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► **To cite this version:**

Alain Tabbagh, Michel Dabas, Christophe Benech. Albert Hesse: life and work (1938-2022). 15th International Conference on Archaeological Prospection, Mar 2023, Kiel, Germany. pp.51-60, 10.38072/978-3-928794-83-1/p6 . halshs-04131350

**HAL Id: halshs-04131350**

**<https://shs.hal.science/halshs-04131350>**

Submitted on 26 Jun 2023

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## Albert Hesse: life and work (1938-2022)

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### Abstract

Albert Hesse was one of the pioneers in archaeometry in France. He has developed the electrical methods, and more specifically the continuous electrical surveying methods and focused very early on urban archaeology and geophysics. This paper focusses on his work, showing specific interactive maps to highlight the position of his different surveys world-wide.

### Keywords

archaeological prospection; archaeometry; earth resistance methods; electrostatic; statistics

## Introduction

Summarizing Albert Hesse's life is not an easy task. Several obituaries have already been published in the different associations and places where he has worked and left an important contribution for the development of geophysical methods: ISAP (<https://www.archprospection.org/albert-hesse/>), GMPCA (<https://gmpca.fr/actualites-de-l-archeometrie/71-actualites-de-l-association/1719-albert-hesse-nous-a-quittes-le-2-juillet-2022>), CEA in Egypt (<https://www.cealex.org/evenement/hommage-a-albert-hesse/>) and ENS (<http://www.archeo.ens.fr/Hommage-a-Albert-Hesse.html>). He is for everybody of us the pioneer for the introduction of geophysical methods in archaeology in France in the 60s. His two first books: "Prospections géophysique à faible profondeur; applications à l'archéologie" (Dunod éd. 1966) and the "Manuel de prospection géophysique appliquée à la reconnaissance archéologique" in 1978 remain important milestones in his career and reference books for all of us, even if more up to date manuals have been published since.

### Resumé of his life (from ISAP Newsletter65)

Albert was born in Casablanca and lived in Morocco during his childhood and adolescence. After his baccalaureate graduation (1956) he moved to his homeland to follow an engineering cursus at the "Arts et Métiers" higher educa-

tion school from which he graduated in 1960. By the end of this cursus, he met Professor André Leroi-Gourhan who guided him to archaeology. Following the teachings of Professor Louis Cagniard, he chose near surface geophysics applied to archaeological prospection and was recruited by CNRS in October 1960. From October 1963 to March 1965 he did his military service in the Navy and followed this up as reserves officer in marine mines detection. He became "Docteur-Ingénieur" in 1964 and was the founder of the discipline of archaeological geophysics in France. He continued with this subject throughout his career in the CNRS, including at the "Centre de Recherche Géophysique" in Garchy (Nièvre) where he was director of the laboratory from 1982 to 1988. He retired by the end of 1999.

His commitment in scientific organization was substantial and constant:

- Supervised ten PhD thesis and taught archaeological prospection methods at University Paris 1 from 1980 to 2000.
- Organised student exchanges between Garchy and the University of Bradford (UK) from 1977 to 1988.
- Founding member (1976), general secretary (1976-1980) and President (1980-1987) of the GMPCA (initially "Groupe des Méthodes Physiques et Chimiques de l'Archéologie" and later "Groupe des Méthodes Pluri-disciplinaires Contribuant à l'Archéologie").

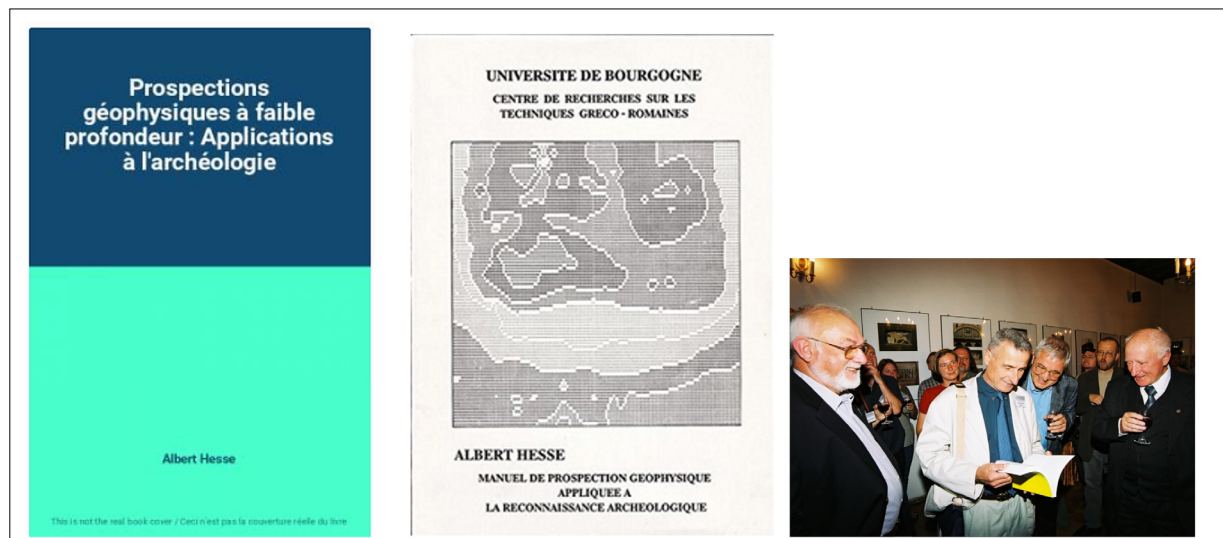


Fig. 1: Front pages of the reference book written by Albert Hesse. Himself at the center of the picture.

- Member of the Standing Committee of the Archaeometry International Symposium from 1980 to 1999.
- Member and Secretary (1997) of the Pre and Proto-History section of the “Comité Technique des Travaux Historiques et Scientifiques” (CTHS).
- Associate Editor of *Archaeometry* (1993-1998) and of *Archaeological Prospection* (1994-1999).
- Member of the editorial board of the French journals “Paléorient”, “Revue d’Archéométrie” and “Histoire et Mesure”.
- Member of the scientific council of Mont Beuvray from 1985 to 1990.
- ISAP founding member (2003) and then honorary member (2004).

## Contribution

His scientific approaches covered archaeometry as a whole. He always intended to introduce measurements to quantify observations, probably as a consequence of his theoretical background as an engineer of Arts et Métiers - see for example his dissertation about the uncertainties in electrical methods in his 1966 book or his article about “Count or Weight? Absolute or relative values?” (Hesse 1999). For him, archaeological prospection was a synthetic approach not limited to geophysical investigations (which provide information about the buried features), but also using surface and aerial observations (cf. his work with kites with B.-N. Chagny in Saï or the sherds counting in

Turkey for the location of amphorae production), statistical analysis of the spatial distribution of remains (his sister was a mathematician), document studies (cf. his work for the Heptastadium in Alexandria), ....all things now facilitated by the use of GIS. He was from a generation which was not using computers at the beginning but was able to draw isocurves maps manually and has always thought about the meaning of each measurement taken in the field (generally written on a piece of paper). This distance from the computers and their stammering introduction into archaeological geophysics made him reluctant to new technologies at first, but has helped understanding how and which measurements should properly be taken into consideration. A philosophy of sparsity, we could summarize nowadays in a period of massive acquisition of data. Those who had the chance to work with him in the field have taken advantage of this teaching. Another point I also learn (MD) from him is to always look in other directions than the one the archaeologist is asking you (the site is there, OK, but what is behind you?). This vision has proved to be very useful in lot of situations. The last important point I learned was that (geophysical) measurements was one thing, but all other clues have to be included to solve a problem. One of these, was to consider the whole landscape and even to feel it barefoot! Painting was one of his passions which probably helped him in understanding a landscape.

As an exploration geophysicist (or we prefer the term surveyor), he chose to work on a large variety of chrono-cultural areas, at first in the Eastern Mediterranean,



**Fig. 2:** Albert Hesse painting in Alexandria (Egypt).

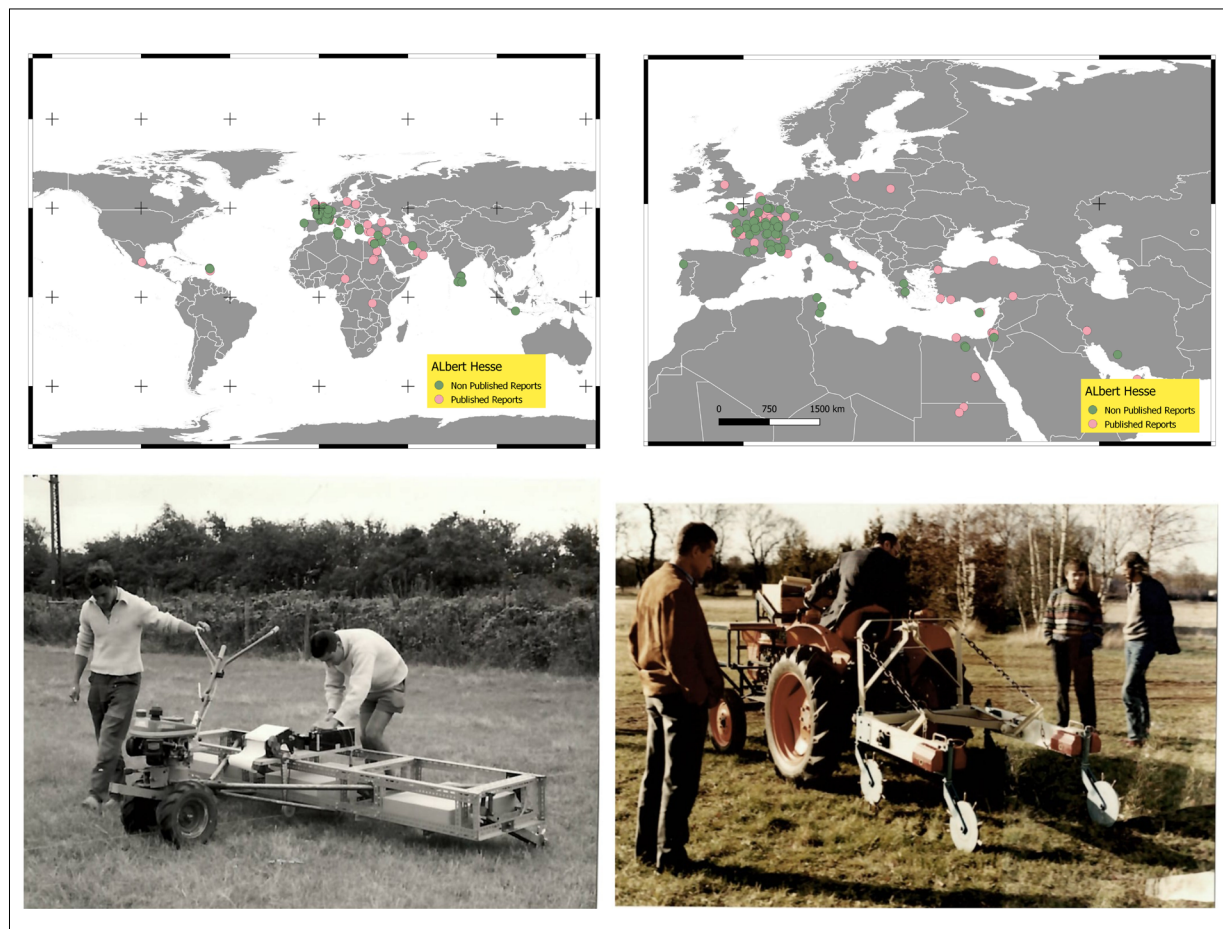
Near and Middle East and Egypt, but also in India, Java, Mexico, Honduras, West Indies, Burundi ... and Europe. These projects were carried out within the framework of 'French abroad missions' and were of high scientific and human interest. However, his efforts to convince the metropolitan archaeology decision-maker to invest in prospecting methods were less fortunate. So that he wrote in 1998: "Who can believe that everything can be detected and is readable by shovel trenches, while there exist numerous examples of identification by measurements of features that were not evidenced by excavations?"

We have developed with a GIS, a list of all places where he has made reports and/or publications (with their hyperlinks for download).

The laboratory of Garchy was the perfect place to develop the geophysical methods for archaeology: direct access to large fields where artificial features have been buried (but also real archaeological features in a close vicinity), a

"dream" team (AT for the theoretical developments, Jeanette Tabbagh for computing and Alain Jolivet for mechanical and electronic design) and finally the possibility to host lot of students in a remote place with all facilities. Knowing his hospitality, lot of students from different part of the world and especially from Bradford University have benefited from this situation.

His major contributions to the development of geophysical techniques were related to earth resistance methods that are very simple in their principles and robust against the different sources of noise. He proposed solutions to overcome climate influences, to correct for anisotropy effects resulting from the orientation of current lines, and overall urged the development of designs for the use of continuous measurements while profiling. Several systems based on specific resistivity meters developed in Garchy (RMCA designed by A. Jolivet) were tested from the first one behind a small tiller or later on by a tractor. In 1995



**Fig. 3:** Locations of the surveys achieved by Albert Hesse throughout the world (top left) and zoom in the Euro-Mediterranean area (top right). Resistivity measurements while moving: in line Wenner system in 1964 (left bottom), and the RATEAU square array prototype (right bottom) with Alain Jolivet, Michel Dabas and Georges Ducomet (1987).

at Wroxeter (England), a hand-towed (and home made by Albert) cart was designed to measure continuously the electrical resistivity in a pole-pole configuration. The system proved successful (Dabas et al. 2000) and was very light. It fulfills the main wish of Albert to survey with the minimum weight and size system!

Beyond archaeology, the resulting technical progress even met a fruitful application in precision agriculture with the very heavy duty systems designed by Geocarta (ARPs). Albert has had indeed a strong interest in soil science and established very early cooperation with research institutions in this field (INRA, Institut National de Recherche Agronomique). Every geophysicist knows that detectability of archaeological targets is a result of the contrast in physical properties between the target and its surrounding, the soil in Archaeology. Albert has understood very early the importance of soil.

The use of geophysical techniques in urban contexts was one of his major interests since the beginning of the 70s. First limited to the earth resistance technique it was later supplemented with two complementary methods, the electrostatic one which is an extension of the resistivity technique and ground penetrating radar (GPR).

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A complete list of his publications (62 in total) can be found here: [http://www.archeo.ens.fr/IMG/pdf/bibliographie\\_albert\\_hesse-added-md.pdf](http://www.archeo.ens.fr/IMG/pdf/bibliographie_albert_hesse-added-md.pdf)

Also interactive maps can be found here: [www.chronocarto.eu](http://www.chronocarto.eu)

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