

CONTRIBUTIONS TO THE PRESERVATION OF THE EXTREMADURA SONOROUS HERITAGE

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ABSTRACT

Extremadura is a region, in the southwest part of Spain, that due to its low both density of population and level of industrial development, and with a very recently increasing level of tourism, still has wide zones of its territory inhabited. This fact has allow the existence of a natural ambiances scarcely influenced by the human activities. Moreover, a rural word survives, with a sonorous richness, with medieval reminiscences, that represents for many people an attractive element. In this work a study of the sonorous heritage of Extremadura is presented.

INTRODUCTION

The development of the modern world has implicit, as a secondary effect, the extinction of the traces of the past, this is, of our heritage. This effect, in many cases not desirable, is in some cases unfortunately inevitable. It is our duty to try to preserve as best as possible this heritage, and anyway, to try to have physical proofs of its existence in the time.

The culture and nature heritage of a nation, and those signals that allow its identification, are aspect of a society, which must not be forgotten. The works for their studies, cataloguing and preservation have to be one of the priority lines in any cultural or environmental politic.

Some world heritage have been studied and catalogued for a long time, and in many cases there is a clear work to preserve them. In this situation is, for example, the architectonic heritage.

Besides, on photographic paper, many images of a past not very far away have been impressed. But, other values, due to their characteristics, many times have not been studied, and even we have not be conscious about their existence.

We wanted to focus our attention on one of these heritages that many people have enjoyed, and even long for it. We refer to those sounds that, together with a culture and an environment, are worthy of being reminded. This heritage should also find supports to be preserved. We are talking about the **sonorous heritage**.

We pretend to use the particularities of our region. Extremadura is a community that, in view of its density of population, industrial development and, why not, tourist development, has still large zones of its territory in which the human presence is scarce or null. This fact has allowed the existence of a nature a little transformed, but with a visuals and acoustics characteristics very desirable for the people fond of the quiet life and the natural environment still not very influenced by the human activities. Besides, still survives a rural word, with a sonorous richness, with medieval reminiscences that supposes for many people an attractive more.

If we consider the extension and the topographic configuration of our region, observe the existence of a variety of environments almost innumerable. Besides, in view of the latitude where our region is, the difference in the seasons along the year, as also the difference in the hours along the day, of the different environments can be very significatives.

Well, until now, everybody has realized the visual aspect of this heritage, but never we thought about the importance of the acoustic part for that the visual component preserve all its attraction.

We consider important to catalogue these environments, in order to record their sounds with an adequate equipment, not only for having digital quality, but to study those sounds, to know the physical aspects of them, and their acoustics indexes. The recording of this heritage would allow, in principle, its "preservation"; the existence of a record library of the natural and rural environments in Extremadura.

In any case, it is important to point out, to not fall in false expectations that, in many cases, we are not talking about very flashy or spectacular documents. We talk about "to preserve the sounds of the silent". However those quiet sounds of the nature, in many circumstances, calm our spirit and help us to be recovered of the daily hard work.

OBJECTIVES

As it can be deduced from the previously mentioned, there are a great number of environments to be considered. Because the work to be done would be huge, in a first approximation we have focus our attention only in some of them. An environment as the Natural Park of Monfragüe, with a special significance for Extremadura. And a rural environment, as the area of Sierra de Gata, where still survive many sonorous component of the past. And other environments, in principle less significatives and known, but useful to be compared with the above mentioned, as a reference.

In the selected environments it is pretended:

- a) To make recordings of the acoustics ambients in different hour intervals of the day and different seasons of the year.
- b) To take simultaneously photographic material of the environments in the different seasons.
- c) To analyse the taken sonorous documents in view of a cataloguing, interrelation, analysis and recognition of sources.

METHODOLOGY

The proceeding to record sonorous document has depended on the type of environment:

- In the Natural Park of Monfragüe the recordings are done at least one day each month of the year. In each recording are taken sonorous documents of different environments at different hour intervals.
- In the area of Sierra de Gata the recordings are done at least one day each season of

the year, trying to catch different meteorological and acoustic conditions covering also different hour intervals.

- In the rest of the natural and rural environments, the recordings are done along the year with analogue methodology.

RESULTS

From the beginnings of the works, four visits have been done to the Natural Park of Monfragüe, each of them two days of duration, acceding to places of the Park very distant between them. The first zone is a restricted area and there it is pretended to take recordings that allow knowing the environment less perturbed by the human activities.

In this environment, in the different visits, the only detected source not related with the natural media is the pass of planes in regular flights to a high altitude. These recordings and the subsequent analysis, will be useful as a reference for those made in others environments, and also we will allow to evaluate the sonorous richness of these type of places, and the values of the reference levels that appear there.

These reference values of the sonorous levels, obtained in environments little perturbed by the human activities, will allow to evaluate the importance of the acoustic contamination values in our cities respect to those in these environments where the life have been developed and evolved.

The second zone visited by us is an open area of the Park, accessible for everybody where are the dependences and shops for the reception of the visiting public with some rooms showing special aspects of the Park.

Therefore, in this second zone of study, we find the perturbations coming from the road, that crossing the Park, allows to the visitors to have access to the different installations and routes of the Park. This road represents also a way of communication between villages around the Park. It is also necessary to consider the perturbations originated by the visitors walking inside the Park, in the open routes.

According to the above mentioned, it is natural to think that there is more difficulty to get recordings which represent the natural sounds of the Park in this second zone. Both vehicles moving in the road and people walking in the open routes, represent perturbations. Anyway, it is interesting to study the influence of these perturbations and analyse their importance.

Respect to our visits to the Sierra de Gata, we have done two visits to the zone already, lasting each visit two days. The Sierra de Gata is composed of hills belonging to the Sierra Carpetvetónica, in the limit of the provinces of Cáceres and Salamanca, and being with the Sierra de Gredos the divisor line between the rivers Douro and Tagus.

Different villages of the zone have been visited, mainly those less transformed by the development, so that they conserve still and structure and architecture of several centuries ago, in some cases more than one millennium.

During the first journey of each visit, recordings are taken in the western zone, in villages as Hoyos, Eljas, Trebejo and San Martín de Trebejo. The second journey is the eastern zone, visiting the villages of Robledillo de Gata, Torre de Don Miguel, Gata and Santibáñez el Alto.

In general, the sonorous environments of these villages can be grouped in two types. In one hand there are some villages that have a acoustic atmosphere representative of the old times when there were not vehicles with motor and the sounds came from the water flowing, the whispers, whistles and laments of the wind, the talks between neighbours at the sun, the lost steps in the almost absolute silent of the cold nights in winter, lowings and brayings of the animals, the barks of the guardian dogs, the miaows of the silent cats, the sing of a cricket, etc. In these villages, at these hours, only a human noise source could be perceptible, the pass of a

plane in the sky in a regular flight. Nothing else. On the other hand, in certain hours intervals, the sonorous environments are not very different of the environments which can be found in other villages and our. Finally, others sonorous environments closer to the city of Cáceres have been selected. These environments can be also considered as sonorous heritage.

In all the above mentioned environments we have found some comparable results, so that it could be concluded that one on the most important sonorous heritage is the almost absence of sounds, only broken by weak murmur of the domestic or wild animals that sounds in the far away fields. There are still wide environments with life where it is possible to walk almost alone and enjoying with the vision and the audition of the free nature.

We can observe in Figure 1 a recording a bit longer than one week (5th to 12 of February 2002) in a natural environment slightly modified by the random presence of houses. It can be observed the existence of several consecutive periods with levels even lower than 20 dB. Figure 2 shows an interval of 8 hours during night time taken from the Fig. 1, (7th of February 2002).

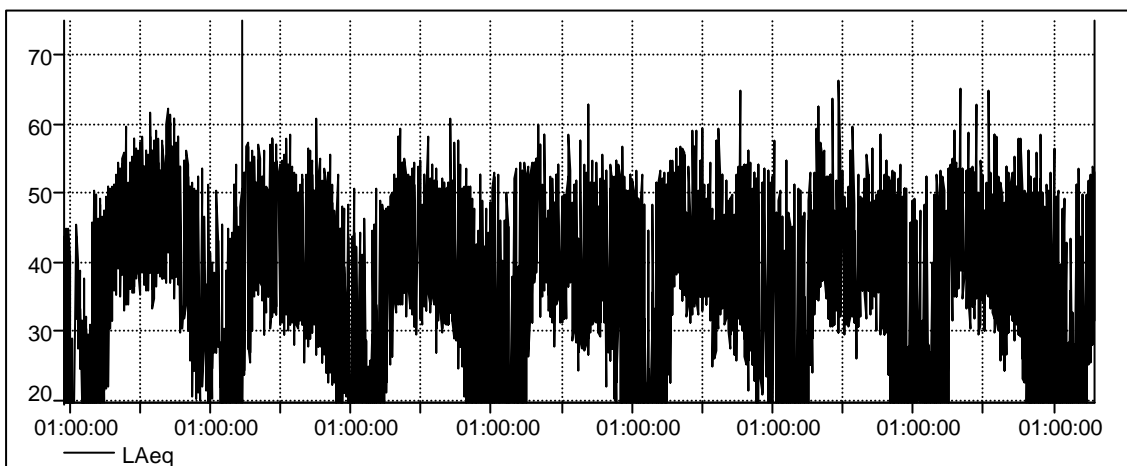


Figure 1: Evolution of the equivalent level during 176 hours taking values every 10 seconds.

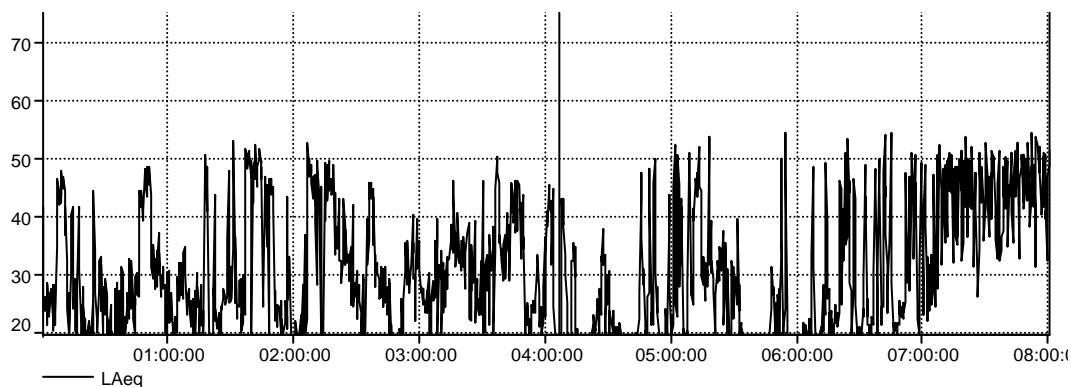


Figure 2: Selection of the previous figure corresponding a night interval of eight hours (7th /February / 2002)

In order to have an idea about the values of the sonorous levels in a week measurement, we have group the hour intervals in increments of 8 hours. We can see in Table 1 that, even these intervals, between 00:00 and 8:00 hours do not surpass for the L_{AFMin} the value of 19,7 dB.

| Date | Beginning time | Duration | Saturation | LAeq | LAFMax | LAFMin |
|----------|----------------|----------|------------|------|--------|--------|
| 05/02/02 | 00:00:00 | 8:00:00 | 0,0 | 35,7 | 57,4 | --- |
| 05/02/02 | 08:00:00 | 8:00:00 | 0,0 | 47,7 | 74,1 | 24,9 |
| 05/02/02 | 16:00:00 | 8:00:00 | 0,0 | 47,3 | 70,5 | --- |
| 06/02/02 | 00:00:00 | 8:00:00 | 0,0 | 40,5 | 62,1 | --- |
| 06/02/02 | 08:00:00 | 8:00:00 | 0,0 | 45,7 | 68,4 | 24,2 |
| 06/02/02 | 16:00:00 | 8:00:00 | 0,0 | 42,8 | 73,7 | --- |
| 07/02/02 | 00:00:00 | 8:00:00 | 0,0 | 33,8 | 58,1 | --- |
| 07/02/02 | 08:00:00 | 8:00:00 | 0,0 | 45,0 | 70,1 | 22,0 |
| 07/02/02 | 16:00:00 | 8:00:00 | 0,0 | 42,2 | 73,1 | --- |
| 08/02/02 | 00:00:00 | 8:00:00 | 0,0 | 41,2 | 64,4 | --- |
| 08/02/02 | 08:00:00 | 8:00:00 | 0,0 | 45,9 | 72,2 | 21,4 |
| 08/02/02 | 16:00:00 | 8:00:00 | 0,0 | 43,7 | 75,1 | --- |
| 09/02/02 | 00:00:00 | 8:00:00 | 0,0 | 38,8 | 66,1 | --- |
| 09/02/02 | 08:00:00 | 8:00:00 | 0,0 | 44,7 | 74,5 | 21,9 |
| 09/02/02 | 16:00:00 | 8:00:00 | 0,0 | 44,5 | 74,6 | --- |
| 10/02/02 | 00:00:00 | 8:00:00 | 0,0 | 36,4 | 62,4 | --- |
| 10/02/02 | 08:00:00 | 8:00:00 | 0,0 | 44,3 | 79,2 | 22,5 |
| 10/02/02 | 16:00:00 | 8:00:00 | 0,0 | 44,3 | 68,5 | --- |
| 11/02/02 | 00:00:00 | 8:00:00 | 0,0 | 40,1 | 61,9 | --- |
| 11/02/02 | 08:00:00 | 8:00:00 | 0,0 | 46,3 | 76,9 | 22,4 |
| 11/02/02 | 16:00:00 | 8:00:00 | 0,0 | 42,4 | 66,9 | --- |
| 12/02/02 | 00:00:00 | 8:00:00 | 0,0 | 38,4 | 64,9 | --- |

Table 1: Values of some acoustics levels (in dBA) obtained in periods of 8 hours.

If we make a analysis in one over third octave bands we can observe than in the night time the bands with higher frequencies disappear in the natural environments. For example, in Figure 3 a spectrum with the corresponding frequencies to the sounds existing in a studied environment the day 7th of February 2002 during the first eight hours is shown. It can be observed that from the one over third octave band of 125 Hz, the measured levels are about 20 dB or lower.

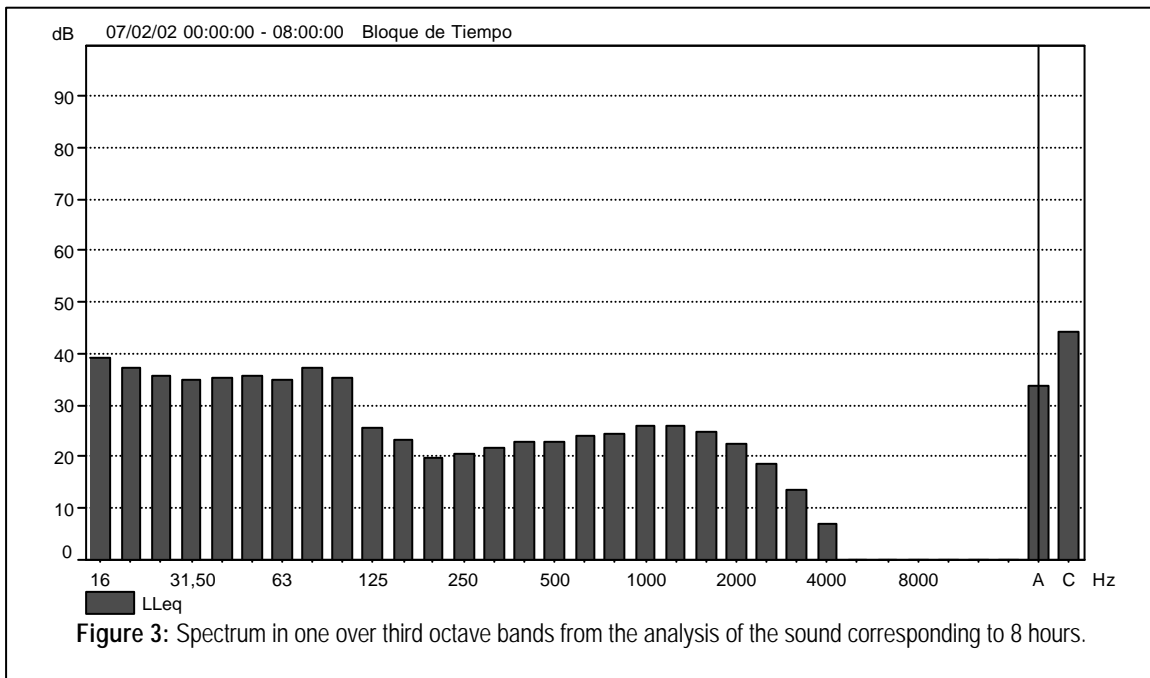


Figure 3: Spectrum in one over third octave bands from the analysis of the sound corresponding to 8 hours.

From the analysis of the made recordings it can be obtained the sonorous levels corresponding to determined significative events, as for example the broken of the silent due to the wild or domestic life, pass of vehicles in the roads close to the recording points, etc. In Figure 4 we present different recordings associated to the following events: Background noise,

sounds by birds and flies, disturbances of the sounds of the birds due to the pass of vehicles in a close road, sound of cocks and dogs, when the sun is arising.

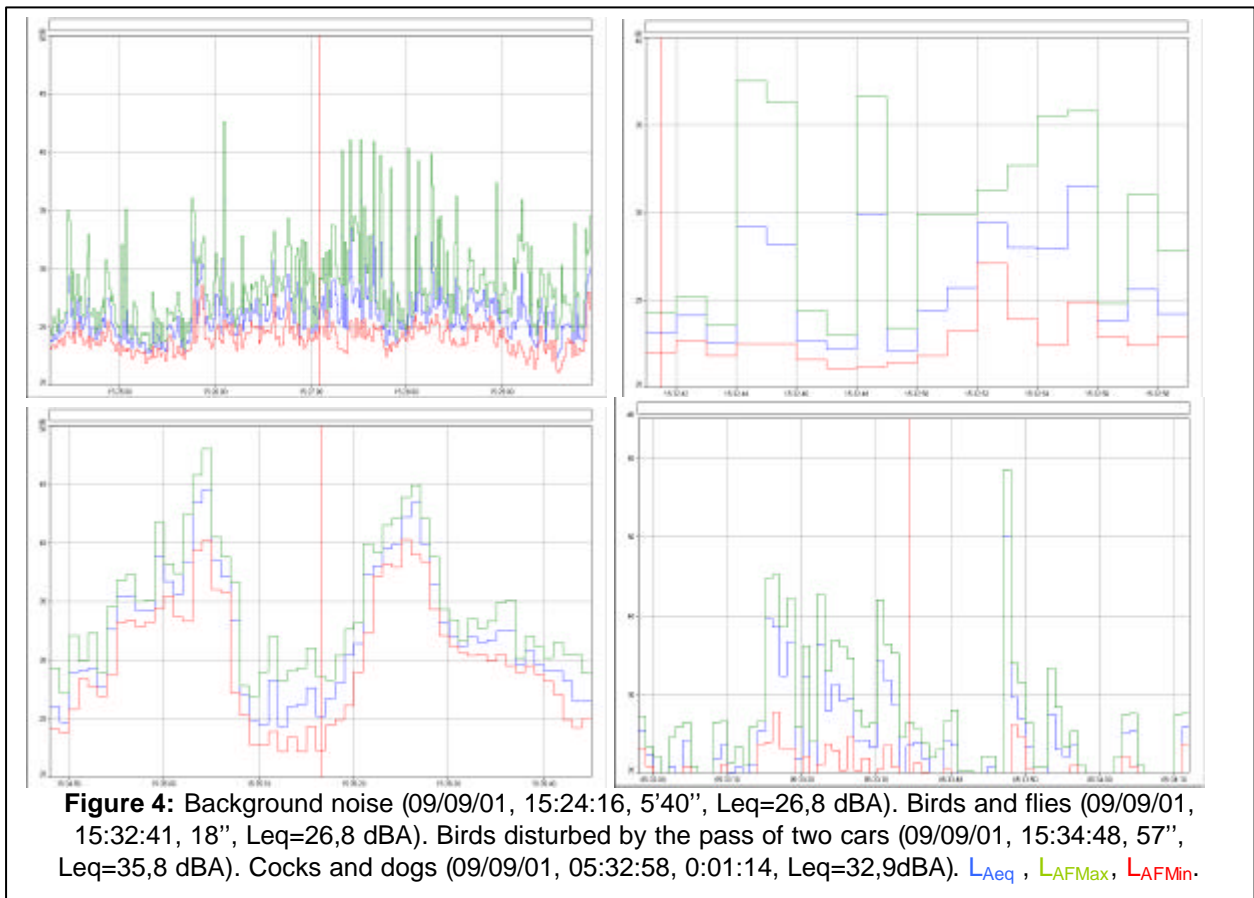


Figure 4: Background noise (09/09/01, 15:24:16, 5'40", $Leq=26,8$ dBA). Birds and flies (09/09/01, 15:32:41, 18", $Leq=26,8$ dBA). Birds disturbed by the pass of two cars (09/09/01, 15:34:48, 57", $Leq=35,8$ dBA). Cocks and dogs (09/09/01, 05:32:58, 0:01:14, $Leq=32,9$ dBA). L_{Aeq} , L_{AFMax} , L_{AFMin} .

CONCLUSIONS

Measurements of the sonorous levels, frequency analysis and recordings have been done for different sonorous environments: natural environments with sound very little perturbed by the human activities, natural environments with sounds a bit more perturbed by human activities, and rural environments little perturbed by sound coming from technologic machines., etc.

In the natural environments the sounds coming from the planes in regular flights can be considered like omnipresent.

Natural and rural environments little disturbed present night sonorous levels even lower than 20 dB.

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