From Film to Video : How Japanese TV Found Its Niche in the Society of Visual Media

メタデータ	言語: eng
	出版者:
	公開日: 2009-04-28
	キーワード (Ja):
	キーワード (En):
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URL	https://doi.org/10.15021/00002858

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1. INTRODUCTION

In this paper, I would like to look back on the history of television as a quintessentially visual medium. There have been numerous studies about television, but most of them have been from the perspective of the viewer. When we think about information and communication systems from the standpoint of the demand for such services, the discussion ultimately becomes focused on culture. If television is to be brought into the area of civilization studies, it seems appropriate to do so by focusing on the supply side of television broadcasting through civilization's mechanisms of systems, technology, and organization. Therefore, in this paper, I would like to discuss the relationship between television broadcasting technology and those media that preceded it, namely, cinema and theater. By doing so, I hope to clarify how the TV media has been trying to find its "niche" in the stage of visual media from the time it arrived as a newcomer, and what kind of role the technologies have been playing in that process.

2. THE EARLY DAYS OF JAPANESE TV BROADCASTING

The word, "television" was used first in 1909 as a scientific term in Great Britain. In 1925, a British man, John Logie Baird succeeded in scanning images and monitoring them by means of a rotating disk, known as "Nipcow disk" invented by a German Paul Gottlieb Nipkow, thus inventing the "mechanical television." He named this a "televisor." It was renamed "television," and experimental broadcasting started in 1932. In Japan, Takayanagi Kenjirō used the Nipcow disk to send signals with a vacuum tube in the monitor and developed the first electronic television. In the United States, Vladimir Kosma Zworykin of the Westinghouse company started experimental TV broadcasting. He developed the image pick-up tube and announced it as the world's first Iconoscope in 1933. Takayanagi also succeeded in making an Iconoscope. He joined the Nippon Hōsō Kyōkai Technology Research Institute (hereafter, NHKTRI) and continued experimenting. This was just before the 1940 Tokyo Olympics, and planning for this event fueled the development of the new technology. The details of this will be covered later in this paper, but it is worth noting here that, as we see many times, a major historical event spurred broadcasting and especially television broadcasting technology. The general picture of the NHKTRI leading such technological developments was already creating a pattern from such early days of television.

The Pacific War caused the suspension of the 1940 Tokyo Olympics, and experimental television broadcasting was suspended as electronic engineers were drafted away for research on electronic warfare, such as radar systems. After the war, the Allied Occupation authorities initially banned television research, but this ban was lifted in June 1946. NHK restarted its research program and made numerous public experimental broadcasts. Occupation officials acknowledged that broadcasting were important for Japanese democratization. Nonetheless, they initially sought to exclude private broadcasting, but changed their policy two years later, permitting broadcasting by both private stations and NHK. It demanded that the Japanese government provide a legislative basis for broadcasting based on American idealism.

This led to the enactment in June 1950, of the so-called "Three Broadcasting Wave Laws," namely, the Radio Law, the Broadcasting Law, and the Law for the Establishment of *Denpa Kanri Iinkai*, Electromagnetic Wave Supervisory Committee (EWSC). The first of these provided regulations for facility requirements, permits, and management of radio stations. The second law dealt mainly with the scope of broadcasting, programming, and ethical standards. Together they provided the framework for NHK as a reorganized public corporation, for freedom in programming, and for the introduction of commercial broadcasting. The EWSC was a supervisory and controlling organization independent of the government, modeled after the Federal Communications Commission (FCC) in the United States; it strongly reflected the views of the progressive faction within the Allied Occupation.

The Japanese government opposed the Occupation policy and tried to retain control over broadcasting but was unsuccessful, and hence, the EWSC was born. However, with national independence regained by the signing of the Treaty of Peace with Japan at San Francisco in September 1951, the Japanese government dissolved the EWSC on 31 July 1952. In its place, it founded the Electromagnetic Wave Supervisory Council in order to regain supervisory power over broadcasting under the auspices of the Ministry of Posts and Telecommunications (*Yūseishō*). This provides a means for the ministry officials and the ruling party to exercise direct influence over broadcasting. Had the EWSC survived, Japanese broadcasting might have had a different history.

The Three Broadcasting Wave Laws began the parallel system of public NHK and private stations that continues to the present-day. It is historically quite remarkable that the two competitive establishments of NHK and the private stations continue to thrive, the former resembling the British pattern in which public broadcasting is extremely important, and the latter resembling the commercial broadcasting most typically found in the United States.

The beginning of Japanese television broadcasting cannot be discussed without mention of Shōriki Matsutarō. I will omit the details here of how he came to be involved in television, but his conflict with NHK is significant for assessing a number of features in the history of television, including the characteristics of the broadcasting, communication, and television media, the tendency of ministry officials to give priority to NHK, and the debates about introducing technology from the United States versus developing technology domestically.

Shōriki fervently promoted his vision for television broadcasting. He announced the opening of an experimental broadcasting station on New Year's Day 1952 in his newspaper, *Yomiuri*. This swelled public opinion for an early start to television broadcasting, and in May of that year, the House of Representatives voted for the accelerated broadcasting schedule proposal.

Shōriki then gave a press conference to announce his "Vision for Founding a Nippon Broadcasting Network." This was greatly influenced by the "Vision of America" announced by the U.S. Senator, Carl Mundt, who argued that the best way to prevent communism from infiltrating Japan was to promote American television. Mundt strongly advocated introducing an American television network in Japan, but Shōriki told Mundt that while he would like to receive technical assistance from the U.S., he would prefer to build his own network.

Shōriki's plan was to open a station in Tokyo and to build 22 mountain-top microwave relay stations across the country. He intended his national network to be not only for television, but also for FM radio, facsimile, and teletype broadcasting. In this manner, his "Vision for Founding a Nippon Broadcasting Network" resembles the current multiple digital data communication through communication satellites and community antenna television (CATV), although in his days, only analogue data were transmitted. The idea foreshadowed today's efforts for the fusion of one-way broadcasting and two-way communication. Had

Shōriki's vision materialized in his day, Japanese broadcasting and communication would be very different from what they are today.

Shōriki's idea for financial backing from the U.S. so unsettled NHK, which originally thought conditions were not ready for regular broadcasting, that it made a decision for an earlier date. Without Shōriki's endeavor, broadcasting would have taken longer to begin in Japan. NHK prided in itself in having conducted experimental broadcasting from before the war, and did not want a latecomer like Shōriki to steal its thunder. NHK argued for the benefit of a public broadcasting monopoly, using the British BBC as its model, and tried to check Shōriki's moves.

The competition between NHK and Shōriki's group escalated through the year 1952. EWSC worked to provide additional regulations for television that had been missing from the Radio Law and Broadcasting Law, but it hit a snag regarding transmission standards. Its January hearings with technical professionals on the matter focused on whether the wave bandwidth for a TV channel should be 6 MHz or 7 MHz. This was popularized as the "6 Mega vs. 7 Mega" debate. The debate was actually one between whether to introduce the existing U.S. system in order to expedite broadcasting, or whether to develop a system domestically, which supporters argued would be advantageous for future colorization. It was, in effect, however, a surrogate war between Shōriki and NHK.

EWSC originally favored the 6 MHz standard that had been adopted by NHK in its early postwar experiments, but when NHK shifted to the European 7 MHz standard in opposition to Shōriki's proposal, the EWSC changed its position accordingly. However, EWSC again changed its position when it met with fervent lobbying from Shōriki's group, and it finally issued a decision to adopt the 6 MHz standard. NHK resisted with various arguments, and succeeded in forcing another hearing. However, the policy was not overturned, and Shōriki was victorious. The future direction of the development of TV technologies through the introduction, ingestion, and improvement of the American system was thus determined.

It had been decided that EWSC would be dissolved on 31 July 1952. Right up to the last minute of its existence, the Committee was weighing to whom to grant broadcast permits among the seven companies that had applied. The officials of the Ministry of Posts and Telecommunications made it known that the authorization decision ought to be left to them on the next day, since the ministry would then be responsible for the matter. This was taken as an insult to the EWSC, which had prided itself on being independent of the government, and its members acted to secure freedom of speech through private television. They granted Shōriki's Nippon Television Network (NTV) a preliminary permit, but deferred decision about applications from NHK and Radio Tokyo (which was renamed Tokyo Broadcasting Systems in 1960, then officially adopting the acronym TBS in 1961), awaiting a later decision by the Diet for NHK, and awaiting firmer establishment of its broadcasting infrastructure for Radio Tokyo. The other applications were denied permits for reasons such as insufficient finance and

capability.   All of the EWSC rulings were completed finally at 23:40 on its final day.

Reactions to these final EWSC rulings divided into two camps, one criticizing them as too accommodating to Shōriki, and the other hailing them as strong commitments to the principles of anti-monopoly and inclusive competition.   Such reactions again reflected the opposition between NHK and Shōriki.

One significance of the EWSC rulings was that they applied the same standards to television station permits as to radio station permits, relying on a Ministry of Posts and Telecommunications administrative rule, "Basic Standards for Opening Broadcasting Stations," which had been issued in December 1950 to complement the Broadcasting Law.   This rule provided that 1) commercial stations could not to be nationally operated by a single organization such as NHK; that 2) commercial stations were to be basically prefectural in scale; and that 3) ownership and control of mass media were not to be concentrated in single persons (known as the principle of preventing mass media concentration).   Shōriki's plans for national broadcasting violated the above standards and did not materialize.

It was a great disappointment to NHK that its permit was not immediately granted.   However, after the Diet approved an additional budget for broadcasting costs, NHK, too, obtained a preliminary permit from Ministry of Posts and Telecommunications on 26 December 1952.   Defeated by NTV in trial broadcasting, NHK strove to overtake NTV in regular broadcasting.   NHK regular programming started in Tokyo on 1 February 1953.   NHK financed its own construction of a microwave network between Tokyo and Osaka via Nagoya, and was able to start regular programming in Nagoya and Osaka the next year on 1 March.

By contrast, NTV was delayed in its importing of American transmitters and its manufacturing of antennae.   Its regular programming started half a year after NHK Tokyo, on 28 August 1953.   NTV's plan to build a microwave relay network with foreign investment and to lease it to the Denden-kōsha (Nippon Telegraph and Telephone Public Corporation) as well as use it for its own broadcasting met with opposition.   The public corporation and the mass media argued that it was undesirable for a private company to build the nationwide communication network.   The Joint Telecommunication Committee of the both Houses ruled that the microwave communication facility was to be under the auspices of Denden-kōsha alone.   It was in April 1954 that the public corporation completed the relay network between Tokyo and Osaka via Nagoya.

Thus, ironically, Shōriki's vision for a national network that would integrate both broadcasting and communication actually inspired the Japanese government to create and supervise separate public organizations for the two projects, with NHK in charge of the broadcasting network and Denden-kōsha operating the communications network.   It can also be said that Shōriki's vision promoted technology development in both NHK and Denden-kōsha, and contributed to the rapid materialization of their nationwide networks.

3. TECHNOLOGICAL ADVANCEMENT AND TELEVISION PROGRAMMING

1) A brief history of television broadcasting

Broadcasting is a highly technology intensive industry, and not surprisingly, technological change played a large role in the history of broadcasting. A comprehensive electric technology is needed for television broadcasting, including 1) the transformation of audiovisual input to electric signals, 2) the modulation and transmission of audiovisual signals, 3) reception and demodulation of them to remote audiovisual display, 4) recording on a storage medium, and 5) various transformation processing of audiovisual data. However, as the technology called for very many detailed adjustments, the postwar electric and electronic industries and the Ministry of International Trade and Industry (*Tsūsanshō*) acknowledged television as the most suitable area for nurturing the basis of Japanese electronic technology. In reality, because foreign standards and equipment, especially the 6 MHz standard, were originally adopted, Japanese television technology had to follow the course of importing, dissecting, imitating, and improving American products.

The Japanese government prepared a Outline on Guidelines for the Establishment of the Television Industry in November 1953 to ensure research support, the patenting of appropriate equipment, proper conditions for encouraging the domestic manufacture of cathode ray tubes and other necessary parts. Manufacturers and NHK collaborated in research and development, and the manufacturers themselves collectively founded councils for sharing technology. It had been radio that had helped push start the Japanese electronics industry, but a television monitor required ten times as many parts as a radio. In particular, the manufacture of the cathode ray tube required much more than the somewhat undeveloped domestic glass industry was capable of providing. The tubes were first imported, and only through technological assistance from RCA of the United States and Philips of the Netherlands, was domestic manufacturing accomplished around 1953.

It is not the purpose of this paper to discuss the features of television as an industry. Rather, I would like to review the history of television technology by focusing on VTR technology and its relationship with programming. This is because VTR has played an pivotal role in television programming history. In order to offer an overview of Japanese television over the years, let me organize its development in terms of a series of catch phrases that capture the various moments:

(a) 1955–59: From the streets into the home

Television monitors, first set on the streets and in coffee shops to attract customers (*kyaku-yose*), was starting to be popularized especially from around the Crown Prince's wedding on 10 April 1959. As people became acquainted with

television, television advertisement revenue surpassed that of radio, and television's superiority was demonstrated by the television programming section of newspapers becoming more prominent than that for radio.

(b) 1960–64: Start of all-day programming and color television

The national television audience increased further with economic growth. Television stations started regular all-day programming by 1961 to 62. Color transmission was started by NHK, TBS, Asahi Broadcasting, and Yomiuri Television on 10 September 1960. NHK reception contracts to individual homes exceeded 10,000,000.

(c) 1965–69: Television as the creator of things au courant

Mass consumerism grew out of the so-called "*Izanagi* Economic Boom," which began in the fall of 1965, a boom produced in part by television commercials. Numerous UHF stations were granted permits, and station affiliation groups emerged. News networks were formed as well. NHK's reception contracts for individual homes exceeded 20,000,000 in 1967, and NHK radio-only reception fees were abolished. It was also a period when rebellious youth and counter- cultures emerged.

(d) 1970–74: The birth of localism and local production

Youthful rebellion, particularly against rapid economic growth, culminated, then rapidly waned with the *Asama Sansō Jiken* (Asama Lodge Incident) involving radical leftist terrorists in 1972. With the first "Oil Shock" of 1973, people quickly became conservative about their lives and life planning. The phrase of the time, "*mōretsu kara byūtifuru e*" (from excessive work to beauty), expressed the drive to local programming and documentary programs. Television stations went into debt
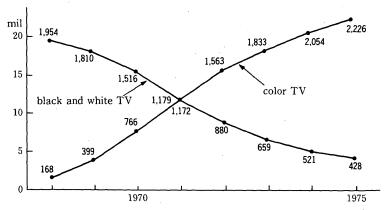

Figure 1. Changes in the Number of Television Reception Contracts for Black & White and Color Televisions for Individual Homes
(source: *Thirty Years of Television Viewership*, Nippon Hōsō Shuppan Kyōkai)

in their rapid support for affiliated UHF stations and color transmission, and many chose to restructure by out-sourcing their production divisions. This was soon to become the normal practice. NHK color reception contracts for individual homes exceeded that for black-and-white (Figure 1).

(e) 1975–79: The era of special programming
　　The Electronic News Gathering (ENG) System enabled extensive and varied news collection and helped develop local news. The strategic utilization of such capability nurtured production companies, which created longer drama specials, resulting in a boom in special programming. Television advertisement revenue in 1975 exceeded that for newspapers, which had until then held the top position in generating advertising income (Figure 2).
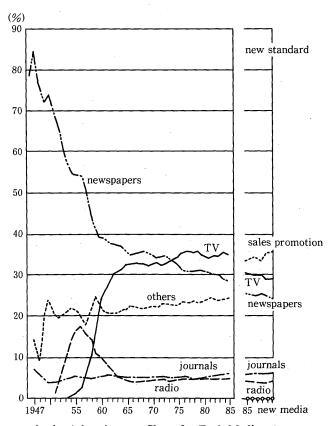

Figure 2. Changes in the Advertisement Share for Each Medium
(source: *Broadcasting Handbook*, Tōyō Keizai Shinpō-sha. Compiled from Dentsū data, scale discontinuous because of change in standards in 1985.)

(f) 1980–84: Unorthodox programming and the emergence of the new media

Comedy and variety shows, and quiz shows incorporating travelogue and gourmet features, which were quite unorthodox by former programming standards, became very popular. At the same time, average television viewing time had already reached a plateau at three hours twenty-seven minutes in 1976, giving rise to social critics' call for *"terebi-banare"* (or weaning from television). Trial satellite broadcasting started in May 1984, the same year that urban cable television networks first appeared.

(g) 1985–89: The era of news reporting

News Station, starting in October 1985, was immediately popular for its fresh style, and influenced other news programming through its vigorous reporting of the fall of the Iron Curtain and other major news. Satellite News Gathering (SNG) augmented the reporting function of television. Average television viewing time crept back up from a recent drop to around three hours, and viewership was no longer concentrated at a certain hour or programming. Viewers were becoming accustomed to "multi-channeling," spinning the dial and taking in several programs at the same time. A partial deregulation of broadcasting tried to keep pace with the multi-media production and multi-channel viewing consumption.

(h) 1990-present: The era of competition

Suffering from the weak post-bubble economy and faced with competition from pay-per-view private programming using broadcasting satellites (from April 1991) or communication satellites (from May 1992) and from more urban cable network businesses, ground wave stations have tried to compete with these newcomers. The emphasis on satellite relay in news reporting on the Persian Gulf War resulted in station affiliations between Japanese and U.S. broadcasting companies and networks.

2) The history of VTR technology and program production

What can we say about the relationship between VTR technology development and program production during the above television history? Generally speaking, there are three categories of standards in audiovisual equipment, varying according to image quality: broadcasting use, commercial use, and public use. The commercial-use standard is for taping that is not intended for the broadcast airwaves, such as for corporate advertisements, official records of local events, and school viewing, but there is no clear demarcation between this and the broadcasting-use standard. Figure 3 shows the chronological history of VTR technology arranged by eras involving the three standards and related technology. As can be seen, the key technologies for VTR development were, for example, the transformation of the magnetic recording system, the narrowing of magnetic tape width (eventually leading to cassette tapes), high image quality, and reduction in size.

	For Broadcasting	For Commercial	For General Public	Editing
1956	2", 4-head: Ampex			
1959	2", HVTR: Toshiba, JVC			
1961	2", 4-head, color: Ampex			
1965			1/2" open: Sony	Spliceless editing
				Computer assisted off-line editing
1970		3/4" cassette, U-matic: Sony, Matsushita, JVC		
				CBS (U.S.) starts ENG CVS (U.S.) sells TBC
1977	1", HVTR becomes world standard, Sony		1/2" cassette (Beta, VHS)	Digital Video Effecter introduced
1980			CCD Video Camera available	
		1/2" cassette, single-tube camcorder (Betacam): Sony		
		1/2" cassette 3-tube camcorder (Betacam): Sony		
1985	CCD camera for broadcast	1/2" cassette, (M2): Matsushita	8 mm Camcorder: Sony	Quantel (Great Britain) introduces non-linear editor (Harry)
	3/4", cassette, digital (D1)	1/2" cassette camcorder (Betacam SP), weighing 7 Kg		
	3/4", cassette, digital (D2)	8 mm (Hi-8): Sony		
1990	1/2", cassette, digital (D3)			DTV (Desk Top Video) introduced
	1/2", cassette, digital (Digital Betacam)			
1995		6 mm, digital camcorder (Digicam): Sony		

Figure 3. A Summary of the History of VTR

VTR of course did not exist at the beginning of television broadcasting. Programming was either live, or a telecast of movie film called "telecine." Early television cameras were quite bulky and heavy so that live broadcasts were mostly of sports and theater. Studio programs left out many funny episodes of happenings related to the live format. News reports specifically used 16 mm movie films, and followed the newsreel format. The films needed to be developed, and the time required for this hampered speedy reporting.

(a) Broadcasting standards: from the two-inch vertical scan to the one-inch helical scan

At the National Association of Broadcasters convention in April 1956, an American company, Ampex, announced the first VTR for broadcasting. It used a two-inch open reel tape, and the direction of the track that recorded one screen of signals was vertical to the direction of tape movement; the tape head scanned the

tape vertical to the direction of tape movement. This VTR was extremely large, weighing 450 kilograms, and it was quite expensive, but almost all Japanese stations purchased the VTR for their programming production. NHK Tokyo started to use it in regular programming beginning in July 1958.

Smaller VTRs required narrower tape width, but for the Ampex vertical scan system, this would mean a shortened image track, and unless magnetizing density was augmented, the image quality would deteriorate. The Ampex two-inch tapes were used in television stations mainly because they allowed the necessary high-quality images. In this vertical magnetizing system, one could actually spread iron powder on the tape and look into a magnifying glass to learn the location of the image track. Editing the tapes this way was specialized craft, and the continued existence of proud, artisan-like staff was another reason the Ampex technology could be employed long. It is said that twenty minutes were required for one cut-and-paste. Such "splicing" was no longer necessary in 1962 when control signals were also recorded on the tapes, which enabled electronic editing. NHKTRI developed the world's first automated editing system that used control signals for computerized editing.

A major technological advancement was the helical scan system, in which the signal track was positioned diagonally to the direction of the tape, with the head scanning diagonally. This allowed the tape to be narrowed while still retaining the same length. With support from the Ministry of International Trade and Industry, NHK and other manufacturers established a VTR study committee for research. In 1959, both Toshiba and Sony succeeded in developing a two-inch tape helical VTR, abbreviated HVTR, and in 1961, Sony developed a fully transistorized HVTR. HVTR was thought unsuitable for broadcasting because the image quality was affected by the unevenness of the tracking speed, but the development of the Time Base Corrector (TBC) in 1973 paved the way for use in broadcasting. TBC first transformed the image signals into digital form to store as memory, then accurately read the synchronous signals as it transformed them into analogue form again to create image signals free of time lag. It was one of the first digital processing of image signals, possible only because of progress in IC memory technology.

Sony unveiled its record system using a one-inch open reel tape as the "C format" in 1975. This was approved by the Society of Motion Picture and Television Engineering (SMPTE) of the United States as its broadcasting standard. This was epoch-making, both because of the generational change from the two-inch system to one-inch HVTR in broadcasting and also because it marked a leadership change from Ampex to Sony. Automated editing using the one-inch HVTR took hold in 1980, as television stations exchanged their two-inch tapes for one-inch tapes. In 1985, all NHK programs used the VTR, and the next year, 16 mm film developing equipment was scrapped.

The introduction of the VTR and automated editing transformed the style of program production. Before VTR, dramas were recorded live in the studio, so actor movements and story development had to take place in real-time. Directing

could not help but be theatrical. With the introduction of VTR and facilitated editing, new techniques became possible, such as multiple shoots for one scene and cluster shooting of scenes requiring the same actors, that rendered directing more cinematic. It has been said that the production staff of the early days of television tried to emulate movie-making, but that this only became possible through the introduction of VTR. However, now that editing had become technologically easier, it also became an expected part of program production, having the effect of lengthening the production schedule.

(b) Commercial standards: U-matic and ENG

In the areas of tapes for commercial and public use, tape width was made even narrower, because image quality was not so important as for broadcasting. Sony developed the 1/2-inch open reel tape VTR in 1964, and by 1967, it shrank the size of the camera to about that of a suitcase. The image quality was not good, however, and demand was limited to schools, companies, trading companies, and athletes.

Sony introduced a better quality 3/4-inch open reel tape standard in 1969. In manufacturing its cassette tape version, Sony joined with Matsushita and Japan Victor in setting the "U-matic" standard in 1970. Image quality was not as good as that of the broadcasting standard, but it was adequate for news footage. It was also portable, which attracted the attention of the stations. Used in place of 16 mm film in news gathering, it significantly transformed reporting style, because no film developing was required, and speedier coverage was possible. CBS of the United States was quick to call for ENG (Electric News Gathering) that used Japanese-made VTR and small-size cameras along with Field Pickup Units (FPU). CBS surprised other stations by broadcasting the 1972 White House press conference by U.S. presidential aide Henry Alfred Kissinger at the signing of the peace treaty with Vietnam with only a 25-minute delay.

In Japan, NTV used ENG for the 1975 Okinawa Oceanic Exposition (which opened on 19 July for six months). NHK and private stations accompanying the Emperor on his visit to the United States (30 September to 14 October of that year) used ENG in earnest. In 1980, 60% of television news was on video. ENG was epoch-making also in that it spurred the race for smaller cameras and VTRs as well as energy conservation. The U-matic VTR also transformed program production.

More and more production divisions had been separated from the television stations since 1970, to form affiliated production companies. Using U-matic VTR and TBC technology, it became easier to make an entire program, from news gathering to editing. Numerous companies were born, often employing experienced staff from television stations and maintaining a production relationship. For example, TV MAN UNION, the first Japanese independent production company (founded by staff who had retired from TBS) created a three hour drama special, "Umi wa Yomigaeru" (The Sea Revives), which was broadcast by TBS in August 1977 and inspired a rush for special programming. This was an

example of how editing hardware capabilities ushered in an "Era of Editing."

The process of television program production can be divided into the pre-production stage, in which program materials and recordings are assembled, and post-production, in which these are then edited and processed to create a program. As VTR editing became easier, the post-production workload increased, because there was ever more and more recording and directing that relied on post-production editing. This editing was increasingly out-sourced to professionals, resulting in a post-production boom.

(c) Combining the 1/2-inch cassette VTR and the camera: commercial standard

In 1975, Sony introduced Beta format for the general public, and Japan Victor introduced VHS, both using 1/2-inch wide tape. The two recording systems and cassette sizes were made standard in 1977, with the two companies competing intensely to expand the market to ordinary users. This 1/2-inch cassette tape for the general public and the single tube small camera was incorporated in one VTR in Sony's Betacam in 1981. In 1983, Sony introduced the Three-tube Betacam that completely united the three-tube camera capable of commercial-quality image and the VTR. This "camcorder" spatially expanded the material gathering range, contributing to full-fledged ENG as well as promoting a documentary-like feel in programs. It also became a powerful tool for the small-scale CATV stations in making their own programs. In 1985, Matsushita introduced the MII commercial standard mechanism that used cassette tapes equivalent in size and image quality to the Betacam. In the U.S., Ampex took on the OEM sales of Sony's Betacam, which was symbolic of the fact that the 1/2-inch cassette tape had become the standard in commercial VTR and that Ampex was no longer a major supplier in television equipment. Sony proceeded to introduce the Betacam SP, which had a 90-minute recording capability, in 1987. This seven-kilogram camcorder made it possible for a reporter to single-handedly gather news.

(d) Digitalization: broadcasting and commercial standards

Digitalization in broadcasting standard VTR started from about 1985. Sony and NHKTRI cooperated in developing the digitalization system VTR "D-1" that used 3/4-inch cassette tapes. This was approved as the universal standard in 1986. It utilized component signals that independently processed the brightness signal Y and the color signal C. Superior in image quality to the systems usually operating in television stations with composite signals that multiplexed the Y and C signals, it was also more cumbersome to hook up to existing equipment. Thus, it came to be mainly used in high quality image editing, such as editing the output of the Digital Video Effecter (DVE), the computerized special visual effect processor that rapidly became popular after 1977. In 1986, Sony co-developed with Ampex the VTR "D-2" that used the same tapes and digitally recorded the composite signals in 1986. This was extremely compatible with the existing equipment so that it is rapidly becoming popular in program production.

In 1990, NHKTRI developed and Matsushita commercialized the digital VTR standard "D-3" that used 1/2-inch cassette tapes and composite signals. This was broadcasting standard's very first camcorder. Sony introduced the Digital Betacam in 1993, which also used 1/2-inch cassette tapes. This was epoch-making in that it recorded component signals compressed 50% using digital technology. These two camcorders have become popular in program production.

(e) Further reductions in equipment size and the rise of the video journalist

Reduction in equipment size almost always started with those manufactured for the general consumer. In 1962, Sony, Japan Victor, Hitachi, Philips, and Matsushita formed a core group of manufacturers to call for an international conference to discuss standardizing the 8 mm video for the general public. Such conferences were periodically held, and it has been said that although the conference papers were given in English, the discussion was in the Japanese language. This is symbolic of the leadership of the Japanese manufacturers in VTR. Sony introduced the 8 mm video camera in 1985. "Hi 8" is its cousin with higher image quality for commercial use. Amateur videos taken with "Hi 8" have been occasionally broadcast since then, and it has been said that it contributed greatly to the "amateurization of material," or the "localization of broadcasting."

Sony next introduced the "Digicam" in September 1995. This was a camcorder that digitally recorded on a 6 mm cassette tape. It only weighed 1.6 kilogram. Because of its high quality image meeting the commercial standard, it is expected to become a powerful tool in news gathering. "Tokyo Metropolitan Television," which opened in November 1995 in Tokyo, set the world abuzz by recruiting video journalists with much experience on such small-sized camcorders.

The above is a brief history of VTR-related technology, in which several themes can be identified. First, oftentimes NHKTRI initiated a technological development that manufacturers then applied to practical use. Also, Japanese VTR technology started by importing technology from the United States but gradually took over leadership from about 1960. In particular, size reduction of the equipment that still retained high quality images began with those manufactured for public use, and next spread to those for commercial use, then for broadcasting use. Furthermore, the above history demonstrates how technological development greatly transformed the style and system of program production. And finally, it is also clear that American influence on the style of production has remained strong.

It is likely that with digitalization and computerization, VTR tape will soon be replaced by hard disk or other electronic storage devices. With the advent of the video camera with built-in hard disks, it will be possible to do editing and eventually program production on location. The prospects for video journalists will expand, and amateurism will spread in broadcasting. At the same time, programs may be broadcast with little oversight by people other than the immediate staff, resulting in a sort of "anarchy." Cultural and sociological discussions will be necessary on this

matter.

3) News reporting and technological change

Here, I will present a brief history of news programs. As stated above, early news programs used material from news gathered on 16 mm film tapes and superimposed captions. News thus lacked rapid reporting, because 16 mm film material was limited to three minutes per shoot; material then was developed, edited, and broadcast with telecine equipment. In the early days, developing and editing of a single take required one hour, only later shortening to today's ten to twenty minutes. Regular news programs were twice a day, in the morning and evening. There was also weekly news, with footage often brought in from newspaper companies. In this type of news footage, a newscaster's comments and face inserted between news shots were thought to be distracting to the viewer, and were avoided as much as possible. The ideal was an impartial-sounding voice-over. This was also common in cinema newsreels.

NHK developed the "screen process" technique that projected 16 mm images in motion in the background of the announcers in 1955. It was also around this time that NTV took an interest in the American news format, in which commentators with journalistic background provided commentary, and to whom viewers became loyal enough to choose channels. In 1956, the year of NTV's third anniversary, the station began an "early morning broadcast" from 6:30 A.M., and incorporated the "talk-news format" into the 7 A.M. morning news, in which television personalities played a major role. NHK unified its radio and television news formats in June 1957, and, from October, incorporated the screen process technique as well as television personalities in its *News This Morning*. However, the television stations were not experienced enough to build viewer loyalty with commentators and personalities, and, ultimately, the new format did not take hold.

Newscasters returned to television after the stations reorganized news gathering and reporting structures. The true pioneers of the newscaster format are said to be Den Hideo and Furuya Tsunamasa, both former newspaper reporters, in *Newscope* of TBS starting in October 1962. NHK started *Studio 102* in April 1965, and *News Center 9* in April 1974. The latter, with former reporter Isomura Hisanori as the chief newscaster utilized an eclectic staff of reporters from various divisions such as politics, economics and entertainment, establishing the news show format.

From 1975, as ENG combining a small-size camera and VTR began to be used in Japan, news footage taken with video film increased. Carried on the technician's back, combined with FPU loaded onto the reporting van and helicopter, such ENG made reporting on location possible. In the 1980s when the method took hold, several major events, such as the crash of a JAL jumbo airplane in August 1985, and the overthrow of the Marcos government in February 1986, played a major role in television during this "era of news reporting."

The satellite transmission of image material developed from ENG and is called Satellite News Gathering (SNG). This method first emerged in large countries such

as the United States, Canada, and Indonesia. Its first use in Japan was the news of the earthquake in western Nagano Prefecture transmitted by the communication satellite "Sakura 2," which took off in February 1983. Because SNG is done with a mobile transmitter on location through the communication satellite relay directly to the television station, it greatly reduces the multiple relays needed for ground transmission. Also, there is no risk of jamming, because the FPU uses a different frequency band from those on the ground. Another advantage was that the material could be transmitted in real time from remote areas.

An even smaller and portable satellite transmitter is called the Fly Away. This saw much use in Kuwait and Baghdad during the Persian Gulf War. CNN (Cable News Network) became famous as the only station authorized to report with Fly Away. At the same time, CNN was criticized as being the "mouthpiece of Iraq" by the U.S. government, which had wanted to regulate coverage after its bitter experience with the media during the Vietnam War. The proliferation of real-time coverage on location has also been criticized for leading to constant coverage of often incidental developments in a story and for substituting fast coverage for journalistic synthesis and analysis of the material.

4) Technological development as led by major events

Major events tend to initiate television-related technological development. For example, the Olympic Games and World Expositions are prime targets for broadcasting, but their programming often stimulates technological change. As we have seen above, the Tokyo Olympics scheduled for 1940 was motivation for television's early development in Japan.

More recently, various innovations for relay equipment and systems, such as the long distance mobile camera, were created to cover the imperial wedding parade that followed the Crown Prince's wedding in April 1959. It was at that event, too, that NTV used the color camera, barely out of the experimental stage, to relay outdoor segments for the first time in Japan. Around then, numerous authorizations were given for new private stations. In 1959 in Tokyo alone, NET (Nihon Educational Television; from 1977, TV Asahi) opened in February and Fuji Television in August. The private stations formed affiliated groups of NTV/Fuji TV and TBS/NET to coordinate a network news broadcasting system. For this, Denden-kōsha laid out a microwave circuit, and other television infrastructure was built for the occasion. Significantly, the news networks created around this time and the birth of Fuji Television, which was a member of the *Sankei* Newspaper business group, spurred further reorganizations and affiliations for news and other programming with newspaper companies. Household appliance manufacturers pushed sales of television monitors, and NHK contracts for reception in individual households rose 200% from 1,000,000 in 1958 to 2,000,000 by the day before the imperial wedding.

The Tokyo Olympic Games in 1964 served to spread color television monitors, because it was broadcast in color. It was epoch-making in that it realized satellite

relays between Japan and the U.S., which had been experimented with only the year before. The American communication satellite "Syncom 3" had been engineered for telephones, and because of this could only utilize a narrow frequency band, compromising image quality. This pushed NHKTRI to rapidly develop equipment for image signal band compression.

From the Tokyo Olympic Games on, Olympic coverage that had formerly been transmitted to the world in summary form through video and film was transformed into real-time relay via satellite. The Games and television broadcasting formed stronger ties as schedules of popular athletic meets were moved to time slots where the advertising sponsors could expect the highest viewership. The Olympic Committee also began a system of appointing equipment manufacturers to provide the official broadcasts of each Game. The manufacturers' competition for official appointment spurred further development. For example, from various VTRs, the Matsushita "D-3" was chosen for the 1992 Barcelona Games, and the Sony "Digital Betacam" for the 1994 Lillehammer Winter Games; Matsushita was again selected in January 1994 as the sole supplier for the 1996 Atlanta Games. Japanese VTRs account for 90% of world sales, and the competition between Matsushita and Sony has attracted much attention at each of the Olympic Games.

World Expositions have also been occasions for introducing new technologies. In the area of audiovisuals, ENG was first utilized in the 1975 Okinawa Oceanic World Exposition. Instead of the projectors commonly used for public screenings of audiovisual works, the 1985 Tsukuba Science World Exposition showcased huge multi-screens and 3-D screens using liquid crystals and CRT; these and other technologies offered a tremendous advantage in the future development of audiovisual presentation technologies for exhibitions.

I do not have time in this paper to analyze further the above developments, but it must be mentioned in passing that while it is true that the technologies related to television were a response to various factors, including the audiovisual impact of broadcasting major events and the business advantages in sponsorship, nonetheless, it is also true that many technical researchers felt an inherent motivation to develop new technology.

4. THE RELATIONSHIP BETWEEN TELEVISION AND OTHER VISUAL MEDIA

Television is a newly-born visual medium. How did it emerge in relation to the earlier, established media of theater and movies? This section offers a brief history of their relationship, focusing on several factors.

1) Directing methods

Japanese Broadcasting Law recognizes four categories of television programming: culture, education, news, and entertainment. Each type of program has come to require a large production staff (Figure 4). Such a staff is led by one

director. In program production, the most prestige accrues to directing dramas, and there is a tendency to discount those directors who have not directed a drama. It is not unusual for directors to move among the program categories, but it is said that directors who started out in drama generally fare better than those who began in documentaries or variety shows. Among directors, there is a common pride that the impetus behind television has been drama. In this genre, apprenticeship still is the norm, perhaps because the drama genre has deepest ties to the theater and movies that were the forerunners of the visual media. This section will describe such ties among drama direction, theater, and movies.

I have read statements by television staff in the early days that they made drama programs in order to bring movies into the home. This is because around then movies had become quite popular, and television aspired to be in league with this

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P (producer)
   P. A. (producer assistant)
   D. (director) or P. D. (program director)
      T. K. (time keeper)
      A. D. (assistant director)
         F. D. (floor director)
         F. M. (floor manager)
      Art D. (art director)
         S. D. (set designer)
            Wig Maker
            Hair Stylist
            Makeup Artist
            Dresser
            Sceneshifter
            Credits Designer
            S. E. (special effects operator)
      T. D. (technical director)
         L. D. (lighting director)
            L. O. (lighting operator)
         MIX (sound mixer)
            M. E. (microphone engineer)
            B. M. (boom microphone operator)
            T. R. (tape-recorder operator)
            S. E. (sound effect operator)
         S. W. (camera switcher)
            V. E. (video engineer)
            C. (cameraman)
               C. A. (cameraman assistant)
         VTR (video tape recorder engineer)

Figure 4. The Hierarchy of Production Staff Members in
            TV Program Making

visual art. However, it faced several technical limitations. To begin with, the early television cameras were extremely heavy and did not have good light sensitivity. This made outdoor locations impossible, and shoots had to be done in the studio. Not only were the cameras heavy, but also they had long electric cords that made moving shots difficult. Multiple, fixed location cameras and adjustments to studio sets could partially compensate for such shortcomings. However, until the advent of VTR, television consisted of live programs; it was, as it were, a real-time art.

Sets were constructed for each of the fixed cameras. Moreover, they were built in such a way that the same set shot from a different angle would look like a different scene. To guarantee the real-time feel, multiple cameras were used to maximum advantage. It was sometimes necessary to remake and assemble one of the sets for another scene while the camera was shooting elsewhere. Thus, television dramas may have aspired to be like the movies in dramaturgy, but early television incorporated art techniques from the theater.

In smaller studios, the distance between the camera and the actors was so short that costuming and makeup needed to be done with great care. In theater, the audience and the actors share a common space to together create an artificial world, so reality is not necessary in costume and makeup. In contrast, television viewers watch the cathode ray tube in the ordinary space of their home and expect reality in the image. Man-made fiber could not pass for supple silk, and thus the real thing had to be used on the set. This raised production costs, and, for example, is the reason that samurai dramas are being made less and less.

Makeup also needed to look authentic, thus giving birth to the job of the makeup artist. In Japan, actors traditionally did their own makeup. This practice continued in movie-making, because it was thought integral to making the character one's own. In the early days of television, former actors from theater and movie joined in the staff. However, at NHK, a director from the United States was invited from late 1952 to March 1954 to instruct the staff in production techniques. One of the points he insisted on was that television programs required professional makeup artists, and NHK hurried to train such people.

As the VTR became available in 1958, and recording and editing was made possible, the movie-like directing that had been the original goal more and more replaced theater-like directing, as mentioned in Section 3.2. The first full use of the VTR in drama was for the TBS production of "*Watashi wa Kai ni Naritai*" (I Want to Become a Seashell), broadcast in October 1958. This started a whole trend; NTV's *Mama, Chotto Kite!* (Mama, Come Here for a Moment), became the first of the so-called home-dramas (starting in July 1959); NHK's *Jiken Kisha* (Incident Reporters) was the first criminal investigation drama (from April 1958); and TBS's *Toshiba Sunday Theater* (starting in August 1959) provided the dramatic feel of a good novella. Thus, various genres of drama became a fixture of television programming, in which movie-like directing was more evident than that of the theater. It was also, significantly, in 1958 that the six Japanese movie companies

declared that they would not cooperate with television (e.g., they forbid their contract-bound actors from appearing on television). Television was thus forced to make its own drama programs.

The introduction of VTR also created another new job, the timekeeper, whose duty was to record the time in seconds and even fractions of second as the cameras rolled as well as manage time in VTR editing and programming. Before the VTR, the assistant director kept time. But the work then was not exact, and commercials were skipped as the program spilled into the allotted time (which drew complaints from the sponsors), or there were blanks between programs. In contrast, VTR editing required exact timekeeping. The timing coincided with the proliferation of station and network affiliations where exact programming made timekeeping responsibility enormous.

Although television drama-making turned to cinematic direction, it gradually became clear that the medium needed its own visual expression distinct from that of movies. One problem was that of sound. In movies, the soundtrack is generally recorded separately, in post-production, whereas in television, it is recorded simultaneously. Furthermore, the reproduction range of magnetically recorded VTR sound is from 50 Hz to 10 KHz, whereas that of optically recorded cinematic sound is limited to about from 200 Hz to 4 KHz; it requires more delicate treatment of television sound. In fact, moviemakers tend to be of the opinion that visual expression is more important than the sound, and Kurosawa Akira and Rene Claire have made statements to that effect. In television, however, image and sound are equally important, and speech is indispensable in developing the story. This is more so because television viewers are at home immersed in their everyday environment, not necessarily concentrating on watching television. To make the story comprehensible to the "*nagara*" viewers (those who watch while doing something else), speech serves an explanatory, and music serves a descriptive function in television.

Time shifts are expressed differently in television and the movies. The movie theater provides an environment that allows, even forces, the audience to concentrate on the screen. Moviemakers can imbue the image with as much meaning as they wish. Cinematic devices, such the cut, are acknowledged by the audience to denote time shifts, and other unique expressions of cutbacks and flashbacks are comprehensible for those who are closely watching the screen. The uniquely cinematic expressions of time devised by the moviemakers are called "cinematic time" by some scriptwriters. In contrast, for viewing in the everyday home environment, television uses real-time expressions, with lower information content and where time shifts are minimized. "Home dramas," of which the Kuze Teruhiko-directed *Ohayō* (Good Morning) and *Jikan Desu-yo!* (It's Time!) were extremely successful examples, utilized such real-time limitations of television dramas. In the home drama genre, expressions of ordinary and casual time were successfully used to rediscover humor and pathos in the details of everyday life.

Television is also disadvantaged in color reproduction compared to the movies.

Movie film can reproduce delicate color gradations, i.e. small contrast images, whereas television system cannot—or rather, it better handles stronger color contrast. In the worst case, there can be a complete white-out or black-out on the screen. Furthermore, because the television image is reproduced on a monitor screen with its own fluorescence, the range of reproducible colors is limited. In order to reproduce pure black and grayer gray, television studios have devised their own unique color designs. The development of black-screen television was an endeavor to reduce the reflections of external light sources, a problem that doesn't exist for the movie screen in a darkened theater, as well as to better reproduce color by improving the monitor hardware. For productions of such historical period programs as *Mito Kōmon*, where color reproduction is of particular importance, movie film rather than the VTR is used, indicating the color limitation of television.

The cathode ray tube inside the television monitor is a vacuum tube, so that inevitably the screen is curved. It has been noted that in contrast to the flat movie screen, the television screen reproduces the characters' distance on a curved plane, which does not always convey correct distances, because the human eye compensates for the curvature of the television screen. I have heard that there is a camera angle unique to the shooting of television scenes to overcome this tendency. When flat screen television becomes more popular, the camera angle again may change.

As seen above, documentary programs were born when camcorders were developed from VTR, allowing mobility in filming. The VTR characteristics of good quality recording and reproduction served to create many programs that incorporate numerous monologues by the general public to imbue the program with reality. Since I have limited the discussion of this section to drama production, I will only comment in passing that location shoots using the handy camcorders are said to have recreated television programs that are more like the movies.

In sum, it can be said that television started with parallels and origins in theatrical production, yet has come to aspire more towards cinematic qualities with the advent of VTR; at the same time, it has devised its own unique techniques of expressions, different from those of the movies, in response to the television viewing environment and technical characteristics.

2) The origins of studio terminology

The above section has dealt with the history of the relationship between television and theater and movies with the focus on programming direction. Here, I will explore how the traditions of the two foregoing media have been kept alive by television, by focusing on the origins of studio terminology. Table 1 shows the number of words in the television terminology glossary used in the studios, where columns are classified by job areas given in Figure 4, rows show categories of terms that uniquely belong to television, terms shared with movie terminology, terms shared with theater terminology, and terms that are common to all three media.

Obvious areas of terminology exclusive to television production are related to

Table 1. Categories and the Numbers of Studio Terminology

	General	Production and Direction	Art	Effects	Lighting	Camera	Recording (Sound and Image)	Technical
Used in Broadcast only	73	167	9	11	36	45	120	233
Common to Broadcast and Cinema	10	81	6	2	29	94	24	12
Common to Broadcast and Theater	1	4	23		2			
Common to Broadcast, Cinema and Theater	19	40	94	3	23			

production and direction, lighting, camera work, recording, and technique. In the area of production and direction, there are words related to the medium's real-time limitations, such as "push," "make a good picture," "spill out," and "twine." There are also words related to television-specific jobs, to the limitation of space in the studio, such as "steal the steps," and to the image processing methods developed only for television, such as "polascene" (special effects using polarized light). In the area of lighting, there are words developed specifically for visual effects, such as "catchlight," "effectlight," and "miracle screen." For audio and visual recording and for techniques, there are words related to the characteristics of the monitor and the electrical signal processing, reflecting the fact that television broadcasting is based on electronic technology. It is also peculiar to this area that the words are often Japanese borrowings of an English term.

In the area of camera work, there are television-specific words that relate to the situation where multiple cameras are used in the small studio, such as "overshots" and "same-size." However, there are also terms that illustrate television's heritage from moviemaking. For the artistic terminology of sets and costuming, many theater words continue to be used in television. The terms are almost all Japanese words, and the measurement units for the sets are still expressed with the old Japanese units of *shaku* and *sun*. For example, a flat platform of three-by-six *sun* is called the "three-six."

Even such a brief summary is sufficient to extrapolate how much the heritages from theater and movies have endowed television program-making with rich vocabularies that nonetheless also has many terms specific to the technology of television.

3) The relationship between television and the movie industry

The movie companies were antagonistic towards television from the beginning. In 1954 the five companies of the Moviemakers Association (Shōchiku, Tōhō, Daiei, Shin-Tōhō, and Tōei) decided not to sell their movies to the television stations. There was a precedent for this in the early boycott by movie studios in the

United States towards television. However, towards the end of the same year, NTV negotiated with the companies, and when Shin-Tōhō agreed to a contract to broadcast its movies on NTV, all the others followed suit. This movie broadcast agreement is said to have spurred the growth of NTV in the early days of the station. In April 1955, NHK was also able to sign an agreement with the companies to purchase broadcasting rights of those movies that were at least three years old.

However, in July 1956, the movie companies annulled the agreements, and reasserted their rights over their contract-bound actors to deny authorization for their working on television. This antagonistic policy was urged by Nikkatsu, a newcomer to the Moviemakers Association (*Nippon Eiga Rengōkai*). Thus, from late September 1957, television had very few movies to broadcast—at a time when thirty-four private television stations had been granted broadcasting permits at once. These new stations lacked expertise in program production and compensated for this by foreign-made movies. This they could do because around that time, the U.S. film studios had started to sell old and made-for-TV movies due to financial hardship. This was the real reason that American movies and television movies were broadcast en masse on Japanese television. The high standard of living in the U.S. depicted in these films (for example, the popular *Father Knows Best*) later helped promote sales of household appliances during 1960s, the era of rapid economic growth in Japan.

The Japanese moviemakers responded to television's challenge in three ways. First, they emphasized the theater movies' uniqueness of large screens. Tōei used Cinemascope to film *Ōtori-jō no Hanayome* (The Bride of Ōtori Castle) in 1957. Their second move was to buy stock in the television stations. Tōei, for instance, provided the capital for founding Nihon Educational Television, while Shōchiku, Tōhō, Daiei, and Nikkatsu did the same for Fuji TV at the same time, in November 1957. Their third strategy was to set up television movie production divisions within their companies. Tōei was among the first to realize the need to coexist with television, and it established both a company television section and the Tōei TV Production Company as an affiliate.

In 1958, the number of moviegoers reached a peak of 1,127,000,000, and afterwards began to decline. As stated above, VTR was introduced to TV around this time to create drama programs with a unique feel. In hindsight, this was the beginning of the end of the use of movie films in TV, which completely disappeared around 1985. Made-for TV movies bridged the transition from film to video.

In 1961, Shin-Tōhō went bankrupt. Not only were 550 old movies sold to the TV stations, but Nippon Art Company was jointly founded by TBS, Fuji Television, and Dentsū (a major advertising agency) to make television movies with the equipment and staff from the defunct company. This company was renamed Kokusai Hōei in March 1964, and continues to this day. By 1962, movie companies had all followed in the footsteps of Tōei in creating a television division within their organizations. In January that year, the top executives from the Moviemakers Association and television stations met to discuss peaceful coexistence.

Moviemakers had come to recognize that they had to accommodate television divisions within themselves, and restarted supplying movies to the television stations in 1963. They had to retreat from the offensive they had started in 1956.

In response to the moviemakers, NTV, TBS, and NET all created movie divisions in the organizations in 1962. This was partly because of declining viewership for foreign films. Also, NHK Chairman Nomura Hideo pulled all American films from broadcast in July 1960, citing the heavy violence depicted in them. (His ardor, I suspect, had more to do with the television coverage of the forced ratification of the Japan-U.S. Security Treaty in the Diet that year, and the ensuing demonstrations that ended in bloodshed.) With such a background, the television stations must have decided that it made good business sense to produce domestic-made television movies.

The actual television movie making was done with cooperation from the television movie production divisions of the major film companies, or other independent production companies. There were exchanges of resources, such as when movie directors were asked to shoot a television movie for the stations. This was a time when both television stations and movie companies dreamed of getting along together.

However, with improving VTR quality, it became possible by 1965 to produce many VTR programs with computerized automatic editing, and the differences in the image brightness of television and movie films became more evident. Movie film was still revered for its subtlety of contrast and good reproduction of color, but, more and more, VTR came to be used due to facilitated editing.

Movies made for the movie houses were soon to use VTR as well. As both VHS and Beta models became standard and VTR came to be used in ordinary homes from about 1977, the movie companies that had formerly filmed only with an eye towards the huge screens came full circle, and produced standard size and Vista Vision size movies that anticipated subsequent television broadcast.

Kokusai Hōei, the company born from defunct Shin-Tōhō, to this day produces audiovisual materials. Originally using movie films, the company also shifted to VTR around 1985, and is now developing into a multimedia firm not only for independent productions for television and CATV, but also for karaoke software productions, exhibits and theme park events.

5. CONCLUSION

Kokusai Hōei is a member of the Association of All Japan TV Program Production Companies (ATP), which boasts fifty-three members as of October 1995. Other members include major production companies such as TV MAN UNION, Office TWO-ONE, and EAST. The programs created by these and other ATP companies account for 70% of all the programs broadcast during "golden time." The number of programs produced by the television stations is decreasing. Even when a program looks as if it had been produced by the station, it turns out

that often only the producer works for the station and all the other staff, including the director, are temporary workers affiliated with companies that had joined the National Association of Broadcasting Temporary Work Service.

Generally speaking, broadcasting companies are either publisher-broadcasters with transmission facilities or production-broadcasters who create software for programs. The current Broadcasting Law requires the two to be one. However, with the recent 1989 Broadcasting Law and Radio Law, the two can now be divided, as in the case of satellite broadcasts. This is a part of the deregulation started by the Ministry of Posts and Telecommunications. In effect, the ground stations more and more out-source their programs or use temporary staff, and only produce news programs and choice programs designed to boost station identification. Deregulation seems to have already progressed in television stations as a matter of fact.

I will defer further analyses of the relationships between production and the legal system, and between CATV and satellite broadcasts for a later occasion. Then, I would like to focus more comprehensively on the dynamics among the four elements surrounding television, the legal context, the organization of production, its technology, and its social environment.

In this paper, I tried to show the process of TV dominating over the preceding media of theater and cinema resembles an evolutionary competition between species. Of course it can be misleading to apply a biological model directly to media history, which involves essentially social phenomena. Nevertheless, I hope that useful viewpoints for exploring historical changes in media can be developed by analogy with biological models.

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