

Research on the Photographic Printing Technology of Pictorials in the Context of Early Chinese Films

-- Taking the Pei-Yang Pictorial News from 1933 to 1934 as an Example

Zijun Zhao

School of History, Wuhan University, Wuhan, China

2019301120062@whu.edu.cn

Abstract. Among the numerous studies on the history of early Chinese films, film derivatives, as a part of it, have been neglected to some degree. Even worse, there are fewer studies on the material media with an archaeological concept. To fill this void, this paper adopted the column "The World of Screen" of the Pei-yang Pictorial News from 1933 to 1934 and the photo copperplate printing and zincography used as the object of study. Based on the research approaches of media archaeology (materiality, heterogeneity and reproduction), this study investigated the involvement of film promotion in the process of social cognitive shaping under new technologies, and highlighted the new graphic design, the image of the naked women and aesthetic changes brought about by film promotion from the perspectives of sensory extension, reading space expansion and power distribution. Finally, the study attempted to clarify the resurgence and rupture of media logic from the remnants of theatrical posters and the emergence of electronic advertising via modern concerns.

Keywords: Photo Copperplate Printing and Zincography; Film Promotion; The Pei-Yang Pictorial News; Media Archaeology.

1. Introduction

The Chinese film industry began to prosper during the 1920s. Du Yu's Shanghai Film and Television Company was founded in 1922, which paved way for the film industry in that period. From then on, a series of film company emerged, including Baihe Film Company in 1924 and Tianyi Film Company in 1925, etc. Newspapers such as Shun Pao Newspaper and the Republic of China Daily set up a special column on films. In 1930, "The Red Peony" was produced and screened in 1931, bringing Chinese films into the era of sound. In 1930, Lianhua Film Company was founded. It later merged with a number of important film companies with its strong capital, and the film production industry began to enter the era of relative monopoly. The development of the film production industry required more advanced film promotion strategies. In that era, the introduction of photo copperplate printing and zincography has led to the rapid development of photo-based film promotions, which replaced the old model and changed the way information was saved, recorded and communicated, to which society also responded. This paper took the Pei-Yang Pictorial News as an example in order to review its printing technology, sort out the content of the photographs, and try to reveal issues related to the extension of the senses, the expansion of reading space and the distribution of power under this influence.

2. Definition and Background

2.1 Definition of Pictorial

Scholars have different views on defining the term "pictorial". According to the Chinese Encyclopedia, "a pictorial newspaper is a form of media in which pictures are the main focus and text is the supplement. The audience enjoys it, and it mainly publishes photos and drawings to spread information and knowledge with images and visual graphics. Fan believed that Pictorials are a visual culture of images, using pictures to visualize things for people to understand it. The above definitions

all focus on the picture of the pictorials. Although they inductively describe the characteristics that distinguish them from other paper-based media, these definitions are far from exhaustive. Wu, by analyzing the early "Dianshizhai Pictorial", affirmed the function of reporting news of pictorials. At the same time, the Modern Miscellany in the Republic of China also mentioned that "for graphics, we will seek fine, valuable and thoughtful painting and photography." Clearly, pictorials not only use images as their material, but also have strict regulations on their content and value. To sum up, this paper regards pictorials as a medium with aesthetic and artistic images as the main content, supplemented by news reporting text.

2.2 Background of and Literature Review on the Pei-Yang Pictorial News

Established in Tianjin(Tientsin) on July 7, 1926, "the Pei-Yang Pictorial News" featured the slogan as "latest news, art and science" and was oriented to "cater to the psychology of readers and identify their needs", which had an important impact on the Chinese media industry at that time and was called "the giant of the North". Its printing technology was always praised by readers. Although the copperplate photographic technology used was not the most advanced, it was quite unique and was known as "the first copperplate pictorial newspaper in Tianjin and North China". Among the copperplate printing newspapers in the northern part of China, the Pei-Yang Pictorial News marked the peak period of the application of copperplate photographic technology. The Pei-Yang Pictorial News set a special column for films called "The World of Screen" in 1933 and was continued to be published until 1937 when the Japanese army invaded Tianjin. The newspaper published a large number of film advertisements, photographs of stars and other pictorial materials, which are of high historical value. Due to the limited length, this paper chose the column "The World of Screen" of Pei-Yang Pictorial Newspaper from 1933 to 1934 as the object of study.

At present, the main achievements of studies on the Pei-Yang Pictorial News must be the two questions of "what" and "how" the Pei-Yang Pictorial News transmitted from the perspective of communication science, as discussed by Zhu; Wang examined the cultural identity of it from four aspects: the people who operated the newspaper, the editors, the image of women and romance novels; Han investigated the urbanized life and culture of Tianjin(Tientsin) in the Republic of China from the perspective of the Pei-Yang Pictorial News and its advertisements; Zhang, Y.Q. made an overall review on the operators, printing technology and style of this newspaper; Zhang, X.H., on the other hand, analyzed the relationship between Pei-Yang Pictorial News and early Chinese film stars.

By restoring and analyzing the material basis of the equipment and framework of the photo printing of the Pei-Yang Pictorial News, this paper examined how the operational mechanism and technological control of pictorial production in the context of early Chinese cinema were involved in the shaping of our figures, senses and cognition. Guided by Kittler's "information materialism" and Zielinski's "deep time" theory, the paper also examined the interaction between old and new technologies and the rupture between printing media and modern digital media, in order to understand the evolutionary logic of film promotion through the perspective of media archaeology.

3. Pictorial Printing Technology and the Updating

In the early stage of film development, the printing technology used in pictorial newspapers mainly included lithographic printing, copperplate printing & zincography printing and photogravure. The representative pictorial newspaper using lithographic printing was "Diangshizhai Pictorials", which mainly printed news and hand-drawn pictures. The representative pictorial newspaper using copperplate printing and zincography technology is the Pei-Yang Pictorial News, which first introduced the photographs shot. As for the representative pictorial newspaper using photogravure is "Liang You", which used a large number of photographs and had more comprehensive and rich contents.

3.1 Photographic Plate Printing Technology (Copperplate Printing & Zincography)

Copperplate printing & zincography printing technology is a type of letterpress printing technology. As the name implies, letterpress printing refers to the technology of printing plates/letters on which the text and images are raised above or above the blank. During the printing process, the ink from the graphic part is transferred to the surface of the substrate due to the pressure of the graphic part. Compared with other printing methods, letterpress printing can make the content of printed products clearer and more vivid. The invention of photographic plate making technology was much later than that of text-based plate making, and in 1839, the Frenchman Daguerre invented the silver plate photographic technology, which pioneered the photographic plate printing technology. In 1906, the photographic plate printing technology was introduced to the China National Publications (Shanghai) and the Shanghai Commercial Press. The key to copperplate printing and zincography lies in the production process of photographic copper/zinc plates, which in turn depends on the optical equipment of the plate making camera, which is used to photograph various originals. After that, the plates need to be "tanned", and the core technology "photo-imagable liquid" is used, which includes ammonium dichromate, potassium dichromate, protein, isinglass and bone glue. The underlying principle is that the photo-imagable liquid forms a special substance insoluble in water under the action of light, so that it is possible to produce patterns by manually controlling the light source. The "negative image" of the manuscript is overlaid on the metal plate and exposed. The graphic part hardens under the action of light, while the blank part does not react, thus obtaining the "positive image" of the manuscript. Then the non-printed part of the plate is etched by applying acid, so that the graphic part of the plate is raised and finely processed to obtain a smooth plate for printing.

Although the Pei-Yang Pictorial News was featured as its use of photographic plate printing technology (copperplate printing & zincography), it did not own the most advanced technology, so its group paid a lot of attention to technical improvement. In the No.50, the editors said a few words at the end of the year: "Next year will mark the two years' anniversary of this newspaper, so we will have to make some big changes. The front sheet of our next issue will be printed entirely on copperplate paper, and the cover will be colorfully printed. ...". In the No.55, the editors said, "This newspaper, since the change to the use of copperplate paper special for books and newspapers, has been more and more exquisite, which other newspaper cannot realize...". The editor notes of No.58 wrote, "In order to meet the needs of the readers, at the expense of our investments, we will assign the copperplate paper we purchased for other uses. From this issue onwards, we will use the same paper we used last year" In No.64, they said, "Since the No.101, we have more copperplates, and we are striving to print the text beautifully, as you all can see...". Therefore, it can be found that the Pei-Yang Pictorial News kept adjusting the newspaper and copperplates through readers' feedback in order to ensure the best reading experience.

3.2 Lithographic Printing and Photogravure

Lithography was the more common printing technology for pictorial printing before the photographic one emerged. Later on, the more advanced photocopy printing technology was invented. The key to lithography is the production of lithographic plates. The main principle of making lithographic plates is the incompatibility of water and ink. A special oil-based ink pen is used to draw on the lithographic plate, and then the plate is coated with a weak acid to corrode the blank portion of the plate, thus creating a hydrophilic layer of calcium oxide. Subsequently, the surface of the stone plate is dabbed with a layer of water to make calcium oxide fully absorb water, and then a layer of ink is applied to make sure that the blank part of the page is water and the printed part is ink. Finally the printed products can be obtained by pressing the machine. Photolithography came about after wet-plate photography was applied to copper/zinc plates, so the Commercial Press began using photolithography in about 1910. Later on, a more advanced "heliogravure", also known as "photogravure", was invented by Czech painter Karl Klietsch in 1890. The photogravure plate is made by transferring the original "negative" image from the plate-making camera to the carbon paper with a tanned grid, and exposing it to form a hardened layer of photoresist, which is then etched with a

ferric chloride solution through the hardened layer of resist, thus, the gravure plate was obtained. The photogravure printing technology was introduced by the Commercial Press in Shanghai only after 1924.

By comparing these three methods, it can be seen that printing effects, especially the presentation of photographs, have gradually improved, and that the technical elements of "light sensitivity" and "exposure" have even been reproduced in modern digital technology. Lithography was only able to print text and hand-drawn images at the very beginning. With photographic copper/zinc plates, images began to appear in pictorials, but the quality was not so high. For gravure printing, a large number of beautiful photographs could be printed. It is worth noting that these three technologies were not a relationship of iterations, and that the invention of the latter did not quickly replace the former due to its high cost, but rather coexisted. By reviewing the development from photographic copper/zinc printing to photogravure printing, it is easy to see the important role of the photo-imagable liquid and exposure process in plate making. Although modern digital printing technology no longer requires plate to convert digital files directly into printed materials, the basic printing concept of laser beams for conducting digital signals in monochrome pixels and printing cylinders made of light-sensitive materials can still be regarded as a reproduction of the old printing technology.

3.3 Influence of Photographic Printing Technology

Photographic copper/zinc plate technology has promoted the development of typography and graphic design, enriching the connotation of photographs and making it possible to publish a large amount of film information based on image. The material in the original periodicals and Chinese newspapers consisted of only a large amount of text and a few hand-drawn illustrations, with very limited correlation between the different sections, and the expression of images was based only on the personal perception of the artists, which lacked reliability and was difficult to resonate with the audience. The information of film was not enough. Even worse, the introduction wordings about the key information such as titles, show times, locations and the general content of the film, were dull and unappealing. With the development of copperplate printing technology, photography, as a large part of newspapers and magazines, has become the focus of major print media, and images were no longer the embellishment or explanation of "words". The newspaper group can not only show some typical shots of the film, but also can invite the actors and actresses of the film to take photos specifically for the promotion. The film as a whole was further promoted on top of its inherent value, and with the rise of the production industry, film supplements and special issues appeared, and film publicity entered a new stage.

4. Pictorial Printing: Sensory Shaping and Film Promotion

From 1933 to 1934, there were 308 issues published, 42 of which included the column "the World of the Screen". After reading all of them, we discuss the social impact of photography and printing technology from the perspective of early film.

4.1 Human Senses – Visual Extension and Graphic Design

Photo letterpress printing made photographs more widely available as an extension of the "human eye". It truly involves "real images" in the print medium. Beyond the reach of the human eye, a wide range of real visual information poured into the print medium. Photographs were integrated with text and drawings, and with the new content and the rapid pace of publication, a new logic of information reception was created.

In addition, photographs were not only used as visual record, but deconstructed and reorganized under typographic design for smoother and more prominent graphic visual effects. As photographs in journals became more important, it was reasonable that the images would replace the text as the subject of newspaper. As a result, new ways of storing information were created, new cultural products based on photographic printing transformed the public visual experience, and new ways of

social communication and memory were generated. This undoubtedly gave an advantage to film promotion, which mainly provided visual arts. Films then were no longer promoted with merely the words on the newspaper, but together with pictures. Take Figure 1 for example, which consists of six photographs and three articles. The photos were close-ups of actors and directors, screenshots of a scene in the movie and photos for the film's promotion, while the articles were composed of descriptions of the film shooting process, movie reviews and hot topics of movies and society. The photos occupy two-thirds of the pictorial page as the main body. Meanwhile, the photo retouching like making irregular polygons overlapped with the images creates aesthetic feelings while retaining the main content of the pictures. The space was saved for arranging the texts, demonstrating the idea of modern graphic design. In order to present as much information as possible in a limited space, the content of articles and pictures could only be overlapped in a small amount, highlighting the pictures more. As a result, a large number of film photos were stored in the form of columns like "the World of Screen" together with text by photographic copperplate and zincography technology. The photos taken for promoting films created new visual experience for the audiences, and thus a new way of interaction between the production company and the audience, between the movie stars and the audience, and between the audience and the audience for the communication of movie information.



Figure 1. The World of Screen, No. 21 of the Pei-Yang Pictorial News



Figure 2. The World of Screen, No. 38 of the Pei-Yang Pictorial News

From traditional hand drawings to photographs, modern culture at that time was able to show the reality of a flat space as a whole, and the viewers got the fantasy of image content visually and mentally. Peoples reading habits were changed from reading while rationally thinking to be distracted by images, and the exhibition value of film itself was further magnified. Because of the reality, it was difficult for actors or film cast spots to directly face the massive movie fans and tourists, and this special right was monopolized by a few people, which was is contradictory to the socialization of film, in that the display value of film characters and ancillary film facilities must gradually catch up with their "utility value". The display value is reflected in the audience's visual and spiritual

possession of the film product. Therefore, in addition to the screening of the film itself, the photographic copperplate and zincography technology began to create a complete flat space for the audience with modern visual characteristics. A "cinematic" expression was constructed, and a series of visual impacts made the audience experience a unique attraction. In Figure 2, the audience is placed in a set of continuous "imagery" designed by the pictorial, with a large number of photos of female movie stars shown in groups, pairs or individual portraits, with as many as 28 characters. The newly taken photos were favored because of their association with what the public know about the stars in their backgrounds, experiences, and character relationships. Spiritually, viewers felt they got closer to the film stars within the capabilities of printing technology. It is worth noting that the photo in the bottom right corner of this issue is a large double-decker studio, the photography scene of Shanghai Star Company, which is so special since other photos are all stars. During this period, many film companies often shot their films on site, and the studios used to simulate the needs of multiple scenes were expensive facilities owned by large companies, very rare, and difficult for the average viewer to see. Therefore, this kind of promotion of advanced film shooting technology fully exploited the public value of private facilities beyond personal ownership, bringing a panoramic film experience to the audience and combining with the film itself to create a vague "virtual and real" appeal, thus highlighting the effect of film promotion.

4.2 Read Space: Privacy and Nude

More space was provided for reading private content under the effect of technology and capital. This change made it possible for intimate behaviors like appreciating human bodies and love affairs to be prevalent through film promotion. In the past, aspiration for peeping, as a kind of human nature, is satisfied when people were in a limited space, whether for the people's body or some certain scenes. When watching films, in pursuit of vivid images, what one expects is a metaphysical journey of desire to escape the sublime and sacred, whether tangibly or invisibly. By cooperating with the print media, photographers published their work on the newspaper. Moreover, with people's appeal for freeing our mind, the space for reading private content was thus enlarged.



Figure 3. The Dancing girl in *Her Bodyguard*



Figure 4. The Ideal Perfect Movie Star

Almost every issue of the "Pei-Yang Pictorial" published promotional photos of popular actresses, showing them in terms of dress, schedule and screen image. The publicity for Western actresses was more explicit, with them appearing in dancing dress, bathrobes and swimsuits. According to the Table 1, From 1933 to 1934, there were as many as 40 photos of nude actresses in 42 issues of "the World of Screen". This suggested a tacit understanding between the editors and the readers. As a reader-oriented pictorial, the editor's exploration on the reading materials was constantly recognized by the readers. Thus, different kinds of photos of actresses emerged, and the attempts of different identities and scenes contributed more and more to this result. In the 10th issue of the World of Screen, the promotion of film "Her Bodyguard" produced by Paramount Picture showed nearly twenty female dancers on stage, all wearing short skirts and stockings, some standing with their arms akimbo and their right legs slightly outstretched, others lying flat on the stage facing the audience with their right legs straight up and their left legs bent outwards, similar to the postures of "Twisted Column in Chinese Dance" or "Can-Can Dance". These movements showed the female dancer's physique in various angles, and presented the dynamic performance of the dancer on stage in different dance postures. At the same time, this influence was ultimately limited to the reading space, i.e., the visual field, and the influence on the advertising behavior of local female movie stars was very limited, as can be seen in Table 1, where there are only two photos of Chinese "hot ladies", illustrating that the constraints of traditional morality on female behavior were still deep-rooted.

Table 1. Statistics of the Photos of "Nude Actresses" in the Column "the World of Screen" of the Pei-yang Pictorial News from 1933 to 1934

Female Star Image	Dancing girl	Girls in Swimsuit	Girls in bathrobe	Others
Representative	Dancing girl in the film <i>Her Bodyguard</i>	Patricia Wilson	Manaro	Peggy Jones
Number of Photos	10	9	5	16
Proportion of Chinese girl to foreigners	1:9	1:8	0:5	0:16
Overall Characteristics	Many people wearing dance costumes, with the help of other props, present their performance.	One person standing or warming up by the pool or other scenes, wearing a swimsuit	A single person nude or in underwear, in a bathing or emergence posture	Stills or individual portraits of single, double or multiple people

In general, the presentation of the female body is both artistic and secular, introducing the Western culture of body art and openness while responding to the secular visual desires of men. Through a series of photo promotions, the identity of the "modern lady" in the film was extended beyond the film and transformed into a symbol of the film, a "weapon" to stimulate and provoke the viewer's visual system, triggering their imagination of more content related to the film. This association is closely linked to the culture of films, fashionable life and urban outlook, so the nude actress carries the imagination of the audience and many citizens for modernization. The series of photos designed and selected based on the potential desire of the viewers, made the previous privacy of the voyeuristic space gradually appear in the public, along with people's growing expectation for modernization a more avant-garde and inclusive way of information storage and dissemination.

4.3 Power Distribution - Technological Domination and Aesthetic Change

During the transition from the old technology to new ones, the influence of media on the society also changed. New problems appeared when new technologies were adopted. Since people in the past were greatly affected by the text-dominated media, they read materials critically. While with the development of printing technology, the visual effect of pictures was guiding people to read materials with emotion instead of critical thinking. Pictures were more connotative than words, which further extended the reading scope and the media power status changed silently. Technology thus potentially

invaded the power of thought; the boundary between matter and thought was broken; man was controlled by tools while using them; and new ways of social memory and communication brought about visual modernization while also creating new limiting effects. As far as film promotion was concerned, the massive promotion of stills and portraits of movie stars had a subversive impact on traditional aesthetics and lifestyles while also had people stuck in a new dilemma of fashion and aesthetic bullying.

In the early context of films, Western culture like aesthetics entered in China with a condescending attitude. By showing photos of many female movie stars, the pictorial even summarized and introduced new Western aesthetics into the country. In Figure 4, titled "The Ideal Perfect Movie Star," body parts of eight western female movie stars, including eyes, lips, teeth, breasts, waist, knees, legs, feet, and gait, are selected for exemplification. The celebrity stature effect can easily guide the public. This display of the Western female body simultaneously liberated Chinese women from old morals and imprisoned them in the Western aesthetics, resulting in a long-lasting Western aesthetic hegemony. This aesthetic intrusion influenced the on-screen image of Chinese actresses during this period. On the whole, Chinese women were more conservatively dressed than those in the West, mostly in cheongsams or in theatrical makeup, and in terms of posture Chinese women were also mainly dignified, rarely appearing in pictures in a wide range of poses. By examining the features of the Chinese actresses in the Pei-Yang Pictorial, it is easy to see their pursuit of Western facial features -clear facial contours, large eyes with double-fold eyelids, and red, plump lips. In addition, although Chinese actresses are less likely to wear low-cut clothes, there are obvious westernized features in their accessories and costume details, such as furs with large plush collars, small hats and shawls, plaid coats, and so on. Thus, new technology brought new ways of visual information exchange, and people were able to expand their horizons while being deeply restricted by the visual content: What was printed was popular; what was popular was published; what was published was witnessed; what was witnessed was what was thought; technology was shaping attractive ideas through layers of hurdles. By examining the features of the Chinese actresses in the Pei-Yang Pictorial, it is easy to see their pursuit of Western facial features -clear facial contours, large eyes with double-fold eyelids, and red, plump lips. In addition, although Chinese actresses are less likely to wear low-cut clothes, there are obvious westernized features in their accessories and costume details, such as furs with large plush collars, small hats and shawls, plaid coats, and so on. Thus, new technology brought new ways of visual information exchange, and people were able to expand their horizons while being deeply restricted by the visual content: Things printed were the things prevalent and later to be published; Things published were the things witnessed and later thought by people; technology was shaping attractive ideas through multiple levels of barriers.

5. The Reproduction and Rupture of Pictorial Printing

According to Benjamin's constellations theory (ideas are to objects as constellations are to stars) and Zielinski's deep time theory, The same media elements, motives and phenomena are reproduced in a non-linear form in a new media context. Such reproductions are retained with the development of printing technology. Paper media such as movie posters are partially screen printed; For large format, airbrush is often use, and offset printing is more common for small format. The few copies produced by these technologies have become "decorative objects" located in offline cinemas, and their "pictorial connotations" are gradually ignored by the audience after they glimpse them. The utopian fantasy of the pictorial newspaper was carried forward in the age of paper media, but in modern times it has been reduced to a mere subordinate of electronic media. Despite its short-lived "resurgence", the print media with a lot of movie information has been largely eliminated, and new virtual media such as web pages, Weibo and WeChat have started to emerge. With the continuous refinement of film promotion, the contents of previews, reviews and screening information have been gradually divided into different software and stored and disseminated in digital form, instead of being concentrated in a special edition of a pictorial. As a result, the same media elements between old and

new technologies can still be perceived. The initial attempts to attract audiences with photographs have been preserved and further developed after being freed from the spatial limitations of the print medium. With the increasing popularity of the Internet and electronic devices, the reading space for film promotional messages has been further expanded, along with the advancement of multiple viewing methods both online and offline. The socialization of film has deepened and the influence of film stars on society and culture has increased as never before. Taken together, these studies make the various modern media phenomena so familiar.

Moreover, the digital technology also led to the heterogeneity and rupture in the media development when it replaced the status of paper media. The digital promotion of films has also become the mainstream way for film publicity. The original material media have been abandoned, and the graphic information is stored in the form of digital codes in the "black box" of computers and the interactive properties of the Internet functions in electronic devices for film publicity. In the era of photographic printing, photography and printing technology were the main technological bases through which images and texts were stored and widely disseminated in the form of material media. This old logic order disappear abruptly in the digital age. The digital code began to absorb and transform the material media of the past, and it represents what Kittler called the ultimate direction of the technological media of the information age, as opposed to the traditional media, namely the irreversibility of storing, modifying and disseminating everything digitally. Although the digital promotion of modern films is still based on old materials such as photos and texts, and is largely used to gain favor through "retro", its fundamental logic has changed. The material media have been replaced by data, and have become a secondary identity between electronic devices and the audience, thereby eliminating media diversity.

6. Conclusion

By restoring the photographic printing technology of pictorials in the context of early films promotion, this paper focuses on plate making to analyze the first photographic copperplate printing and zincography technology and its influence on typography. Taking the Pei-Yang Pictorial News, which was printed with photographic copper-zinc plates, as an example, the paper delved into the promotion of pictorials in terms of extending readers' horizons, expanding reading space and dominating social culture. It further examined the promotion of the value of displaying film culture products, the breaking of female conservatism and the change of social aesthetics. In modern times, with the development of the Internet and digital technology, the original print media used for film promotion has been reduced to the "decoration" of offline cinemas. The original graphic information stored in material technology has been transformed into digital code, and virtual media has become the main means of film promotion, reflecting the short-lived resurgence of the old technology and the logical gap with the new technology. Finally, it should be noted that, due to the limitation of space in this paper, further research is needed to recover the contents of "the World of Screen" of the Pei-Yang Pictorial News from 1935 to 1937, as well as the operation mechanism and impact of copperplate printing and photography in this period.

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