.



*C. Sagan and I. Shklovskii at Byurakan, 1971.*<sup>180</sup>

Sheridan points to the fact that SETI scientists from the West never acknowledged that they had to be part of a 3-way conversation. As such, the language barrier, the mere translation and the empirical evidence of the success of communication were not as a high preoccupation as in the Soviet block. This potentially explains - along, of course, with other factors, such as funding, internal conflicting forces, etc -, why only the West will later send probes into outer space sampling “human culture”, like the Voyager plates. Sending artefacts out there to be deciphered would have made less sense for Soviet scientists who were constantly aware of the difficulties of “their” knowledge being successfully transmitted on the other side of the

---

<sup>178</sup> Sheridan (2011).

<sup>179</sup> Hollings (2016), p. ix.

<sup>180</sup> Credits: Sheridan (2011). The images at Byurakan II had also been previously reproduced in Sagan (1973).

Iron Curtain. The *metaproblem* of translation was deeply ingrained in the Soviet collective unconscious of scientists internationally active.

While the non-universality of language and the deciphering problem manifested itself more visibly in the preoccupation of the Soviet scientists, the definition of intelligence and life seems to have been a shared one across the Iron Curtain. The particular instantiation of life already contained in it a dimension of intelligence, whose conceptualization comes close to a cybernetic approach: “matter capable of collecting, abstracting, analyzing, and using information for the purpose of acquiring qualitatively new information about its surroundings and itself”<sup>181</sup>. While cybernetics did indeed strike a cord in the Soviet authorities sensibilities at the time, the framing of the intelligence under these terms also relegates the domain of biology to other scientific domains, just as previously at Byurakan I, and more visibly in the Kaplan volume.

At the same time, the mere possibility of finding “intelligence” or human-like forms of life outside of the planet allowed to postulate a cosmic connection, by *nature*, and not a conquest of science that forces itself onto the universe, rather an a priori justification for being into space. Human intelligence - and therefore science and culture - were a legitimate part of nature - to the universe out there. Ultimately, being able to communicate with non-human intelligence non-terrestrial would attest to us being on the right way in whatever science is doing. Both the West and the Eastern block were embarking on the ship of space futurism<sup>182</sup> of which the competition between the two was part of the picture. For this reason if convergence existed, then human intelligence - defined under certain terms - was the foundation for it, and at the same time the foundation for a convergence with extraterrestrial beings.

What was at stake in competing for reaching out to extraterrestrial intelligence? While for the other space race targets - sending terrestrial beings out there, for instance - the primacy of one side was the proof of the ideological superiority, in contacting ETI a dose of precaution seems to have been taken, at least in the Soviet Union. The conferences were kept away from the public out of organizers’ initiative<sup>183</sup>. However, according to Sagan, various articles appeared in the Soviet Union reporting to the larger public included after the fact<sup>184</sup>.

---

<sup>181</sup> Kaplan (1971), p. 5.

<sup>182</sup> Geppert (2018).

<sup>183</sup> Shklovskii (1991), p. 254.

<sup>184</sup> Sagan (1973), p. xii.

This does not however single out the Byurakan events or the CETI project inside the Soviet Union. Previously, the launching of Sputnik had been made known to the Soviet public only after the West recognized it as a success. A certain precaution was part and parcel of the Soviet authorities' side when it came to making its achievements in outer space exploration known to the Soviet population. This seems to have intersected, if not matched, the approach of Soviet CETI scientists themselves.



*First Soviet-American Conference on CETI, held at Byurakan in 1971.*<sup>185</sup>

As different actors with different stakes were already involved in the space race, the same seems to have been the case in CETI. Beyond the rather innocent difference between experimentalists and theorists<sup>186</sup>, the contrast between the peaceful portrayal of space exploration and the military programs deeply linked with it point to another layer of deep entanglements of contradictory actions and ideas. While Shklovskii was never a full member of the Academy of Sciences, but in time was rewarded high honours for the Venera missions - the Soviet unmanned landing programs on Venus -, he did express often enough his criticism towards the Soviet authorities and supported the dissident Sakharov. Other figures more aligned with the political power, such as Zel'dovich and Kotel'nikov, enjoyed the

---

<sup>185</sup> Credits: Gindilis & Gurvits (2019).

<sup>186</sup> As referred to in the first chapter of this dissertation.

membership of the Academy of Sciences and helped as such in supporting the project<sup>187</sup>. Whether convergence was the result in any way of the diversity of opinions can only be speculated at the moment. What remains clear is that the cooperation between differently interested Soviet parts in CETI was a fact at the time.

Compared with some of the exchanges from completely different scientific fields, CETI does stand out. In contrast to one of the earliest knowledge transfers, namely the borrowing of the polio vaccine from the USA by the USSR as early as 1956, CETI was not driven by a (recognized by Soviet authorities) pressing (health) crisis<sup>188</sup>. Even so, with such a health crisis, the agreement on collaboration between the two states was marked by the usual problems reported by the American side: delays in Soviets fulfilling their side of the agreement once they had what they needed to solve the crisis, as well as “taking advantage” of the Western welcoming agreement. According to the American sources, even if the vaccine had been obtained from the American scientists in 1956, it was only in 1958 that the formal agreement was signed, USSR gave less access to its research and knowledge than the USA, and finally with regards to the bilateral exchange of students it was reported by the American side, that the Soviet ones stayed longer<sup>189</sup>.

When it comes to CETI, no source has been revealed yet from the American side that reports on similar concerns. Moreover, it looks rather like the American scientists might have taken advantage of the Soviet welcome. Firstly, the Soviet-American conference in Armenia was not matched by a symmetric bilateral event in the United States. Nonetheless, in October 1968 - meeting of the CETI Organizing Committee is held in New York. The question is how intense was the exchange during this event in comparison to the Byurakan II conference? The historical documents (meetings minutes and personal accounts) recording this meeting have not been consulted for the current study and therefore this remains one of the limits of it. Whether the asymmetry would have indeed pervaded the Soviet-American exchanges, one would have expected to find something referring to it in Shklovskii's autobiography. For example, just as he criticizes Sagan for not having shared properly the rights to his publication with him, any kind of unjust or disbalanced nature of the exchange could have very well been mentioned, similarly.

---

<sup>187</sup> See for example Kardashev interviewed by Oliver in Swift (1990), pp. 178-197.

<sup>188</sup> Raymond, (1973), pp. 229-230.

<sup>189</sup> Idem.

This asymmetry in exchange relates to the main overarching research question asked here in the following way. If the fact is arguably that the exchange was indeed asymmetric, then is this asymmetry visible in the discourse as well? This brings us to the second hint that the American part has taken advantage of the Soviet ideas. According to Sheridan, who has critically summarized the differences approaches between the American scientists and the Soviet ones, as well as the exchange that took place in Byurakan in 1971, there were a few things “missing” from the American part. For example, during the panel on the nature of language of communicating with extraterrestrial intelligence, there was only one Western scientists, the American linguist Marvin Minsky presenting, and furthermore, the participation in the discussion was almost absent from the American side.

These aspects, together with the insensitivity to the translation problem, hint at a lack of depth in the American involvement in the exchange at Byurakan. This points to a paradox: at the same time that Soviet scientists were eager and engaged in an intense scientific exchange, pushing the Cold War limits of scientific internationalism, the American (Western) were too cautious to engage to a similar extent. This paradox may not seem surprising for Cold War historians, but if it is indeed further validated by research, then the question that can be raised is what patterns, if any, there were in such paradoxes throughout Cold War scientific internationalism.

According to Wolfe, in the 1960s, American scientists that were taking part in exchanges with the Soviet Union were inevitably playing a double role of building genuine relations and collecting information for their government<sup>190</sup>. For this reason, a double game in CETI, itself defined per se by scientific internationalism, would seem like a natural feature of the era. While exactly how this played in the meetings and through the transfer of documents remains an open question. Nonetheless, the time of convergence has allowed for the exchange to take place, and for scientists to imagine a common extraterrestrial space with its intelligent beings reachable by humanity on both sides of the Iron Curtain.

---

<sup>190</sup> Wolfe, p. 15.

### 3. The Metamorphosis of CETI

Shortly after the Byurakan II conference, the IAA CETI Organizing Committee met in Brussels. Pešek reported on the recent event and proposed to cancel Prague Symposium and organize a half-day International CETI Review Meeting at the International Astronautical Congress in Vienna. The Board of Trustees agreed, and as a result review meetings were held in Vienna (1972), Baku (1973), Amsterdam (1974), Lisbon (1975), Anaheim - California (1979). In a few years time, due to a growing interest in the subject, a Standing Committee was created to replace the former Organizing Committee<sup>191</sup>. The international range of the preoccupations was therefore expanded.

Similarly, the formal recognition inside the Soviet Union of CETI seems at first sight to attest to a similar phenomenon. It is only after the Soviet-American conference, that the Soviet Union institutionalized a radio astronomy program to reach out to extraterrestrial intelligence. According to the Scientific Council on the Radio-Astronomy Problem Area of the Academy of Sciences of the USSR *Astron., Zh.*, 51 , 1125-1132 (September-October 1974):

In March 1974 the Board of the Scientific Council on the Radio Astronomy Problem Area, Academy of Sciences of the USSR, considered and approved a Research Program on the Problem of Communication with Extraterrestrial Civilizations. The Program was developed by the Search for Cosmic Signals of Artificial Origin section of the Council on Radio Astronomy, on the basis of recommendations made at the Soviet National Conference on the Problem of Communication with Extraterrestrial Civilizations held at the Byurakan Astrophysical Observatory in Armenia in May 1964, and the Soviet-American CETI conference held at Byurakan in September 1971. The projected program was reported to the 7th Soviet National Conference on Radio Astronomy, which convened at Gor'kii in 1972.

(published in the NASA archive: *SP-419 SETI: The Search for Extraterrestrial Intelligence, complementary documents [211-217]*)

This raises the question of what has CETI achieved in the Soviet Union before it transmuted into SETI at the level of IAA? The moment CETI gained credibility from the

---

<sup>191</sup>Pešek, in Billingham & Pešek (1979), p. 7.

Soviet authorities corresponds with the end of the Thaw and therefore with the reclosing of the borders with the West and tightening of restrictions for scientists included. The year before Shklovskii and other astronomers had been prevented from attending the IAU Symposium in Australia<sup>192</sup>. Were both the establishment of Soviet CETI and the new restrictions on CETI scientists an attempt from the Soviet authorities to contain the relevant research in order to prevent information drain to the West?

However, the space age was approaching its dawn after it had become clear that the American space program had surpassed the Soviet one<sup>193</sup>. The subject had lost its appeal in the USSR to both the authorities, and public culture, since it did not contain the hope of building the Soviet dream anymore. This is also attested by the *nauchnaya fantastika* literature that turned to dystopia from utopia during the post-Thaw period and criticised the former dream of building socialism based on the promising new fields of science and technology like outer space exploration<sup>194</sup>. In other words, the loss of interest in space exploration was accompanied by a dismissive cultural reaction. If space science was heading for a fall from this moment - fast or slow - then this led arguably to the official recognition from the centre inside the Soviet Union of the prospect of communication with extraterrestrial intelligence through radio astronomy.

The historical record does not for the moment clarify to why the weariness of one topic led to contradictory reactions from the Soviet authorities. As previously mentioned in the first section of this chapter, historians point to contradictory actions being undergone in other cases and some even argue that it was a generalized mode on the basis of which the Soviet system per se functioned throughout its existence with regards to science or not<sup>195</sup>. This was mostly due to the problem of containing power, containing a large territory, population, and therefore a variety of initiatives, studies, ideas. At the central level, there was no unanimous opinion or agreement on how things should be often and internal tensions were a recurrent feature. It was even more the case for different representatives of Soviet power to allow for measures that jointly challenged the consistency of the regime, in an attempt to

---

<sup>192</sup> Friedman, in Shklovskii (1991), p. 7.

<sup>193</sup> Barry (2001).

<sup>194</sup> Andrews (2016).

<sup>195</sup> See for example Kojevnikov (2004).

strengthen governmental power, ironically<sup>196</sup>. More often than a matter of conflict, it perpetuated as a constant logistical problem of the Soviet system.

Nonetheless, this logistical problem has been exploited by different actors wishing to advance their project. Shklovskii himself had launched the Soviet reach out for ETI by taking advantage of the momentum, namely the Sputnik anniversary preparation. The main question that remains unclear with regards to scientists or policy-makers taking advantage of the moment in the post-Byurakan II era was how did Shklovskii, Kardashev or other CETI protagonists related to the changes happening to the project, in other words, how much agency did they have? Furthermore, what was the interplay between how much agency they enjoyed and how much agency they could show of having - especially to their foreign counterparts?

A further possible question points to how this agency changed by the end of CETI at the international level and its beginning at the Soviet level. If CETI gained central institutional legitimacy from the Academy of Sciences, of which Shklovskii was only a corresponding member in 1974, CETI was replaced by SETI in 1976 at the level of the IAA. Did this change in name mark something more than a closing of the Iron Curtain? It remains a *fact* that scientists from this moment could not communicate that well anymore between the two worlds. Neither does the IAA officially states clear the reason for this change:

The term CETI persisted until about the mid-1970s, when it was gradually replaced by the current acronym, SETI. The reason for this substitution was probably a belief that, before talking about establishing communications with extraterrestrial civilizations, these must first be detected. Consequently, the search must precede the communication. Eventually, the CETI Committee of the IAA was renamed the IAA SETI Committee. It now exists as the SETI Permanent Committee of the International Academy of Astronautics.<sup>197</sup>

The end of relatively intense terrestrial communication between the two worlds succeeded very shortly after the Soviet CETI research program was approved by the country's authorities. This coincided with the Soviet Union losing its leading role in the

---

<sup>196</sup> I refer to no precise literature since this topic has been many times discussed during the Seminar "Empire of Engineers: Soviet Science in Society and Politics", held during the winter semester 2018/2019 at Humboldt University of Berlin, in which I have participated.

<sup>197</sup> Excerpt from the official website of the International Academy of Astronautics SETI Permanent Committee: <http://www.setileague.org/iaaseti/pesek.htm>.

game. According to historian Steven K. Dick, the year 1975/1976 marks a turn in international dominance of West vs. East in CETI/ SETI. While the majority of searches before this time had been carried out by the Soviet side, the balance shifted from this moment on in favour of the North-American scientists, who began henceforth to dominate SETI observing programs<sup>198</sup>. If indeed more information had been previously collected throughout the 1960s than shared by the American scientists, as studies from other areas, such as Wolfe's, seem to suggest, then the rise of SETI at the expense of CETI looks like a regular Cold War battle result. Nonetheless, the end of "Communication" with ETI marks the end of a rather unique scientific communication across the Iron Curtain.

Left with very limited exchange with their Western counterparts, Soviet scientists had probably more chances to communicate better with extraterrestrial intelligence than with the extrasoviet terrestrial one. Shklovskii became more skeptic in time, while Kardashev continued to publish on the subject and participate in CETI/ SETI activities. The communication on an international scale had reached nonetheless a peak in 1971, a very unstable one as it was shown by the second Byurakan event. It had opened up the space through its discourse for new ideas and possibilities to be discussed and imagined by the two political superpowers. If the knowledge transfer was not symmetric - and the Americans were more cautious than the Soviets, then this raises further questions with regards to the primacy of ideas, the old question of who was first to suggest or advance an idea.

Within the precincts of the CETI project, as it has been analyzed here, it is hinted that the Soviet scientists had less access to Western knowledge both preceding the development of CETI, and during it. In the late 50s, Soviet radio astronomy findings were reaching the West, but were the worries of the West not preventing already the exchange? Only access to more archives in Russia can help in quantifying the symmetry or unbalance in knowledge transfer. While studies such as Wolfe show that behind the leniency of the exchange and the freedom of the Western scientists there was a restriction much more nuanced than the very straightforward Soviet one, this may mean that the Soviet scientists had shared more. Furthermore, how much did Shklovskii or other radio astronomers manage to read the works

---

<sup>198</sup> Dick (1993), pp. 130-131.

of their CETI Western counterparts? Additionally, there is the fact of the landmark of Kardashev's work<sup>199</sup> in the field that still pervades.

Returning to how the Soviet-American cooperation in CETI had jumpstarted, the landmark publication for the larger public of the question of (extraterrestrial) intelligent life in the universe came about as a result of the original manuscript by Shklovskii being translated and integrated into a larger book co-authored by Sagan and published in the West only. Besides the asymmetry of financial reward resulting from this fact and deplored by Shklovskii personally in his autobiography, there is the question of how much Western culture, if not western scientists themselves, were influenced by Soviet ideas/ scientists much more tacitly than vice-versa. In the Soviet Union, it was still easy to distinguish, even in an exaggerated way, the ideas that were coming from the West, the filter being much more dense. This suggests that the Soviet Union, in being more reluctant to receive ideas from the West, but having reached a moment in which it encouraged the exchange, instead of symmetrically exchanging ideas, it had rather leaked them in the sunset's direction.

The thesis expressed by this paradox is supported by the evidence shown so far, but considering the scarcity of sources taken into consideration here, it can not constitute an established historical fact. Some arguments that can be explored in this direction, that are compatible with Alexei Yurchak's perspective. For instance, once CETI moved from being an international concern to being a Soviet one, what changes in the discourses could be noticed? Was the same type of questions being asked, or did the discourses remained constrained within the technical realm rather than on the edge between science and humanities? Does the merging of the two cultures of fiction and science continue? If yes, does it continue unaltered? If not, how does this relate to the transformation or shrinking of scientific internationalism? Finally, how does the outer space imaginary, if so, shrinks, or changes, in relation to these changes?

By the time of the 10th anniversary of the Soviet-American conference in Tallinn, the atmosphere was highly different from the Byurakan 1971. Drake's account on the event for the public record records a disappointing turn out from the very limited possibility of Americans to travel in large numbers (like in 1971) to the Soviet Union:

---

<sup>199</sup> The Kardashev scale that categorizes civilizations in the universe. Despite the Toronto scale having been developed in the meantime, the Kardashev scale still remains "a generally accepted tool to describe the advanced civilizations even today" see Galántai, op. cit., p. 2.

Some thirty people from the United States were invited, but the shortage of travel funds and other obstacles prevented most from attending. Indeed, were it not for a timely travel grant from the Sloan Foundation, there would have been very few Americans present. In the end, a total of 10 Americans, of which I was one, attended this conference in another world and about other worlds.<sup>200</sup>

This section probed into how CETI continued or metamorphosed into something else, by raising question tracing CETI from its rise to its disappearance and referring to the historical development of the outer space imaginary in the 20th century and beyond till this day. One of the advantages of researching CETI historically lies also in the fact that the history of CETI is very well reported in the immediate aftermath of its birth by the IAA. The historicity of it is of special interest to the ones in the field and public records are here very clear. In 1972, only six years after the introduction of CETI to IAA, the First International Review Session on CETI takes place during the annual meeting of the IAF. Additionally, in 1977, a Second CETI Review Session is introduced “in response to the increasing interest in the subject”<sup>201</sup>.

This points to the fact that CETI was still a very rich resource for research and asks further questions on the intersection of CETI with SETI, as well as to the transition to a focus on SETI since then. Additionally, the name CETI prevailed long after its official demise. When introducing his Byurakan II talk in the 2001 edition, Ginzburg mentions that “CETI (sic) is worth pursuing”<sup>202</sup>. How the name CETI continued to successfully refer to either a lingering concept, and even more, at an international level.

Even if the creation of the Soviet CETI program had to wait until after the Byurakan II conference, and therefore the all-union coordinated efforts on CETI resumed in 1964 and potentially with the Kaplan volume introducing “Exosociology”, the context was favourable for astrophysics and astronomy in general throughout the 1960s. In 1967 one of the “very first monographs to give a comprehensive and modern account of all aspects of modern cosmology”<sup>203</sup> was published. Surprisingly, during the 70s, the problem of CETI seems to

---

<sup>200</sup> See Drake (1982).

<sup>201</sup> Billingham & Pešek (1979), p. 2.

<sup>202</sup> Ginzburg (2001), p. 264.

<sup>203</sup> Kragh (2012), p. 25.

have preoccupied more and more Soviet scientists: Drake mentions that there were about 100 of them working in this area at the time of the 1981 gathering<sup>204</sup>. Whether the quality had been replaced by or complemented quality remains an open question.

So far, the CETI landscape shows that Soviet ideas were developing much more on the international platform during the late 60s, than internally. And even when they did take place inside the Soviet Union the transfer of knowledge to the West was performed rapidly. This can illuminate on one disagreement between historians of the space race. In difference to Siddiqi, many of them view the end of the space race as marked by the 1975 moment of the Soyuz-Apollo mission. If the exchange of ideas had already tilted the balance more in favour of the Western scientists who have potentially received more information from the Soviet side during the 60s, this explains the first sign of the Soviet Union's falling behind. Philosophical and scientific ideas were co-created - or at least the attempt to do so manifested - across the Iron Curtain through CETI. This potentially led to the "real", or the second stage of the fall of the Soviet Space Exploration era shortly after the USSR's catching up with the US in terms of nuclear capabilities.

---

<sup>204</sup> Drake (1982).

## Discussion

In emphasising how communication across the Iron Curtain underpinned communication with extraterrestrial intelligence what is not at stake is to reduce the CETI project and international cooperation it engendered to a mere political action, or even a terrestrial communication. On the contrary, it is to show how the terrestrial informs what humans “do” in outer space. Previously, scholars have noted how the outer space imaginary produced in the West through SETI has involved, and still continues to do so, the transposition of terrestrial antropoc cultural elements<sup>205</sup> into the extraterrestrial realm. In the same line of argument, the findings in this dissertation extrapolate from this observation, looking at the East-West (Soviet-American) scientific relations exported beyond the earthly limits. They point to how the quest for the extraterrestrial other has its origins partially in a Cold War episode where competition and cooperation were intricately complex.

The project of *Communication with Extraterrestrial Intelligence* underscored not only a geo-political entanglement, but also a scientific one, testifying to how the Thaw was rather a “volatile alternation of thaws and freezes, one succeeding the other at a dizzying pace”<sup>206</sup>. The Thaw, which began with literature<sup>207</sup>, was a reframing of the political, a readjustment of the imaginary possibilities. And it further raises the hypothesis that it could start with literature because literature had the potential to awake the political imagination, while CETI shared with literature the non-political place, non-real space that enabled other realities to be expressed. It allows for questions to be asked in order to understand how much was changed by scientists, and other actors coming together and speaking out through the space created as such - as “even if they were not able to do much, speaking out was doing a great deal”<sup>208</sup>. CETI enabled as such an interdisciplinarity as a platform for global concerns, offering a larger context as a point of reference. It shows the entanglement of science with fiction when it has political impact.

Siddiqi argues that the roots of the Soviet space program in the 60s did not originate in the teleological conception of science and progress, but rather in the mystical dreaming

---

<sup>205</sup> Basalla (2006).

<sup>206</sup> Csicsery-Ronay, Jr. (2004), p. 339.

<sup>207</sup> Idem.

<sup>208</sup> Ibid., p. 338.

that characterized early Soviet cosmism<sup>209</sup>. While it remains debatable whether in general this indeed applies to the Soviet space program, in CETI at least the teleological conception of science and progress was quite pervasive with a twist, though, the concern for the consequences of the progress, a similar critique with the one addressed in the West by movements such as the Club of Rome or the Russell-Einstein manifesto. Reflective of a more general trend in the scientific discursive regime at the time, CETI took a critical approach that brought it closer to the West in more ways. The international range of the project from the beginning played out in manifold ways. More precisely, it extended not only at the level of institutionalized international science (IAU, IAA), but also through personal correspondence, as well as translations and passing of materials that bypassed these channels. Scholars have noticed a larger trend of Soviet natural and physical scientists to participate during the intellectual thaw of the 1960s in international conferences where peace and security were discussed<sup>210</sup>. The findings in this dissertation give a first insight into the contribution of the outer space imaginary of CETI to this trend.

The mix of non-science with science in CETI was, rather than a mostly unconscious characteristic, a form of keeping knowledge production in a domain that remained safe from ideological constraints, or political interference from the centre. It gave rise to a hybrid knowledge that remained unnamed at the meta-level - there was no CETI science, just as there is no SETI science till day. The hybridity of the knowledge having being produced through the CETI discourse allowed for diplomacy and other forms of knowledge to enter into a conversation, and form the CETI scientific field. As such, through internationalism, a new domain was reached by focusing on outer space and on the question of communicating with extraterrestrial intelligence. Questions that could have barely been brought into a discursive existence in other delimited scientific fields found their way here.

The fact that the CETI discourses developed during the 1960s bore the signs of the 60s generations who had witnessed a dramatic change in the Soviet Union “from poverty to rapid improvement”<sup>211</sup>. The hopes expressed in CETI were nonetheless a product of their era. It is agreed upon between historians that the publicity of the USSR’s accomplishment influenced positively the adoption of cultural reforms in the West. As Western actors came to

---

<sup>209</sup> Siddiqi (2016).

<sup>210</sup> Graham (1993), p. 168.

<sup>211</sup> Kojevnikov, in Andrews & Siddiqi (2011), p. 25.

know of the Soviet outer space imaginary and its (extra)terrestrial reaches, epistemological changes were performed. The extent of these transformations and processes of entanglement remain so far understudied. The analysis on CETI in this dissertation merely opens up the space for further studies. By focusing on the ideas that transpired in the 1960s and on the historical unfolding of scientific internationalism through the quest for intelligent life in the universe, novel findings can be brought to light on the period of the Cold War.

CETI discourse resembles other types of discourses during Khrushchev's Thaw which attest to the change in the discursive regime. Nonetheless, what sets CETI apart from them is the rich international exchange that was a political in the international stage. While science fiction might have performed at least as a courageous imaginative exercise as the CETI discourse, Shklovskii and alike have actually acted politically by transmitting their political ideas beyond the borders of the Soviet Union, as well as forming some of them in an open conversation with the West. This episode in the Cold War scientific internationalism is an example of how focusing on the history of knowledge rather than on the history of science and/ or ideas allows to ask further questions about "basic epistemic categories, their interrelations and mutual constitution"<sup>212</sup>. It is in this sense that discursive events become conditions for truth<sup>213</sup>.

Today's program of reaching out to extraterrestrial intelligence through SETI is currently a most vivid example for the fluidity of cognitive authority, as well as for the forms of knowledge production and communication. For this reason, tracing its history back during the Cold War from the point of view of the knowledge as an extended field allows to see how science and politics, science and fiction entangled in action. This is in line with the current concerns in the scholarship for changing the focus to a history of knowledge as response to current needs in society of the discipline. Historicising the scientific quest for extraterrestrial intelligence through radio astronomy in the universe as such reveals the role the discussion played in politics as well as in the larger imaginary. Tracing the transformations the phenomenon undertook may help us better understand the "origins" of today's attempts to align "human" intelligence with a universal category. Moreover, it speaks for the stakes that are at work when doing so, on Earth.

---

<sup>212</sup> Dupré & Somsen (2019), p. 197.

<sup>213</sup> Yurchak (2003).

The resulting effect, international cooperation, is also the cause of the discourse. As such, what is comparing the CETI discourse with the other discursive modes (like *nauchnaya fantastika* or scientific prose) in relation to one another in an attempt to answer the question of how the discourse on ETI was shaped in this particular scientific internationalism, is opening a conversation by extrapolation with the history and anthropology of outer space exploration and of the extraterrestrial imaginary. The work analysing the Western imaginary, such as that by Traphagan, Crowe, Denning<sup>214</sup> or Messeri<sup>215</sup> have indirectly propelled the ideas put forward here. These scholars have innovated the study of outer space imaginary from very different angles. While Traphagan and Crowe focus mostly on the intersection with religion, with Crowe focusing mostly on the historicity of the extraterrestrial life debate, Messeri and Denning approaches are rich critical ethnographic descriptions of how the imaginary is constructed.

It is hoped that the dissertation here initiates a much needed conversation on the Soviet and Cold War war legacy in the problem of extraterrestrial intelligence in the anthropology of outer space and other related disciplines. To say the least, this can lead to a critical readjustment of some of the categories of thinking about outer space, categories largely produced in the West, or perceived as a result of Western thinking. A discursive analysis on CETI is both a shift in time and in space (and therefore an epistemic gain) for anthropological approaches to the history of space exploration.

---

<sup>214</sup> Traphagan (2011; 2015); Denning (2006; 2012); Crowe (1997).

<sup>215</sup> Messeri (2016).

# References

## Primary Sources

Billingham, John & Pešek, Rudolf. Preface to Billingham & Pešek (ed.) *Communication with Extraterrestrial Intelligence*. Acta Astronautica, Vol. 6, pp. 1-2.

Bobrovnikoff, N. T. (1968). Soviet Attitudes Concerning the Existence of Life in Space. In Wukelic, E. George (ed.). *Handbook of Soviet Space-Science Research*. New York: Gordon & Breach.

Bricker, P.J. Rodney (1981). US Technology Transfer to the Soviet Union: A Dilemma, *Air War College Report*, No. MS094-81, ch IV+VI.

Cocconi, Giuseppe & Morrison, Philip (1959). Searching for Interstellar Communications. In *Nature*, Vol. 184, pp. 844-846.

Drake, Frank (1982). SETI Tallinn-1981. Communication with Terrestrial Intelligence in *Cosmic Search*, Issue 13, Vol. 4, Number 1; First half 1982. Retrieved: <http://www.bigear.org/CSMO/HTML/CS13/cs13p04.htm>.

Dyson, Freeman (1971). Letter from Armenia. In Dyson (1993), *From Eros to Gaia*. London: Penguin Books, pp. 285-295.

Kaplan, A. Samuil (1971). *Extraterrestrial Civilizations: Problems of Interstellar Communication*. Jerusalem: Published for the National Aeronautics and Space Administration and the National Science Foundation, Washington, D.C. by the Israel Program for Scientific Translations. Retrieved: [https://archive.org/stream/nasa\\_techdoc\\_19710005278/19710005278\\_djvu.txt](https://archive.org/stream/nasa_techdoc_19710005278/19710005278_djvu.txt)

Kardashev, Nikolai (1969). Strategy for the Search for Extraterrestrial Intelligence. In Billingham, John & Pešek, Rudolf (ed.). *Communication with Extraterrestrial Intelligence*. Acta Astronautica, Vol. 6, pp. 33-46.

Sagan, Carl (1973). *Communication with Extraterrestrial Intelligence. Proceedings of the Byurakan conference held September 1971*. MIT Press.

Pešek, Rudolf (1979). Activities of the IAA CETI committee from 1965-1976 and CETI outlook. In Billingham, John & Pešek, Rudolf (ed.). *Communication with Extraterrestrial Intelligence*. Acta Astronautica, Vol. 6, pp. 3-9.

Shklovskii, Iosif (1991). *Five Billion Vodka Bottles to the Moon. Tales of a Soviet Scientist*. Translated and Adapted by Zirin, Mary Fleming & Harold. Introduction by Friedman, Herman. New York: W. W. Norton & Company.

Shklovskii, Iosif & Sagan, Carl (1966). *Intelligent Life in the Universe*. San Francisco: Holden-Day.

Tovmasyan, M. G. (1967). *Extraterrestrial Civilizations. Proceedings of the First All-Union Conference on Extraterrestrial Civilizations and Interstellar Communication. Byurakan, 20-23 May 1964*. Jerusalem: Israel Program for Scientific Translations.

First Soviet-American Conference on Communication with Extraterrestrial Intelligence (1972). In *Icarus*, Vol. 16, pp. 412-414.

The Soviet CETI Program (1975). In *Soviet Astronomy*, vol. 18, no. 5, March-April 1975 (translated from *Scientific Council on the Radio-Astronomy Problem Area, Academy of Sciences of the USSR, Astron., Zh.*, 51, 1125-1132, September-October 1974). Retrieved: <https://history.nasa.gov/SP-419/s3.11.htm>.

International Academy of Astronautics - SETI Permanent Committee: <http://www.setileague.org/iaaseti/pesek.htm>.

Central Intelligence Agency Declassified Document (1970): *The Theory of "Convergence and/of "Futurology"*. Approved for Release 1992/09/02: CIA-RDP79-01194A0004001400001-7.

## Secondary Sources

Andrews, T. James & Siddiqi, A. Asif (2011). *Into the Cosmos. Space Exploration and Soviet Culture*. University of Pittsburgh Press.

Andrews, T. James (2016). Scientific Propaganda and Anti-Religion. In Betts, Paul & Smith A. Stephen. *Science, Religion and Communism in Cold War Europe*. Palgrave Macmillan, pp. 105-125.

Barry, P. William (2001). Book Review of ‘Challenge to Apollo: The Soviet Union and the Space Age, 1945-1975. By Asif Al. Siddiqi. Washington: NASA, 2000’. In *The Journal of Military History*, Vol. 65, No. 3, pp. 859-860.

Basalla, George (2006). *Civilized Life in the Universe. Scientists on Intelligent Extraterrestrials*. Oxford University Press.

Csicsery-Ronay, Istvan Jr. (2004). Science Fiction and the Thaw. In *Science Fiction Studies*, Vol. 31, No. 3, Soviet Science Fiction: The Thaw and After, pp. 337-344.

Crowe, Michael J. (1997). A History of the Extraterrestrial Life Debate. In *Zygon Journal of Religion and Science*, Vol. 32, Issue 2, pp. 147-162.

Daumann, Christin (2003). Astrophysics Legend Nikolai Kardashev, Civilization Ranking Scale Author, Died Age 87. In *Asgardia, The Space Nation*. Retrieved: <https://asgardia.space/en/news/Astrophysics-Legend-Nikolai-Kardashev-Civilization-Ranking-Scale-Author-Died-Age-87>

Denning, Kathryn (2006). *Ten Thousand Revolutions: Conjectures About Civilizations* (Paper for session “SETI II: Interdisciplinary Aspects”, International Astronautical Congress, Valencia, Spain, October 2006).

Denning, Kathryn (2012). In Mann, Adam, Q & A: The Anthropology of Searching for Aliens, *Wired*. Retrieved: <https://www.wired.com/2012/04/space-anthropology/>.

Dick, J. Steven (1993). The Search for Extraterrestrial Intelligence and the NASA High Resolution Microwave Survey (HRMS): Historical Perspectives. In *Space Science Reviews*, Vol. 64, pp. 93-139.

Dippel, Anne (2016/ undated). Algorithmic *Palimpsests*. *On the Production of Knowledge about the Nature of Nature at CERN* (Conference presentation). Retrieved: [https://www.academia.edu/12683478/Algorithmic\\_Palimpsests.\\_On\\_the\\_Production\\_of\\_Knowledge\\_about\\_the\\_Nature\\_of\\_Nature\\_at\\_CERN\\_Centre\\_de\\_la\\_Recherche\\_Nucleaire\\_Meyrin\\_Switzerland\\_](https://www.academia.edu/12683478/Algorithmic_Palimpsests._On_the_Production_of_Knowledge_about_the_Nature_of_Nature_at_CERN_Centre_de_la_Recherche_Nucleaire_Meyrin_Switzerland_).

Doel, E. Ronald (2008). The Kozyrev-Kuiper Controversy over Lunar Vulcanism: An Episode in Soviet-U.S. Relations. In L.S. Shikhobalov, A.N. Dadaev, N.N. Kazansky, D.N. Kozyrev, and F.N. Kozyrev (eds.) ed., *Время и звезды: к 100- летию Н.А. Козырева* (Time and Stars: The Centenary of N.A. Kozyrev). St. Petersburg: *Nestor-Historia*, pp. 308-351 [with a 2007 Postscript, pp. 348-351].

Dupré, Sven & Somsen, Geert (2019). The History of Knowledge and the Future of Knowledge Societies. In *Berichte zur Wissenschaftsgeschichte*, 42, pp. 1-14.

Galántai, Zoltan (2007). After Kardashev : Farewell to Super Civilizations. In *Contact in Context*, vol. 2, n° 2, 2007 Retrieved: [https://www.academia.edu/1018345/After\\_Kardashev\\_Farewell\\_To\\_Super\\_Civilizations](https://www.academia.edu/1018345/After_Kardashev_Farewell_To_Super_Civilizations).

Geppert, Alexander (2015). Die Zeit des Weltraumzeitalters, 1942-1972. In Geppert, C. T. Alexander & Kössler, Till (Ed.). *Obsession der Gegenwart. Zeit im 20. Jahrhundert*. Göttingen: Vanderhoeck & Ruprecht, pp. 217-250.

Geppert, C. T. Alexander (2018). *Limiting Outer Space. Astroculture after Apollo*. New York: Palgrave Macmillan.

Gerovitch, Slava (2008). InterNyet: why the Soviet Union did not build a nationwide computer network. In *History and Technology*, Vol. 24:4, pp. 335-350.

Gindilis, M. L. (2012). The Development of Radio Astronomy at the Sternberg Astronomical Institute of Lomonosov Moscow State University and the Space Research Institute of the USSR Academy of Sciences. In Braude, Y. S. et al. (Eds.). *A Brief History of Radio Astronomy in the USSR*. New York: Springer.

Gindilis, M. Lev. & Gurvits, L. Leonids (2019). *SETI in Russia, USSR and the post-Soviet space: a century of research*. Preprint submitted to Acta Astronautica.

Ginzburg, L. Vitalii (2001). *The Physics of a Lifetime. Reflections on the Problems and Personalities of 20th Century Physics*. Berlin/ Heidelberg: Springer-Verlag.

Gol'danskiĭ, I. Vitalii (1997). *Essays of a Soviet Scientist*. New York: American Institute of Physics Press.

Graham, R. Loren (1987). *Cosmology and Cosmogony*. In *Science, Philosophy, and Human Behaviour in the Soviet Union*. Columbia University Press.

Graham, R. Loren (1993). *Science in Russia and the Soviet Union. A Short History*. Cambridge University Press.

Guth, Stefan (2015). One Future Only - the Soviet Union in the Scientific-Technical Revolution. In *Journal of Modern European History*, Vol. 13:3, pp. 355-376.

Hollings, D. Christopher (2016). *Scientific Communication Across the Iron Curtain*. Springer International Publishing: Springer Briefs in History of Science and technology.

Ilyenkov, Evald (2017). *Cosmology of the Spirit*. An attempt to give a basic outline of the objective role of thinking matter in the system of universal interaction (A Philosophical-Poetic Phantasmagoria based on the principles of dialectical materialism). In *Stasis*, Vol. 5, No. 2, pp. 164-190.

Ivanov, Konstantin (2003). Science after Stalin: Forging a New Image of Soviet Science. *In Science in Context*, Vol. 15, pp. 317-338.

Kardashev, Nikolai & Marochnik, Leonid (1992). The Shklovskii Phenomenon. In Kardashev, N. *Astrophysics on the Threshold of the 21st Century*. Philadelphia: Gordon and Breach, pp. 7-24.

Kojevnikov, B. Andrei (2004). *Stalin's Great Science - The Times and Adventures of Soviet Physicists*.

Kuchment, Mark (1990). Bridging the Two Cultures: The Emergence of Scientific Prose. In Graham, R. Loren. *Science and the Soviet Social Order*. Harvard University Press, pp. 325-340.

Kragh, Helge (2012). The Universe, the Cold War, and Dialectical Materialism. Cornell University. Cornell University Physics Archive - History and Philosophy of Physics. Retrieved: <https://arxiv.org/abs/1204.1625>.

Lalli, Roberto (2017). *Building the General Relativity and Gravitation Community During the Cold War*. Springer.

Messeri, Lisa (2016). *Placing Outer Space: An Earthly Ethnography of Outer Worlds*. Duke University Press Books.

Menzel, Birgit (2005). Russian Science Fiction and Fantasy Literature. In Lowell, Steven and Menzel, Birgit, *Reading for Entertainment in Contemporary Russia: Post-Soviet Popular Literature in Historical Perspective.*, München: Sagner. pp. 117-150.

Michaud, A. G. Michael (2007). *Contact with Alien Civilizations. Our Hopes and Fears about Encountering Extraterrestrials*. New York: Copernicus Books, Springer.

Lynn, Margulis (1975). [Review of the] *Communication with Extraterrestrial Intelligence (CETI)*. Proceedings of a Conference held at the Byurakan Astrophysical

- Observatory. In *The Quarterly Review of Biology*, Vol. 50, No. 1, pp. 120-121.
- Raymond, A. Edward (1973). US-USSR Cooperation in Medicine and Health. In *The Russian Review*, Vol. 32, No. 3, pp. 229-240.
- Sagdeev, Z. Roald (1994). *The making of a Soviet Scientist. My Adventures in Nuclear Fusion and Space from Stalin to Star Wars*. New York: John Wiley & Sons.
- Sheridan, Mark (2011). Chapter 5: The Soviet Critique of SETI. In Sheridan. *Seti's Scope: How the Search for Extraterrestrial Intelligence Became Disconnected from New Ideas about Extraterrestrials*. Charleston: Proquest, Umi Dissertation Publishing. Retrieved:[http://www.daviddarling.info/encyclopedia/S/SETI\\_critical\\_history\\_SETI\\_Soviet\\_critique.html](http://www.daviddarling.info/encyclopedia/S/SETI_critical_history_SETI_Soviet_critique.html).
- Siddiqi, Asif (2016). Tsiolkovskii and the Invention of 'Russian Cosmism': Science, Mysticism, and the Conquest of Nature at the Birth of Soviet Space Exploration. In Betts, Paul & Smith A. Stephen. (Ed.) *Science, Religion and Communism in Cold War Europe*. Palgrave Macmillan, pp. 127-156.
- Siddiqi, Asif (2011). From Cosmic Enthusiasm to Nostalgia for the Future: A Tale of Soviet Space Culture. In Maurer et al. *Soviet Space Culture. Cosmic Enthusiasm in Socialist Societies*, pp. 283-306.
- Strel'nitski, Vladimir S. (1995). The Early Post-War History of Soviet Radio Astronomy, *Journal for the History of Astronomy*, Vol. 26, pp. 349-362.
- Sullivan, T. Woodruff III (2009). *Cosmic Noise. A History of Early Radio Astronomy*. Cambridge University Press.
- Swift, W. David (1990). *SETI Pioneers: Scientists Talk about Their Search for Extraterrestrial Intelligence*. Tucson: University of Arizona Press.
- Traphagan, John (2015). *Extraterrestrial Intelligence and Human Imagination: SETI at the intersection of Science, Religion, and Culture*. Springer International Publishing

Switzerland.

Traphagan, John (2011). Culture, Meaning, and Interstellar Message Construction. In Vakoch, A. David. *Communication with Extraterrestrial Intelligence (CETI)*. Albany: State University of New York Press.

Valentine, David (2012). Exit Strategies: Profit, Cosmology, and the Future of Humans in Space. In *Anthropological Quarterly*, Vol. 85, No. 4, pp. 1045-1067.

Wolfe, J. Audra (2018). *Freedom's Laboratory*. Baltimore: John Hopkins University Press.

Yurchak, Alexei (2003). Soviet Hegemony of Form: Everything Was Forever, Until It Was No More. In *Comparative Studies in Society and History*, Vol. 45, No. 3, Jul., 2003, pp. 480-510.

\*\*\*The Bruce Medalists: Viktor Amazaspovich Ambartsumian:  
<http://www.phys-astro.sonoma.edu/BruceMedalists/Ambartsumian/>.

\*\*\*Radio Astronomy Department, Sternberg Astronomical Institute of Moscow University: <http://comet.sai.msu.ru/radio/>.