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Galvanometer and Light-Valves: An Archeology of Dolby SVA in Italy

Foreword[1]

Just before Christmas 2013, Technicolor's headquarters in France decided to close all of their European studios, including the Italian one. This decision was totally unexpected, and brings to an end the history of International Recording, founded in 1957, which was one of the most celebrated sound post-production facilities in Europe. I wish to dedicate the first part of this article to the dubbing engineers and technicians whose fate has changed so suddenly. In particular, my thanks go to Paolo Biondo, Federico Savina and Alberto Sbroscia, who guided me in collecting oral accounts of the history of this facility.

Research context[2]

The Italian-American Giuseppe Biondo was Radio Corporation of America (RCA)'s leading point man for Europe (figg. 48-49). He had served Westinghouse and then RCA in its New York headquarters for nearly 20 years, ever since he had arrived in America in 1924.[3] He then became director of the RCA Paris Office, the leading European office for RCA's commercial strategies. Soon after the war, in December 1945, Giuseppe Biondo embarked for Italy.[4] In only a few years he was to create an operation destined to change the technological and cultural paradigms of postwar Italy, in a complex chain of events whose main points I shall summarize here. In 1947, RCA participated in the Milan Fair, a European showcase for American companies just after the war.[5] RCA was the first US company to present a television system in Europe. Rome represented the heart of the nation's political life at a moment in history when important decisions about the country's future technological structures were in the making, that a few years later included, for instance, television standards. Rome was also the city of Cinema. RCA was immediately entrusted with a series of important commissions from Cinecittà. Even more sig-

nificant were its contracts with the Ministry of Defense, for which it provided radar and communication devices. A fervent Catholic, RCA's president Frank Folsom was relying on the Holy See's strategic involvement in creating the future Italian RTI (Radio e Televisione Italiana, subsequently renamed Italian RCA).[6]

Figure 51 shows Biondo and Folsom in front of the Economic Cooperation Administration (ECA) offices in Rome. The ECA was the Marshall Plan's executive branch.[7] As oral sources maintain,[8] the most important fact in the Italian RCA's industrial history was a huge financial contribution from the Marshall Plan devoted to building the vinyl printing facilities in Rome. With this operation, music attained a central position in the Plan's propaganda operations: the Cold War had already begun, and was manifesting itself among other things through the creation of a new postwar Italian musical culture that defined a new soundscape for postwar Italy, with important implications for both the history of popular music in Italy – a certain distance was in fact taken from musical folklore during these years – and the history of film music, given that composers began to look westwards in the coming years.

Following various maneuvers carried out by the Vatican to increase its control over RCA, in 1957 Biondo left RCA and set up a new establishment, International Recording (IR), devoted primarily to what he identified at the time as the most profitable activity, namely music recording – especially for movies – and film sound post-production. The recording rooms' acoustics were the work of Michael Rettinger, an international authority on studio acoustics (who at the time had already engineered many recording studios in Hollywood).[9] This, according to several sources, was the first Italian recording room with a decidedly "American" sound.[10]

Production process (1959: an overview)

While in the realm of literature historical and critical research proceeds apace, less progress has been made on the history of techniques and production processes, in particular for film sound. Until the 1980s every facility was a world of its own from a technical standpoint. This high degree of personalization of systems and production flows poses significant historiographical problems. Sometimes circuits were modified on the spot, without any prior project drawings: these changes may at times have turned out to be opaque even to those who made them, and engineers often had to resort to reverse engineering to understand their own logic. Even where projects did exist they were lost together with the devices, thrown out once they became obsolete.

When these devices are analyzed, an intimidating stratigraphy emerges. In this paper I shall examine the case of optical recorders – an emblematic example of technical archeology. I will now consider the production process from a bird's eye view.[11]

Figures 50 and 52, taken a few weeks before its inauguration, shows International Recording's projection booth and music booth.[12] The control room, located under the projection booth, at level 0 contains two mono Ampex models (one of which is not visible in the picture: one model has 350 electronics with octal base valves, the other has 351 electronics with noval base valves); two 2-track Ampex 351 models (one not visible in the picture) and two 3-track Ampex models on ½-inch tape (300-3, with 351 electronics and Sel-Sync units).[13] The 12 channel control room console was made by Westrex Italia. According to several oral sources,[14] this was the first fader console installed in an Italian studio. A mechanical system of wires, moved by the fader, acted upon a Daven potentiometer, already in use in the RCA consoles. The preamplifiers, compressors and filters were manufactured entirely by RCA: BA-21A preamps, BA-23A amplifiers, and BA6 compressors.[15] The control room speakers were three Tannoy Gold (15" duo cone) models arranged in horseshoe formation around the console, amplified by three McIntosh 60W. The projectors are two IPC Simplex models. Only partially visible on the right are the twelve recorders for 35mm perforated magnetic tape – RCA make, Film Phonograph model – to which one optical head must be added, visible in the picture (third from last rack towards the back). The last rack is a

recorder made by RCA. On the second-last rack there is a Tannoy loudspeaker, from which recordists in the booth monitored the audio of the sound heads. At the far end of figure 50, beyond the door separating the music booth from the soloist room, we can glimpse the electronics of the optical sound-on-film recorder: a variable-area RCA Photophone, galvanometer system.

Among the machines of the transcription department, I would like now to focus on a particularly complex one: a 35mm recorder with a ¼-inch tape player for transcribing direct sound recordings. The instrument was locally assembled with electronics from Rangertone which could read the pilot frequency of the ¼-inch tapes – such as, from 1961, the Nagra with Neopilot sync. Technical details apart,[16] it was through this machine that ambient sounds and special sound effects were processed. Transcribed onto 35mm perforated tape, the special sound effects – such as a passing car or a gunshot, in other words effects requiring precise synchronization – were synchronized in Moviola. The high cost tapes necessitated the use of the static-magnetic junction, meaning the insertion of a given length of 35mm placeholder film (termed "static" in the Italian procedure) where there were no sound effects. Following synchronization in Moviola, the reel was mounted on the tape heads of the projection booth for the sound effect pre-mix, which was done reel by reel. With rare exceptions, ambient sounds did not require precise synchronization and were organized and loaded in loops onto the tape heads, supported by specially constructed loop-holders. Figure 53 shows the original plan of the facility, modified with a reconstruction of the positioning of the various devices. Stage 1, intended for recording and mixing, is located at 0.22 m above ground level. It stretches out 21x12 m horizontally and has a wooden floor made of vertical dovetail slats in solid cherry wood, an expedient devised to eliminate involuntary squeaking from musicians' and operators' movements. Walls are planked with a 1 m high wainscot in perforated masonite, with mineral wool upholstered with jute canvas (0.70 m high) and with 2 m high plywood veneered semi-cylinders. The music booth is opposite the recording stage and is separated by a glass panel. The choir stage is about 0.22 m to the right of the recording stage. Behind the projection booth and the music booth stand two echo-chambers with asymmetric walls and floors and walls covered in foil.[17] The premix output was recorded on a couple of 35mm mono records[18] located in the transcription department. The reels containing sound effects, dialogue and music premixes were then in turn loaded onto the tape heads for the final mix, whose output was always recorded on RCA mono recorders. Then came the last phase, which was one of the most delicate: the transcription of the film mix onto the 35mm film negative.

Although the final mix was initially transcribed on an RCA mono optical recorder (galvanometer system), this device was short-lived. Despite its excellent results, it required continuous and difficult technical maintenance. Thus, from about 1964 onwards, the main optical recorder of the facility was substituted with a Westrex 900 that uses the competitor's light-valve system. According to the oral sources, this was the only Westrex 900 in use in Italy (many other Westrex systems were in use, but not a 900 system).

Optical transcription is, from a historical point of view, one of most fascinating parts of the entire sound post-production process. Recorders were gradually changed to support new optical sound formats, with progressive alterations concentrated around a single instrument. As I will try to show, the stratification of changes in optical recorders requires us to consider a period that spans over 70 years.

A stratigraphy of optical recorders

Before the magnetic era, sound trucks for direct sound recording mainly adopted Westrex 600 optical recorders.[19] From 1964 onwards IR substituted their galvanometer optical recorder with a Westrex 900, which was a more sophisticated and modern piece of equipment than the Westrex 600 model.

A galvanometer system is extremely delicate and few technicians were allowed to touch it. The light valve sys-

tem was even more delicate and engineers, in Italy and abroad, viewed its main component – the light valve – with almost religious awe. Figure 55-I shows one of the last light-valve models in use in the facility.[20] This is one of the two modified four ribbon light-valves used by IR. A business card coming from Simon Daniel Sound can also be seen – one of the few companies in the world which can make repairs and changes to this very delicate component.[21] This is the heart of the whole process.[22]

Other images in figure 55 show similar models of sound cameras in action, in other facilities in Rome. Figure 55-III shows a Westrex camera modified for Dolby SVA and Dolby Digital. Figure 55-IV shows a similar Westrex sound camera modified for Dolby Digital and DTS, with the SDDS module placed between the 600 m reel-holder and the chassis hosting Dolby SVA and Dolby SR-D modules. Here technician Antonio Croce (CDC SEFIT Group, Rome) is stamping the optical negative in order to recognize the starting point in the darkroom. On the left we can glimpse part of the Nuoptix Inc. electronics, today used for sound camera control.[23] Figure 55-V shows a detail of the stamped optical negative.[24]

The facility started to mix in Dolby Stereo Variable Area sometime around 1977. But until 1980 International Recording did not possess an optical recorder suitable for Dolby SVA photoengraving. Before this date the final mix of the film, recorded on a 4-tk 35mm magnetic perforated tape, was shipped to the London Dolby Laboratories for optical transcription and Dolby SVA encoding. As Dolby decoders were not universally adopted in Italian cinemas, from 1977 to about 1983 both the Dolby format and the mono transcription circulated, along with the so-called *magnetico pistato* transcription,[25] re-introduced in the facility as of about the end of the Seventies. This format was parallel to the *magottico* (*magoptical*)[26] format, an ingenious invention created by Bernard Shelley and Federico Savina that was used from the mid 1970s during the complex transition from monoaural to multichannel audio.

In the meantime, in 1980, International Recording was the first in Italy to modify an optical recorder for Dolby SVA transcription.[27] The Westrex 900 camera used until that moment was not suitable for transformation, as the technical know-how to transform *light-valve* systems did not yet exist. Instead, the old RCA galvanometer camera, which had spent all this time in a storeroom, could have been transformed.

Very few specialists in the world had the prerogative to manage this kind of transformation. An experimental line of modified recorders was made by Dolby's Max Bell.[28] The first RCA galvanometer optical camera to be modified by Bell was the one used by Elstree Studios of Elstree and Borehamwood (the famous studios in the commuter belt of London where MGM also operated).[29]

The first transformation took place in England in July 1974.[30] Bell was assisted by David Plunkett. Immediately after London, further optical recorders were modified in the US by the engineer David Gray. In the meantime a second European camera, modified by the Dolby Laboratories, started to be used in the Dolby headquarters in London. This recorder, modified and maintained by David Plunkett, was used for Dolby SVA transcriptions in sound facilities all around the world.

In the absence of an agreement with Elstree studios, post-production facilities could not transcribe the mix master onto optical negative, so Dolby provided an independent camera. In this way the first international Recording Dolby SVA mixes were therefore passed to the Dolby laboratories' camera.

The third European instrument to be modified, in chronological order, was International Recording's RCA galvanometer camera. Giuseppe Biondo decided that it was time for the facilities to have its own sound camera. New galvanometers[31] were acquired by Alberto Sbroscia, at the time IR's technical director, from San Paolo film. David Plunkett was entrusted with transforming the camera along with the Italian engineers, and it was in operation by the end of 1980.

However, this instrument was short-lived. Shortly afterwards Neuoptix produced a new electronic control system for recording Dolby SVA on Westrex cameras. In about 1985 Dolby sponsored this more reliable system

and advised International Recording to abandon its old galvanometer camera in favor of Westrex. The Westrex 900 camera already owned by International Recording could not be used for the purpose because there was insufficient space between its mechanical parts for it to be adapted. The very common old optical cameras used on sound trucks since the late 1940s could instead be modified.[32] For this reason the second hand market for Westrex 600 cameras had a new lease of life, becoming the preferred instruments for Dolby Digital, SDDS, and DTS sound camera transformations until late into the 1990s.

At the end of 1984 the technical director Sbroscia acquired from Calpini studio an old Westrex 600 whose mechanical parts, in particular the drive electronics for the stepper motor, was partially assembled and modified in Rome. Neuoptix electronics for SVA transcription were acquired through the mediation of Dolby's Max Bell. The new 4-ribbon light valve was bought by Dolby and modified by Los Angeles based technician Daniel Simon,[33] one of the few specialists in the world able to adapt and repair light-valves.

As was also the case with other facilities, this instrument would serve for optical transcription until 2013, with progressive improvements. I will not go into the technical details here, but the addition of SDDS and DTS modules and the substitution of a new reel mount when 600 m reels came in are worth pointing out. As can easily be inferred from Figure 54, new modules were added by modifying the original basis: an old Westrex 600 optical camera. These models were in use until the first months of 2013, when the transition to D-Cinema was completed, definitively putting the 35mm negative, used as film sound's main medium, into retirement after a complex history lasting over 70 years.

This exceptional technical stratification is the fruit of a period characterized by sudden discontinuities and unexpected revivals. The industry's promotional discourse tended to present developments in film sound as the advent of a new era, but a stratigraphy of the devices used demonstrates how "old" and "new" media met in a highly complex way.

The fascinating aspects of this part of the post-production process are to a large extent due to the convergence between improvements in magnetic recording and older optical technology. Even in the digital age, optical technology continued to impose its specific features and its limitations – a fact often disregarded by historical research.

Suffice it to point out a few significant details. Even in the case of a perfectly calibrated device optical transcription is not a neutral process and film development can significantly alter the sound quality. For example, minor temperature variations in the processing bath can often lead to under- or over-development. Faced with constant complaints from clients and developing facilities, International Recording developed a series of quality control tests. One of these involved matching, reel by reel, the original mix master on magnetic tape with the optical soundtrack, as received from the printing facility. An offset level was assigned to the optical soundtrack to compare the two mixes. Any discrepancies may indicate a badly developed reel – in this case, a series of audible distortions alert the engineer's ear. He would then investigate the soundtrack under the microscope. For example, over-developing may distort the waveform, determining a thickening of the peaks that may cause an alteration of the high frequencies, while a bad alignment of the sound negative could determine an incorrect focus of the soundtrack with significant alterations for the listener. There are plenty of examples of movies that reached cinemas with alterations of waveform caused by this last part of the post-production process.

Examining the bottleneck imposed by optical transcription involves exploring some exceptional historical layering, in which devices dating back as far as the 1940s have survived – albeit with continuous integrations – to the present day. Investigating these historical "sequences" means understanding the essential problems of technological change in film sound: when light becomes sound.

Illustrations

48. Giuseppe Biondo (first from left) and Vladimir Zworykin (second from left), center: unidentified German functionary (signed and dated on the back by Vladimir Zworykin), Berlin, 1934.
49. Giuseppe Biondo (right) and Prime Minister Alcide De Gasperi, via Asiago RAI headquarters, Rome, 1947.
50. Frank Folsom and Giuseppe Biondo, ECA offices, Rome, ca. 1948-1950.
51-52. IR's Music booth and projection booth, 1959.
53. Horizontal plan of the facility (0.22 m above ground level).
54. Light Valve (serial no.: 50).
55. Chronology of optical recorders (International Recording, 1959-2004).

Notes

[1] Translated by Ilario Meandri and Susan Phillips, revised by Brent Waterhouse.

[2] The research I shall refer to here has been developed within the *Cabiria* Project (Census, Cataloguing and Study of Manuscript and Printed Music for the Cinema in Piedmont, University of Turin) first coordinated by Luisa Zanoncelli and then by Annarita Colturato, to whom I would like to express my gratitude. Some of the information found in this paper, analyzed here in greater detail, has been published, in Italian, in Ilario Meandri, *International Recording (1959-1969). Indagine sulle memorie orali*, Kaplan, Torino 2013. In addition to printed works, I will also refer to: 1) oral sources collected in 2012 and 2013 during extensive fieldwork; 2) documents from International Recording's archives (henceforth IR Archive), property of Paolo Biondo, former CEO at International Recording from 1980 to 2004. In this work I shall cite recorded orals sources indicating name, date and place of collection. I will refer to archive documents, which have not yet been catalogued, with a general title deduced from the files and, where possible, a date, placed in square brackets if the date has been inferred. Other published studies may be of interest for a comment on the methodology adopted in the collection and analysis of oral sources: Ilario Meandri, *A History of Technique in Film Music and Film Sound Post-production in Italy. Methodological Remarks Complementary to an Examination of Oral Memories*, in Annarita Colturato (ed.), *Film Music: Practices, Theoretical and Methodological Perspectives. Studies around Cabiria Research Project*, Kaplan, Turin 2014, pp. 187-219.

[3] Giuseppe Biondo, signed curriculum vitae [ca 1945]. Courtesy of Paolo Biondo, International Recording Archive (henceforth: IRA).

[4] Paolo Biondo, 25 October 2012, Rome.

[5] Information leaflet no. 018/454 by "RCA International Division. 745 Fifth Avenue, New York," in Italian containing information on the products exhibited at the Milan fair (probably the 1947 "Celebrazioni Marconiane").

[6] Cf. Ilario Meandri, Paolo Biondo, "Giuseppe Antonino Biondo e la fondazione dell'International Recording," in *Musica/Tecnologia - Music/Technology*, nos. 8-9, 2013-2104.

[7] Courtesy of Paolo Biondo, IRA.

[8] Paolo Biondo, 25 October 2012, Rome.

[9] When Rettinger signed the project of IR studios he was acoustic engineer at RCA Broadcast and

Communications Products Division, based in Hollywood. The author of several articles and handbooks on acoustics in recording studios, Rettinger also worked on developing new loudspeakers, microphones and magnetic heads and specialized in the acoustic design of Scoring Stages and Motion Picture Theaters. He was the author of numerous projects in the States and in Europe, such as Capitol Tower (LA) in the Fifties and Hollywood's Cinerama Center Theater in the Sixties. At the current state of research, no confirmation could be found of his work at the Universal studios, on which Biondo (23 October 2012, Rome) reports. However, Rettinger is documented as an acoustics consultant who was very active in Hollywood and who carried out important studies at least from 1935 onwards as main designer or consultant. This biographical note is taken from an editorial article that appeared in the *Journal of the SMPTE* in 1966, when Rettinger retired ("Biographical Notes," in *Journal of the SMPTE*, vol. 75, no. 5, 1966, pp. 534-536, p. 534).

[10] Paolo Biondo, 25 October 2012, Rome; Federico Savina, 6 October 2012, Rome; Danilo Moroni, 26 October 2012, Rome.

[11] I will now consider a small part of the process, which concerns sound effect post-production. Although I will not be dealing here with dialogues and music, following the production path of sound effects will clarify how the entire process finally comes to optical recorders.

[12] Source: photostatic copy of the information leaflet of CNAIAF manufacturing company, Courtesy of Paolo Biondo, IRA.

[13] The transition to solid state Ampex units and the constructions of new solid state devices began at the end of the 1960s, under the technical direction of Bernard Shelley and with the collaboration of Federico Savina, at that time music scoring mixer, and Alberto Sbroscia, Shelley's assistant and later technical director of the facility.

[14] Paolo Biondo, 25 October 2012, Rome; Federico Savina, 6 October 2012, Rome; Danilo Moroni, 26 October 2012, Rome; Alberto Sbroscia, 27 September 2012, Rome.

[15] From between 1963 and 1964 Langevin 7-band equalizers were also in use.

[16] Oral sources are contradictory on this point: some claim that the device was assembled by the Swiss Perfectone, but there is a clear resemblance with the name of the company founded by colonel Ranger, initially a competitor of Ampex. Rangertone specialized in the mid 1950s in the construction and proposal of various systems for synchronizing magnetic tape and film (see for example Richard H. Ranger, "Sprocketless Synchronous Magnetic Tape," in *Journal of the SMPTE*, 1950, vol. 54, no. 3, pp. 328-336). Perfectone had patented a synchronization method similar to that of Nagra, but with a 100kHz pilot frequency (twice that of the most European mains supply) and pilot frequency heads positioned on either side of the tape, not centrally as in the case of Neo-pilot (cf. EUROPEAN BROADCASTING UNION, *Synchronization of Audio Tape-Recorders with Film Cameras (EBU-Tech 3095)*, European Broadcasting Union, Geneva 1973, p. 9). This instrument, as described by Alberto Sbroscia, clearly uses a Neo-pilot-type heads configuration so it is not currently clear whether this was a system originally designed by Perfectone to support its proprietary sync method that was only subsequently adapted to the Nagra Neopilot system. New photographs of the original device, now in the hands of collector and audio expert Marcello Braca, seem to confirm this. The photographs show a detail of an Ampex 350, property of IR. Next to the tape transport control cluster there is a control panel of a module for reading a sync signal. The device is produced by "Rangertone Inc. Newark, N.J." Future analysis should provide a key to its functioning.

[17] Source of the original plan: photostatic copy of the information leaflet of CNAIAF manufacturing company, courtesy of Paolo Biondo, IRA.

[18] These are RCA recorders (presumably PM66 models). Only at the end of the 1960s did the technical direction begin designing and building a new generation of multitrack recorders.

[19] Similar models were presented by R. E. Warn, Westrex Corporation (New York HQ) in a 1949 article in *J. SMPTE*, where various optical recording systems used worldwide are described (including those used in the Fonoroma facility). The 600 system is here described in great detail with photographs. As an example of its portability and ease of use Warn cites the case of the Zurich "Praesens Studio," which installed the system on truck used for direct sound recording in central Europe. See R. E. Warn "Recording Equipment throughout the World," in *Journal of the SMPTE*, vol. 53, no. 3, 1949, pp. 236-241.

[20] This is a four ribbon light-valve in use until the mid aughts for the transcription of a Dolby Stereo Variable Area on the sound negative (cf. *infra*).

[21] Photographed on 17 October 2012 at the Technicolor factory. Courtesy of Fabrizio Nisi, Technicolor Rome.

[22] There are only a handful of technicians in the entire world who can open a light valve: as it is the heart of the photophone system, no one dares to open it for fear of damaging the sophisticated ribbon system inside.

[23] Photographed on 16 October 2012 at the CDC SEFIT Group, Rome. Courtesy of Antonio Croce.

[24] Photographed on 17 October 2012 at the Fonoroma facility, Rome. Courtesy of Fonoroma.

[25] Since the early 1970s, some copies were released with the so called *magnetico pistato* format (the Italian name for CinemaScope's 4-track "stereo" magnetic sound, i.e. 35mm positive copies where four magnetic strips are pasted). A film's final mix is recorded on these 4-tracks through a purposefully modified instrument (cf. "Bomar device," in Ilario Meandri, *International Recording*, cit.). This is a format Fox introduced in the Fifties which then fell into disuse at the end of the same decade, eclipsed by 70mm widescreen systems (Todd-AO, MGM Camera 65, Super Panavision). The latter formats had sound released on 6 magnetic tracks. According to what Paolo Biondo reports (25 October 2012, Rome), since the magnetic track was re-introduced the positive copies were sent to Studio Barbieri, a facility that managed the so-called *pistaggio* process (*tracking*, i.e. the process of gluing the 4 magnetic strips to the 35mm film positive) which is obtained with specific machines. Savina reports (30 October 2012, Rome) that only Italian copies were used to paste the magnetic strips – which often caused problems because the tracks would detach after numerous runs on the projector – whilst for the American copies the magnetic strips were emulsified on the film, with a slightly inferior audio quality, but guaranteeing greater safety. The standard 35mm original for this format is slightly different, using smaller dragging perforations (CS perforations, otherwise known as "Fox holes") to make enough room for the magnetic strips. That is also due to the fact that, when tracking was resumed in the 1970s no cinema would have accepted spending the amount of money needed to change the reels for CS perforations. The "new" 1970s tracking thus uses standard 35mm film perforations and consequently places the tracks according to a different standard than CinemaScope's 4-tk (Paolo Biondo, 25 October 2012, Rome).

[26] Briefly, this is a method developed in IR from 1973-74 to circa 1982-83 which, upon optimizing the position of tracks on the 35mm, allows the transcription of the film mix on 4 magnetic tracks though maintaining backward compatibility with the mono-aural VA bilateral optical format. The magnetic tracks on the 35mm film are aligned so that one of the magnetic strips covers exactly half of the two millimeter optical track: in this case the optical head reads half of the bilateral track, the same optical track being covered for the other half by one of the four magnetic strips. This method helped IR save

on multiple copies, so that one single copy would serve the cinemas equipped with projectors with magnetic 4-track sound heads as well as cinemas with traditional monoaural optical heads.

[27] Paolo Biondo, 25 October 2012, Rome; Alberto Sbroscia, 25 October 2012, Rome.

[28] At the same time, David Simons, one of the few specialists in the world and owner of Daniel Simon Sound, specialized in repairing and adapting the light-valves of the Westrex systems (the first IR light-valve for Dolby stereo was however acquired by Dolby). For Dolby SVA recording Westrex systems require a four ribbon light-valve, like those introduced by Westrex in 1938 (see Scott D. Smith, "When Sound Was Reel 8. Dolby Noise Reduction in the '70s," in *695 Quarterly*, vol. 1, no. 4, 2012, pp. 26-30, p. 27). In 1937 an interesting article by J. P. Maxfield, Electrical Research Products Inc., describes the first public demonstration of a stereophonic recording in New York made with a system developed in cooperation with Bell Telephone Laboratories that uses a pair of light-valve ribbons to obtain a stereophonic recording. See J.[oseph] P. Maxfield, "Demonstration of Stereophonic Recording with Motion Pictures," in *Journal of the SMPTE*, vol. 30, no. 2, 1937, pp. 131-135. For a biographical account of J. P. Maxfield see Rick Altman, *Joseph P. Maxfield*, in Geoffrey Nowell-Smith (ed.), *The Oxford History of World Cinema*, Oxford University Press, Oxford 1996, p. 213.

[29] The well known dubbing mixer Bill Rowe (1931-1992) worked at the Elstree Studios. At IR he mixed the Italian edition of *Alien* (Ridley Scott, 1979). There he came into contact with Bernard Shelley, G. A. Biondo, P. Biondo and the facility engineers (Paolo Biondo, 27 March 2013, Rome). Rowe pioneered the introduction of Dolby A-Type onto the film *A Clockwork Orange* (Stanley Kubrick, 1972), which used Dolby NR in pre-mixes and during the film's final mix; and for the film *Callan* (Don Sharp, 1974) which was the first to utilize A-type NR also on the mono optical track. Rowe was also the first dubbing mixer to work with Dolby matrix encoding onto the film *Tommy* (Ken Russell, 1975) which used an "experimental" Quintaphonic format, but which was in effect the first Dolby Stereo, although it was a *sui generis* experiment (this was a matrix encoded "double stereo" recorded onto two of the four magnetic strips on 35mm which, once decoded, returned four channels – lF rF/lB rB – plus a third magnetic track – without matrix encoding – which was used for the center speaker; the fourth magnetic track was not used). Rowe was also the first dubbing mixer on the first "official" Dolby SVA movie (but without the surround channel): *Litzomania* (Ken Russell, 1975). Elstree commissioned Dolby's Max Bell to modify the first galvanometer camera in June 1974 (Paolo Biondo, 27 March 2013, Rome). Unless otherwise specified this information comes from Bill Rowe's obituary, "Obituary: Bill Rowe," in *The Independent*, 13 October 1992, available at http://www.independent.co.uk/news/people/obituary-bill-rowe-1557149.html, last visit 7 July 2014.

[30] *Ibidem*.

[31] The modified cameras are equipped with a *dual galvanometer* system, following an improvement perfected by Uhlig and Leahy in 1973. The dual galvanometer system enables recording a stereo track onto an optical negative. At the time, experimental use of Dolby Noise Reduction (A-Type – model 360, and B-type – model 101, as proposed by Ioan Allen at the "42nd Convention of the Audio Engineering Society" of 1972) was made during recording. See Scott D. Smith, "When Sound Was Reel 8. Dolby Noise Reduction in the '70s," cit., p. 27 – on the dual galvanometer system. See Ronald E. Uhlig, "Stereophonic Photographic Soundtracks," in *Journal of the SMPTE*, vol. 82, no. 4, pp. 292-295 – on the type of NR utilized.

[32] The optical sound camera sponsored by Dolby for use with Neuoptix system is RA-1231, reissued by Litton-Westrex.

[33] See note 28.

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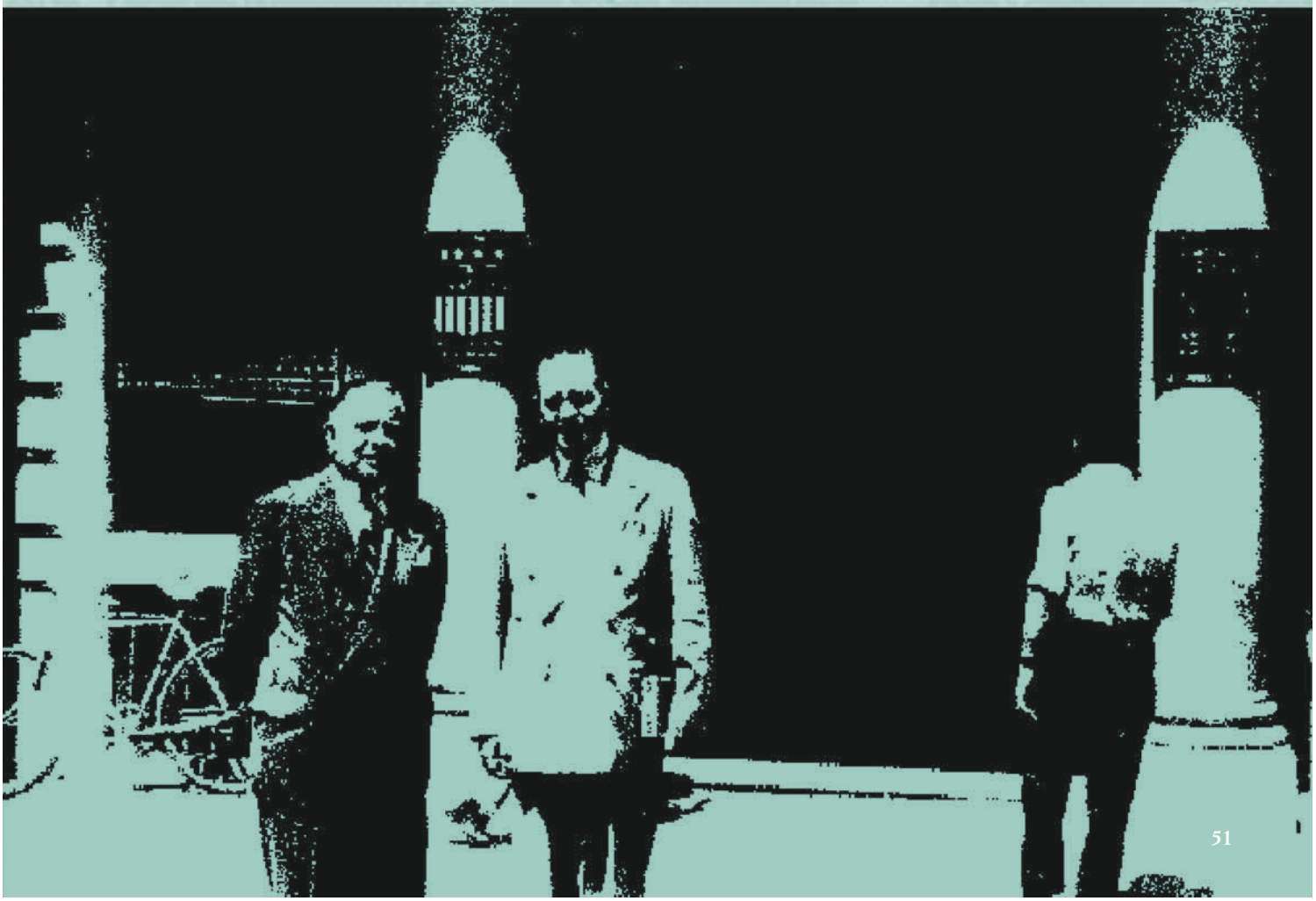

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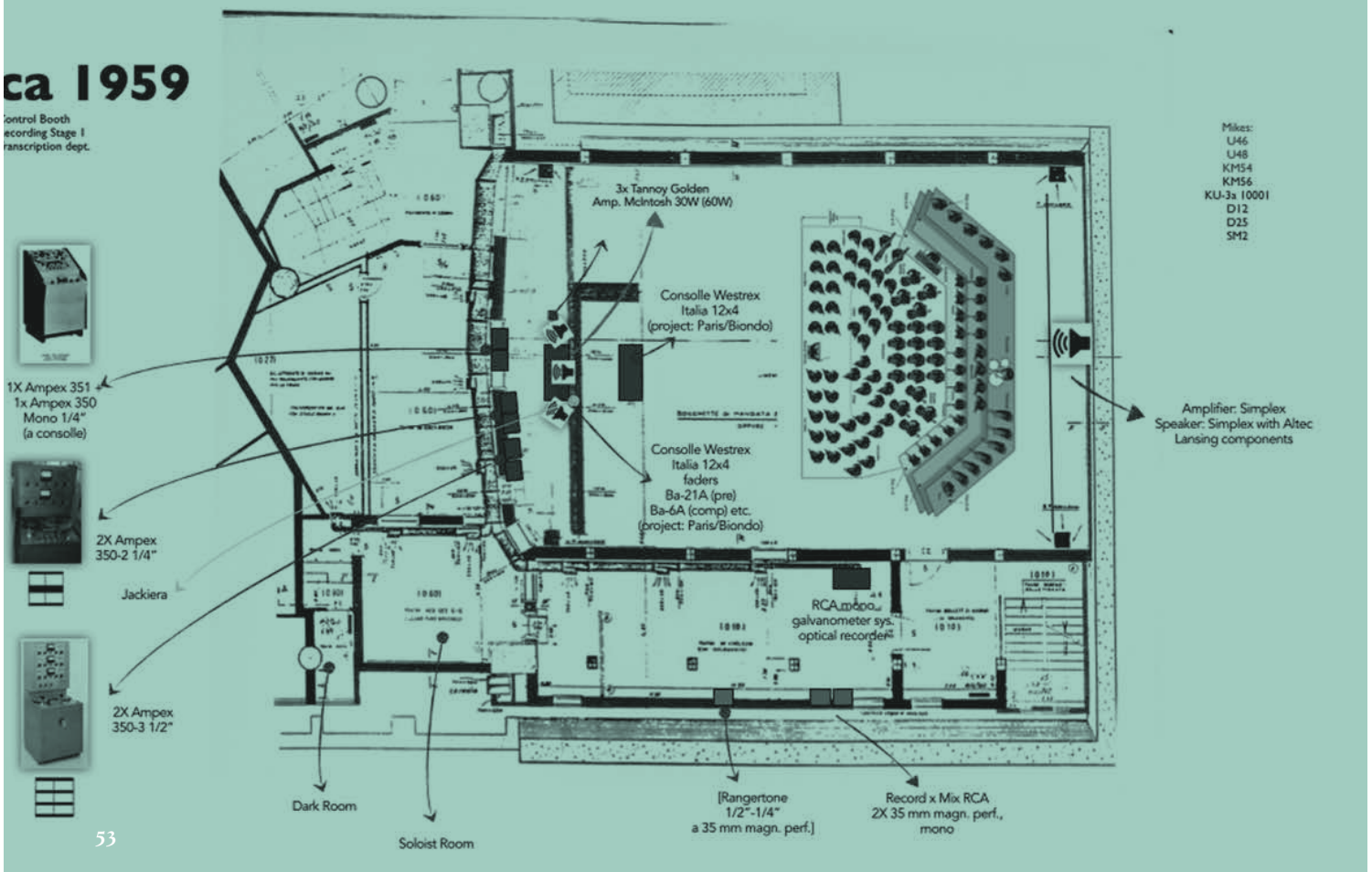
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Mikes:
U46
U48
KM54
KM56
KU-3a 10001
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D25
SM2
3x Tannoy Golden
Amp. McIntosh 30W (60W)
Consolle Westrex
Italia 12x4
(project: Paris/Biondo)
1X Ampex 351
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Mono 1/4"
(a consolle)
Amplifier: Simplex
Speaker: Simplex with Altec
Lansing components
Consolle Westrex
Italia 12x4
faders
Ba-21A (pre)
Ba-6A (comp) etc.
(project: Paris/Biondo)
2X Ampex
350-2 1/4"
Jackiera
RCA
galvanometer sys.
optical recorder
2X Ampex
350-3 1/2"
Dark Room
Soloist Room
[Rangertone
1/2"-1/4"
a 35 mm magn. perf.]
Record x Mix RCA
2X 35 mm magn. perf.,
mono

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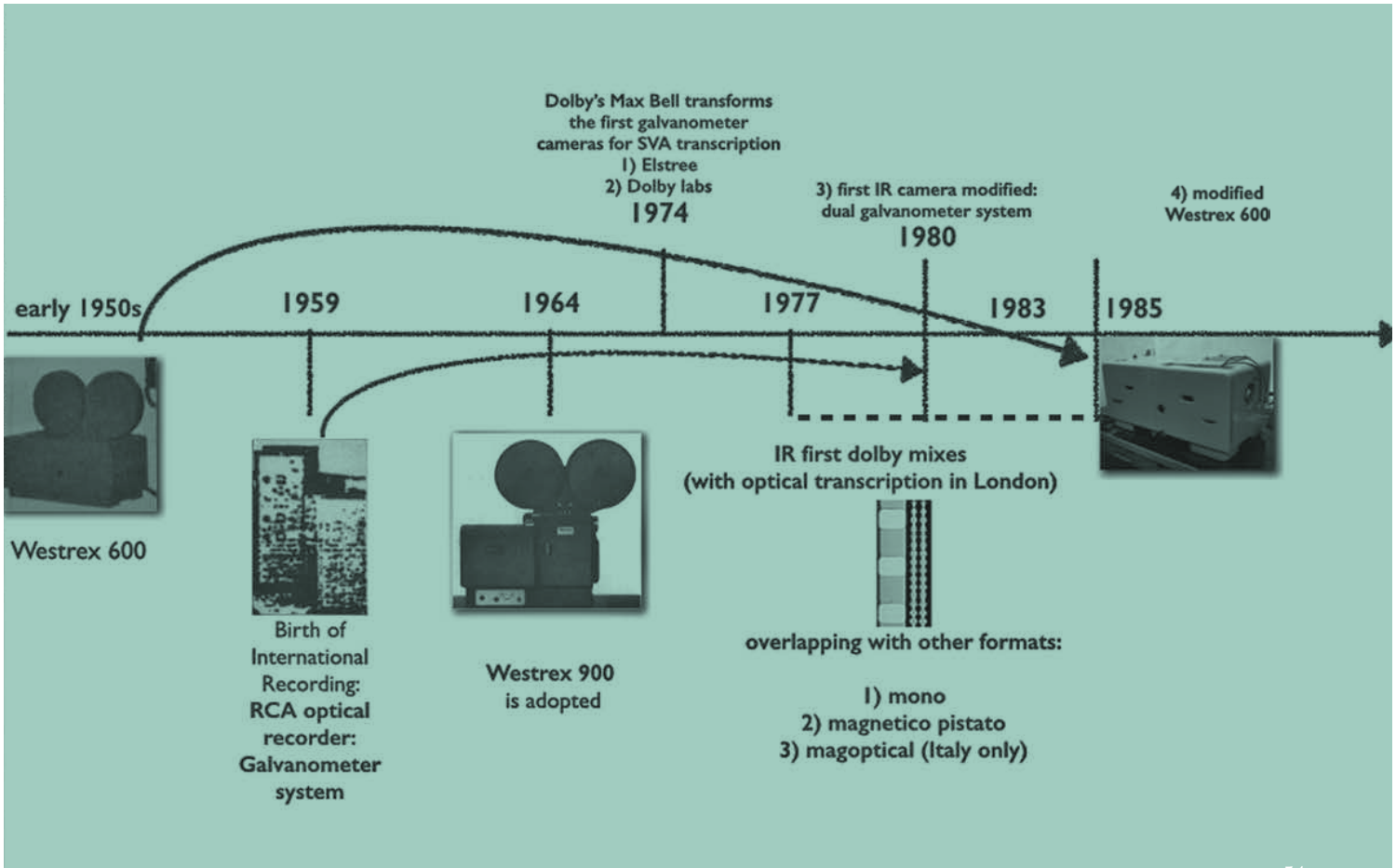
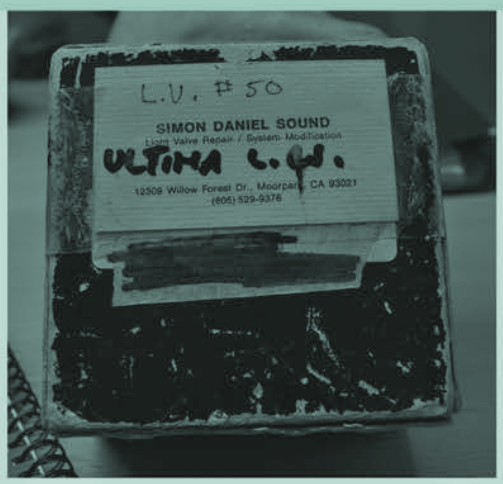

Dolby's Max Bell transforms
the first galvanometer
cameras for SVA transcription
1) Elstree
2) Dolby labs
1974
3) first IR camera modified:
dual galvanometer system
1980
4) modified
Westrex 600
early 1950s
1959
1964
1977
1983
1985
Westrex 600
Birth of
International
Recording:
RCA optical
recorder:
Galvanometer
system
Westrex 900
is adopted
IR first dolby mixes
(with optical transcription in London)
overlapping with other formats:
1) mono
2) magnetico pistato
3) magoptical (Italy only)


L.V. #50
SIMON DANIEL SOUND
Light Valve Repair / System Modification
ULTIMA C.V.
12509 Willow Forest Dr., Moorpark, CA 93021
(805) 529-9376


LIGHT VALVE