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THE PRODUCTION OF SOUND EFFECTS FOR RADIO DRAMAS

BY

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THE PRODUCTION OF SOUND EFFECTS FOR RADIO DRAMAS

Summary

Excerpts from two broadcast plays demonstrate the application of electro-acoustical methods of producing noises. Special importance should be attached, in this connection, to the consideration given to audio-psychological factors.

One of the regular tasks of the Studio for Electronic Music is the production of sound effects for radio dramas(1). It is particularly concerned with sound phenomena which cannot be produced with mechanical or simple electro-acoustic means. Authors and stage managers are very interested in the great number of stylized sounds which have not been heard before. It should be pointed out, however, that even the convenient and time-saving imitation of naturalistic sound processes has its advantages. Similarly, the production of sounds which cannot be carried out mechanically because of the size of the acoustic sources required may be of value.

It must also be considered that a large number of natural sound phenomena cannot be transmitted for reasons of dynamics and frequency limitations. By producing such sounds on psychological principles an illusion can be produced in the listener which reinforces the artistic intentions of the spoken words(2). With respect to use, radio-drama sound effects can be classified as naturalistic or stylized. Those of the first group may characterize the treatment of the play both conventionally and symbolically, while the second group may be used either as imaginary or symbolic. Any noise can either be incorporated

into the action of the play or may serve for the production of the acoustical atmosphere.

In order to produce noises without needless experimentation and without an excessive expenditure of time, a classification of sound phenomena, even an incomplete one, is valuable. Physically speaking, all sounds can be described in terms of a frequency spectrum which also takes into account the compensation processes. However, a system of radio-drama noises which will satisfy all demands is extremely difficult to set up, since dramaturgical, psychological and physical principles have to be taken into account.

As a practical aid to the conversion of psychological phenomena into physical ones, their classification according to the kind of frequency spectrum has proved useful. As shown in Fig. 1, we distinguish between (a) line spectra, (b) band spectra and (c) mixed spectra. Classification of a noise under one of these three spectra almost always provides a starting point for its realization. Sound phenomena of tonal character, e.g. vocal or whistling sounds, possess a line spectrum, the noise of escaping steam or rushing water, on the other hand, can be represented by a band spectrum, while howling wind can be mentioned as an example of a mixed spectrum.

Of course, other phenomena such as frequency and amplitude vibrato, or the resonance processes can be drawn upon for the physical characterization. Most sounds can thus be classified according to the impression which they are to make on the listener. Skilful use of this scheme, however, usually provides satisfactory starting points for the ultimate attainment of the noises desired.

Basically, two methods can be used for producing radio-drama sound effects. In one case, natural sound processes are shaped by electro-acoustic means so that they satisfy the

dramaturgical requirements. In the other case, synthetic noises and sounds which are not accessible by mechanical-acoustic means, are employed(3). A few of the many possibilities will be demonstrated with excerpts of two broadcast radio dramas.

In the drama "Reaching for the Stars" (Der Griff nach den Sternen) an expedition to Mars is depicted in which noises associated with the start of the space ship play an important part. For clarification a few places from the text accompanied by sound-effects directions will be quoted:

SPEAKER 1:

> "Today we are going to make a flight into the future - four decades hence to the summer of 1993! If you wish to come with us then please step into our time rocket!"

(An unreal noise which swells slowly up to a high point then reduces in volume and finally ends so that we have the impression of an aeroplane landing, running along the ground and then stopping).

SPEAKER 2:

> "Well here we are in mid-autumn 1993!"

To make the required sound, coloured noise with a band width of one octave was employed in a range of 400 to 800 c.p.s. modulated by a sinusoidal sound sliding from high to low frequencies and mixed linearly with resonant melochord sounds.

REPORTER:

> "Attention everyone. The motors of the space ship are starting. 750,000 h.p. are being released."

(First a hissing noise gradually growing louder).

This noise was produced by coloured noise of 600 c.p.s. band width with the centre lying in the region of 5000 c.p.s.

"They are forcing the fuel into the combustion chamber. To give you the correct impression we are turning our sound microphone, which is 10 metres away from the rocket, at a steep upward angle."

(*The thundering noise increases.*)

The hissing is made with the ring modulator aided by the beat frequency oscillator at the lower frequency range and undergoes a transition into the thunder. The latter sound is obtained by eightfold expansion of the sound of a door being slammed hard.

"The earth seems to vibrate. Now it's trembling. I do not know whether you can still understand me. White jets of flame are shooting from beneath the structure.
All hell is breaking loose! It's terrifying, indescribable! Now the rocket is rising, flames are shooting in every direction, white flames, red flames! The rocket is rising! Gaining speed it disappears into the blue of the sky."

The thundering sound gives way to a howl which goes from low to high frequencies. Frequency displacements take place by glissandos to which, at the lower registers, are added frequency vibratos.

In the series "Against the December Storm" the first east-west flight of Lindbergh over the Atlantic is depicted.

LINDBERGH:

"As I stare at the instruments, for what seems like eternity, half sleeping and half waking, the fuselage behind me becomes crowded with ghostly creatures. They accompany me in the aircraft without affecting its weight and I am not surprised at their presence.

Without turning my head I can see them as clearly as if they were right in front of me. These phantoms talk with human voices - friendly, misty shapes which vanish or appear at random and pass in and out through the walls of the fuselage as if no wall were there. Now a crowd of them has gathered behind me, now there are only a couple of them left."

The voices of the phantoms, which are recognizable as human voices but are not intended to be intelligible, are formed by modulation of sinusoidal tones with severely frequency-clipped speech. Each separate phantom can be characterized by a pitch of its own.

These examples will probably suffice to show that the electronic music techniques can be used with advantage for the production of radio-drama sound effects.

References

1. Enkel, F. Elektroakustische Mittel zur Darstellung von Hörspielgerauschen (Electro-acoustic means for the production of radio-drama sound effects). Tech. Hausmitt. NWDR, 5: 47, 1953.

2. Turnbull, R.B. Radio and Television Sound Effects. New York/Toronto, 1951.

3. Meyer-Eppler, W. Wie lassen sich Klänge und Gerausche in Film und Rundfunk "elektronisch" gestalten? (How are sounds and noises produced "electronically" in cinema and radio?). Umschau in Wiss. u. Tech. 3: 81, 1954.

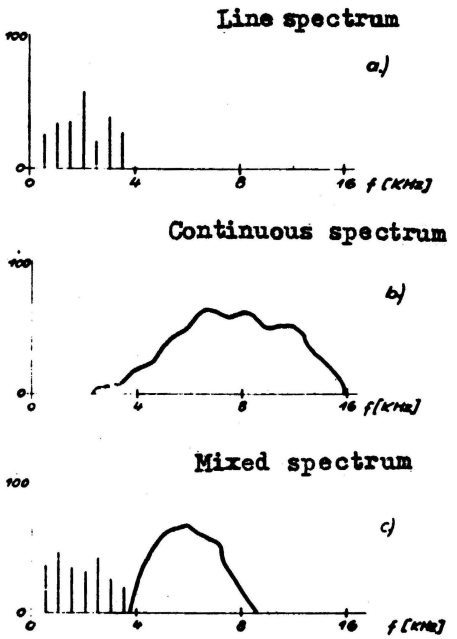

Fig. 1

Frequency spectra of sound phenomena:

(a) Line spectrum

(b) Continuous spectrum

(c) Mixed spectrum