

Original Research Article

External form and internal instrument: Visual translation and cultural adaptation of modern technology in the Dianshizhai Pictorial

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Abstract: During the late Qing dynasty, as Western learning spread eastward, modern Western technological artifacts entered Chinese society and collided sharply with traditional knowledge systems. Using lithographic line drawing as its medium, the Dianshizhai Pictorial (1884–1898) systematically visualized and locally re-signified technological objects such as trains, telegraphs, steamships, and microscopes, thereby formulating a dual translation strategy of "External Form" (Meixing) and "Internal Instrument" (Neiqi). At the formal level, the pictorial, grounded in traditional baimiao (plain line drawing) and integrating Western perspective, chiaroscuro, and compound focal composition, transformed unfamiliar mechanical forms into "visible forms" that aligned with indigenous aesthetics. At the cultural level, it employed the frameworks of Gezhi (investigation of things), Yin-Yang and the Five Phases, and Confucian ethics to decode scientific principles in accessible terms and reshape their value, thereby shifting the perception of Western technology from "strange and ingenious tricks" to "practical tools for statecraft and public welfare." This translational practice not only lowered cognitive barriers for the general public and enabled the popularization of scientific knowledge, but also built a cognitive bridge between Chinese and Western cultures. It became an important starting point for visual modernity in modern China and offers historical lessons for contemporary cross-cultural communication, science popularization, and the modern transformation of traditional culture.

Keywords: Dianshizhai Pictorial; line-drawing translation; cultural translation; modern technology; visual modernity

1. Introduction

In the mid-to-late 19th century, under the impact of foreign powers and the impetus of the Self-Strengthening Movement, China began to introduce and cognitively transform Western technological artifacts. Industrial achievements such as steamships, railways, telegraphs, and electric lights gradually moved from elite circles to popular society. However, traditional knowledge systems and abstract scientific principles were difficult for ordinary people to grasp, and textual translation had its limitations. The spread of lithographic technology and the rise of mass media made it possible to visualize and popularize scientific knowledge. As the most influential current-affairs pictorial of the late Qing period, the Dianshizhai Pictorial (1884–1898), using a "pictures on the left, text on the right" format, transformed Western technology into visual texts that urban residents could perceive, understand, and accept, thus serving as a key medium between Western modernity and popular cognition in late Qing China.

Existing studies have mostly approached the pictorial from the perspectives of journalism history, art history, and cultural studies, examining its media management, visual style, social narratives, or gender constructions, while paying insufficient attention to the systematic visual translation of technological artifacts. Taking "External Form" (formal translation) and "Internal Instrument" (cultural translation) as its core framework, and employing methods from iconology, communication studies, and art history, this paper analyzes how the pictorial reconstructed the external shapes of technological artifacts through traditional line drawing and decoded their principles and values through indigenous cultural frameworks. It reveals the pictorial's unique value in late Qing technological enlightenment and the construction of visual modernity, offering a new perspective on Sino-Western cultural interaction in modern China.

2. Historical context: Late Qing technological communication and the logic of the pictorial

After the Opium Wars, the idea of "mastering the barbarians' superior techniques to control them" became a consensus at both court and society, and Western technology shifted from being seen as "strange and ingenious tricks" to a core support for national wealth and power. However, elite translations and scientific explanations of Western learning were largely confined to the scholar-official class and could not reach the mostly illiterate urban populace. Ordinary people were curious and puzzled by artifacts such as trains, telegraphs, and microscopes. Traditional beliefs in the supernatural and geomancy (fengshui) conflicted with modern science, creating an urgent need for an accessible, intuitive, and visual mode of communication to bridge the gap.

The introduction of lithographic technology laid the technical foundation for the pictorial. Compared to traditional woodblock printing, lithography could reproduce fine lines accurately and produce low-cost bulk copies, meeting the demand for "pictorial proof." The British businessman Ernest Major, relying on the news network and distribution channels of Shenbao (Shanghai Daily News), hired professional painters such as Wu Youru, who were familiar with both Chinese and Western painting methods, to launch the Dianshizhai Pictorial. Positioning it as a mass medium for "all who love to look at pictures," Major integrated news, Western technology, and urban legends into a picture-led, text-assisted communication model.

The pictorial's creative team consisted mainly of folk professional painters who abandoned the reclusive literati aesthetic and focused on realistic narration and visual popularization. Its content covered transportation, communication, medical devices, military equipment, municipal facilities, astronomical exploration, and other technological themes. It presented the fruits of Western industrial civilization while fitting local cognitive habits, striking a balance between realism and aesthetics, novelty and accessibility, and became the core vehicle for the popularization of technology in late Qing China.

3. External form: Formal translation of western technology through traditional line drawing

"External Form" refers to the pictorial's strategy of visually reconstructing Western technological artifacts: Using traditional baimiao as the core, integrating Western realist techniques to transform unfamiliar, cold mechanical forms into "visible forms" with flowing lines, clear structures, and indigenous aesthetic appeal, thereby achieving cognitive adaptation at the visual level.

3.1. Line reconstruction: From expressive line drawing to analytical lines

Traditional Chinese baimiao emphasized the "bone method" (gufa yongbi), focusing on rhythm and lyricism. The pictorial shifted the function of lines from expression to analysis, adapting techniques such as "iron-wire drawing" (tiexianmiao) and "nail-head rat-tail drawing" (dingtou shuweimiao). Using angular, forceful, and strategically dense lines, it presented mechanical structures and material properties. When depicting trains, steamships, or cannons, it used hard, uniform lines to outline forms and highlight the hard texture of metal. When rendering gears, rivets, or bridge trusses, it employed fine, short lines to differentiate components and reinforce structural logic. These lines preserved the rhythmic charm of traditional brushwork while achieving the precision of scientific illustration, making complex machinery identifiable and perceptible.

3.2. Perspective integration: Spatial expression through hybrid perspective

The pictorial broke free from traditional scattered perspective (santou toushi) and selectively adopted Western linear perspective, creating a "hybrid perspective" system. When depicting railways, ships, or buildings, it used linear perspective to create depth (objects appearing larger when closer), enhancing realism. In scenes of human activity or landscape backgrounds, it returned to scattered perspective to accommodate multiple narrative elements. For example, *Death under the Wheels* (Bian yu che xia) uses perspective contraction to show the railway tracks receding, intensifying the spatial tension of the accident. *Giant Coastal Cannon* (Bianfang jupao) juxtaposes multiple viewpoints to fully present the cannon's structure and loading scene, balancing realism and narrative.

3.3. Compound focal points: Guiding the viewer's virtual presence

The pictorial employs a "compound focal-point composition," using the gazes of onlookers inside

the image to create multi-layered viewing relationships. The astonishment, stares, and discussions of the figures in the picture draw the viewer outside the picture into the scene, creating an immersive sense of "virtual presence." For instance, *Wonderful Flying Machine* (Miaozhi feiche) uses the upturned gazes of a crowd on the ground to guide the reader's attention to the aircraft in the sky, reducing the strangeness of the technological artifact. *Praiseworthy Sailor* (Shuishou kejia) uses multiple levels of onlookers to reinforce the event's authenticity and empathy, allowing readers to accept the legitimacy of technology through "the viewing of viewing."

3.4. Simplified chiaroscuro: Rendering texture through indigenous aesthetics

The pictorial abandoned the strong chiaroscuro of Western oil painting, using light ink washes to simplify shading in service of the line-dominated visual logic. When depicting metal objects, it used pale washes to suggest volume and reflection. For smoke, steam, or folds in clothing, it used soft washes to create texture. This method of "bones in line, flesh in wash" not only enhanced the three-dimensionality of artifacts but also resonated with the traditional Chinese aesthetic of "counting white as black," avoiding the cultural dissonance of Western realist techniques.

4. Internal instrument: Cultural translation of technology through indigenous knowledge frameworks

"Internal Instrument" denotes the pictorial's cultural decoding of the principles, functions, and values of Western technology. Using *Gezhi* (investigation of things), Yin-Yang and the Five Phases, and Confucian ethics as frameworks, it transformed abstract scientific principles into an intelligible system for local audiences, completing a value reorientation from "alien object" to "useful instrument."

4.1. Gezhi and Yin-Yang: Indigenous interpretation of technological principles

The pictorial interpreted scientific principles using the Confucian concept of *Gezhi* (extending knowledge through investigation of things) and the Daoist cosmology of Yin-Yang and the Five Phases, bypassing complex formulas and turning mechanical dynamics and electromagnetic transmission into familiar cognitive logic. It explained steam engine power as "water and fire assisting each other, Yin and Yang in harmony," interpreted telegraphic communication as "electrical resonance and the interflow of vital energies" (qi), and analogized mechanical motion to the circulation of blood and qi in the human body. Such *geyi*-style (analogical) interpretations sacrificed scientific precision but effectively lowered cognitive thresholds, integrating Western technology into traditional cosmology.

4.2. Ethics and everyday life: Secular reshaping of technological value

The pictorial embedded technological artifacts into Confucian ethics and urban daily life, assigning them moral attributes and practical utility. At the ethical level, it emphasized the "state-serving and people-benefiting" functions of railways and telegraphs in facilitating commerce, strengthening defense, and enlightening the people, while depicting electric lights and microscopes as symbols of "civilized enlightenment." At the everyday level, it integrated telephones, bicycles, and clocks into shops, homes, and alleys, showing their convenience and efficiency. For example, *Shaving under Electric Light* (Xiumei bei ti) shows an electric light in a barbershop, transforming Western technology into a tool for daily life. *Bicycle Race* (Sai jiao ta che) uses a bustling street scene to dissolve the alienation of machinery.

4.3. Imaginative construction: Suture of meaning under cognitive limits

Faced with scientific and technological achievements beyond traditional understanding, the pictorial used mythical thinking and dramatic narratives to imaginatively fill gaps and suture cognitive ruptures. It interpreted a hot-air balloon ascent as "feather-winged flight to heaven," compared a submarine to "a creature that moves underwater," and explained unknown technologies through mythical imagery and everyday experience. At the same time, it placed technological accidents and wonders within a framework of karmic retribution, satisfying popular curiosity while maintaining traditional moral order, achieving both cognitive and ethical adaptation.

4.4. Value shift: From "strange and ingenious tricks" to "practical tools for statecraft and public welfare"

Through sustained visual narration, the pictorial reshaped the value of Western technology, rejecting the prejudice of "strange and ingenious tricks" and repositioning it as an "instrument for statecraft and public

welfare" that enriches the nation, strengthens the military, and benefits the people. When depicting ironclad warships and new fortifications, it highlighted their defensive value. When presenting railways and steamships, it emphasized their commercial value. When showing Western medicine and firefighting equipment, it underscored their public welfare value. This value shift aligned with the Self-Strengthening Movement's contemporary concerns and provided ideological legitimacy for popular acceptance of Western technology.

5. Social impact: Cognitive transformation and the enlightenment of visual modernity

The translational practice of the Dianshizhai Pictorial profoundly influenced the values and ethical concepts of the late Qing public and propelled the transformation of visual modernity in Chinese society.

At the cognitive level, the pictorial broke the traditional shackles of "valuing the Way over implements," fostering a pragmatic view of technology among the populace. It moved people from "rejecting foreign devices" to "accepting useful ones," laying the social foundation for the indigenization of modern technology. At the ethical level, it embedded technological activities within the Confucian ethical order, shaping traditional virtuous images of artisans, soldiers, and envoys, thus mitigating conflicts between modern technology and traditional ethics and achieving cultural adaptation.

From the perspective of visual modernity, the pictorial used lithographic images as a medium to construct a new visual language and mode of viewing, pushing Chinese art from traditional literati painting toward popular visual narrative, and became an important starting point for visual enlightenment in modern China. Its "image-based reductive communication" model offers a valuable historical precedent for science popularization and cross-cultural communication.

6. Conclusion

The Dianshizhai Pictorial, taking "External Form" as the surface and "Internal Instrument" as the core, accomplished the visual translation and cultural adaptation of modern Western technology. Formally, it created a visual language that combined indigenous aesthetics with modern features by integrating traditional line drawing with Western realist techniques. Culturally, it decoded technological principles through indigenous knowledge frameworks and reshaped their value and cognitive acceptance. This practice was neither a passive copy of Western technology nor a stubborn closure to tradition; rather, it was a creative cultural act full of agency. It built a bridge of understanding in the midst of Sino-Western cultural conflict and promoted technological enlightenment and social transformation in the late Qing.

Its historical lessons are as follows: Cross-cultural communication must respect the cognitive habits of the audience and overcome cultural barriers through localized translation; science popularization needs to balance professionalism with accessibility, using visualization and narrative to increase communication efficiency; traditional culture should maintain its subjectivity in modern transformation while achieving innovative development by drawing on foreign civilizations. The translational wisdom of the Dianshizhai Pictorial provides a valuable historical mirror for cultural exchange, science communication, and traditional cultural innovation in today's globalized era.

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