TOWARDS A DATA BASE IN MUSICOLOGY:
THE COMPUTER PROCESSING OF THE BRIDGMAN FILE.

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The project presented by the E.R.A.T.T.O. team for which I am responsible, is a response to a precise objective put forward by the management of the C.N.R.S.: place at the disposal of the scientific community the documents discovered or elaborated by the researchers. Here it involves the edition and exploitation of an exceptionally rich file: the Bridgman file.

This file is well known to musicologists specializing in the fifteenth century vocal music, it constitutes a unique source. Its author, Madame Bridgman, Honorary conservator at the Bibliothèque Nationale has been working since 1944, at the demand of the International Repertory of Musical Sources. Since this date, helped by her collaborators, she gathers, sorts and studies the manuscripts of polyphonic vocal music which are noted between 1420 and 1520 and are conserved in the following countries:

Belgium, Denmark, Spain, United States, United Kingdom, (Italy, Portugal), South Africa, Canada will soon join this list.

For each manuscript, she notes for each piece and for each voice the incipit, i.e. the first notes and the first words of the text. The works are made up of between two and eight vocal parts, sometimes even more. The collection forms an enormous file which contains more than twenty thousand cards, i.e. about eighty thousand incipits. And this number is growing steadily.

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This file was first conserved in the Music Department of the Bibliothèque Nationale, and has been in our team's offices at Ivry since 1979. The cards are based on the following model:

But we must take into account the fact that we are speaking of a job done manually over a very long period of time. Its conception had necessarily evolved.

Each card contains three types of information:

1. Bibliographical information. These are: the reference of the town and library where the document is conserved, its reference, the piece's precise location, order number, folio or page. The composer name, if known, figures in the following manner: noted text to the piece, in the table, identified by concordance. In the latter case, the reference which permits the identification is nevertheless marked on the card.

2. Musical information. These include the number of voices in the piece (if the precision is necessary), the musical incipit of each voice, i.e. a dozen of notes reproduced in conformity with the original notation (number of lines, key, signatu-
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3. Literary information. These include the literary incipit of each voice, possibly the title of the piece and, if known, the author of the text. For the literary incipit the first verse is normally retained.

Other than this information which is taken directly from the source manuscript, each card possesses an element added by Madame Bridgman which serves as a musical identification of its content. This is a numerical "sigle", a process which she invented, and which, with a slight modification, is very commonly employed. To permit the comparison of similar melodic lines which can nevertheless be transposed, Madame Bridgman marks the value of the intervals which separate the successive notes from the initial note, which is coded 0. The following intervals are denoted by the number of half-tones which separate them from the given 0, preceded by the sign + or - representing up or down intervals. So as not to provoke mistakes due to the division of notes of longer values, repeated notes are not accounted for. The result is a diagram of the melodic curve, which can be used for comparisons. In all, only the upper part is numbered, and only four intervals are retained, which results in five figures.

As we can see on the card, the general information concerning the manuscript itself is not marked on each card. It is stored separately and will become the object of a separate recording, naturally consultable for each piece.

Because of its size and conception, the Bridgman file is a powerful research tool and numerous musicologists come to Paris to consult it. Its publication is being undertaken under the auspices of the International Repertory of Musical Sources, but due to financial reasons, the musical incipits cannot be reproduced. The published work will contain the description and the summing up...
of the manuscripts, with a list of all the pieces, the identities of
the authors, the publications in modern editions. The musical part
will be represented simply by the "sigle" of the upper voice. However
because of its brevity and its schematic conception, the "sigle"
allows only a general comparison of the beginning of the upper voice.
If two "sigles" are similar, the make-up of the incipit can only be
established by looking at the card itself. Due to this, and until
the INM is published, it will still be necessary to compare with
the original.

Apart from this, because of the symbolisation of the upper
part alone, the file cannot be exploited extensively. The tenor part
from this period is just as important as the upper part. Its exami-
nation is indispensable. Finally, a manual consultation allows sim-
ply the extraction of partial information. Numerous correlations are
therefore ignored.

In order to resolve all these problems, the
E.R.A.T.T.O. team has undertaken the computer processing of the file.
These are the aims of the operation:

1. Make available to the researchers the totality of musical
information stored on the cards by publishing a copy of them, in-
cluding the plotting of their musical incipits.

2. Extract using computers the totality of information,
symbolising all the voices to facilitate diverse correlational re-
search.

3. To make the whole of information easily accessible to
musicologists by creating a Data Base.

The first point of this project is already op-
erational thanks to the D.O.R.S.T. (Délegation Générale à la Recher-
che Scientifique et Technique) and to the C.N.R.S. (Centre National
de la Recherche Scientifique). Funds were allocated to us in order
to establish an input language for the treatment of musical texts,
and for the carrying out of programs for the dataprocessing of

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The input language created was adapted to the diverse data carried by the card. Three levels were classified, corresponding to three definitions "for representation". The bibliographic information is mostly carried over textually, but always preceded by a grade of authenticity, i.e.: established, supposed, dubious. The codification (more complex) of musical information, takes into account two fundamental notions of the file. The first is the "sigle" which is essential for the comparison of the pieces, but for our purposes, we have developed it further and now it includes all the notes, even those repeated. The second notion taken into account is the note, with all the necessary particularities for a reproduction in conformity with the original: nature of the figure, colour, height, orientation of the stem, and so on. Due to this, six characters are necessary as much for the notes to generate as for the rests:

The third level is comprised of literary information and only presents problems in very special cases, e.g. those texts where the word "heart" is replaced by a drawing. But in most cases, the texts are introduced without modification.

The plotting programs work from these data. We use the Benson plotter of the Calculation Center of C.N.R.S., situated at Orsay. Here are the results which we obtain.

The setting up of the publishing program and the exploitation presented a number of material problems. In particular, the most optimistic estimations indicated the need for approximately 9000 working hours to enter the information, that is one person full time for five years... Apart from which we couldn't drop our own re-
PROGRAMS: REYNE PAGES AND HENRY DUCASSE.
search to concentrate our time to the necessary programming for the
establishment of a Data Base.

Finally, the direction of the C.N.R.S. believed work of
such importance should be the fruit of an international collabora-
tion. I therefore turned towards a Canadian university, the Universi-
ty of Ottawa. Two members of the Musicalological Department, Profes-
seur Chartier et Labelle, as well as Professeur Logrippe of the Com-
puter Department showed a great deal of interest in this type of re-
search. The Canadian Council for Humanities Research were quite will-
ing to sponsor the project and a cooperation agreement will be si-
gned with the C.N.R.S. The work will begin in January 1981.

The tasks to be accomplished were determined as:

1. The publication of the file should be carried out vi-
then five years, at the rate of one volume annually. Each volume will
be made up of copies of the cards. It will complete and complement
the HNB edition. The plotting is carried out in France, using the
program which we possess, the publication being a co-edition C.N.R.S.
and University of Ottawa. The work will resemble that of Professor
Norbert Börker-Jell of Berlin, which is based on the German Teneedler.
Numerous indexes will facilitate the consultation. The first volume
should be placed in the hands of the publisher during 1982, the second
one year after...

2. Investigation. The file will be worked on at Ottawa from
tapes made in France. We foresee especially the "signe" of all the vo-
cal parts and methodological research into their correlations permitting
us to obtain an extensive list of concordances and identifications.
All the elements contained by the cards, whether bibliographic or
literary will equally be subject to methodical investigation and con-
frontation. For example, the relationship between the age of the ma-
uscript, its origin, the type of musical notation employed, or, the
association of the language used in the literary text, the ma-
uscripts place of origin, and the frequency with which certain themes
appear, determined with the aid of keywords.

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A certain number of triple-crostypings have been established and we are working in more depth towards the whole series of possible investigations. It is certain there will be a considerable gain.

3. The constitution of the Data Base represents the final stage of our work. It is to be taken for granted that this will be implanted simultaneously in France and Canada, to facilitate its consultation. This will be to my knowledge the third or fourth in our field (after Professor Lincoln, Dr. Bédow-Nell, and R.I.L.M.). During the first two years, our Canadian colleagues had intended to use an existing standard system, but later they developed a more flexible system, better adapted to our research.

Does this mean that a new area is opening up for modern musicology? I would like to hope so. But it is certain that presents two problems. One concerns Europe more particularly. The modesty with which the Data Base of the RILM made its appearance leads us to believe that the musicologists are not quite ready for data processing in their research, even if it is simply for the consultation of documentary reserves. Beside this, the Data Base is not accessible at the Bibliothèque Nationale nor at any specialized musicological library in Paris. A real effort is necessary to sensitize the researchers and the public services concerned.

The second problem is at an international level: the constitution of several bases has been undertaken and we remark that on the whole, they concern vocal music, giving coverage of the greater part of musical composition from 1420. They will soon go as far as 1600. An extremely rich source of information will soon be offered to the researchers. Unhappily, due to the different input languages this reserve cannot constitute a unique filecard. An important series of identifications will slip through our investigations. Transcoding programs will become necessary.
Now that musicology is turning towards the constitution of data bases, it looks urgent - to my mind - to prevent the dispersion which has started. If we wish that the field profits fully from the efforts and the investments involved, it would be best if a common policy concerning the work zones, the norms for the establishment of data and the consultation system could be developed very quickly. They should be standardized before the optimal exploitation is possible. This is the only condition for scientific profitability and economy.

I wonder if this could be the subject for a round table in the next congress of the International Musicological Society (Strasbourg, 1982).