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**THE SOUND IMAGE OF THE FLUTE
IN 20th-CENTURY COMPOSITIONAL EXPLORATIONS:
BETWEEN TRADITION AND INNOVATION**

**ЗВУКО-ОБРАЗ ФЛЕЙТИ
У КОМПОЗИТОРСЬКИХ ПОШУКАХ ХХ СТОЛІТТЯ:
МІЖ ТРАДИЦІЄЮ ТА НОВАТОРСТВОМ**

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Abstract. This article examines the evolution of the flute's sound image in 20th-century music through the interplay of tradition and innovation. It traces how the flute, historically associated with pastoral imagery, developed into a virtuosic and versatile instrument over the course of the 20th century. This transformation was driven by the emergence of new artistic styles (impressionism, neoclassicism, avant-garde) and the expansion of flute performance techniques. The author analyzes innovative compositional approaches—such as quarter-tone intonation, flutter-tonguing, glissandi, multiphonics, and percussive key effects—and their integration with traditional flute idioms in the works of leading composers. The study demonstrates that the adoption of these techniques significantly broadened the flute's expressive palette and elevated its timbre to a key element of musical dramaturgy in contemporary compositions. Overall, the flute's role in the 20th century shifted from embodying Romantic pastoral associations to serving as a vehicle for radical sonic experimentation, with the synthesis of traditional and innovative means in its usage reflecting the broader trends of musical art in the last century.

Keywords: flute, sound image, tradition, innovation, extended techniques, 20th-century music.

Problem Statement. The relevance of this research is driven by the significant changes in the role and sound of the flute throughout the 20th century. Traditionally, the flute was associated with a pastoral timbre and a natural idyll. In European musical culture up to the 19th century, the flute's image was primarily that of a quiet, pastoral-sounding instrument. Its warlike, piercing potential was known but used more rarely by Romantic composers. At the turn of the 20th century, the situation changed: tellingly, the first recognized work of musical Impressionism begins with a flute solo, creating a refined image stylized as an antique pastoral idyll. Debussy's *Syrinx* (1913) became a landmark early-twentieth-century work for solo flute that helped re-center the instrument in modern concert repertoire, conveying mythological-pastoral moods through new

musical means. These examples demonstrated a transition from the flute's traditional *role* as a "shepherd's" instrument to a new role as a bearer of an expressive, innovative sonic image.

In 20th-century music, a radical shift in aesthetic priorities gave rise to new styles and composition techniques. This fostered the emergence of a new concert phenomenon in flute music. The improvement of the instrument's construction, initiated by Theobald Boehm's reform, transformed the flute from predominantly an orchestral accompanying voice into a virtuosic solo instrument. Composers of various tendencies (from Impressionism and Neoclassicism to the avant-garde) began actively engaging the flute's timbre in their works, expanding its expressive capabilities. Thus, the problem examined in this study is to comprehend the transformation of the flute's "sound image"—from traditional pastoral associations to experimental, innovative uses of the instrument—as a reflection of the general trends in 20th-century musical art.

Aim and Objectives of the Research. The aim of this research is to identify the features of the evolution of the flute's sound image in the works of 20th-century composers, in the context of the dialectic between tradition and innovation. To achieve this aim, the following objectives were set: 1) analyze the historical context and the traditional image of the flute in European musical culture up to the beginning of the 20th century, and clarify its semantic characteristics (pastoral, lyrical, etc.); 2) investigate new compositional approaches to the flute in the 20th century, in particular the introduction of modern playing techniques and experimental methods of sound production; 3) determine how leading 20th-century composers combined the flute's traditional functions with innovative techniques, and trace stylistic transformations of its sound using specific works as examples; 4) summarize the impact of innovative explorations on expanding the flute's expressive potential and changing its role in the musical art of the 20th century.

Analysis of Recent Studies and Publications. The flute art of the 20th century has attracted the attention of both Ukrainian and international researchers. In Ukrainian musicology, several substantial works provide a theoretical foundation for our study. For instance, Andrii Karpyak, in the monograph *Conceptual Foundations of the Artistic Thinking of the Modern Flutist* (2013) [3], highlighted the aesthetic and technical principles of contemporary flute performance. The dissertation research of Anastasiia Gusarova (2019) [2] was devoted to the role of the flute in the chamber-instrumental music of Moldovan composers of the late 20th – early 21st centuries, indicating a European national perspective on the adoption of new flute repertoire. Important historical groundwork has been laid by studies tracing the flute's evolution: the reconstruction of the flute's image in the works of 18th-century composers (Liudmyla Havrylenko, 2023 [1]) and a historical-stylistic discourse on the development of flute art (Yaroslav Novosadov & Natalia Mozgalyova, 2023 [6]). The stylistic vectors of 20th–21st century flute discourse have been explored in articles focused on individual composers. For example, A. Lukatska (2014) [5] analyzes the use of the flute in the chamber music of Francis Poulenc, while Pan Tintin (2015) [7] examines the flute-and-piano sonata genre in the compositional poetics of the 20th century. Collectively, these works demonstrate scholarly interest in the topic from both historical and performance practice perspectives.

Among international studies that address modern playing techniques and new possibilities for the flute, a fundamental work is Nancy Toff's *The Flute Book* (1996) [14]—an encyclopedic guide covering the flute's historical development and performance aspects, including the modernization of the instrument and repertoire that accelerated in the 20th century. Equally insightful in terms of the essential characteristics of contemporary flute performance are the writings and methodological contributions of the American flutist-inventor Robert Dick. His book

The Other Flute: A Performance Manual of Contemporary Techniques (1989) [11] is considered a foundational method for modern flute technique. In several works, Dick has developed and described innovative flute-playing techniques (circular breathing, timbre enrichment through extended techniques, modifications of established performance techniques, etc.). The very appearance of such manuals indicates that by the late 20th century, the flute's expanded technical possibilities had become an object of systematic study. In addition, flute periodicals (for example, the journal *Flute Talk* [13]) regularly publish articles and interviews on the latest techniques and pedagogical approaches to mastering them.

Results and Discussion.

The flute's sound-image in the first half of the 20th century. The sonic image of the flute that had formed in European culture by the 19th century—shaped in the works of many composers and performers of the Romantic era—presented the instrument foremost as one of gentle, pastoral sonority. Its more martial potential, as a source of piercing, calling sound, was less of interest to Romantic composers (though not entirely unknown to them).

In 20th-century musical culture, changing aesthetic tastes that ushered in new artistic movements and styles fostered the emergence of a new concert phenomenon in flute music. Boehm's reform not only eventually received full recognition (the Paris Conservatory adopted the Boehm-system flute into its curriculum in 1860), but further improvement of the flute continued along the path opened by the German master. Formerly used chiefly for orchestral color, the instrument emerged as a major concert solo instrument. Today, composers of virtually every movement actively utilize the flute's timbre. The flute appears in genres of absolute music, program music, theater music, applied music; in the orchestra, with the orchestra, in diverse ensembles, with voice, with piano, and as a solo instrument. The flute's expressive resources have expanded, and performance techniques have been substantially renewed.

A major impulse for the flute's revival was the work of the French Impressionist masters—first and foremost, Claude Debussy. Debussy's initial interest in the new flute sound arose in the 1890s. During that time, the composer wrote a landmark piece that resonated widely and became the starting point of musical Impressionism: *Prélude à L'Après-midi d'un faune* (*Prelude to The Afternoon of a Faun*, 1894). Significantly, the first recognized work of musical Impressionism begins with a flute solo. This refined image, stylized as an antique idyll, is realized in the flute's mezzo-soprano register (the refrain of the piece). The instrument unfolds the semantic core of the work—associated with a mythological pastoral scene—using innovative modal-intonational means. The flute's melody combines two of Debussy's favorite modal spheres: chromaticism (an outline built on a tritone) and diatonicism with a pentatonic mode.

Subsequently, Debussy returned again to the flute. The vocal cycle *Chansons de Bilitis* (*Songs of Bilitis*, 1897–1898) on poems by Pierre Louÿs consists of three miniatures, the first of which is *La Flûte de Pan* (*The Flute of Pan*). The scoring of the cycle is voice with an ensemble of two flutes, celesta, and two harps (there is also a version with piano). The semantics of the flute's sound here recall the stylized pantheistic pastoral quality embodied in *Prélude à L'Après-midi d'un faune*. Thanks to the solo flute piece *Syrinx* (1913), Debussy brought the flute *alone* onto the concert stage. The imaginative world of *Syrinx* reflects the Greek myth about the metamorphosis of the nymph who, fleeing Pan's pursuit, was transformed into a reed—out of which the god, in memory of his beloved, crafted a flute. In the music of the piece, one senses agitation, anxiety, and longing, conveyed through a complex pitch organization that eschews straightforward tonality. Structural-

ly, Debussy favors short phrases with light virtuosity, avoiding extended cantilena lines. Similar in style is the late *Sonata for Flute, Viola and Harp* (1915), Debussy's final work involving the flute.

To a lesser extent, Maurice Ravel featured the flute's sound in his works. However, the flute's timbre is an active component of the conception of his famous *Boléro* (1928), and Ravel also employs a flute solo in the ballet *Daphnis et Chloé* (1912). The flute's expressive possibilities are used in an original way in the vocal cycle *Chansons madécasses* (*Madagascar Songs*, 1926) on poems by Évariste de Parny, as well as in *Introduction et Allegro* (1906) for harp, flute, clarinet, and string quartet.

Attention to the flute's timbre also marked the work of composers of the late-Romantic trend at the turn of the 19th–20th centuries. In his symphonic scores, Gustav Mahler often uses the flute timbre as a tone painting of bird chirping, the music of the forest, the pristine purity of nature. In *Das Lied von der Erde* (*The Song of the Earth*, 1909), alongside actual bird calls, the flute's timbre in its low register conveys an ethereal, transfigured color; combined with pentatonicism, it embodies the idea of the breath of Eternity. At the same time, in dramatic, expressive moments of Mahler's works the flute sounds high and piercing (as in the *Fifth Symphony*), and occasionally paradoxically low (the "Funeral March in the Manner of Callot" from the *First Symphony*).

Expressive orchestral combinations involving flutes were implemented by Richard Strauss. Notable examples include the melody of the silver rose in the opera *Der Rosenkavalier* (1911), and the staccato parody theme of the Enemies in the tone poem *Ein Heldenleben* (1898). Strauss boldly introduced new flute techniques: in the symphonic poem *Also sprach Zarathustra* (1896) he uses tremolo not only legato but also on a single pitch by means of tonguing (flutter-tongue tremolo); in *Don Quixote* (1897) he employs for the first time the *Flatterzunge* (flutter-tonguing) technique to illustrate the noise of a windmill. Late Romantics such as Jean Sibelius, Carl Nielsen (the orchestral piece *Pan and Syrinx*, 1918), George Enescu and others also drew on the flute timbre in their works.

The flute figures in the works of composers of the Neoclassical current—Ferruccio Busoni, Max Reger, Igor Stravinsky, Sergei Prokofiev, Paul Hindemith, Darius Milhaud, Germaine Tailleferre, Arthur Honegger, Heitor Villa-Lobos, and others. In the 1920s, Stravinsky enthusiastically used the flute in various works written for specific instrumental ensembles. The period of the composer's neoclassical orientation coincided with his fascination for wind sonorities. As Stravinsky himself notes, "...this group [winds] creates a certain austerity... String instruments possess, for example, less of a cool, blurred quality of sound... [strings] emotionally color the music... I am always interested and attracted by new instruments..., and I am also delighted by new resources of 'old' instruments" [8, p. 237]. In these compositions Stravinsky gives pride of place to wind instruments, including the flute. The flute is present in the *Octet for Wind Instruments* (1923), written after a Bach model and combining woodwinds (without oboes) and brass (trumpets and trombones); in the quasi-Baroque Concerto for Piano and Wind Instruments (1924); and earlier in the ballet *Petrushka* (1911) and the vocal-instrumental pieces *Pribaoutki* (1914). Many years later, Stravinsky returned to the flute's sound, featuring the flute in *Three Songs from Shakespeare* (1953) and *Epitaphium* (1959) for flute, clarinet, and harp.

The flute is an active participant in the symphonic, chamber, and concerto works of Paul Hindemith, as an equal soloist and ensemble member. Notably, Hindemith's output includes the *Symphony in B♭* for concert band (1951), the *Concerto for Woodwinds, Harp, and Orchestra* (1949), and the vocal cycle *Die junge Magd* (*The Young Maiden*, 1923) on poems by Georg Trakl, scored for voice, flute, and clarinet, among others. In addition, the composer wrote sonatas for

virtually all instruments, not overlooking the flute as a concert solo instrument. For flute and piano, Hindemith composed a dance-like *Sonata* (1936) and the piece *Luna* (1942), which are characterized by pre-Classical principles of thought, variability (variation technique) and polyphony, as well as elements of Baroque-like improvisational style. In the 1920s, Hindemith also created works for *unmixed* flute ensemble sound. The *Canonical Sonatina for Two Flutes* (1924) demonstrates a stylistic transition from Romantic expressiveness to neo-Classical simplicity. Subsequently, the *8 Pieces for Solo Flute* (1927) appeared, written in a similar vein.

The activity of "Les Six" (the circle of composers around Erik Satie and Jean Cocteau) aimed to establish a new paradigm centered on the fetishization of the city, technological progress, machines, and human intellect as the engine of progress. From this came an emphasis on moderate-sized symphonic and especially chamber ensembles, where each line could be clearly heard. Considerable focus was given to steady, driving rhythm. The followers of this aesthetic devoted significant attention to the flute. In the instrumental palette of *Les Six*, Stravinsky's influence is palpable, both in the treatment of the orchestra as a group of soloists and in the elevated role of winds. In this vein were written Darius Milhaud's *Sonatine for flute and piano* (1922), Germaine Tailleferre's *Pastorale* and *Concertino* (1924), Arthur Honegger's *Chamber Concerto for Flute, English Horn and String Orchestra* (1948), and Francis Poulenc's *Sonata for Flute and Piano* (1957).

Arthur Honegger employs the cool flute timbre in vocal works of the 1920s, such as the songs on texts by René Morax for a theatrical adaptation of Andersen's *The Little Mermaid*. The flute is used in chamber ensembles and concertante forms by Albert Roussel, Jacques Ibert, Eugène Bozza, Henri Tomasi, Daniel-Lesur, Gian Francesco Malipiero, and others. In a similar direction were the compositional explorations of André Jolivet in the solo flute cycle *Cinq Incantations* (1936), where the composer experiments with exotic modes, abandoning tonal thinking to achieve sonorous effects through rhythm. Among the works of the "Les Six" masters, one should mention the solo flute piece *Danse de la chèvre* (*Dance of the Goat*, 1919) by Honegger, created under the influence of Debussy's flute innovations.

In the musical art of Expressionism, represented by the Second Viennese School, the flute as a concert instrument is practically absent, with the exception of Ernst Krenek's *Sonatine for flute and viola*. In the works of the New Viennese composers, the flute appears only as a partner in ensembles or in orchestral scores. However, even in those contexts its semantic and stylistic transformations continue, honing a new intonational essence for the instrument. Among the flute-related achievements in the works of the New Viennese expressionists, one should note Anton Webern's serial *Concerto Op. 24* for 9 instruments, which includes a flute. In this work, each voice has its own timing and plane of sound. The composition is based on a kind of multiple invariance of melodic lines that run in parallel and change unevenly. Thus, the artistic discoveries of the Expressionists laid the foundation upon which flute artistry would develop in the second half of the 20th century.

This overview of the flute's representation in various artistic movements of the first half of the 20th century demonstrates an evolution in artistic conceptions of instrumental sonority and the self-sufficiency of timbral imagery. As a result, the flute emerges as both an ensemble and a solo instrument capable of realizing complex technological and compositional challenges.

Flute in Compositional Experiments of the Second Half of the 20th Century. Works involving the flute in the second half of the 20th century reflect the main trajectories of the development of musical avant-garde, characterized by the search for new compositional techniques and experimental performance methods. The first of such compositions is Edgard Varèse's *Density 21.5*

(1936) for solo flute. In the following sections, the evolution of flute performance will be discussed in greater detail.

The achievements in the technical capabilities of the modern flute necessitate addressing the performance challenges that inevitably confront flutists. Traditional notions about the flute's possibilities (for example, the idea that the flute has a fixed tone color that is difficult to alter, or that the flute is fundamentally a monophonic instrument) tend to limit its application in avant-garde compositional pursuits. Furthermore, the Boehm-system flute is still virtually not adapted to the microtonality of Eastern music.

Given that musical domains requiring extended flute techniques are actively in demand in today's music world, questions arise in both performance practice and compositional creativity regarding the need to broaden conceptions of the flute's significant expressive and technical potential. Contemporary flute performers often compose musical works themselves that utilize new flute techniques. For example, the Canadian flutist Robert Aitken, whose repertoire spans academic and avant-garde music, is the author of *Ice* (1977), a piece saturated with innovative playing techniques. Robert Dick (USA) has also written a solo flute piece titled *Remembrance*, which exploits extended techniques. Matthias Ziegler remarks that "the most difficult aspect when working with students on contemporary music pieces is helping the student develop their technical potential while simultaneously revealing the work's meaningful and emotional components" [13, p. 10]. Ziegler adds that "the path to studying contemporary music lies in, starting from nothing, understanding every detail of the piece and combining their multiplicity into a whole, thus creating music. Students must realize that the hardest part of studying contemporary music is understanding the content of the work. The most difficult period in learning a contemporary piece is the first hours. After that, the process accelerates significantly" [13, p. 10].

The problem of interpretation in avant-garde art is extremely acute. The artistic concept of modern musical works often consists of exceptional, unique performance techniques, timbral discoveries, and other qualities of a purely performative nature. The notated text itself becomes ever less "weighty" and increasingly conditional; new symbols proliferate, making a piece difficult to perform without special deciphering. A great burden thus falls on the performer. Contemporary composers write music not so much with notes as with sounds and techniques of sound production, guided by particular conceptions of each instrument. Therefore, the accuracy and fidelity with which an interpreter reads the author's text—and the professionalism of the execution—ensure that the listener can grasp the meaning and form an emotional connection with the music. It is clear that a serious approach to working on contemporary music is one of the essential requirements for the interpreter. Mastering the flute's extended performance techniques—which for 20th-century composers became a new arsenal of expressivity—has cultivated a new auditory stratum in musical culture. The experience of perceiving contemporary works that employ innovative techniques greatly enriches the scope of our listening experience.

Among the flute's expressive resources is a rethinking of the processes of instrumental sound production: the use of vibrato of varying intensity, various noise and vocal effects, key percussion, monody—multiphony (simultaneous singing and playing), etc. Also noteworthy are tempo modifications and gradations. Overall, the dramaturgical potential of innovative performance techniques in flute literature is enormous and still largely untapped.

One of the earliest examples of recognizing the dramaturgical function of new flute performance techniques in composition is Ursula Mamlok's serial *Variations* (1961) for solo flute, as well as Charles Wuorinen's *Variations* (1963), where articulation means are given form-defining

and dramaturgical roles. In both works, the use of innovative performance devices—tone color and articulation—helps shape the variation structure, delineate individual variations, and highlight the climax of the piece. The suite-like layout of movements in Heinz Holliger's *Sonata (in)solit(air)* is built on the contrast between traditional sound production and the use of original techniques. The strict serialization of the system of musical expressivity is built on a complex of articulation devices (as in Brian Ferneyhough's *Unity Capsule*).

Turning now to an analysis of the new expressive means most frequently used by contemporary composers in flute works: One of the simplest ways to alter the flute's sound quality is to employ the harmonic overtone series (notated with a small circle (○) above the note). Composers have often made use of this striking and distinctive device, for instance to create echo effects or extraordinarily extreme diminuendos on high pitches. Harmonics speak clearly when it is necessary to place emphasis on a note — for example, in Variation No. 7 of Ursula Mamlok's *Variations for Solo Flute*. Most often, composers use harmonics as a contrasting coloristic element. Typically they are played *piano*, but when used *forte* a greater number of overtones can be heard. Various sound effects are achieved through the use of alternative fingerings throughout the second and third octaves of the flute's range. Natural harmonic overtones are produced by alternating a normal fingering with overblown fingering from B₃ (B in the small octave) up to E \flat 5 (E-flat in the second octave).

Since a sound's timbral characteristics depend in part on the fingering used, flutists often employ the fingering variants developed by Robert Dick. His idea of creating the maximum number of fingering options for playing the chromatic scale allows the flute's timbral palette to be expanded as much as possible. The new fingering methods compiled by Dick (up to B₇, inclusive) enable a timbral quality that is quite difficult to achieve using traditional fingerings [11, pp. 12–55].

In performing traditional musical compositions, standard fingerings are aimed at producing a “good” sound (full, “rounded”). A classical virtuoso flutist cultivates a characteristic clear tone color, achieving excellent homogeneity across the flute's entire range. Within the bounds of traditional fingerings, a certain degree of timbral variety is possible, so experienced performers use a broad spectrum of tone colors for their artistic ends. In traditional flute playing, cross-fingerings are often applied to facilitate trills and difficult passages. Each fingering variant—whether traditional or new—has its own distinct sound, which can certainly be modified by embouchure adjustments.

The flute, as is well known, is an instrument capable of producing microintervals or microtones. *Microintervals* (or micro-chromatic intervals) are pitches that lie “between” the notes of the chromatic scale. They are usually indicated by quarter-tone accidentals. Alteration of pitches using microtonal technique is employed by Robert Dick in his piece *Remembrance* for solo flute, where he uses microintervals in both monophonic lines and implied two-voice textures. In the sphere of flute music, we can distinguish three types of microintervallic usage: (1) quarter-tone scales; (2) microtonal fragments—short, easily executed scale segments of extremely small intervals; (3) full microtonal scales for all flutes from D₄ (D in the first octave) to G₇ (G in the third octave), consisting of intervals approximating sixteenth-tones. Fingering charts for all these kinds of scales, for flutes with both closed and open key holes, are presented in Robert Dick's *The Other Flute: A Performance Manual of Contemporary Techniques* [11].

Micro-chromatic glissandi on the flute are encountered in Kazuo Fukushima's piece *Mei*. This technique is also employed by Donald Martino in *Sentimental Song* for solo flute. Such micro-chromatic pitches are executed by means of specially adjusted fingerings in which the tone holes

are not completely closed. Microtonal inflection can also be achieved by altering the embouchure angle (rolling the flute inward toward the lips or outward). A microtonal trill sounds like a combination of a normal trill and a wavering pitch bend; it is used most often for coloristic effect.

One of the innovative expressive means is the execution of *multiphonics*—multi-tone sonorities. The flute's ability to produce two to five pitches simultaneously has been known for a long time: as early as the beginning of the 19th century, the Dutch flutist Georg Bayr demonstrated such sonorities. The first multiphonic used in modern music appeared in Luciano Berio's *Sequenza I* (1958) for solo flute. *Sequenza I* is a highly virtuosic work, vividly emotional, full of improvisational flourishes and fleeting hints of classical operatic allusions. Experimental performance techniques are integrated into the overall fabric very organically—either as yet another aspect of virtuoso mastery or at moments of climactic intensification of sound.

In Berio's composition, extended playing techniques are incorporated within the context of traditional flute sound production. Through this work, the author proclaims a “new virtuosity” and a “new theatricality,” all within the framework of complete, natural command of avant-garde performance techniques. Alongside customary cantilena playing, Berio here employs various types of flutter-tongue, key slaps, key tremolos, and an unconventional quartal multiphonic.

Some composers use multiphonics as a coloration for an entire work (for instance, Dick's *Remembrance*). One interesting application of multi-tone complexes is the slow multiphonic phrase in the coda of Jōji Yuasa's *Sphere*. Multiphonics with different embouchure positions are utilized by Toru Takemitsu in *Voice* for solo flute.

Performance practice shows that among the various manuals on flute multiphonics, the most valuable and detailed recommendations are provided in Robert Dick's work—documenting over a thousand multiphonics, ranging in interval content from microintervals to 1/12-tones (see Dick, *Tone Development Through Extended Techniques*, 1986) [12]. Dick notes that “...the timbral multiphonics range from clear, resonant tones to very bright or, conversely, muffled ones. These sonorities are available to every flutist, given daily practice. Many can be easily executed with double tonguing; many are of moderate difficulty to perform” [12].

The essence of this technique is as follows: multiphonics are the simultaneous sounding of two or more pitches, produced through special fingerings and by overblowing a lower fundamental to reach a higher overtone. Thus, multiphonics are typically played with the mouth opened much wider (vertically) than would be required for producing single tones. In this position, it is much more difficult to direct the air stream, and this becomes the main challenge that flutists encounter when first attempting this technique.

One extended technique that yields a multitude of effects is flutter-tonguing (*frullato*) — producing sounds ranging from gentle pulsations to very loud humming and noise. These techniques can be applied to the entire spectrum of flute sounds produced by the movement of the airstream, including single tones, multiphonics, residual tones, whisper tones, and jet whistles.

Flutter-tongue is created by a rolling motion of the tongue (as in a rolled “r”), using the tongue's tip. Many flutists can produce this effect in two ways: with the tongue or with a particular throat articulation. If a flutist is adept at both, they may notice that throat flutter-tongue is most convenient for playing *piano* and in the low register.

André Jolivet makes active use of flutter-tongue in his *Cinq Incantations*. This technique appears in pieces No. 2, 3, 4, and 5 of the cycle, encompassing both high, tongue-induced flutter-tongue and low, throat-produced flutter. Flutter-tonguing pairs well with the jet whistle in the high

register (*Incantation No. 1*), as well as with loud residual tones. The most distinctive flutter effect is an intense growling buzz (to achieve this, the tongue is placed deep in the mouth and pressed against the hard palate far back, behind the upper teeth, to maximize the vibrating pressure).

A favorite technique among contemporary composers is the *key slap* (key click). There are three main varieties of this effect: with a definite pitch, without a definite pitch, and the technique in which the tongue covers the embouchure hole (tongue ram). The key slap *with* a defined pitch was first used by Edgard Varèse in *Density 21.5* (1936). It is notated as a cross (+) above a note and is performed as follows: while playing the written note, the flutist sharply taps the keys, producing a percussive click simultaneously with the tone. The dynamic level of the tone and of the slap may differ, as indicated by the composer. If feasible, the performer should use the G-key for the slap, as this yields the most resonant sound.

The key slap can also be produced *without* a definite pitch (for example, in Harvey Sollberger's *Riding the Wind*, 1973). This is notated by a small cross in place of a notehead. It is executed by striking the keys with the fingers in the configuration of the indicated pitch, but without blowing air into the flute; the resultant percussive click approximates the notated pitch in register. Key slaps, both with and without pitch, are skillfully employed by Takemitsu in *Voice* for solo flute.

Another variant of the key slap appears in Berio's *Sequenza I*. He combines this effect with tremolo, using both pitched and unpitched key slaps. Yet another usage is found in Sollberger's piece, where unpitched key slaps form a quiet little melodic line (*Riding the Wind*).

“*Whisper tones*” (also known as whistle tones) are the individual overtones of a given pitch. They can be produced with any fingering, and depending on the fingering one can obtain from five up to fourteen distinct whisper tones by forming the lips into a very narrow aperture and blowing as softly as possible into the embouchure. Whisper tones are very difficult to distinguish from one another, as they tend to fluctuate. One must practice extensively to be able to produce them reliably at specific pitches. Although whisper tones at first sound extremely soft, with sustained practice a flutist can attain a dynamic range from pp up to mf when playing them in the flute's upper two octaves.

The *jet whistle* effect is achieved by sealing the embouchure hole between the lips and forcefully directing the air *fully into* the flute (so that no air escapes outside the mouthpiece). The jet whistle is a faint, half-muted resonance of the flute's tube. The effect is produced with short, strong bursts of air, resulting in a very soft tone reminiscent of a whisper tone. A clearer jet whistle can be produced using double tonguing. The timbre of the jet whistle is highly dependent on the shape of the oral cavity (vowel shape). By changing the position of the lips and tongue corresponding to vowels (from [i] toward [u]), the flutist can lower the pitch of the jet whistle by approximately an octave. The fingering used for a jet whistle determines its base pitch as well as influences other parameters. A chromatic fingering sequence from B₃ to E₇ yields progressively higher jet-whistle pitches (the range of resulting whistle pitches spans roughly a fifth). The intensity of the breath determines the loudness and timbral brightness of the jet whistle: maximum air pressure produces an extremely loud jet whistle, raising its pitch and emphasizing its higher overtones.

This effect can be used as a standalone coloristic device or to execute entire phrases. For example, Joji Yuasa in *Sphere* writes an entire formal section using the jet whistle technique. André Jolivet employs this effect strikingly in the second piece of his programmatic cycle *Cinq*

Incantations. Clear articulation of a jet whistle can also be achieved by combining it with an intense flutter-tongue, which creates a low, noisy growl. The quality of this sound can be modified by shaping the mouth to different vowel configurations and by moving the tongue forward or backward in the mouth. The pitch of the flutter-tongued jet-whistle sound can be lowered by roughly a major sixth by altering the lip formation from [i] through [e], [a], [o] to [u], while simultaneously retracting the tongue from the front of the mouth back toward the throat as far as possible.

Nearly the full spectrum of *singing while playing* techniques can be observed in Toru Takemitsu's work *Voice* (1971) for solo flute. This piece—evoking direct associations with Arnold Schoenberg's *Pierrot lunaire*—requires the performer to sing, speak, whisper, and breathe into the flute's embouchure hole with varying degrees of openness. Regarding simultaneous singing and playing, one cannot overlook the symbolically rich “Kathinka's Gesang als Luzifers Requiem” (1984) from Karlheinz Stockhausen's musical-theatrical heptalogy *LICHT*.

In Joji Yuasa's *Sphere*, the performer is instructed to utter certain syllables simultaneously with producing a pitched note—specifically, the syllables “fo-u” and “tcho.” Moreover, there are works that include a virtuosic vocal line to be performed by the flutist. For example, Brian Ferneyhough's *Unity Capsule* (1976) is constructed around the use of vowel and consonant sounds spoken into the flute's embouchure simultaneously with difficult microintervallic passages, multiphonic complexes, jet whistles, and other extended techniques. Robert Dick, as both performer and composer, observes that “...with prolonged practice, a player can learn to play and sing any intervals simultaneously. But composers should remember that when writing music employing the technique of simultaneous singing and playing, it is necessary to provide the performer with at least two options for the sung part: one for a high voice and another for a low voice” [11, p. 143].

Circular breathing (also called continuous breathing) is a technique by which wind instrument performers sustain sound by inhaling through the nose while simultaneously pushing air out through the instrument using air stored in the cheeks. Circular breathing is traditional in playing certain kinds of flutes, such as the flutes of the Rajasthan region of India and the Bulgarian kaval. Mastering this technique opens up many musical possibilities in both traditional and contemporary performance. One method for learning circular breathing is described by Robert Dick in his book *Circular Breathing for the Flutist* [10].

Vibrato, as a means of coloring the tone, is a very familiar device in flute performance, having been used throughout the flute's history. The degree of vibrato is often indicated by letters or special markings. The following vibrato indications are commonly distinguished: *non-vibrato* (n.v.)—no vibrato; *slow vibrato* (s.v.); *vibrato* (vibr.)—normal vibrato; *fast vibrato* (f.v.); *molto vibrato* (m.v.)—as intense a vibrato as possible.

In modern music, the most diverse types of vibrato are utilized. This coloristic device imparts dramatic nuance and expressiveness to the music, and flutists may experiment with it even when the composer has not specified particular vibrato usage. However, contemporary composers often regard vibrato as an important expressive resource and explicitly indicate the type and speed of vibrato to be used. Vibrato is used abundantly in Charles Wuorinen's *Variations for Solo Flute* (1963), where the composer distinguishes four vibrato types — from fast to progressively slower oscillations. Wuorinen's innovation lies in employing various transitions from non-vibrato to vibrato, as well as a gradual increase and decrease of vibrato intensity.

We should also address traditional flute technique, which in the second half of the 20th century became more complex and enriched. Pieces written with *extended traditional* technique demand a high level of professionalism and perseverance from the performer. Traditional technique as presented in 20th-century solo flute works assumes the ability to execute wide interval leaps, to control the sound at the extreme ends of the range, to exhibit virtuoso finger technique, and to manage dynamics with great precision, among other skills.

In the contemporary musical landscape, extended flute technique has long drawn the attention of outstanding artists. The experimental means of expanding the flute's timbral colors proposed by composers have become part of modern compositional and performance practice. They continue to be refined, combined, and renewed. Mastery of contemporary flute literature that employs experimental sound-production techniques is an indicator not only of a performer's technical equipment, but also of their capacity to grasp a quite complex authorial intent. On the whole, the broad implementation of microchromatics, experiments with vibrato and flutter-tongue, and the incorporation of voice and various noises during playing have all become widespread in contemporary flute literature.

Conclusion. The results of the analysis confirm that the 20th century witnessed a significant evolution in the flute's sound-image, brought about by the interplay of tradition and innovation. The flute gradually lost its exclusively "pastoral" character and acquired the status of a universal instrument, capable of striking virtuosity, intense expression, and the creation of novel sonic effects. New aesthetic currents—from Impressionism to the avant-garde—revealed the multifaceted nature of the flute's timbre: the instrument began to fulfill a wide variety of functions in musical works (soloistic, coloristic, rhythm-forming, etc.), on par with its traditional roles in orchestral textures. In the first half of the century, composers such as Debussy, Stravinsky, Hindemith, and others still relied on established notions of the flute's "character," deploying its lyrical voice for pastoral or genre scenes. In contrast, the second half of the 20th century was marked by a qualitative leap: the flute became a vehicle for radical experiments in sound. Beginning with Varèse's iconic composition *Density 21.5* (1936) for solo flute, the instrument pushed beyond the limits of traditional technique and range, opening up new horizons of timbral exploration.

Avant-garde composers actively introduced extended techniques of sound production: quarter-tone inflections, various types of flutter-tongue, glissandi, multiphonic effects, percussive key sounds, and so on. Over time, these innovative techniques transformed from isolated experiments into an integral part of the language of new music. The timbral characteristics of the flute's sound became as significant for a composition's dramaturgy as rhythm or harmony—at times even taking on the role of a form-building element of the work. The assimilation of an extended-technique arsenal by both composers and performers has shaped a new auditory stratum within musical culture, greatly enriching the experience of perceiving contemporary music. Thus, the analysis has shown that in the 20th century the flute traversed a path from being a bearer of traditional, Romantic-era associations to becoming an experimental instrument, and that the synthesis of tradition and innovation in its sound-image reflects the progression of artistic exploration over the past century.

Prospects for Further Research. The present research opens several directions that would be worthwhile to pursue in the future. First, an interdisciplinary approach to studying contemporary flute technique—at the intersection of musicology, acoustics, pedagogy, and even neuroscience—appears promising. A detailed analysis of the acoustic properties of new playing

techniques, the impact of technical modifications on the physiology of sound production, as well as the psychological aspects of perceiving unconventional flute sounds, could deepen our understanding of the instrument's artistic potential. Collaborative efforts by composers, performers, and scholars could yield new teaching methodologies that integrate the traditional school of flute playing with the mastery of experimental techniques.

Further investigation is also needed into the evolution of flute art in the 21st century. Today's pioneering artists continue to expand the instrument's capabilities: modified flute constructions have appeared (for example, Eva Kingma's quarter-tone flutes with additional keys) to facilitate microtonal playing, and special devices such as Robert Dick's Glissando Headjoint have been developed to allow continuous pitch bending on the flute. Composers are increasingly combining the flute with electronic technology—from works for flute with pre-recorded tape or live electronics to interactive multimedia projects. These electroacoustic experiments, foreshadowed in the 1950s (for example, Otto Luening's early electronic music pieces for flute), have now grown into a distinct genre layer that calls for dedicated scholarly attention. In sum, the flute's development as an instrument is ongoing, and future research may focus both on technical aspects (improvements in design, new techniques) and on the aesthetic implications of incorporating these innovations into performance and composition. Such an approach will help preserve the link between the flute's rich tradition and the innovative thrust of the present, ensuring continuity and renewal of the flute art moving forward.

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Хуан Цзяю

ЗВУКО-ОБРАЗ ФЛЕЙТИ У КОМПОЗИТОРСЬКИХ ПОШУКАХ ХХ СТОЛІТТЯ: МІЖ ТРАДИЦІЄЮ ТА НОВАТОРСТВОМ

Анотація. У статті висвітлено еволюцію звукового образу флейти в академічній музиці ХХ століття в контексті діалектики традиції та новаторства. Простежено, як флейта, історично пов'язана з пасторальною символікою, упродовж ХХ століття набула статусу віртуозного універсального інструмента. Цьому сприяли нові художні стилі (імпресіонізм, неокласицизм, авангард) та розширені техніки гри. Проаналізовано новаторські композиторські підходи (четвертитонові інтонації, фрулато, глісандо, мультифонія, ударні ефекти тощо) та їх поєднання з традиційними прийомами у творах провідних авторів. Показано, що впровадження цих засобів істотно розширило виразовий потенціал флейти і перетворило її тембр на ключовий драматургічний елемент сучасної музики. Загалом флейта у ХХ столітті пройшла шлях від носія романтично-пасторальних асоціацій до експериментального інструмента, а синтез традиційних та інноваційних засобів у її звучанні відображає загальні тенденції розвитку музичного мистецтва минулого століття.

Ключові слова: флейта, звуково-образ, традиція, новаторство, розширені техніки, музика ХХ століття.