

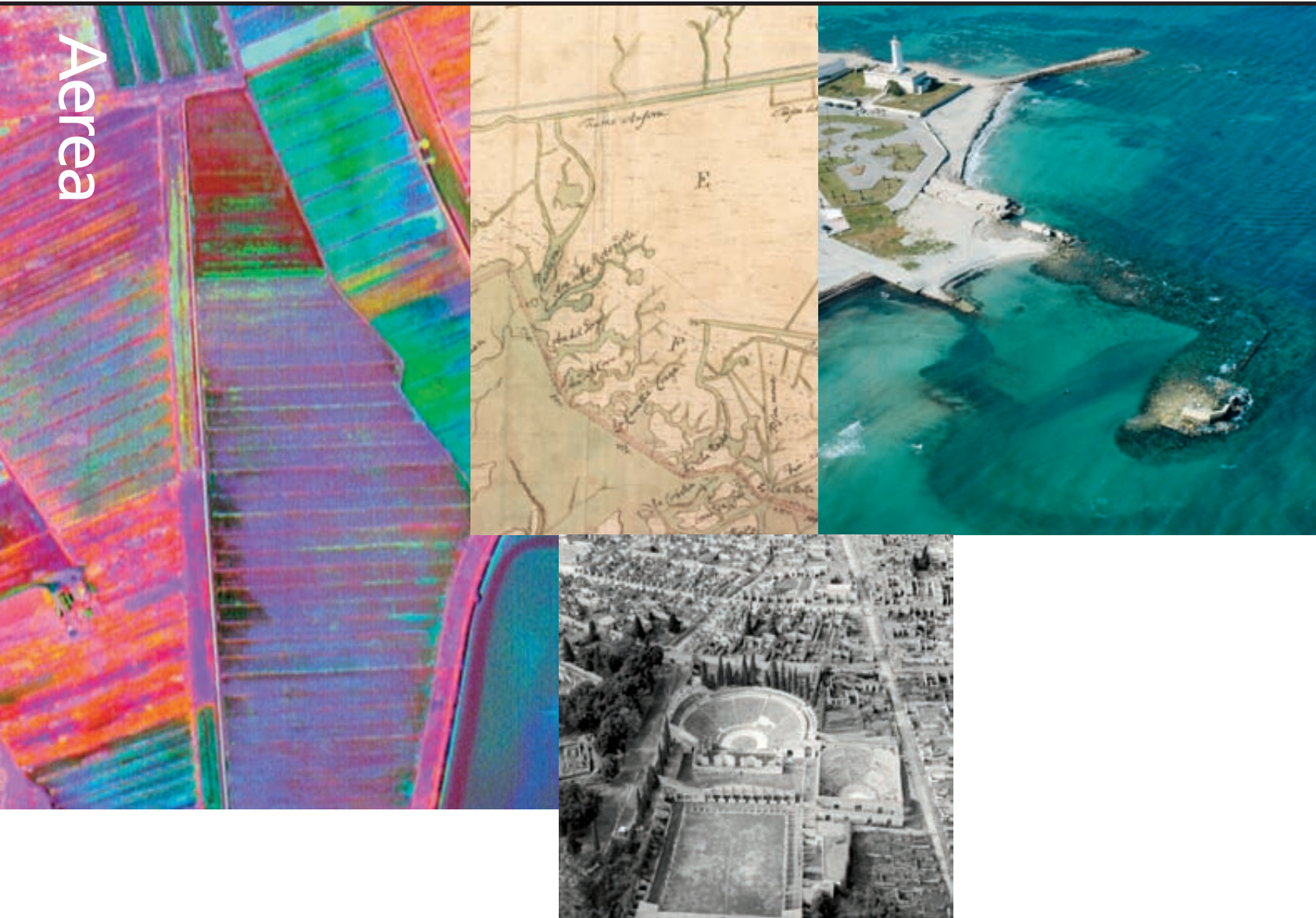


Studi di Aerotopografia Archeologica

Archeologia

# Archeologia Aerea

Aerea



# 3'08

# Archeologia Aerea

## Studi di Aerotopografia Archeologica

III

*a cura di*

Giuseppe Ceraudo

Fabio Piccarreta

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## Introduzione

La Topografia antica è la materia che copre le esigenze della ricerca per tutto quanto riguarda l'indagine sul territorio e la lettura storica del medesimo (spesso intesa oggi sotto il nome di Archeologia del paesaggio).

L'Aerotopografia archeologica è a tutti gli effetti una Topografia antica che utilizza particolarmente a fondo lo strumento aereo e tutte quelle immagini aerorilevate con le sue varie applicazioni ed elaborazioni. Va intesa quindi non come la naturale evoluzione di una materia che, affondando storicamente le proprie radici molto indietro nel tempo, comincerebbe a risentire di un certo invecchiamento, ma come la stessa materia con tutte le sue fonti e tradizioni che riserva un occhio di riguardo allo strumento aerofotografico.

In questi ultimi anni nel nostro Paese c'è stato un ritorno in forze degli studiosi stranieri nel campo degli studi specifici di aerofotointerpretazione archeologica, che è risultato fecondo di stimoli anche per gli studiosi italiani del settore. Questo fatto, unito con il cambiamento delle leggi che regolavano in confini piuttosto ristretti la ricognizione aerea in Italia, ha prodotto un notevole incremento nelle applicazioni legate alla archeologia aerea anche a livello di corsi di formazione specifici. Stimolante è stata anche l'esperienza concretizzata con la mostra *Lo Sguardo di Icaro* e relativo importante catalogo<sup>1</sup>, che ha incrementato notevolmente le ricerche di materiale di archivio dimostrandone l'elevato livello qualitativo e la grande quantità di dati contenuti; in definitiva si è avuto un incremento importante nell'uso della ricognizione aerea e nella estrazione di dati dai voli storici che rientra nella logica classica della Topografia antica e che in essa trova la sua compiuta finalizzazione purché il tutto non rimanga fine a se stesso ma confluisca nella corrente degli studi sul territorio.

Allo stato attuale delle cose, i centri più attivi di Aerotopografia archeologica, anche se non i soli, sono presso l'Università del Salento a Lecce e la Seconda Università di Napoli, in quanto qui si continua a lavorare sulle fotogrammetrie finalizzate all'uso archeologico con una certa continuità. A questo proposito bisogna osservare che in questi tempi si riscontra un notevole collasso nella fotogrammetria commerciale a scopo cartografico, determinata in parte dallo svincolamento della progettazione di massima dalla cartografia di base, in parte dal cambiamento non sempre felice degli strumenti di creazione cartografica (passaggio dai grandi sistemi analitici a quelli digitali puri) determinato fondamentalmente da motivi economici di produzione che per altro non sembra aver salvato economicamente il settore che è insidiato dai nuovi sistemi di cartografia satellitare nelle sue varie elaborazioni e aggiustamenti che al momento però non vanno molto oltre il livello speditivo.

Se per il settore commerciale in qualche modo si salvano le esigenze fondamentali comunque abbastanza povere, la conseguenza nel nostro settore, anche ipotizzando rosei sviluppi dei metodi per il futuro, si concretizzano in una assoluta caduta di precisione e di dettaglio. Non ultima preoccupazione è costituita dal fatto che in pochi anni questo collasso produce e produrrà la rarefazione e l'invecchiamento dei programmi dedicati alla restituzione aerofotogrammetrica e l'impossibilità di reperire tecnici per manutenzione e aggiornamento hardware dei fotorestitutori, producendo come conseguenza l'estinzione del settore che non è attualmente in grado di sostituire i grandi sistemi classici per qualità di prodotto.

<sup>1</sup> M. GUAITOLI (a cura di), *Lo sguardo di Icaro. Le collezioni dell'Aerofototeca Nazionale per la conoscenza del territorio*, Roma 2003.

Come per i primi due numeri della Rivista, anche all'interno di questo terzo volume, riteniamo di aver mantenuto le aperture annunciate in passato, con la sempre gradita presenza di lavori di giovani studiosi e con la disponibilità di spazio a tutti i ricercatori – italiani e stranieri – in rappresentanza delle varie tendenze.

Il terzo numero parte, come ormai consuetudine, con studi sui pionieri o sull'attività pionieristica legata alle riprese aeree: in particolare sull'opera del Battaglione Specialisti del Genio Militare che portò ai rilievi aerofotografici di Pompei (1910) e su materiale storico con l'individuazione e la descrizione di un importante fondo di foto aeree (S.A.R.A. - Ala Littoria) degli anni Trenta del secolo scorso ed alla loro applicazione in lavori topografici in Etruria meridionale. Seguono lavori di fotointerpretazione archeologica classica (anche collegati alle nuove tecnologie di *remote sensing*) ad *Aquileia*, in Toscana lungo la *via Aurelia*, in Campania a *Velia* ed in Puglia nel territorio di *Mesagne* e a *San Cataldo di Lecce*; non mancano anche questa volta contributi di respiro internazionale, come le indagini sulla città romana di *Ammaia* in *Lusitania* (Portogallo). Inoltre, vengono presentati in anteprima importanti Progetti di "archeologia aerea" avviati di recente in Italia: in Emilia Romagna nel territorio di *Classe* (Ravenna) ed in Puglia a *Sipontum* (Siponto-Manfredonia). Chiudono il volume, impreziosito dalla cura e dalle capacità editoriali di Claudio Grenzi, due articoli sulle attività e sullo stato dell'arte della nostra materia in Europa ed in Italia e sulle prospettive future di ricerca legate alle immagini aeree.

Giuseppe Ceraudo  
Fabio Piccarreta

## Abstracts

a cura di Chris Musson

G. STEFANI

### **The 1910 'Rilievo topofotografico' (Topographical/Aerial Map) of Pompeii**

This article deals with the circumstances surrounding the realization of the first air photographic survey of Pompeii, undertaken by a military special unit (the Italian Military Engineers Specialist Battalion) in 1910 and reproduced at the scale of 1:1000. Unknown to the Pompeii specialists, though now well-known to those familiar with air photographic history, the '*rilievo topofotografico*' (as it was called by its authors) was only the second air-photographic survey ever undertaken in Italian archaeology and thus represents a pioneering enterprise. Several copies of this most interesting aerial map still survive and their exact locations are provided in this study in the hope of prompting further research.

G. SCARDOZZI

### **Historical Aerial Photography and Researches in Ancient Topography in Central-Southern Etruria**

This contribution underlines the importance of historical air photographs for studies in ancient topography. In particular it concerns an archive located in the Government Historic File of Viterbo, named '*Fondo S.A.R.A. - Ala Littoria S.A.*'. This is a collection of the results from numerous aerophotogrammetric flights undertaken in the 1930s by S.A.R.A., *Società Autonoma Rilevamenti Aerofotogrammetrici*, founded by Umberto and Amedeo Nistri; the photographs were taken in order to update the cadastral maps of Viterbo province, using Ala Littoria aircraft. The images have only rarely been used for archaeological research and a many of them remain unrecognized and unexamined. The first section presents a series of examples relating to ancient settlements in Southern Etruria (including Tarquinia, *Sorrina*-Viterbo, Castel d'Asso, Norchia, Musarna, Ferento, *Falerii Novi*), along with the ancient *Via Cassia* near Viterbo; in all of these cases the photographs of '*Fondo S.A.R.A. - Ala Littoria S.A.*' were taken well before the RAF and IGM images that have normally been used in research studies. The second section presents three examples (two small ancient settlements and a necropolis) located in the territory between Vitorchiano and Bomarzo to the north-east of Viterbo; here, the historical air photographs show areas of archaeological remains that have now been almost totally destroyed by the mechanised agriculture that has brought about radical transformations in the landscape.

M. P. MUZZIOLI

### **Air Photographs of the Area to the South-West of Aquileia**

A series of air photographs taken in 1957 reveals traces of early hydrography and a number of linear features. These are interpreted as lines of delimitation in the *centuriatio* system of the colony of Aquileia (founded in 181 B.C., with a *supplementum* in 169 B.C.), along with internal divisions within the system.



A. TRAVIGLIA

### **Identification of Archaeological Traces in the Landscape through Airborne MIVIS Sensor Imagery. The Example of Aquileia**

In the last 10 years particular attention has been paid to the use of airborne hyperspectral sensors for archaeological research in Italy, where the MIVIS sensor has found substantial application as a complementary source of information in topographical studies. This paper presents the results of research in the area surrounding the Roman *municipium* of Aquileia. The spectral content of the MIVIS images has been used to emphasize the presence of archaeological deposits on the basis of the different spectral characteristics of the varying terrain and vegetation. Various algorithms have been applied for processing the images and the results are compared in order to define those which deliver the best results for the various research goals. The large amount of processed images has been managed through the use of GIS technology, which made available and manipulated all of the archaeological and topographical data necessary for evaluating the surface anomalies as traces of ancient origin.

F. BOSCHI

### **Aerial Survey for Archaeology at the Site of Classe. Researches in 2003-2008**

The aim of this project is the examination of the territory of Classe through an integrated approach to the study of the ancient landscape. A new strategy of work has been devised for the historical, geomorphological and topographical study of the territory. It is based on the collection and analysis of historical and modern aerial photographs, new aerial archaeological surveys and the collection of oblique air photographs, along with extensive geophysical survey of the most interesting sites and field walking survey. The project also encompasses the rectification of the oblique aerial photographs, their georeferencing and interpretation, and the construction of three data-bases (for aerial photographs, geophysical survey data and remote sensing evidence) in order to create a GIS platform bringing together all of the remote-sensing information.

G. CIAMPOLTRINI, M. COSCI, C. SPATARO

### **The Via Aurelia from the River Chiarone to the River Ombrone**

The aim of this paper is to re-evaluate segments of the *Via Aurelia* in the area between the Rivers Chiarone and Ombrone, where the aerial viewpoint has proved particularly effective. In the light of recent discoveries (or re-discoveries) of archaeological sites, emphasis is placed on the role played by the road in creating interconnections with the shoreline and sea-ways.

P.P. NARDELLI

### **The Topographical Problem of the Landing-points at Velia**

The location of the ancient landing-points at Velia is an unsolved topographical problem. Earlier studies based on the examination of aerial photographs have suggested landing-points at the mouths of the rivers Alento and Palistro where they flowed separately into the sea. Archaeological excavations in the Southern Quarter resulted in the discovery of building work believed to belong to a basin or dock, damaged by flooding brought about by climate change. New data and a better understanding of the *polis* allow us to recognize the dating of the various phases of walling and to formulate new hypotheses about the ancient shoreline. The archaeological survey and the results of the preceding studies make it possible to propose a new conformation of the ancient shoreline. Furthermore, the aerial photographs allow us to understand the landscape more clearly and to identify natural elements and changes within it, making it possible to identify key element in the ancient landscape at the time of the colony's foundation.

C. LAGANARA FABIANO, G. CERAUDO, A. BUSTO, P. GENTILE, R. PALOMBELLA, M. SAMMARCO, G. SARCIANELLI, A. VALCHERA

### **Archaeological and Aerial-Topographical Surveys at Sipontum. The 'Siponto Project'**

The 'Siponto Project' is based upon the results of five excavation campaigns, carried out since 2000 on the outskirts of the ancient town of *Sipontum*, in the north-eastern part of the Siponto Archaeological Park. Archaeological studies by the University of Bari have made it possible to understand the stratification of the settlement phases of the post-classical period, the least well studied part of the sequence in earlier work in the field. Recently, further topographical and aerial-topographical surveys have been carried out by the University of Salento-LAB TAF, aimed at the cartographic restitution of the area of the ancient town. Eventually, the combined analysis of historical aerial photographs, aerial surveys and recent images has made it possible to reconsider a number of issues concerning the overall topography of the ancient town.

G. CERA

### **The Contribution of Aerial Photography in Defining the Ancient Road System in the Territory of Mesagne**

Air-photo interpretation has made an important contribution to the reconstruction of the ancient road network around the settlement of Mesagne (Brindisi) and within its territory. The georeferencing of aerophotographical traces, combined with the examination of the archaeological remains and of the ancient cartography, make it possible to advance hypotheses about the development of part of Northern Salento road system between the Archaic Age and the Medieval period.

M. SAMMARCO, S. MARCHI

### **The Ancient Port of San Cataldo - Lecce. The Use of Traditional and New Methodologies in a Topographical Study**

San Cataldo, the seaside resort on the Adriatic coast 10 km east of Lecce (southern Apulia), the Roman *Lupiae*, has since pre-Roman times constituted the most natural port of call for inland Messapian settlement. An integrated research project carried out between 2004 and 2007 has made it possible to analyze and recognise the various building techniques, as well as the main features of the work. The techniques do not seem to follow exactly the 'rules' laid down by Vitruvius, though allowance must be made for difficulty in interpreting the archaeological remains, which have been the object of repeated degradation by both human and marine action. Recent aerial surveys, and the acquisition of oblique aerial images, have highlighted the massive submerged structures of the twentieth-century pier, directly founded on the earlier Roman structure; the pier was also studied during a preliminary diving survey. The comparison between the structural data and the abundant historical documentation from archival research together allowed the acquisition of further information relating to the ancient port.

C. CORSI, F. VERMEULEN

### **Elements for the Reconstruction of the City and Suburban Landscape of the Roman Town of Ammaia in Lusitania**

Simultaneous with the on-going archaeological excavations of the *Fundação Cidade de Ammaia* at the Roman town of *Ammaia* in Portugal, a group of researchers from the universities of Ghent and Cassino has in recent years been conducting a geo-archaeological and topographical survey of the ancient town and its surrounding territory. A combination of fieldwalking, geomorphological analysis and the study of aerial photographs has made it possible to reconstruct almost completely the circuit of the city walls, to identify several elements of the Roman street pattern, to suggest a plausible hypothesis for the location of the major roads connecting the town to its hinterland and beyond, to locate several possible buildings in the suburban area (e.g.

the theatre) and to suggest the identification of several funerary monuments along the roads entering the urban area. Some of these same roads are revealed as possible main axes on which at least two orthogonal systems of land division were centred in Roman times. Of particular interest is the discovery in the field of the source and initial canalisation of a major Roman aqueduct, whose linear connection with the water distribution *intra muros* was traced with the help of air photo interpretation. Together with several other discoveries these results of an interdisciplinary survey effort constitute valuable building blocks in the reconstruction of the settlement history of a Roman town in *Lusitania*.

G.J.J. VERHOEVEN

### **Digitally Cropping the Aerial View. On the Interplay between Focal Length and Sensor Size**

The first years of the new millennium have been very remarkable. With the advent of digital photography a new world has opened up for many people. Although photography will soon be celebrating its second centenary, there has never been a moment in history when so many people have owned and used a photographic camera. New technologies often introduce a totally new technical jargon and photography has been no exception in this respect. Although photography already had its own language, digital photography has added many new terms. In spite of the overwhelming amount of – supposedly – informative literature in the form of books, articles in magazines and items on the World Wide Web, most of these new terms remain as words of mystery for most practitioners. This is not always the fault of those seeking information, as a large proportion of this information flow is just misinformation floating around, not least on the Web. One of the often heard and read misconceptions is the fact that the focal length of lenses changes when they are used on a digital camera, leading to strongly magnified images as indicated by the digital magnification factor. By outlining the concepts of focal length and image sensor size, as well as their combined effect on field angle of view, this article aims to show why the statement is not correct. Furthermore, the quantification of angle of view will prove useful in the classification of lenses.

C. MUSSON

### **Magic Carpet or Patchwork Quilt? Aerial Archaeology Provision across Europe**

As the title of this short review implies, the pattern of provision for aerial archaeology across Europe resembles not so much a magic carpet as a patchwork quilt, of difficulties and differing provision, of partial solutions and significant achievements. Like any patterned bed-cover it looks quite pretty on the surface but can hide significant shortcomings beneath. Nevertheless, it may be instructive to look at the wide variety of responses that have been observed across Europe in the past decade by members of the international Aerial Archaeology Research Group, notably during two Culture 2000 projects of the European Union.

G. CERAUDO

### **Aerial Archaeology in Italy. Recent Research and Future Prospects The Contribution of the LabTAF at the University of Salento**

The different archaeological research conducted in Italy in recent years with the help of aerial photography, offer the opportunity to return to talk about the importance of this fundamental instrument in topographical studies and to reiterate some basic concepts.

The aerotopographic researches in Italy, started with G. Lugli in 1938, after a further development from the end of the 2nd World War onwards thanks to the studies of Italian and foreign archaeologists (F. Castagnoli, G. Schmiedt, D. Adamesteanu, J. Bradford, N. Alfieri), find their final consecration in the last decades of the last century and particularly in activities conducted by specific research laboratories of the

University of Siena, Second University of Naples and the University of Salento.

The Italian situation at the present, on account of the spreading of systematic aerial reconnaissance, oriented aerial shots and derived studies, is greatly developing. The change in the legislation with the abrogation, in December 2000, of the restrictive and anachronistic "Royal Decree" of 1939 about aerial recordings, which effectively prevented the free activities of aerial recordings to scholars, is to be considered as one of the most significant changes in our field, and opened also in Italy the frontiers of aimed low flights and of recordings of oblique pictures.

This led to the launch of a number of initiatives and interventions in some regions of our Country. This paper will try to present a synthesis of the current trends and future developments of the matter.



**Studi e ricerche 3.08**  
Studies and Researches 3.08