

Hearing “The Birds” cry: Oskar Sala, the Trautonium and the electro acoustic sound – a project of digitization

by Dr Wilhelm Füssel and Eva A. Mayring, Deutsches Museum, Munich

Dear colleagues,

I’m not entirely certain whether you knew what to associate with the name ‘Oskar Sala’ when my lecture was announced. However, I am certain that you are familiar with the following outtake.

This is an outtake from Alfred Hitchcock’s award-winning film “The Birds” released in 1963. Ringing in your ears you all now have the terrible screeching and piercing caws of thousands of birds as they attack the inhabitants of a small coastal town. Yet, this cawing and screeching are not recordings from nature. They were not dramatic enough for Hitchcock. The cawing was artificially produced on an electronic instrument – called the “Trautonium” – and the man who produced the sounds was – Oskar Sala.



Sala, born in 1910, stemmed from an artistic family. As a child, he already began composing sonatas and piano concertos. In 1929, he went to Berlin where he studied at the Music Conservatory in the Master Class taught by Paul Hindemith (1895-1963). It was here that he also met engineer Friedrich Trautwein (1888-1956) who had just built a new electro acoustical instrument, the ‘Trautonium’. Sala actually played the instrument at the debut of the Trautonium in 1930. For the film “Stürme über dem Mont Blanc” produced the same year, Sala generated the engine noises for the airplane of the well-known German flyer Ernst Udet for the soundtrack. During the 1930’s, Sala gave concerts throughout Europe on his Trautonium.



Budapest 1942

He cooperated on numerous theater, ballet, and opera performances and radio broadcasts. Later Sala worked almost exclusively in his own studio where he produced hundreds of recordings: music and sounds for TV, movies, and industrial films, for advertising, but also his own music which he composed and played on the Trautonium.



Sala's studio in Berlin just after his death

Sala continued to develop the Trautonium for over 70 years. He himself built an instrument called the "Mixtur-Trautonium". Sala played the Trautonium until his death in 2002.

Sala received numerous awards for his electro acoustical music. In 1960, he received the Grand Prix at the Industrial Film Festival in Rouen for his film "Stahl. Thema mit Variationen" (Steel – Variations on a Theme), and in 1987, he was awarded the German "Filmband in Gold". Sala also cooperated on numerous prize-winning films, such as "A fleur d'eau" in 1962, and the industrial film "Alvorada. Aufbruch nach Brasilien" (going to Brazil), 1961.



Friedrich Trautwein and the Trautonium

The Deutsches Museum's initial contact to Oskar Sala goes back to the year 1932. It was then that Sala together with Friedrich Trautwein presented the first Trautonium on the occasion of the museum's Annual Meeting in Munich. The instrument was then donated to the museum. With the opening of a branch of the museum in the former German capital city of Bonn in 1995, Sala gave the Deutsches Museum the "Mixtur-Trautonium". In the following years, contact remained good. In his will, Sala directed that all his artistic works with all rights to them as well as all his property should go to the Deutsches Museum.

After his death, the Oskar Sala Fund was established at the Deutsches Museum with the purpose of looking after Sala's life work.

In autumn last year, several Deutsches Museum employees and I developed a web site devoted to Sala's life and works (www.oskar-sala.de).

The invention of the Trautonium has to be seen in conjunction with a general phase of experimentation with new musical instruments. Berlin at the end of the 1920's and until the seizure of power by the Nazis was a center for electric music. New instruments were developed such as the Hellertion, the Trautonium (1930), the Neo-Bechstein grand piano (1931), the Förster Elektrochord (1932), the Volkstrautionium (1933) and the somewhat later development of the Großtonorgel by Oskar Vierling.

The Trautonium Friedrich Trautwein built in 1930 at the newly established radio broadcasting experimental center used the technology of earlier inventions. The 'Trautonium of the Rundfunkversuchsstelle in Berlin' consisted of a manual comprising wire stretched over a metal rail.



Trautonium of the Rundfunkversuchsstelle (RVS) in Berlin

By pressing the wire to touch the rail, an electrical contact was produced, generating a tone whose frequency depended on the respective point of contact on the rail. A small box was connected to the manual housing a glimmer lamp generator, a tube, and a filter. The glimmer lamp circuit produced a sound rich in harmonics.

Finally, the volume was controlled by activating a pedal.

During the next 50 years, different forms of the Trautonium emerged which were constantly developed further and offered new ways of producing sounds and tones:

1. Trautonium of the Rundfunkversuchsstelle (1930)
2. Volkstrautionium (1933)

Picture: <http://www.oskar-sala.de/oskar-sala-fonds/trautonium/volkstrautionium/>

3. Rundfunktrautionium (1935)



4. Concert-Trautionium (1937/38)

Picture: <http://www.oskar-sala.de/oskar-sala-fonds/trautonium/konzerttrautionium/>

5. Mixtur-Trautionium (1952).

Picture: <http://www.oskar-sala.de/oskar-sala-fonds/trautonium/mixturtrautionium/>

All of these instruments are based on tube technology.

6. “Mixtur-Trautionium based on Oskar Sala“ (1983)

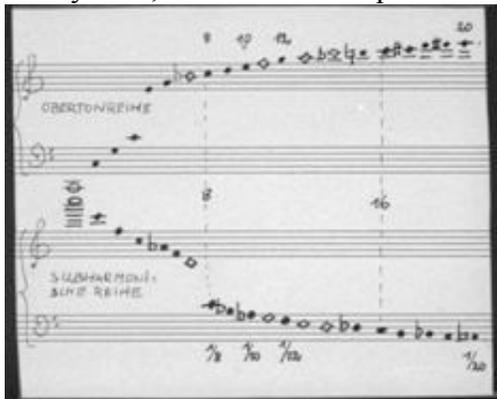


The last Trautonium used by Oskar Sala is based on a development by the professors and students of the Technical College of the German Federal Post in the 1980's working in close cooperation with Sala. This instrument uses semiconductor technology.

Oskar Sala produced most of his works on the Mixtur-Trautonium, the well-known crying of the birds, too. In its holdings, the Deutsches Museum has the only remaining exemplar of the first Trautonium type as invented by Trautwein (1930), three exemplars of the “Volks-Trautonium” developed by Trautwein and Sala together for Telefunken, and Sala's Mixtur-Trautonium from the year 1952. The Concert-Trautonium that Oskar Sala had loaned to the Museum of Musical Instruments of the Cité de la Musique in Paris is now also property of the Deutsches Museum because of our succession to the estate. Moreover, virtually the entire stock of his Berlin

Studio is part of the estate, including his original recording and playback equipment. Only the “Mixtur-Trautonium based on Oskar Sala” is not in the possession of the Deutsches Museum. It stands today in the Museum of Musical Instruments in Berlin.

In any case, the Trautonium produces a wide spectrum of tones unlike those produced by any other instrument.



The subharmonic timbre (excerpt)

The Estate of Oskar Sala

The artistic and technical estate of Oskar Sala came to the archives of the Deutsches Museum after his death in several parts.

Important holdings include:

- Publications on Oskar Sala (248 files)
- Publications on electronic music in general (177)
- Notes on the content of the tapes (493) and protocol notebooks (87)
- Correspondence (174)
- Photographs (933)
- Tape recordings (1,913), of this 1,724 tapes and perforated magnetic tapes

In total, it today comprises 77 running shelf-meters of correspondence, publications on Sala, newspaper clippings of his performances, sheet music, scripts, photographs, and tapes. The estate represents significant holdings that illuminate aspects of significance for culture, film, and technical history as well as the development of electronic music. The estate is formally available today in over 5,200 data sets.

Of particular interest for research is that the Deutsches Museum archives also possess the estate of Friedrich Trautwein who built the first Trautoniums. With the Trautwein and Sala estates the Deutsches Museum thus has one of the main fundamental holdings on electronic music in the 20th century. The 1,724 tapes form the main part of the estate.

The large holdings of sound recordings are not unproblematic for our archive. On his death, Sala was the only person capable of playing the “Mixtur-Trautonium after Oskar Sala” with its diverse variation options. Sala heard its sounds and recorded them on tape. In only the rarest of cases did Sala write down his compositions or music or make a note of instructions as to how the Trautonium had to be set to produce certain sounds. Consequently, the tapes are the only source of his vast artistic work. As a corpus, they are uniquely valuable, particularly since the compositions cover virtually the entire period of his artistic work. The importance of the tapes is that they not only contain completed compositions, but also preliminary stages and studies.

Unfortunately, the estate was not particularly organized when we received it. Instead, we found several moving boxes of “spaghettied tapes” which one of our staff has had to painstakingly untangle.



The problem with these tapes is that we have no information whatsoever about them, and we will have to examine them technically at great effort in order to reach a decision as to whether the tapes should be digitized.

The difficulties in the handling of the tapes are great. Sala, as a professional artist did in fact use high-quality professional recording tapes for his productions. Nevertheless, there are many different types of magnetic tapes which use carrier foils made of cellulose acetate, later polyvinyl chloride (PVC), as well as tapes based on polyethylene terephthalate (PET). The carrier materials of the tapes are in danger because of their decade-long storage in his own studio in Berlin which from a conservational standpoint was nothing but alarming. It soon became clear to us that the tapes had to be preserved through digitization. At the same time, future digital research in the area of “Electronic Music” and “Trautonium” was to be made possible for the first time.

The basic rule of the “International Association of Sound and Audiovisual Archives” was to serve as our guiding principle:

“Sound archives have to ensure that, in the replay process, the recorded signals can be retrieved to the same, or a better, fidelity standard as was possible when they were recorded ... (also carriers are the bearers of information: desired or primary information, consisting of the intended sonic content, and ancillary or secondary information which may take manifold forms. Both primary and secondary information form part of the Audio Heritage” (Guidelines 2004, p. 3)

But how to go about it?

For the digitization, it is necessary to compile as much information as possible about the individual tapes. However, information is unfortunately generally very sparse. Sala, and his wife, had often only drawn up an outline in the form of an index or list, taking the form of a small book, containing the consecutive number and a short title, sometimes also the individual pieces of the respective tape.



There are brief notes for several hundred tapes, frequently no more than a single page, but sometimes extending to detailed accounts of individual sequences, texts and mixing plans. Usually, however, these are sound recordings for extensive films which Sala did the soundtracks to.



Notes about the tapes

The second difficulty is that we couldn't tell from his notes what tape speeds Sala used to record his compositions and whether he recorded in mono or stereo. An examination of the tapes revealed that Sala recorded on a single (full) track, thereby using a professional format. Since we find ourselves in the fortunate position of possessing some of his tape machines, we were able to examine them and, on the basis of the recording heads, we saw that Sala usually worked with mono recording heads. Only one machine had a butterfly head.

Fortunately, Sala had kept the instructions for use for several pieces of equipment so that we know quite a bit about the technical possibilities of the individual tape machines.

Also, given the setting options of the tape machines, it soon became clear that Sala had worked with track speeds of 19 cm/sec. and 38 cm/sec. and then later with a tape machine that also recorded at a rate of 76 cm/sec. This largely coincides with our own observations arising from our study of the written estate.

A study of the machines recently conducted together with a colleague from the Phonogram Archive of the Austrian Academy of Sciences also revealed that Sala services his machines well. The recording heads were vertical and not oblique so that the recordings also reproduced high quality.

Digitization Program

Ultimately, it was also soon clear that digitization with all preliminary work would cost almost 300,000 Euros, a sum that we could not raise without external financing. By chance, we discovered we stood to benefit from a new cultural promotion fund introduced last year by the German Federal Cultural Foundation together with the Cultural Foundation of German States. The program "KUR – A Programme to Preserve and Restore Mobile Cultural Assets" was predestined for our plan. Projects submitted must have a high national cultural significance. It was also necessary that applying institutions contribute 30% of the total funding from their own finances or from additional solicited donations. Well-known experts and institutions are also to be involved in the project as cooperators. Our cooperators include musicologists from Germany and the Phonogrammarchiv – the Austrian Audiovisual Research Archive of the Austrian Academy of Sciences in Vienna. And, I take great delight here among colleagues from CASE to say that Peter Harper was willing to support our funding application by writing a very positive letter and to make today's presentation of the project possible. I would like to thank you sincerely, Peter, for your support.

The project was approved in February 2008 and received funding totaling 265,000 Euros. The Deutsches Museum Archive is the only German archive facility sponsored by the program. Most of the other institutions to receive funding from the program were specialized museums and special collections.

The Project Stages

We are currently in the starting phase of the approved project. After having researched Salas' written estate and preparing a catalog of his works which have lead to a better understanding of the different Trautonium types, the tapes, and their recording technology, we now have to study the tapes. Last week, together with the Phonogrammarchiv, we put together a selection of tapes which is now being studied and measured in Vienna. The goal is to document the technical parameters necessary to then be able to commission external firms with the

actual digitization process. We figure it will take 18 months to digitize the material. With the digital data we demand an accurate documentation of the metadata from the service providers: when and where are the cuts? What kinds of separators are used between the individual cuts? What settings can be read from the tapes? At what points did Sala change the tape speeds? Where did Sala make what comments about the tapes? What high frequencies, etc. did Sala use? We then have to play the data back into our archive database and document them.

For the future we are planning on putting a number of digitized recordings online at the oskar-sala.de web site. Also, CDs are to be produced from his artistic works in order to make them better known among the general public. And, finally, the museum is planning a special exhibition on Oskar Sala in the Musical Instruments Collection at the Deutsches Museum that will include a reproduction of his studio in Berlin. The exhibition is to include the different Trautonium types and also electronic simulations of their diverse tones.