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Verbalization of Music Processes
(The Engine of thought Experiment in the Music of the Early-Modern Period)

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Abstract--- Thematic justification: *The most important source and carrier of hidden non-verbalized meanings is music. It can penetrate the innermost layers of consciousness and being that are fundamentally inaccessible to scientific knowledge. Therefore, nonverbal thinking, as well as and non-verbal methods of obtaining information, are increasingly become the subject of scientific research. Under the conditions of the rise of personal and universal issues, the search for a solution to not only these problems but also the exposure and study of rational tools for comprehending the world through verbalization of musical processes becomes essentially important.*

Purpose: *To reveal and verbalize rational algorithms constituting musical creative activity.*

Methods: *The presented article employed various methods of dialectical logic, phenomenology, comparative studies, the system-structural method that considers the literary text as a semiotic system, and general scientific research methods (abstracting, idealization, modeling, and extrapolation).*

Results:

- *It was established that the engine of a thought experiment is the basis of rational algorithms of the art music*
- *It was proved that the development of musical thought in the music of the Early-Modern Period obeys dialectical logic of ascent from the abstract to the concrete;*
- *The most important stages of a thought experiment in a musical text were described, also, an idealized object was identified;*
- *Methods of transformation and modification of an idealized subject were revealed and specific methods of transformation of an idealized subject in music were established;*
- *The commonality of transformations of an idealized subject in mathematics and music was emphasized.*

Conclusions: *The identification of the meaning-creating mechanisms of musical creativity by revealing the possibilities of a thought experiment allows realizing the aesthetic principles and ideals of musical culture, as well as predicting its further development. The study established the commonality of thought processes in scientific knowledge and artistic creativity. It was also revealed that the verbalization of musical processes stimulates the development of promising areas that allow real integration of philosophical and musicological approaches with regard to the problem of a thought experiment.*

Keywords--- *Verbalization, Process, Thought Experiment, Abstracting, Idealized Subject, Transformation, Music, Creativity, Extrapolation.*

I. INTRODUCTION

Is difficult to overestimate the importance of art in society, however, it acquires a special significance in crisis

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and turning periods, as it provides an opportunity to observe not only the processes taking place in life but also to comprehend and experience the deep foundations of the culture of the time and past eras. It is in artistic creation, in particular, in music, that both social issues and the processes that shape the human consciousness are most clearly displayed. Turning to art and artistic experience helps to comprehend and display the most important features of modern culture, as well as to some extent rethink, anticipate and predict the future paths of its development.

The relevance of the research is associated with the multilevel nature and heterogeneity of modern information flows, where nonverbal methods of cognition play an increasingly important role.[2] When analyzing works of art, those processes and operational mechanisms that initiated their creation, as a rule, remain outside the framework of aesthetics and philosophy of art. Particularly relevant in the study of musical art is the search for rational foundations of musical creative activity and the exposure of the engines of this activity. Although non-verbal information is very difficult to discursive analysis and interpretation, non-discursive methods of obtaining, storage, and transmission of information, are increasingly used along with traditional rationality.

The most important for verbalization of musical processes is to identify the operational mechanism by which a musical artifact is created, its most important aesthetic qualities are formed, and the logic of musical processes is revealed. Since the speculative and experimental component of aesthetic activity is not always shown to the recipient and the latter most often perceives only the results of creative searches, this mind-set seems most difficult to verbalize. But the complexity of verbalization of musical processes and the difficulty of identifying the rational foundations of musical creative activity does not indicate the fundamental impossibility of detecting them or their absence, because the deeper we penetrate the laboratory of creative processes, the more obvious is the experimental-rational nature of the musical activity.

The study of non-verbal can be carried out by aesthetic and philosophical analysis of artistic creation, by verbalization of musical processes. Verbalization [3] of musical processes is of scientific value not only in terms of art history and aesthetic and philosophical reading of musical messages but also in extrapolating the results to other forms and practices of both verbal and non-verbal thinking.

The verbalization of musical processes and disclosure of operational mechanisms of creative activity should become an essential element of modern scientific research of art. However, to date, there were practically no advance algorithms of future thought actions that have been explicated in musical thinking; although for their qualitative development, musical art and modern art science, of course, need to identify and study the thought processes of creative activity, philosophical reflection, and verbalization of musical processes. The study of the rational components of the musical process leads to the conclusion that the actions of a thought experiment are the mechanism for creating a musical artifact. Exposure and study of the engines of a thought experiment in music, which is one of the forms of non-verbal generation, and processing and transmission of information,[4] are of

[2] Paul de Man observed that: ‘we do continue to hear a great deal about reference, about the nonverbal 'outside' to which language refers, by which the language is conditioned and by which it acts’. *Man* P. *de.* Allegories of Reading: Figural Language in Rousseau, Nietzsche, Rilke and Proust. New Haven, 1979. P. 3.

[3] Jacques Derrida in his Margins of Philosophy claims that any ontology is verbal // Derrida J. Marges de philosophie. Paris, 1972. P. 215.

[4] Giorgio Sanguinetti in his ‘The Art of Partimento. History, Theory and Practice’ proved that the theory of composition and musical pedagogy in the XVII - XVIII centuries in Italy were non-verbal: ‘[Partimento is] a nonverbal theory. <...> There has never been an Italian

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exceptional value, since many non-verbalized and therefore hidden processes that latently occur in consciousness and thinking are the foundation, and, in many respects, they are shaping the public consciousness and quality of our life. That is why verbalization and conceptualization of musical processes, philosophical substantiation and comprehending of the most general internal laws, sources, and mechanisms of musical culture, acquire special significance.

Since music is the unique phenomenon of the generation, structuring and transmission of non-verbal meanings and senses,[5] aesthetic and philosophical studies of musical processes contribute not only to clarification and explanation of already existing musical phenomena, but also encourage the search for fundamentally diverse ways of expression, raise issues of meaning generation, the existence of various ideas, their crystallization and translation into other semiotic systems. The philosophy of music not only serves as a way of explaining a given musical phenomenon, but it also forms a special spiritual and creative field that stimulates the development of music as an art form.

Research Hypothesis

Music is a model of evolution. It not only enters into the universal 'culture code' of a certain era but also forms this code. Music anticipates the most important structural and substantive principles of natural science, sensually reproduces dynamic and logical-structural processes. The composer not simply arranges, but enters a special spiritual and mental field, which, as it were, perfectly reproduces the most important substantive and structural components of objective reality. Musical content unfolds in the space of sound forms. These sound forms are energetically and mentally charged substances that reproduce the most important ontological and global entities in an active dynamic perspective. Studying, analyzing, and interpreting sound forms, the researcher thereby penetrates the depths of human consciousness, thinking, and logic, operating not in one particular sphere, but possessing universality, commonality, and indispensability. Thus, the philosophical and aesthetic study and interpretation of musical structures go far beyond the very boundaries of musical expression and content to the level of philosophy of consciousness, philosophical ontology, and epistemology.

Scientific Novelty

For the first time in aesthetics, a thought experiment is presented as a working mechanism of musical art. The creative process in musical art is tracked and analyzed through the structure of a musical text. It is proved that the basis of a thought experiment in music is the performance of abstracting and idealization; its main stages correspond to the main stages in a scientific thought experiment. It is also proved through case histories that all inventions and innovations in the music of the Early-Modern Period are the results of the performance of a thought experiment. The equivalence of many ways of transforming an idealized subject in music and mathematics was quite established; the connection between a musical theme and its transformations, which are carried out according to the laws of

Rameau - that is, a single theorist, who, through an imposing corpus of theoretical writing, exerted a decisive influence on the way musicians think about their art. <...> All these sources lack almost any kind of text... The paucity - or even absence - of words characterized all Italian (and especially Neapolitan) theory of the eighteenth century' *(Sanguinetti G.* The Art of Partimento. History, Theory and Practice. New York, 2012. P. 9).

[5] On the conditions for constituting musical being beyond the limits of the logos, see *Subotnic R.* Deconstructive variations. Music and Western Society. Minneapolis: Minnesota University Press, 1994. 325 P.

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dialectical logic from abstract to concrete, is revealed for the first time. This principle is embedded in the engine of a thought experiment and is manifested through it. The rise from the abstract to the concrete becomes the law of structuring musical works and the logical form of the music of the Early-Modern Period.

The Purpose of the research involves:

- Detecting the rational operating mechanisms in musical aesthetic activity through verbalization;
- Discovering the possibilities of a thought experiment as an operational mechanism of musical activity;
- Revealing the specifics of a thought experiment in music.

Systematization of known Solutions to a Scientific Problem

The thought experiments were used in the reasoning and evidence by ancient philosophers (Zeno of Elea, Aristotle,[6] Lucretius Car); the thought experiments of the medieval philosopher and theologian Nicholas of Cusa (1401 - 1464) are directly related to the current comprehension of the thought experiment in mathematics. The main mechanisms of a thought experiment in natural science developed during the time of Galileo Galilei (XVI-XVII centuries), but the very term 'thought experiment' (Gedanken experiment) was introduced at the turn of the XIX-XX centuries by Ernst Mach[7] (1838 – 1916). Further, this concept was enriched due to scientific research in physics (Galilei[8], Faraday[9], Maxwell[10], Einstein[11]) and mathematics (Lakatosc[12], Nevanlinna[13]). The universality and necessity of performance of a thought experiment for any creative processes were first asserted in a philosophical concept by Vladimir Bibler.[14] Hereof follows the logical possibility of extrapolating[15] the concept of 'thought experiment' for any creative activity, and not just for natural science and mathematics. Since the significance of the creative principle in art is undeniable, the extrapolation of the mechanisms of the art of thought in reference to musical art seems quite justified and logical.

Although the most widespread view in aesthetics was the consideration of a piece of art as a result of irrational subconscious activity (Plato[16], Hartmann, Bergson, Freud), but already since the XIX century deeper attention of theorists of musical art has been drawn to the rational[17] and logical constructions of musical texts. The studies of rational logical processes in music were conducted by E. Hanslik,[18] J.F. Herbart,[19] O. Hostinsky,[20] J. Hutter, [21] O.

[6] *Aristotle.* Categories / Aristotle // Aristotle in Twenty-Three Volumes. – London and Cambridge MA: Harvard University Press and William Heinemann, 1983. 542 p.

[7] *Mach E*. Erkenntnis und Irrtum: Skizzen zur Psychologie der Forschung. Barth, Leipzig, 1906.

[8] *Galileo Galilei*. Discourses and Mathematical Demonstrations Relating to Two New Science.
[URL] https://oll.libertyfund.org.titles/galilei-dialogues-concerning-two-new-sciences

[9] *Faraday Michel*. Experimental Research in Electricity. Dover Publications, Mineola, New York, 2004. 368 P.

[10] *Maxwell J*. C. A treasure on electricity and magnetism. Vol. 1. Vol. 2. Clarendon Press, Oxford, 1873.

[11] *Einstein A. Infeld L*. Evolution of Physics. – New York, Touchstone, 1967. 336 p.

[12] *Lakatos I*. Proofs and Refutations. Cambridge University Press, 1976. 174 p.

[13] *Nevanlinna R*. Raumi, Zeit und Relativität: Vorlesungen, gehalten und den Universitäten Helsinki und Zürich. Berkhäuser Verlag, Basel, 1964.

[14] *Bibler V. S.* Thinking as Creation (Introduction to the Logic of Mental Dialogue) / Moscow: Politizdat, 1975. 270 p.

[15] *Kulbizhekov V. N.* Rethinking and Extrapolating of Notion «Mental Experiment» Relating to Musical Art // Proceedings of the XXII World Congress of Philosophy / Seoul National University. Seoul, 2012. Vol. 1. Aesthetics and Philosophy of Arts. P. 153-160.

Kulbizhekov V.N. Extrapolation of notion Thought Experiment relating to musical art. Vestnik of Moscow State University. Series 7: Philosophy, 2008, no. 6, p. 68–78.

[16] *Plato*. The Republic / Plato // Plato in Twelve Volumes. - Vol. VI. - Cambridge, MA, and London: Harvard University Press and William Heinemann, 1994. - 537 p.

[17] *Kulbizhekov V.N.* Rational Musical Creativity Base. Mechanisms of Mental Experiment in the Classical Western European Music of Modern Times. Moscow, Librokom, 2017. 2nd Ed, 200 p.

[18] *Hanslik E*. Vom Musikalisch-Schönen. Leipzig, 1854. [URL] http://www.koelnklavier.de/quellen/hanslick/_index.html

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Zich,[22] E. Kurt,[23] H. Mersmann, R. Müller-Freienfels,[24] H. Riemann,[25] and G. Fechner.[26] These studies became the basis of an alternative point of view on the creative process, not only as irrational and intuitive but also as a logical one. And this was the first step to confirming the existence of a thought experiment performance in music.

Important provisions of the philosophy and aesthetics of music, quite essential for verbalizing musical processes, exposing and comprehending the phenomenon of musical thought experiment, are well presented in the works of the classics of philosophical thought I. Kant, F. Schelling, G. Hegel, A. Schopenhauer, F. Nietzsche, E. Cassirer. T. Adorno; and also in the works of Russian philosophers such as A.A. Guseinov, V.S. Bibler, A.F. Losev, V.S. Stepin, V.N. Kholopova, T.V. Cherednichenko.

However, to the author's knowledge, the phenomenon of a thought experiment has not yet attracted attention in regards to the musical creativity of either European or American philosophers. To fill this gap to some extent is the purpose of the presented study.

II. MATERIAL AND METHODS

The empirical material of the study is represented by literary texts as integrated systems that are analyzed from the point of view of a thought experiment, namely, the music of the composers of the XVII-XVIII centuries. The verbalization of musical processes is revealed through the prism of the operational mechanisms of a thought experiment functioning in musical creativity. Methods of structuring the musical material are considered in accordance with the main stages of a thought experiment.

The choice of empirical material was determined not only by musicological needs since ideal models and mechanisms have already proven their effectiveness for sustainable civilizational development. Therefore, studying the musical culture of the European tradition ipso facto refers to reading up the problems of the relationship between conscious and unconscious, rational and irrational, addressing the issues of the emergence and generation of new knowledge, penetrating the mental component of non-verbalized creative processes, and approaching the perception of the fundamental problems of ontology and anthropology.

The European musical tradition throughout its history demonstrated unusually bright and fruitful periods. Some of these periods, for example, medieval music, to this day stand in need of scrutiny and an adequate assessment; certainly, the early-modern European classical music belongs to global heritage, being an indispensable part of the treasury of the world culture.

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[19] *Herbart J. F*. Psychologie als Wissenschaft, neu gegründet auf Erfahrung, Metaphysik und Mathematik. Verf., Königsberg, 1824. 390 S.

[20] *Hostinský O*. Musikalisch-Schöne und das Gesamtkunstwerk vom Standpunkte der formalen Ästhetik. Aufl. Leipzig: Breitkopf & Härtel, 1877.

Hostinský O. Herbarts Ästhetik in ihren grundlegenden Teilen quellenmäßig dargestellt und erläutert. Leipzig, 2011.

[21] *Hutter J*. Hudební myšlení. Praha: Dr. Václav Tomsa, 1943. 530 s.

[22] *Zich O*. Estetické vnimáni hudby. Cast I. Pokusy // Česka mysl, 1910, №11; Estetické vnimáni hudby. Psychologicky rozdor. – Věstnik Královske Česke společnosti nauk, 1910.

[23] *Kurt E*. Musikpsychologie. Berlin, Max Hesses Verlag, 1931. 323 S. https://ru.scribd.com/document/209802266/Ernst-Kurth-Musikpsychologie

[24] *Müller-Freienfels R*. Psychologie der Kunst. 3. Auflage. Leipzig – Berlin, 1923. Bd. 1. 181 S.

[25] *Riemann H*. Musikalische Logik. Leipzig: Verlag von C. F. Kahnt , 1873. 69 S.

Riemann H. Musikalische Syntaxis. Grundriß einer harmonischen Satzbildungslehre. Leipzig: Breitkopf und Härtel, 1877. [XVI], 123 S.

[26] *Fechner G. Th*. Vorschule der Ästhetik, Bd. 1. Leipzig, 1925.

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III. METHODOLOGY

The author of the presented work was guided by the methods of phenomenology, dialectical logic, the system-structural method that considers the literary text as a semiotic system, and general scientific research methods (abstracting, idealization, modeling, and extrapolation), which made it possible to reveal the basic immanent features and properties of a thought experiment as an operational mechanism of classical music art. The study also employed the principle of dialectical logic, discovered by Hegel - the ascent of thought from the Abstract to the Concrete.

The chosen methodology allows heading from empirical data to extensional generalizations, hypotheses, and concepts. The study is based not on the analysis of the psychophysical and psycho-emotional personal conditions caused by a musical artifact, but on the analysis, decoding, explanation, and interpretation of the data present in musical phenomena and expressed in a symbolic form - a musical text and musical language. These methods allow the most objective approach to the problems of musical phenomenology, that is, from the material foundations of musical art to the analysis and interpretation of ontological components of the creative musical process.

By virtue of the chosen methodology, the conditions and grounds for extrapolating the performance of a thought experiment to music were revealed; not only the existence of mechanisms of a thought experiment in the musical art of the Early-Modern Period is disclosed, but also its functions and significance, which, in turn, give prominence to the most important stages of a thought experiment, such as creating, transforming, and modifying an idealized object.

IV. RESULTS

To solve the problem of having a thought experiment and, respectively, its reference to music, the author relies on Vladimir Bibler's narrative. Bibler distinguishes 3 stages of a thought experiment:

1. Creating an idealized object;
2. Transforming an idealized object;
3. Creating an idealized environment.

Creation of an Idealized subject in the Music of the Early-Modern Period

The most important stage of a thought experiment is the creation of an idealized object. An idealized object is an object that has undergone idealization, which is a type of abstracting. Idealization is characteristic not only of scientific but also of artistic activity. Therefore, it is logical to assume that an idealized subject also occurs in the aesthetics of musical creativity.

The creation of an idealized object involves the imaginary selection or even isolation of certain properties and qualities in the process of idealization, which is reflected in its very name. A selection of initial data or initial means is necessary so that the essence of the phenomenon under study (in science), image (in art) is revealed in absolute purity, not being obscured by random and non-essential elements. J. Derrida noted: 'The ear perceives the result of that interior vibration of material substance without placing itself in a practical relation towards the objects, a result by means of which it is no longer the material form [Gestalt] in its response, but the *first, more ideal activity* of the

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soul itself which is manifested.'[27]

The existence of an idealized object in science and art is diverse. Thus, the idealized object in mathematics and natural science acquires the existential status in visualized systems (drawings, diagrams), as well as various models and model constructions, that is, an idealized object is not only a contemplative abstraction; it appears necessarily objectified in a certain, sensually given material. Therefore, a countertype of an idealized object in music can be education, in some way objectified, or at least visualized, as in mathematics.

The creation of an idealized object occurs at a signified and objectified level, in other words, a written musical tradition; this way it becomes possible to work with it as a material object. The creation of an idealized subject in music is associated with rational work on the selection of artistic and expressive means to obtain a vivid aesthetic effect. An idealized object must necessarily possess the potentials that ignite further artistic or scientific activity, in a manner of speaking, as a bud, contained an implicated form of a source of further development of the artistic image. This is the only case when it will be correct to refer to the presence and possibilities of an idealized subject in musical art.

An idealized subject in music must meet the following conditions:

- Possess potential opportunities hidden in the rhythmic, tone structure for further explication in a musical work;
- Express the main idea of work or, at least, an important aesthetic quality that can dialectically transform to another quality or even to another own self;
- Undergo certain modifications like rhythmic change, diversification, conducting in a decrease, in an increase, augmenting additional elements;
- Be placed in a specific environment (symbolic system), which serves as a source of creating an audio-conceptual image;
- Be expressed in language, speech or symbolic system, i.e., in some sense, be objectified.

An idealized object in music should fully satisfy the requirements of both a philosophical scientific approach and reflect the specifics of aesthetic and creative activity. It should be sensually revealed to the recipient and express the characteristic signs and features of the artistic image as a whole thus representing a complex formation that could become the core of a musical work. If an object of thought is presented as an idealized object through a thought experiment, then it is necessary to identify a musical structure that can become an object of thought. The object of thought should be a structure suitable for the composer's contemplative performance,[28] that is, the idealization, or rather, an idealized object. This means that an idealized object in music is a substance that has visibility (audibility); however, it is not a natural entity, but always a construct invented in the course of rational, creative activity by abstracting and idealizing.

An idealized object as an object of thought should represent the most basic (abstract) and the most typical in a

[27] *Derrida J.* De la grammatologie. Paris, 1967. P. 23.

[28] The composer's contemplative performance involves the use of a semiotic system and modeling, i.e. idealized constructs. Therefore, the composition of a piece of music fully meets the requirements for contemplative work.

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musical image.[29] The most significant and typical in the European musical tradition of the Early-Modern Period is presented in the musical theme. According to Vladimir Protopopov, a significant achievement of the European Early-Modern musical culture[30] '…appeared a concentration of the main content of the music in a compressed and intonationally weighty one-voice theme, which, as the texture unfolds, received a multi-voice design with the help of connecting counterpoints'.[31]

Indeed, the essence of the musical image, the main thesis of the artwork is concentrated in the musical theme. That is why the musical theme is traditionally treated as *the central idea of the artwork*. Since the theme contains the basic, major, and typical features of the musical image as a whole and expresses the central idea, the theme represents an idealized subject. All the signs and properties of the theme and thematic invention are built, cut, and molded so that they all reveal musical logic[32]; every single constructive means in a musical theme works for the whole musical image. Thus, the time values are clothed in such a rhythmic sequence to reveal the dynamics and indicate the vector of development. The tonality, metro-rhythmic grids, and tensions are organized to form a musical eidos through the design of the sounding substance in a logical, expedient, and therefore aesthetically perfect way, that is, the design of the sounding substance according to the logic of a thought experiment also denotes the formation of thought. Susanne Langer wrote: 'In the study of music as a form of expression I came to the conclusion that music expresses the feelings as words express the ideas, rather than tears and laughter express emotions.'[33]

The formation of a musical theme is a complex process in which both the conscious and subconscious levels of the psyche and thinking are involved. Russian music scholar Valentina Kholopova observed that 'The term 'theme' with several synonyms [melodies, motives] began to appear in European music from the XVI century and was applied to polyphonic voices'.[34] Jean-Jacques Rousseau defined the term 'motive' as 'C'est le motif qui, pour ainsi dire, lui met la plume à la main pour jetter sur le papier telle chose et non pas telle autre. Dans ce sens le motif principal doit être toujours présent à l'esprit du Compositeur'.[35] Arnold Sokhor noted: 'Back in the XVIII-XIX centuries it was customary to call musical themes (melodies, motifs) musical 'ideas' and consider their development as the development of certain thoughts (recalling Beethoven's famous statement on his own creative process, which begins with finding musical idea and then includes its deployment, transformation, fragmentation, synthesis, etc.)'.[36] Thus, the concepts of theme and thematic inventions arise in the process of rational work of the composer to highlight and generalize the most essential melodic elements.

When disclosing the problem of a musical theme and thematic invention as an idealized object, its status, and capabilities, it is necessary to note the following: since in a thought experiment an idealized object is placed in

[29] The process of isolating and extracting the most important, i.e. the operation of separating the essence of an object from its being is a task of thinking

[30] This primarily refers to the turn of the XVI-XVII centuries

[31] *Protopopov V.V.* History of polyphony. Western European music of the XVII — first quarter of the XIX century / Moscow: Musica publishers, 1985: 3

[32] Riemann *H.* Musikalische Logik. Leipzig: Verlag von C.F. Kahnt, 1873. 69 S.

[33] *Langer S.* The Principles of Creation in Art // The Hudson Review. Vol. II, No. 4. New York, 1950. P. 515

[34] *Kholopova V.N.* Music as a kind of art / M: Musica publishers, 1983. P 10

[35] The motive is what inserts a pen into the composer's hand and makes him write something. In this sense, the motive must always be present in the composer's soul. *Rousseau J.-J.* Motif // Dictionnaire de Musique. Hildesheim, 1969. P. 302

[36] Sokhor A.N. Social conditionalism of musical thinking and perception // Problems of musical thought: collected works, Ed. A.A. Aranovsky / Moscow: Musica publishers, 1974. P 62

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invented (artificial) situations, any change must be logically substantiated. The latter is expressed in music by the fact that often the musical material itself dictates to the composer the development methods that should be carried out according to the logic of the theme and the logic of the musical artistic image. A musical theme should have the potential to explicate and unfold the entire semantic spectrum with all its shades and meanings. Hugo Riemann wrote: 'Der gute Taktteil hat immer den Vorzug vor den schlechten, d. h. die schlechten erscheinen ihm folgend oder vorausgehend, also auf ihn bezogen, er ist von ähnlicher Bedeutung wie der thetische Klang in der harmonischen These... So hat z. B. bei Schumann, Kreisleriana No. 5 das dritte Thema anäpastisches Metrum und macht durchweg mittelbare Thesen'.[37]

Let's establish sharply defined notions by which a musical object can be qualified as an idealized subject.

i. Thus, the first condition that determines the status of an idealized object is the inherent potential to reveal certain hidden qualities of objective reality that are inaccessible to direct contemplation; this also refers to the potential to unfold these qualities in a sensually perceived object. A musical theme as an idealized object is always a way to a new level of comprehending of objective reality. At the same time, a musical theme is not a cast from real life, but such an ideal construction that expresses the essential foundations of a certain culture or ethnos in a specific historical period, that is, a musical theme as an idealized object expresses universal content through a particular and/or individual embodiment. The theme is the initial impulse of musical development in its etymological implication.
ii. An idealized object should express the main idea of the artwork. A musical theme is the most aesthetically presentational part of musical artwork, its face, and also its image. The theme is the representation and expression of the most significant features and qualities of a musical work, it's 'business card'; it can present itself even without harmonic support, without timbre and coloristic features, or in a different register, and at a different pace. That is why even an imperfect reproduction of the main theme or thematic material of a musical work can recreate an integral musical image in the mind of the recipient. Hence it becomes obvious that the theme is really not just the initial impetus, the impulse of the work; it reveals the essential relationship of the musical creation as a whole, expresses not external or non-essential particulars and details, but reveals *the meaning* of the musical object in an exposed and utmost visible form. Therefore, the musical theme and thematic invention (das melodishe Fortchreiten[38]) is the most concentrated, expressed idealized content of a holistic musical image.
iii. An idealized object should be subject to changes and transformations, which, ultimately, should maximize the full disclosure of all possible inherent potentials. The musical theme, as is commonly known, is not a static formation. While maintaining its self-identity and its own semantic and structural core, the musical theme in the course of development, transformations, and modifications, interacts with other themes, textured, harmonic and other structural musical formations, thus revealing their potentialities.

[37] *Riemann H.* Musikalische Syntaxis. Grundriß einer harmonischen Satzbildungslehre. Vaduz, 1998. S. 76
[38] *Kurth E.* Grundlagen des linearen Kontrapunkts: Einführung in Stil und Technik von Bachs melodischer Polyphonie. Bern. Akademische Buchhandlung von Max Drechsel. 1917. 546 S.

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iv. An idealized object is not self-insulated, it is necessarily placed in a certain environment, where not only its sensory appearance (aesthetic aspect) takes place, but a logical concept is developed,[39] as well as the process of comprehension to the maximum degree of generalization. Therefore, the musical composition may also represent philosophical meaning. Many musicologists have repeatedly emphasized the philosophical nature of musical works of such titans of music like Bach, Beethoven, Wagner, Mussorgsky, Scriabin, Shostakovich, and others.

v. Musical composition is actually capable of developing a sound concept that expresses eternal universal human philosophical ideas in a non-verbal form; this refers not only to just expression but to the way to salvation and quest for the new ways that implicitly fuse into the culture and forced to intensify scientific and philosophical search at a verbal level. A case in point could be the works of Richard Wagner, who had a huge impact on the philosophical formation of Friedrich Nietzsche.

vi. An idealized object should not be just a sound envelope; it should be fixed in a visual sign system, which may be subject to decoding. Music has its own language, not only not inferior, but, according to musicologists, superior to verbal and the language of mathematical symbols. The objectivity of a musical idealized subject (musical theme) reveals new possibilities in the musical language. If in preliterate musical culture the layout of musical material was limited by a number of common rudiments and methods of shaping, then visualization of musical constructions opens up much greater possibilities, allows working with a musical theme as with a compound, as well as with individual intonational elements of the theme, i.e., idealized object allows its perceiving as a material object, [40] opening up new opportunities for the development of musical art.

The invention of an idealized object expresses a new attitude, a desire to understand the multifaceted nature of the manifestations of the natural and metaphysical essence of things and phenomena, as well as the hypothetical possibility of a variety of worlds. There is a good reason why the composers of the beginning of the XVII century structured musical text in a new way. Stretto was removed from the beginning of the compositions as inappropriate and interfering with the wavy flow of the melody. This led to dramatic changes both within formal and contextual frameworks. Rudolph Réti noted: 'Each musical composition at a high structural level contains several motive cells from which it is formed. These cells should not be identical to specific motives. In some compositions, these cells may even remain imperceptible in their literal form.'[41] It was the expositional differentiation (inventio, dispositio) and development (elocutio) that greatly contributed to the invention of the musical theme; at least two types were produced. Firstly, the theme was composed of contrasting elements, which further contributed to the contrast of configurations in the all-musical form (fractal principle). Secondly, the theme started to build according to the scheme: core - deployment - cadenza. Such a structure created a special dynamism and internal energy, requiring explication in further development (Bach, Handel, Corelli, Vivaldi).

[39] For more on the sound (audio) concept see: Kulbizhekov V.N. Rational Musical Creativity Base. Mechanisms of -Mental Experiment in the Classical Western European Music of Modern Times, Ch.10: Conceptual discourse in music. The audio and audio image concepts / Moscow, Librokom, 2017: Pp. 117 – 136

[40] Donald Davidson in his Mental Events suggests the identity of mental and physical events: '… mental events are identical with physical events' // *Davidson D.* Mental Events / D. Davidson; Foster and Swanson (eds.) // Experience and Theory. - London: Duckworth, 1970. – P. 109.

[41] *Réti R.* Thematic Patterns in Sonatas of Beethoven. New York, 1967. P. 17

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Thus wise, *vox antecedens* (the central idea, the carrier of imagery) got separated from the actual thematic development. As a result, parts of the musical form began to perform logical functions. That is why the melody as an artistic abstraction expressing the central idea, the essence of the artistic image, can be identified with an idealized object, that is, the object of thought in a musical thought experiment.

Methods for Modifying an Idealized Object

Consideration of the ways of modifying an idealized object revealed that in the music of the Early-Modern Period it corresponds to a musical theme. Also, it is worth recalling that the most essential quality of an idealized object (manifested in the process of a thought experiment) is its ability to reveal own logical and meaningful volume during various modifications. An idealized object is capable of undergoing spatial modifications, for example, in mathematics; it is possible to mentally compress an object to a point or to complete a figure to infinity, as well as to add new elements, etc.

A musical theme as an idealized object does not produce a holistic picture of a musical image. A musical image can reach its fullness and certainty only as a result of development and modifications of an idealized object, and the disclosure of its logical capabilities using the entire arsenal of expressive means of a musical language, that is, an idealized object in music is able to blossom in an artistic and aesthetic sense only after appropriate modifications and transformations.

Revealing the changes occurring to the theme in polyphonic development, noteworthy that if various ways of converting a musical theme and thematic inventions in a homophonic and harmonious array of static musical forms of the XVI-XVII centuries still being outlined, then in polyphony the highest degree of mastery was achieved in the ways of transforming, changing, and modifying a musical theme and thematic inventions. A good exemplary embodiment of the latter might be represented by the methods of transforming an idealized subject that is common in mathematics and music. [42]

The establishment of performance of a thought experiment in music contributed to the emergence and development of a new musical language, the invention of new principles for structuring and composing musical works, and the emergence of new genres and forms. Carol L. Krumhansl noted: 'Music, particularly music in the Western tonal-harmonic style, is often described in terms of patterns of tension and relaxation. This tradition of musical analysis is related to Gestalt principles in that both rely on graphic methods'.[43] Graphic methods made it possible to work with the musical matter as a physical object. As a result, the musical form acquired dynamism and vivid contrast.[44]

The transformation of an idealized object is conducted out of its immanent, essential signs and properties. Furthermore, as a consequence of transformations of a musical theme, dynamic musical forms were invented, as

[42] The very fact of the identity of the transformations of musical and mathematical idealized objects irrefutably evidenced the impact of the Pythagorean roots, again manifested in the least expected way in the European Early-Modern culture. See *Eggebrecht H.* Musikalisches Denken. Aufsatze zur Theorie und Ästhetik der Musik. Wilhelmshaven, 1977. S. 12).

[43] *Krumhansl C.L.* A Perceptual Analysis of Mozart's Piano Sonata K. 282: Segmentation, Tension and Musical Ideas // Music Perception. 13 No. 3: 1996. P. 402.

[44] *Riemann* H. Musikalische Syntaxis. Grundriß einer harmonischen Zatzbildungslehre (1887). Vaduz, 1998.

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well as rhythmic structures[45] that did not exist in musical practice before the actions of a mental experiment were applied.

Table 1

Thought experiment performance in mathematics	*Thought experiment performance in musical art*
1. Selection of the geometric component part and its further consideration as an independent figure.	1. Selection of a motive from a theme and its consideration as independent in a special section of the form - development.
2. Quantitative transformation. Enlargement of the object (up to infinity).	2. Increase in the theme in polyphony (fugues) and in the sonata form recapitulations due to rhythmic changes.
3. Decrease to a point.	3. Decrease in the theme in fugues (acceleration in time).
4. Introduction of new elements (additional constructions)	4. Adjunction of new elements in variations, creating a contrast between the primary aria and the second (new) theme; introduction of interludes with progressions to the fugue (a new element plays the role of a logical connective, a transition to a new section of the form).
5. Strengthening the basic properties of the object.	5. Strengthening the basic properties is achieved in the advancing sections of the form, for example, in development. The contradiction (conflict) reaches its limit due to the transformation of the theme and its elements towards enhancing their activity.
6. Transformation of the object towards infinity with the transition to a new mathematical concept.	6. Musical structures are seamless by virtue of their nature; it is possible to reach a nodal point in development, the limit of emotional tension, followed by a logical transition to a new state.
7. Idealization of the object is an abstraction.	7. An idealized object (theme) is created by abstracting.
8. Connection to logical categories.	8. The musical artistic text contains the categories of discontinuity - continuity, stability - instability, variability - invariance, quantity-quality, momentariness - persistence, etc.
9. Geometric figures are model images that encompass the whole (integral structural formations).	9. Musical composition is a model image embracing a holistic structural formation.
10. Geometric figure is a visual construct.	10. Musical theme is a visual construct of a musical text.

Also, a new logical form was invented in the XVII century due to the thought experiment performance: distinguishing a theme (idealized subject) as the main thought of creation (abstract), followed by its transformation. Until the XVII century, such a logical form did not exist. That was going to be the invention of a new logical form in the process of a thought experiment: exposing an idealized object (theme, central idea, core message) with subsequent explication, unfolding the entire semantic spectrum which ultimately represented nothing more than a dialectical movement of musical thought from the Abstract to the Concrete. The latter became a new logical form, a unified law of structuring a musical text in the XVII century. The movement from the Abstract to the Concrete was not manifested in the music of earlier eras since there was no musical theme. Perhaps in a thought experiment of the XVII century, Western European musical art discovered the laws of dialectics earlier than they were theoretically formulated by Hegel.

The formation of the logical form of a musical thought experiment, namely the movement from the Abstract to the Concrete, was conducted using various methods of transforming the theme as an idealized subject. For example,

[45] *Meyer L.B., Cooper* G. The Rhythmic Structures of Music. Chicago, 1963. P. 144

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the performance of a thought experiment to select an individual element from the theme and consider it as an independent one led to the formation of a special section of the musical form, namely, the development (see Sonatas by Domenico Scarlatti[46]). In polyphonic forms in the works of Johann Sebastian Bach, such selection of the initial element with further consideration as an independent one is carried out in the interludes, which indicates the introduction of the developmental principles into other musical forms, in addition to sonata form. The introduction of new elements into one section of the form (the second theme in the sonata is a collateral part, in case of Bach it is the interlude) facilitated the subsequent interaction, the conjugation of what marks the sonata principle as such.

A musical theme as an idealized object is a form of cognition with the expression of a certain logical type. It is no coincidence that composers' themes are built according to a certain algorithm - either from contrasting elements or according to the 'core - deployment – cadenza' formula. Thus, the method of structuring an idealized object expresses a certain noetic that is featured by the particular musical era.

As follows from the above reasoning and musical examples, a thought experiment as the logical and rational ways to work with a musical theme as an idealized object choose to go with actions that are largely identical to scientific methods and techniques. Just like a mathematical idealized object, a musical one (theme) can be spatially (in a semiotic system) and temporally (in a real sound) compressed, that corresponds to *morendo* and *allargando* in musical terminology.

However, musical art has developed its own narrow-musical, specific methods of working with the theme as an idealized object. For example, a object in polyphony undergoes changes, transformations, and inversion, and also in crab motion and in conducting Stretto, as a rule, at the culmination points of a musical composition, at the point of the 'golden section',[47] which is true to form the transformation of an idealized object only in musical art. Unlike mathematics and science, a musical idealized object has a quality that is not so clearly expressed in a math and natural science, namely: a musical idealized object at the same time represents not only a given contemplative fixture but also an *aesthetic* phenomenon. It is its aesthetic nature that is essential to build a holistic artistic image. It follows that a musical idealized object is the result of the work of logical-rational and sensual-aesthetic components equally and is expressed only in a sensually perceived form.

Although a thought experiment in music as mechanisms of self-objectification employs methods similar to natural science, it always proceeds from the fact that artistic and aesthetic goals and natural science goals are not identical. The process of creating and transforming an idealized object through a musical thought experiment is impossible outside of historical reality and out of the bounds of sound content; during this process, an 'intonation dictionary of the era' is created.[48] Idealization, although it is a mental formation, requires, as noted, its objectification; an objectified idealization, or an idealized object, is not only an object of consciousness and psyche but an object of aesthetics, art and culture as a whole.

[46] Kulbizhekov V.N. Rational Musical Creativity Base. Mechanisms of Mental Experiment in the Classical Western European Music of Modern Times, Ch. 13: D. Scarlatti, Sonata in C Major, K.100; Sonata in F major, K.94 // Moscow, Librokom, 2017. 2nd Ed, Pp. 151 – 154

[47] Losev A.F. Music as a Subject of Logic. The logical structure of the two basic laws of musical form. Divine Proportion and Metrotectonics / The name is the thing itself: Works // A.F. Losev. – Moscow: Eksmo-Press, 1999. P. 790-802

[48] Asafiev B.V. Musical form as a process: vol. 1, 2. 2nd Ed. / Leningrad: Musica publishers, 1971. 376 p.

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Thus, it was revealed that:

- A musical theme acts as an idealized subject in musical art;
- Transformations of an idealized subject were initiated by various innovations and inventions in the course of a thought experiment in the art of the Early-Modern Period;
- These innovations and inventions, in turn, contributed to the development of a new logical form and a new concept;
- All constructive developments, as well as all the methods of theme-based evolvement, invented as part of a musical thought experiment, were aimed at the aesthetically more perfect expression of artistic content.

V. DISCUSSION

The creative musical process is considered in terms and categories of general logic and natural science (abstracting, idealization, and extrapolation). The study solves the problem of justifying the extrapolation of a thought experiment into music. The basis for extrapolating a thought experiment to music is the following.

Firstly, a thought experiment is the basis of any creative activity, and since in classical music the meaning of creativity is obvious, extrapolation of a thought experiment to music seems logically justified.

Secondly, musical art operates not with the supernatural, but with artificially created constructions that are the result of abstracting. A thought experiment is the performance of theoretical modeling. This means that a thought experiment performance is carried out not with supernatural but with idealized objects. This applies both to the creation of an elementary musical scale, and to the processes of structuring a musical composition. Moreover, the spatio-temporal characteristics of a piece of music are also the result of distraction, abstracting from the supernatural space and time.

Thirdly, idealized objects in the processes of a thought experiment undergo transformations and modifications to reveal their logical volume. In music, the theme as an idealized object also undergoes various transformations and modifications that occur according to the logic of the theme itself. The presented study revealed the identity of the methods for transforming an idealized subject in mathematics and music (see Table 1, P. 15-16), which indicates the theoretical level of a thought experiment in music and serves as the basis for its extrapolation to musical art.

All these facts indisputably prove the existence of engine of a thought experiment in music; since the latter is a form of theoretical modeling, its performance is carried out with idealized (ideal) objects. Therefore, the main problems of the study were the discovery of an idealized object in music and identification of the period when it was formed.

An idealized object should express the central idea and contain the essence of the musical image along with its essential qualities, as well as undergo certain changes and transformations. It was in this capacity that the idealized object in music was formed at the turn of the XVI-XVII centuries. The idealized object in music, therefore, is the musical theme. The conducted study justifies why a musical theme can be a counterpart of an idealized object and reveals ways of transforming an idealized object, as well as its specificity, which consists in the fact that it has an aesthetic character. The study also reveals ways of modifications and transformations of an idealized subject, which

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are largely similar to transformations of an idealized subject in mathematics. Despite the identity of many methods of transforming an idealized subject in mathematics and music, a musical idealized subject has its specifics, as well as own particular methods of transformation. Specific ways to transform an idealized subject into music are, as follows:

1) Conversion of timing parameters (Stretto);
2) Transformation of mode and tonality.

The transformation of an idealized object guides and shapes the logic of the musical image motion.

The analysis of literary texts of various authors in terms of the operational mechanisms of a thought experiment revealed that each logical move of the composers of the Early-Modern Period is associated with the use of one or more methods of transforming an idealized object. Thus, two methods of transformation (identical to scientific methods) were used in Bach's Fugue h-Moll (I) at the beginning of the first interlude: 1) fragmenting the component of the whole and considering it as an independent part; 2) transforming towards reduction and time compression (which is a purely specific musical technique). Bach's developmental principles were masterminded through the performance of these operations; the intensity of development was caused by the contradiction. Traditional analysis characterizes this technique simply as a developmental method; however, the reason for employing the developmental but not the alternative version method, as well as the origin of this figure, are still undisclosed.

A feature of the author's approach is considering the creative process through the structure of a musical text; all transformations of the theme thus form a discursive conceptual movement. According to Vladimir Bibler, the essence of the concept is the equivalence of objectness and categoricality. Analyzing the text, we reveal the dialectic categories. For example, the theme of Fugue in B minor by Bach not only consists of contrasting elements but contains a contradiction. Further intensification of development is caused precisely by the presence of a category of contradiction. The interest in processes of the world's variability and transitions to a new quality was particularly peculiar to the composers of the XVII century. The aesthetic ideal of the XVII century composers is, in fact, the idea of dialectical development as a qualitative change. Beauty as a concept of aesthetically appropriate is a perfect embodiment of this idea in a musical text. The musical text as a model of the world revealed to the audience the composers' understanding of the world as infinite variability and diversity. Therefore, it was precisely those expressive means embodying this variability and reflecting the processes of transition to a new quality that were invented.

The categorical cogitative process determines the consistency of considering the categories of 'Abstract' and 'Concrete'. The process of ascending from the Abstract to the Concrete is the general principle of dialectical logic formulated by Hegel. This is a derivative law, a method of theoretical reproduction in the mind of a holistic object and the process, as well as a universal form of development of scientific knowledge. Since the study revealed the connection of the theme with its subsequent development and transformations, the principle of the ascent from the abstract to the concrete was for the first time applied to explain the logical movement in a musical text in the XVII-century music.

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VI. CONCLUSION

The XVII-century composers modeled in own musical thought experiment their appreciation of the world with its development, variability, and diversity, from the standpoint of the Early-Modern Period contemporaries. They considered the development of the world as a directed and irreversible change, leading to a qualitatively new condition. Until the XVII century, the variability of the world was modeled in the technique of counter-punctual permutations; however, the development itself was not perceived as a qualitative change. In traditional musicology, the term 'development' is applied to the development of themes (developmental, variational, and alternate) and to the development of the musical form. The author is entitled to the opinion that this term should be considered quite broader. The development in the music of the XVII century appears as a new world outlook, as a single internally connected line consisting of stages:

1) The contradiction as the driving force of development;
2) The accumulation of quantitative changes for the transition to a new quality;
3) The emergence of a new quality.

Thus, the musical model of the world (an artistic text) reproduces universal characteristics of the processes of global developments. In the XVII century, a new logical form took shape in music with the application of 'from the Abstract to the Concrete' philosophy (Hegel dialectic principle). The study had revealed this for the first time; the abstract reflects the essence of the image, and the concrete is the developed abstract. It is the author's opinion that the principle of the ascent of thought from the Abstract to the Concrete in the XVII century musical texts was formed in practice by the engine of a thought experiment.

The development of the problem of a thought experiment in art has great prospects. The research results, which make it possible to comprehend the role of a thought experiment as a working mechanism of musical thinking, can contribute to the emergence of new approaches to solving the problem of creating a musical text and its analysis.

The presented study can contribute to the development of theoretical principles for explaining and interpreting various phenomena of aesthetic reality, as well as to the integration of various fields of knowledge: scientific, artistic and philosophical.

The results of the study may prospectively stimulate:

- Creating a science-oriented paradigm for explaining and interpreting aesthetic processes occurring in modern artistic practices;
- Structuring and classifying the epistemological capabilities of the mechanisms of thought experiment to create an aesthetic object;
- The identification of general trends in the integration of scientific and artistic aspects in the cognition of the universe;
- The emergence of a new exploration trend in the aesthetics and philosophy of music associated with general scientific research methods within the framework of a thought experiment;
- Entering the field of pure musicology in the consideration of specific musical works from the point of view of the operational mechanisms of a thought experiment.

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A musical thought experiment allows a more thorough and detailed study of musical development, which is not always possible with the use of the traditional approach. For example, the consideration of musical development on the background of a thought experiment significantly differs from the traditional one (see Bach's Fugue h-Moll analysis).[49] Thus, using the mechanisms of a thought experiment, one can analyze the processes occurring in music at greater length and in greater detail.

The exposure of the meaning-creating mechanisms of musical creativity by revealing the possibilities of a thought experiment allows perceiving the aesthetic principles and ideals of musical culture and forecasting its further development. The study identifies promising areas that allow for the real integration of philosophical and musicological approaches in reference to the problem of a thought experiment. Comprehending the possibilities of a thought experiment in musical art opens up wide prospects for researchers. And first of all, due to the proven similarity of thought processes in science and art, it becomes possible to bridge the gap between scientific and artistic thinking.

The presented study allows arguing the existence of universal laws of scientific and artistic thought. The integration of philosophy, aesthetics, and musicology may contribute to the enrichment of contemplative philosophical research with evidence from specific areas of scientific and art knowledge, as well as expand the boundaries of scientific research to create a prospective holistic paradigm of social and cultural development, and also facilitate the creation of a single picture of the universe with harmonic appearance of both scientific and artistic elements.

The critical reasoning of this unified image will also allow more detailed formulating of the futuristic challenges that humanity is facing with increasing complexity. Awareness of the role of a thought experiment in the aesthetic artistic sphere allows speaking to the fact that both technical and technological civilizations are directly dependent on the quality of the heuristic and creative tasks that they set for themselves. The alliance of musicology, philosophy, and aesthetics can lead to a new synthesis of fragmented knowledge on science and art and bring artistic appreciation to a new frontier.

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[49] See Kulbizhekov V.N. Rational Musical Creativity Base. Mechanisms of Mental Experiment in the Classical Western European Music of Modern Times. Moscow, Librokom, 2016, Pp. 155-168. Ch. 14. J.S. Bach, Prelude and Fugue in B minor, vol. 1

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