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## Prosody in French theatrical declamation traced backwards in time

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Listening to early recordings of a French theatrical personality, such as Sarah Bernhardt, the emphatic emission of words is very noticeable. It is sometimes ascribed to Bernhardt's theatrical mannerisms, but possibly also caused by an erroneous speed of reproduction. But even at correct speed, huge variations in intensesness are very noticeable. Literature does not give a clear indication whether this manner of performance was considered deviating at the time (ca. 1900).

New research into the original handwritten patent documents of Édouard-Léon Scott (filed 1857 and 1859) has analyzed his method of recording the performance of the human voice. Scott documented the performance of a complete stanza from a French play, and looking at his graphical output and interpretation it becomes clear that the prosody of Mme. Bernhardt was already in place in 1859. Having identified the French play, even earlier descriptions of the prosodic approach in French declamation were found.

The paper also discusses the patents of Édouard-Léon Scott and his desire for the use of his invention, which was different from that of his manufacturer, Rudolph Koenig. Furthermore, the prosodic documentation will be demonstrated, and a historically informed reproduction of a recording by Sarah Bernhardt will be presented.

## 1 Introduction

The "antics" of the theatre, the "exaggerated" gestures, the declamatory style, the "garish" costumes are all elements that have developed over centuries in order to project the drama to an audience in an environment without PA systems. Theatrical historians will tell us that there were national differences, that the means used for projection changed over time, and at present we are in a phase where one meaning of "theatrical" is "artificial, pompous, spectacular, or extravagantly histrionic" [1].

Actors have reputations that cross centuries, and among the earliest actors that we would be able to pass judgment on ourselves is Sarah Bernhardt (1845 - 1923), because she made recordings. In other words, our judgment is based on hearing her performances with our own ears. In her records

we hear a style that to modern ears appears as very strange, full of almost a travesty of artificial pathos. Even to non-specialists they become unforgettable. For this reason, encountering a similar phenomenon apparently documented and not just witnessed almost 50 years earlier called for further investigation.

## 2 Early performance documentation

Working with early registration of vibration and sound it became necessary to consult the handwritten sources to such procedures. This meant retrieving from archives any available originals of the inventor's patents and similar early documentation. The inventor of recording of airborne sound was Édouard-Léon Scott (1817 - 1879) [2]; his claim

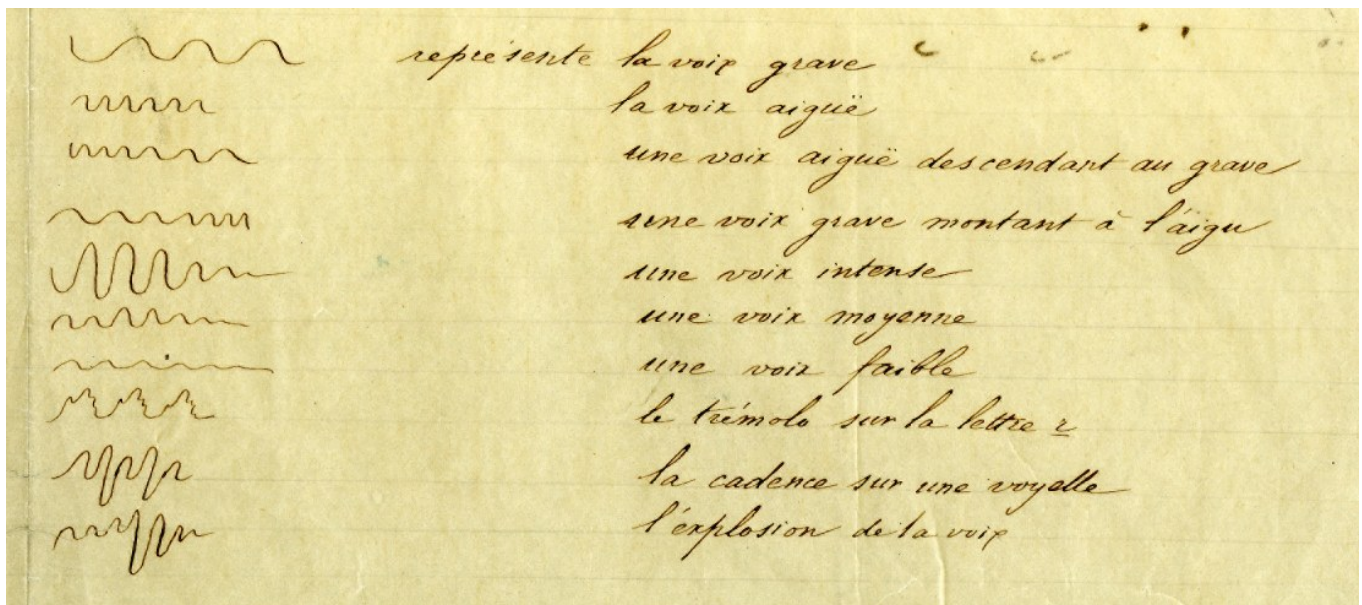


Fig. 1: Scott's table of signs on phonautograms and their interpretation

to this status and his cooperation with the Paris scientific instrument maker Rudolph Koenig is described in the accompanying paper "Early use of the Scott-Koenig phonautograph for documenting performance", this volume. The importance of the phonautograph for documenting performance has already been discussed in [3].

Scott was very conscious of his ideas and wrote in great detail, both to the Académie des Sciences and the Société d'Encouragement pour l'Industrie Nationale in the period 1857-61 as well as in the patents mentioned [4, 5, 6, 7, 8, 9, in chronological sequence].

Essentially, the phonautograph was from 1859 a sound collector with a membrane at the end, which made an inscribing stylus trace an undulating line on a sheet of soot-impregnated paper wrapped around a cylinder. The cylinder itself was mounted on a threaded rod, so that it was displaced sideways as it rotated.

The most important document in the present context is the last sheet in [8]; a large sheet (ca. 539x438 mm), not in Scott's handwriting, with the heading "Application of phonoautographic notation for the transcription of declamation". In honour of the 150th anniversary of the deposit of Léon Scott's first patent the texts of both patents have been translated to English in [10] by the present author, including the text on this sheet.

Scott states: "It is sufficient in order to translate by sight, apart from the articulation, to make the following remarks: the horizontal distance of the foot of the curve indicates the tone or tonality; the height of the same curve the intensity of the voice; the details of the curves the timbre; the lack of curves the pauses or silences. The few natural expressions shown here are sufficient to understand this figure". Next to the above text Scott brings a series of "typical" shapes, and the "natural expressions" are given below the explanatory text in great detail. The "natural expressions" consist of seven lines of verse, which are quite clear and coherent;

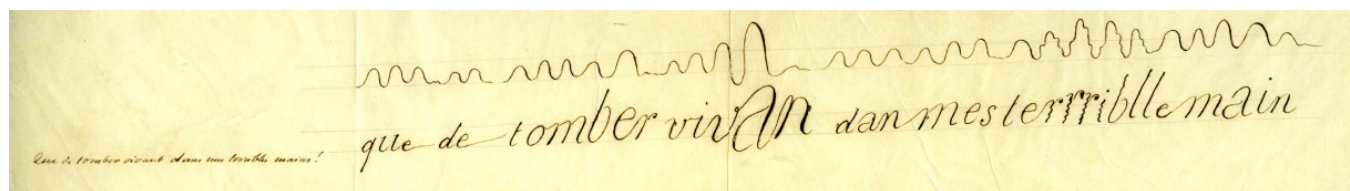


Fig. 2: Dynamic expression in the performance (1859) of a line of Ducis' *Othello* (1792)

It is proposed that the phonautographic curves are re-traced from original tracings and not merely idealized reconstructions performed by Scott. The reason is that the lines of verse are slanted upwards with approximately the same angle as are the traces on the original phonautogram attached to [8]; the slant corresponding to the thread of the helix that represents the time axis.

By using the quote from Ducis' *Othello* to demonstrate the capacity of the phonautograph to document declamation Scott has provided us with two facts: in 1859 it was reasonable to perform *Othello* in this fashion, and the play had sufficient age (1792) that it might be possible to find earlier, of necessity only in witness form, reference to this style of performance. Declamation was already given a long article in Diderot & d'Alembert [12].

However, another approach could be to search for reports of the performance of the creator of the rôle, François-Joseph Talma (1763 - 1826). This has been done extensively by students of French theatrical prosody and declamatory style, or as in [13], and a non-specialist would not be able to evaluate their respective merits. However, it is from a completely different source that contemporary statements may be found. In 1825 Mr. Pichot, a French traveller to Great Britain published a series of travel letters [14]. He compares the performance styles of British and French actors. He identifies those of Shakespeare's lines that correspond best to the quote of Ducis, above: "..... Oh that the slave had forty thousand lives! One is too poor, too

they form part of the one and the same phrase uttered by Othello in the French adaptation by Jean-François Ducis [11] (1733 - 1816) of Shakespeare's play of the same name. The seven lines are arranged most instructively. For each line, on a first line is given a handwritten re-tracing of the original phonautographic tracing. On the second line, first the line of the verse is reproduced in minute characters, followed by a phonetic transcription of the verse line in parallel with the phonautographic trace and with the combination script and longhand modified in such a way that the various modulations and inflections indicated by the phonautographic trace distort the line and size of the characters. Their height indicates volume, and a shakiness indicates vibratory sound, such as a rolling "R".

S'il faut qu'à-ce rival

Ait remit ce bandeau! Dans leur rage cruelle  
Nos lions du désert, sous leur antres brûlans  
Déchirent quelquesfois le voyageur tremblant  
Il vaudrait mieux pour lui qu leur faim dévorente  
Dispersà les lambeaux de sa chair palpitante  
Que de tomber vivant dans mes terribles mains!

The last line as transcribed by Scott is reproduced here.

weak for my revenge" (p. 397). He compares Talma's shouting and crying of Ducis' verbose text to the British actor Kean's other and more subdued means of expression, which however, creates the same terrifying effect. In a different letter Pichot writes about French and British actresses, and he says (p. 348): "Their prosody give to Shakespeare's so varied verse the sad cadence of our [French; *GBN note*] Alexandrins". In other words, he expresses his familiarity with the French declamatory style as the contrast to a more quiet style of the British. Apparently the style did not disappear entirely from the French stage until ca. 1968 [15].

### 3 Sarah Bernhardt's recordings

Bernhardt made recordings both for the Compagnie Française du Gramophone and for Edison. The latter were cylinders, which shall not be discussed here. The former were in the form of shellac discs, commonly known as "78s", because 78 rpm (revolutions per minute) became the acknowledged standard speed of recording and reproduction in the long commercial life of this format: from 1894 to 1962. When Bernhardt records are reproduced at this speed, the frantic delivery creates precisely the impression of travesty described above. However, when the reproduction is historically informed, i.e. with a speed of reproduction that is closer to the practice in the recording studio at the time of recording and with compensation for

linear distortions, the performance comes alive; it is suddenly a living presence, and the pathos is real. "Theatrical" indeed, but the artifice suddenly appears as the intended effect it was.

The recording used as an example is from Racine's play *Phèdre* (1677) "Oui Prince, je brûle", recorded in Paris in 1903 and issued on Disque du Gramophone 31103, repressed from original masters in HMV's historical catalogue No. 2 as one side of record number E 326. The speed that provides a natural performance is 71 rpm

Other French actors made correspondingly early recordings, but no recording of Ducis' *Othello* has been found.

## 4 Recording technology before 1925

The first sound recordings were the tracings from the phonograph dating back (according to Scott [c]) to 1854. They were obtained by a sound collector with a membrane at the narrow end that operated a stylus for inscribing. In 1877 Thomas Alva Edison successfully demonstrated that it was possible to reproduce the inscribed sound if it had been in the form of a vertically changing surface, which provided a cam for a cam follower to trace in reproduction. The cam follower drove a diaphragm that was in airtight connection to listening tubes; later it was a soundbox and horn. In 1887 Emile Berliner demonstrated that a tracing of a phonograph type on a surface could be made into a continuous, undulating but continuously spiralling groove on a flat tablet, a record. He furthermore provided a manufacturing method from originals. Eldridge R. Johnson ca. 1900 modified the tracing of Berliner into a tangible cutting away of material in a tablet of a wax compound; the cutting stylus was vibrated by the sound pressure obtained via a recording horn and soundbox. Galvanotypic processes enabled the manufacture in the same type of material that had been found suitable by Berliner [16].

The recording process was entirely dependent on using a conical (almost invariably) recording horn coupled to a soundbox as a velocity-to-pressure converter. The wax was rotated on a horizontal lathe below the cutting stylus at a speed that was determined by experience in the early years. Berliner used typically between 65 and 70 rpm, and the velocity gradually increased in the period under study, with very large deviations. There was a tendency that spoken word would have a lower speed than e.g. violin recordings. For a period the Compagnie Française du Gramophone used a tuning reed pipe for calibration at the end of their records, giving  $a=435$  Hz. When the performers also used this as their tuning pitch (which by decree was prescribed for the Paris Opera and the band of the Garde Républicaine), the speed of reproduction is completely determined. It was not until the 1930s, when electrical recording using microphones, amplifiers, and electrical cutterheads were the norm, that the speed was standardized at very close to 78 rpm.

However, there is a further approach. The cutting process causes the background noise in the groove to display a coloured quality in dependence of the impedance presented to the cutting stylus by the recording horn and soundbox. Using a Long Term Average Spectrum it is possible to obtain a spectral fingerprint from the noise signal that is independent of the tuning pitch used [17]. The recording horns used were locally standardized in the two cooperating

companies, the Gramophone Company and the Victor Talking Machine Company, and using recordings calibrated by a tuning reed pipe or by knowledge of the performance as a reference, it is in principle possible to place all noisy recordings using the same horn setups in relationship to each other. This means that it is possible to suggest a speed of reproduction based on measurement. Correcting the influences of the recording equipment and providing the correct speed of reproduction is certainly one way to provide an historically informed reproduction; this approach has the advantage that a signal is obtained that is as close as possible to the original signal presented for recording (apart from background noises).

## 5 Demonstration of style

We have seen the presentation of the performance elements by Scott. To an acoustician the temptation is to use a signal processing programme based on FFT and to evoke the "amplitude" representation known from the Sonograph®. The signal for this application is taken from the original recording, suitably amplified and digitized. However, in principle this is completely unnecessary: Sarah Bernhardt's records are analogue, which means that the curvatures of the groove has a one-to-one relationship to the acoustical phenomenon studied. In other words, the groove is as much a representation as the phonograph trace, perhaps more so, because there is less distortion. Hence, in order to demonstrate the principle a microphotographic image of a small section of the recorded groove is presented. The thing missing from it is the calibration of the time axis. However, in Scott's qualitative, rather than Koenig's quantitative use of the phonograph, there was no calibration as such.

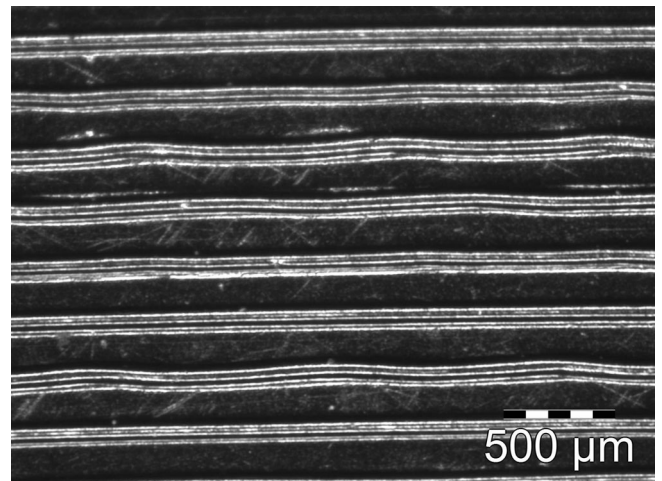


Fig. 3: HMV record E 326, Racine: *Phèdre*.

Fig. 3 is a microphotograph of the surface of the original groove from *Phèdre* performed by Sarah Bernhardt. Neighbouring grooves are one revolution away from each other. Some grooves appear completely smooth, and some display modulation. Even the smooth grooves provide sound, only it is weak sound. Furthermore, the groove is meant to be interpreted by a differentiating device; the original sound pressure variation is proportional to the derivative (also termed velocity) of the groove shape. The outbursts in Bernhardt's rendering is shown as the strong

modulation of the grooves. The time axis is calculable by the radius (in the present example 101 mm) and the speed of reproduction. A compression of the time axis is obtained by an analogue transfer to  $33\frac{1}{3}$  rpm, as shown in Fig. 4.

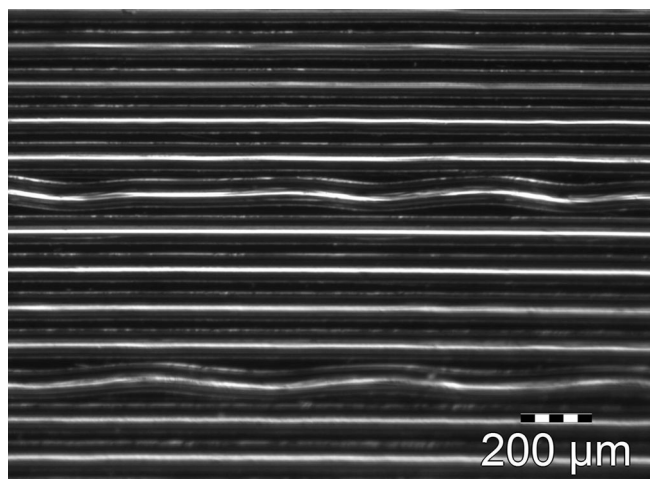


Fig. 4: Private transfer to lacquer record at  $33\frac{1}{3}$  rpm of the original shown in Fig. 3.

Here the radius is 122 mm (totally unrelated to the previous indication relating to the shellac original!). However, the time axis is essentially unknown, because it is dependent on the speed of reproduction of the original when it was transferred to the Long Playing record.

Common to both versions of the images based on the original sound recordings is that there is a difference on the microscopic level between small and large modulation. This information is not directly useful for analysis, although philosophically it is of the same type as the phonautograms created by Scott and Koenig. This was also recognized by the early researchers who desired to use reproducible recordings for analysing the sonic event. The first were Jenkin & Ewing in 1878 [18, 19] who used a lever system with a capillary pen to draw curves from Edison-type tinfoils, and among the better known later workers Edward W. Scripture must be mentioned [20].

## 6 Conclusion

It would seem that it has been possible to document the well-known declamatory style in French theatre by identifying Scott's demonstration in 1859 of the usefulness of his device as being based on a play that had been actively performed since 1792 and well-known for precisely this style of performance. An earlier reference comparing French and English performance styles provides a further corroboration.

## Acknowledgements.

I am grateful for the archival assistance given by the French Patent Office, INPI and by the Archive of l'Académie de France de l'Institut de France, providing facilities for visual

inspection of the handwritten originals and providing good images for in-depth analysis of the texts. I am grateful to Dr. Jean Haury, Paris for originally identifying the presence of the material in INPI and to Jean-Marc Fontaine of UPMC-IJLRA-LAM for in-depth discussion of the contributions of Scott relative to his instrument maker, Rudolph Koenig. Furthermore, I am indebted to Christian Ravn, of IPU, Denmark, for providing facilities for obtaining microphotographs of record grooves.

## 7 Related documents

In conjunction with the present paper two texts from Scott's hand are made available. The first is the complete text of [6] below with a translation into English. The second is the complete text of [7], a single-sided sheet of description prepared by Scott and printed in 100 copies, of which only one is known to survive, in the archives of l'Académie de France de l'Institut de France. A slightly amended translation may be found in [21].

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