

Symbiosis of Technology and Expression: A Study on Modern Treatment Techniques of Pitch Material in "Northern Frontier Lights"

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Abstract: Based on the ethnic pitch DNA of the a cappella chorus suite Northern Frontier Lights, this study systematically analyzes the work's modern treatment approaches to pitch material from three dimensions: pitch development techniques, methods of textural integration, and the logic of emotional expression. The research demonstrates that through modern compositional techniques, including pitch set transformation, control of tonal tension, fusion of multi-voice textures, and onomatopoeic pitch design, the work achieves creative development of ethnic pitch material. The pitch treatment techniques form a profound resonance with the natural landscapes of the northern frontier —such as deserts, grasslands, and forests—and the humanistic spirit of the Mongolian people, thereby accomplishing an organic unity of technical form and emotional connotation. This study provides concrete technical references for the "modern expression of traditional materials" in contemporary a cappella chorus composition.

Keywords: Northern Frontier Lights; a cappella chorus; pitch material; modern treatment techniques; emotional expression

1. Introduction

In the contemporary creation of ethnic music, a core challenge faced by composers is how to achieve an organic integration of traditional pitch material with modern compositional techniques. The a cappella chorus suite Northern Frontier Lights, with the regional culture of the Northern Frontier as its core, deeply integrates traditional Mongolian musical elements with modern choral composition techniques. Its treatment of pitch material preserves the DNA of ethnic culture while simultaneously expanding the expressive power and artistic tension of pitch through modern technology. Currently, academic research lacks a systematic deconstruction of the specific pitch treatment techniques employed in this work. This paper focuses on the pitch treatment techniques across the four movements of the suite, conducting an in-depth analysis of its modern innovations to provide practical reference for the modern creation and research of ethnic music.

2. Developmental Techniques of Pitch Material: From Traditional Melodic Methods to Modern Transformations

2.1 Pitch Set Transformation Techniques: Repetition, Transposition, and Inversion

The work processes its core pitch sets following a logical path of "basic form — repetition and reinforcement — transposition and expansion — inversion and transformation," which is deeply bound to the movement structure. For instance, the four-note core set "G - A - B-flat - C-sharp" in the movement Desert establishes a mysterious desert ambiance through continuous repetition. The developmental section transposes the set up by a perfect fifth (D - E - F - G-sharp), creating an elevation in pitch level to simulate the shifting proximity of a mirage. The climactic section, however, employs inversion, transforming the original set's upward interval (G - A) into a descending one (A - G), thereby generating the intense tension of a desert storm through the reversal of intervallic direction. This transformational technique draws upon Hindemith's "theory of set development," which achieves dynamic musical progression through various transformational methods while maintaining the recognizability of the core material.

2.2 Chromatic Treatment: The Modern Expansion of Ethnic Pitch Sets

To enhance the contemporary feel and expressive power of the pitch material, the work incorporates chromatic embellishments into traditional pentatonic sets, forming hybrid sets characterized by "pentatonic scale + altered tones." For instance, in the thematic melody of Distant Tune, the second scale degree (Shang) is adorned with a raised second (# 2) appoggiatura ornamentation, creating a chromatic pitch flow that preserves the distant, lingering charm of the Long Song tradition while enriching the melodic texture. In the transitional passage of the Border Forest section, a chromatic progression of "Jiao - Qingjiao - Zhi" is employed, coupled with shifts in harmonic color, achieving a smooth modulation of modal color that mimics the subtle flow of wind through a forest. This chromatic treatment aligns with the theory of "pentatonic chromaticism" proposed by Chen Mingzhi, wherein chromaticism does not disrupt the skeletal framework of the pentatonic scale but rather serves as an ornamental element to enrich the expressive capacity of the pitch material.

2.3 Control and Release of Tonal Tension

The work employs a "stable-unstable-stable" logical progression in tonal development, achieving tension control through the gradual expansion and subsequent return of tonal distance. This progression aligns with the emotional arc of the suite: the first movement, Desert, establishes a stable tonal foundation based on the Yu mode, reinforced by a sustained pedal note A. The second movement, Distant Tune, expands tonal tension through a modulation to the closely related Gong mode, expressing the historical depth of the grasslands. The third movement, Pastoral Dance, intensifies the dynamic energy and vitality of the dance through a modulation from Gong mode to Zhi mode. The fourth movement, Border Forest, then achieves overall tonal unity and a release of tension by returning to the Yu mode via a common tone (the Gong note). Throughout this process of tonal modulation, modern techniques such as "mediatory note transition" and "enharmonic modulation" are employed to ensure a natural and seamless flow between tonalities^[1-4].

2.4 Modern Design of Onomatopoeic Pitch

As an a cappella choral work, Northern Frontier Lights transcends the melodic logic of traditional choral writing in its treatment of onomatopoeic pitch, incorporating the creative concepts of modern timbral music. For instance, in Desert, the "hush" (wind sound) is realized through a soprano microtonal glissando (C-sharp - D - E-flat), mimicking the uncertainty of wind; the "sug" (jerboa leap) is rendered by a mezzo-soprano's staccato pitch leaps (A - C-sharp - A), capturing the creature's agility. In Pastoral Dance, the "tagataga" (horse hooves) employs alternating major second intervals (Gong - Shang - Gong - Shang) combined with staccato eighth notes to simulate the crisp, rhythmic patter of hooves. In Border Forest, the "shush" (rustling leaves) is created by a chromatic cluster (E - F-flat) between soprano and mezzo-soprano voices, evoking the forest's tranquil atmosphere. This onomatopoeic pitch design deeply intertwines "pitch, timbre, and semantics," achieving a modern choral expression that "shapes form through pitch and conveys meaning through sound."

3. Textural Integration of Pitch Material: The Multi-Dimensional Construction of A Cappella Chorus

3.1 Monophonic Texture: Refined Shaping of the Pitch Line

In solo and leader passages, the work employs monophonic texture, enhancing expressiveness through a threefold treatment of "breath control, pitch extension, and ornamental embellishment." The Long Song-style theme simulates the "fewer words, longer melodic lines" rhythmic characteristic of the genre by prolonging the duration of core pitches, supported by the choir's sustained breath. In contrast, short-tune melodies increase the fluidity of the pitch line through embellishments with sixteenth-note figures. This approach not only continues the melodic logic of traditional Mongolian music but also aligns with the modern compositional concept of "instrumental treatment of the human voice" in a cappella choral writing.

3.2 Polyphonic Texture: Three-Dimensional Integration of Pitch Layers

The work achieves multi-voice pitch integration through three methods—"contrapuntal polyphony," "harmonic support texture," and "stratified texture"—highlighting the stereophonic advantages of a cappella chorus:

a) Contrapuntal polyphonic texture (as in Pastoral Dance): The upper voice employs a pentatonic set in the Long Song style (Yu – Gong – Shang – Zhi), while the lower voice utilizes the narrative singing motive of a "Gong – Zhi" fifth leap. This creates a "lyrical – narrative" dialogic relationship between the voices in terms of pitch material, simulating the call-and-response between a pastoral song and a storyteller on the grasslands.

b) Harmonic support texture (as in Distant Tune): Based on the core pitch set, pentatonic harmonies are constructed (such as Yu – Gong – Shang triads or Zhi – Jiao – Qingjiao seventh chords). This approach preserves the coloristic characteristics of ethnic harmony while providing stable support for the melodic line in the upper voice.

c) Stratified texture (as in Border Forest): The choir is divided into three pitch layers: high, middle, and low. The high layer uses a chromatic set (Jiao – Qingjiao – Zhi – Yu); the middle layer repeats a perfect fourth interval (Gong – Zhi); and the low layer sustains a pedal tone (A). The contrast and fusion of pitch among these layers create a sense of forest depth.

3.3 Auxiliary Integration of Vocal Sound Effects

The work innovatively employs vocal sound effects to expand the expressive dimensions of pitch, achieving a resonance of "voice, nature, and emotion." In Desert, the bass section produces a sustained low pedal A through "throat resonance," simulating the profound texture of the Khoomei overtone singing style; simultaneously, the soprano section utilizes a "breathy glissando" (C-sharp – D – E) to mimic the elusive whisper of desert wind. In Border Forest, the choir employs a "lip trill" (pitch fluctuations produced by lightly trembling the lips) in conjunction with chromatic pitch sets to simulate the subtle, rustling sound of leaves brushing against each other. This application of vocal sound effects draws upon the "timbral shaping" theory of modern choral music, deeply integrating the sonic possibilities of the human voice with the pitch material^[5-6].

4. The Unity of Pitch Treatment Techniques and Emotional Expression

4.1 Pitch Mapping of Natural Landscapes

The pitch treatment techniques form precise musical depictions of the Northern Frontier's natural landscapes. In Desert, the pitch combination of a "sustained bass note + overtone series" simulates the vast, boundless expanse of the desert. A half-step glissando (C-sharp – D) and microtonal variations (D – E-flat) recreate the dynamic scene of flowing wind and sand. Distant Tune employs an extended pentatonic set to echo the expansive, distant horizon of the grasslands, while modal alternation (Yu mode to Gong mode) mimics the changing light and shadow of sunrise and sunset on the prairie. In Border Forest, chromatic pitch sets and subtle shifts in harmonic color create an atmosphere of depth and tranquility, with the undulation of the pitch line corresponding to the dappled light and shadow within the forest.

4.2 Pitch Interpretation of Humanistic Spirit

The pitch treatment techniques carry a profound expression of the Mongolian people's humanistic spirit. The resolute repetition of core pitch sets, such as the "Gong – Zhi" fifth leap motive in Pastoral Dance, interprets the tenacity and perseverance of the Mongolian people. The free-flowing and flexible modal alternations, like the frequent shifts between Yu and Gong modes in Distant Tune, embody the inclusivity and vitality of the ethnic culture. The fusion of vocal sound effects with pitch material, such as throat-resonance drones and breathy glissandi, conveys reverence for and the continuation of traditional arts. Furthermore, the suite's overarching "stable – unstable – stable" tonal logic serves as a metaphor for the Mongolian people's life philosophy of "adaptation, struggle, and symbiosis" with nature.

5. The Artistic Value of Pitch Treatment Techniques

5.1 Modern Interpretation of Regional Culture

The modern treatment techniques applied to the pitch material in Northern Frontier Lights achieve a creative transformation and innovative development of regional culture, providing a successful model for its contemporary interpretation. Grounded in the pitch DNA of the Northern Frontier's folk music, the work utilizes modern compositional techniques to deconstruct, reorganize, and elevate these elements. This process allows the regional cultural components to retain their original spiritual core while attaining an artistic expression that aligns with contemporary aesthetic contexts.

In the selection and treatment of pitch material, the creator consistently adheres to the core essence of the regional culture. For instance, the distillation and application of elements such as the Mongolian Long Song, characteristic intervals, and melodic contours not only preserve the unique flavor of Northern Frontier music but also amplify and deepen its spiritual connotations—such as reverence for nature and love for life—through the polyphonic textures of modern choral writing. Simultaneously, the application of modern treatment techniques helps regional culture break through traditional forms of expression, enabling it to be accepted and understood by a broader audience. For example, the incorporation of atonal techniques and modern harmonies endows the work with both the distinctiveness of regional culture and the universality of modern music, thereby offering a new pathway for the dissemination and promotion of regional culture^[7-10].

This modern interpretation of regional culture not only enriches the artistic depth of the work but also provides significant inspiration for contemporary musical creation. In the context of globalization, a major challenge facing composers is how to maintain the uniqueness of regional culture while achieving alignment with modern aesthetics. The practice demonstrated by Northern Frontier Lights proves that the organic integration of regional cultural elements with modern compositional techniques can both manifest the vitality of regional culture and expand the expressive possibilities of musical creation, realizing a symbiotic and mutually flourishing relationship between regional culture and modern art.

5.2 Precise Intensification of Emotional Expression

The modern treatment techniques of pitch material provide robust support for the precise intensification of emotional expression in the work. In musical composition, technical means are always in service of emotional expression. Northern Frontier Lights, through its individualized processing of pitch material, achieves an accurate and vivid conveyance of different emotional connotations.

The integration of tonal thinking with atonal techniques endows the work's emotional expression with greater tension. The stability and harmony of tonal passages form a sharp contrast with the tension and intensity of atonal sections. This contrast not only mirrors the variability and grandeur of the Northern Frontier's natural landscapes but also reveals the richness and depth of the emotional world of its people. For example, when depicting the tranquility of the grasslands and the ferocity of a storm, the work utilizes an alternation between tonal and atonal passages. This approach guides the emotional expression from calmness to a climax and back to calm, creating a powerful emotional impact.

Innovations in pitch superimposition and harmonic color provide rich layers of hue for emotional expression. Different harmonic colors correspond to distinct emotional states: the openness of quartal harmony, the richness of quintal harmony, and the tension of secundal harmony. This allows listeners to intuitively perceive the emotional shifts in the work through their auditory experience.

Furthermore, the individualized design and developmental variation of the pitch line lend the emotional expression greater logic and coherence. The transformation of the pitch line—from long and expansive to lively and agile, from low and introspective to passionate and fervent—remains synchronized with the progression of emotion. Through multiple variations, the emotions are deepened layer by layer.

The symbiotic relationship between technique and expression is fully realized in this work. Modern pitch treatment techniques offer more possibilities for emotional expression, while the demands of emotional expression drive the innovation and application of these technical means. This symbiosis ensures the work possesses both a high level of technical sophistication and a sincere emotional power,

achieving a perfect unity of "technique" and "art."

5.3 Innovative Development of Choral Art

The modern treatment techniques of pitch material in Northern Frontier Lights have infused new vitality into the innovative development of choral art. The work breaks through traditional models of pitch organization in choral music, undertaking bold explorations in areas such as tonal application, harmonic construction, and melodic design, thereby expanding the expressive and evocative power of choral art.

Regarding choral texture, the work creates rich inter-voice relationships through diverse pitch superimposition and contrapuntal designs. This transforms the choral texture from a traditional melody-plus-accompaniment model into a multi-dimensional fabric characterized by equal dialogue and mutual enhancement among all voices. This textural innovation not only strengthens the music's sense of layering and complexity but also fully leverages the inherent strength of polyphony in choral art, making each voice an essential component of the musical expression.

In terms of acoustic effect, the application of modern pitch treatment techniques significantly enhances the sonic expressive potential of choral art. Through the collision of dissonant intervals, the free unfolding of pitch lines, and rich variations in harmonic color, the work achieves soundscapes difficult to realize in traditional choral writing. These effects are capable of simulating the grandeur of natural landscapes and conveying complex emotional depth, greatly expanding the expressive boundaries of choral art.

Concerning aesthetic philosophy, the work integrates regional culture with modern aesthetics. It satisfies listeners' emotional connection to traditional musical elements while also catering to contemporary audiences' demand for diverse and innovative artistic expression, thus providing a new direction for the aesthetic evolution of choral art.

The successful practice demonstrated by Northern Frontier Lights proves that the innovative development of choral art is inseparable from the support of compositional techniques, and that innovation in compositional techniques must be centered on artistic expression. The modern treatment of pitch material in this work embodies both the cutting-edge exploration of contemporary compositional techniques and a steadfast commitment to the aesthetic essence of choral art, offering a significant practical model for its innovative advancement.

Conclusion

The modern treatment of pitch material in the a cappella chorus suite Northern Frontier Lights constructs a complete logical chain of "ethnic DNA - technical transformation - emotional expression." The application of modern techniques — such as pitch set transformation, chromatic expansion, polyphonic integration, and vocal sound effects — not only achieves the creative development of traditional Mongolian pitch material but also fully realizes the distinctive artistic qualities of the human voice in a cappella singing. The profound resonance between the pitch treatment techniques and the natural landscapes and humanistic spirit of the Northern Frontier accomplishes the creative objective of "technique serving expression, and expression empowering culture."

The practical experience of this work demonstrates that contemporary ethnic choral composition should be grounded in traditional pitch DNA, achieving an organic balance between ethnic character and modernity through the scientific transformation of modern techniques. The research presented in this paper provides specific technical references for the modern creation of ethnic music and offers theoretical support for the creative transformation of traditional musical elements. Future research could further expand into the analysis of correlations between pitch material and choral text semantics, as well as performance practice, to more comprehensively reveal the work's artistic value.

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