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The *Topographical Survey of Ostia from a Balloon, 1911.*

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(English translation by David Wilkinson, 2012 – for illustrations please refer to the Italian text - **Il Rilievo topofotografico di Ostia dal pallone (1911)**- published in *Archeologia Aerea*, 2, 2006).

The great *Topographical Survey of Ostia from a Balloon* of 1911 was initiated at the enthusiastic requests of Corrado Ricci and Dante Vaglieri, carried out by the Photography Section of the Specialist Battalion of Engineers, and is now held in the Photographic Archive of the Archaeological *Soprintendenza* of Rome - Scavi di Ostia (Fig. 1). It is possible to apply to the *Survey* (as I will henceforth refer to it) the famous definition of man-made landscape by Giulio Carlo Argan as ‘the product of human intelligence, thought and labour over millennia. It is a vast book, a palimpsest in which thousands of years of history are written.’

Argan said that the protection of this landscape was a problem which ‘rather than aesthetic, was ecological, economic, social and urbanistic’ and he went on to emphasise ‘the historical aspect of the environment, in its interweaving of history, nature and culture.’¹

The *Survey* in the history of photography since 1900

The year 1911 was important for Italian photography, because of the numerous significant initiatives deriving from the international exhibitions in Rome, Florence and Turin, celebrating the fiftieth anniversary of a united Italy. Two such initiatives were the International Exhibition of Artistic and Scientific Photography and, from the 24th to the 25th of April, the Third Italian Photographic Congress, both of which were held in Rome, at Castel Sant’Angelo.² In his paper delivered at the Congress, entitled: ‘On the Latest Advances in Balloon Photography’, Captain Cesare Tardivo (1870-1953) described the *Survey* work from balloons carried out by the Photography Section of the Specialist Battalion of Engineers, which also formed part of the exhibition.³ Amongst the most useful applications was the *Survey* of ‘archaeological areas, in which appear not only the dimensions of the remains, but all the characteristics of their structure.’⁴ He referred, in particular, to the notable coverage (achieved with G. Boni) of the Roman Forum (executed in various stages between 1899 and 1906)⁵ and to the very recent coverage of Pompeii (1910), in the latter case noting with justifiable pride the opinion of V. Spinazzola, who had judged it:

‘a miraculous work, so pleasingly proportioned, of such great precision, of such beauty of light and shade, of such sharp relief, and of such harmony both in detail and as a whole, that it becomes at the same time a resource of great importance for science and administration, and a genuine work of art and beauty.’⁶

This type of aerial photography was very new at an international level, where the Photography Section of the Specialist Battalion was in the vanguard, thanks to the brilliant initiative of its founder, Maurizio Mario Moris.⁷ The photography was not only for military use, but also civilian land management – the aerial survey of the course of the Tiber on behalf of the Ministry of Public Works in 1907-1908⁸ was an example of this - and the surveying of historic town centres and archaeological sites.⁹ Tardivo went on to say that:

‘this type of work (...) has also, as I have said, great importance for the survey of archaeological areas, as is demonstrated by the request to execute a survey of the excavations at Ostia on behalf of the Ministry of Public Works, which we will carry out in the coming month of May.’¹⁰

The idea of a topographical survey of Ostia by the Engineers began, while the Pompeii survey was ongoing, with Dante Vaglieri, Director of the Office of Excavations at Ostia Antica, and Corrado Ricci, Director General for Antiquities and Fine Arts.¹¹ An official request was sent by Ricci to the War Ministry, dated 11/2/1911. The ministry responded positively, ordering the survey to be carried out in May of that year.¹² The photographs were shot in the second half of that month¹³, while the required triangulation and final checks took place possibly in July, as implied by the a letter of the 28th in which Vaglieri writes that ‘soldiers and equipment’ were still in the Tiber mouth area.¹⁴ The *Survey* was officially consigned to Ricci on the 19th of October 1911 and was in Vaglieri’s hands on the 23rd.¹⁵

On the 18th May 1912 Vaglieri wrote again to Ricci, requesting in addition the detailed photographs of the archaeological area: ‘these would be of great, or rather, urgent¹⁶ necessity for this office in that they would save the draftsmen from the more onerous tasks and we can thus achieve the plans which we currently lack, with the maximum speed and accuracy.’¹⁷ The prints were sent on the 26th of June to Vaglieri, who on the 27th wrote to Ricci:

‘Yesterday the Photography Section sent me the detailed photographs taken here from a balloon. I would ask Your Excellency to express to the War Ministry not only my thanks for the favour but also my congratulations on the splendid work carried out, at the same time stressing to the Ministry that this work is certain to be of great interest to our office. No draftsman could achieve such accuracy, to the extent that we have already precisely located monuments which were wrongly positioned on all other plans, and we have been able to calculate distances which

could only previously have been calculated with great difficulty and perhaps less accuracy; furthermore, these photographs on which one can even count the basalt blocks on the road, are the most accurate base for the detailed plan because they only have to be enlarged and one can insert whatever is required, adding the more or less conventional elements which can only be drawn. To give an example, we have for some time been working on a plan of the tombs, which are important for their varying construction across different periods (Fig. 2): all of that long preparatory work would have been saved by these photographs: indeed, it has been rendered useless as the photographs provide a more accurate base map.’¹⁸

Vaglieri and Photography

Dante Vaglieri (born Trieste 1865, died Ostia Antica 1913) was appointed Director of the excavations at Ostia in 1907.¹⁹ His actions at Ostia were, for his time, innovative and far-sighted. Finding himself confronted by a desolate and degraded field of ruins, the result of more than two centuries of uncontrolled ‘investigation’ aimed, more or less, at the recovery of prestigious sculpture for the great collections of antiquities,²⁰ he imposed, using rigorous methods, not only a new agenda of scientific intervention in the ancient city, but also the *modus operandi* for those assigned to the Ostia office. Vaglieri conceived a serious, detailed programme of investigation:

‘My programme is threefold and from these three points of view I will consider these excavations:

1. completion of the excavation of the structures not previously brought to light, at the same time addressing the conservation of all the already-excavated remains;
2. the joining up of the isolated groups of remains;
3. excavation in depth to examine the fine detail, in order to clarify the development of the history of Ostia.’²¹

To put such a programme in motion, Vaglieri chose the best co-workers available within his department – the draftsmen Edoardo Gatti and Italo Gismondi, the archaeologist Guido Calza and the supervisors Raffaele Finelli and Guido Veniali²² – and put in place a series of facilities, indispensable for the correct and modern running of the excavations. These comprised: firstly, to guarantee the most assiduous attendance on site, offices and accommodation for the Director and his assistant, achieved through partial conversion of two renaissance buildings - the Casone del Sale which remains to this day the headquarters of the Soprintendenza and the Museum of Ostia, and the Castle of Pope Julius the Second – while the Casalone was re-adapted to house the custodians and workmen; secondly, a library and complete archive of drawn and written documents relating to

Ostia and Portus²³; and a darkroom, the preparation of which we can follow through the correspondence of Vaglieri and the fortnightly reports on the activities in Ostia sent to the Ministry.

²⁴ The enthusiasm which shines through from these documents for the first photographs shot, developed and printed by the Ostia staff is matched only by two other things: the arrival of the Decauville narrow-gauge railway ordered by Vaglieri for the more efficient removal of spoil from the excavations; and the recognition apparent from the frequent visits by King Vittorio Emanuele III and Queen Elena, who arrived from the adjacent royal estate at Castelporziano to follow with particular attention the fervour of the new excavations. Apart from anything else, the royal couple shared with the excavation staff their passion for photography.²⁵

Vaglieri's true passion for the photographic process and for the technological innovations being brought into the world of Italian archaeology is shown by two things: the use of stereoscopy, employed from 1910 not only to record the Ostia excavations but also to capture in time the landscape of which the ancient city formed an integral part²⁶; and the ready appreciation of the practical application of the new photographic method for topographic survey of large areas, working from a balloon.

Part of the second point in Vaglieri's work programme was the aim to 'join up isolated groups of remains,' the intended linkage being not only physical, but also graphic: in fact it is from Vaglieri's time that we can date the first surveys destined to come together, under Italo Gismondi's direction, as the great *Pianta Generale degli Scavi di Ostia* (General Plan of the Ostia Excavations) of 1953 which, albeit with successive additions, is the base plan still used today for survey of the Ostian structures.²⁷ However, as we have seen from the documents in the archive, at a certain stage of the enterprise Vaglieri felt the need for an instrument which would help to bring together the pre-existing situation in an overall plan, providing the most accurate base on which to plot the new discoveries. It was for this eminently practical purpose that the balloon survey was commissioned from the Specialist Battalion: thus obtained, the plan of Ostia served as an excellent base for the precise location of both the old discoveries and the new investigations prior to May 1911, and for all those that came after.

That Vaglieri, Gatti and Gismondi saw the balloon survey with practical eyes is demonstrated not only by the letter from Vaglieri quoted above, but also by various other indications: firstly, the surfaces of the photo-mosaic and of the enlargements are, in the areas of the ancient structures, a mass of very fine pencil tracings which were used to transfer the photographic images onto a corresponding drawing on tracing paper fixed with drawing pins (Fig. 3).²⁸ Secondly, the plan attached to the 1914 Guide to Ostia is clearly different to earlier plans and strictly depended on the situation as represented by the balloon survey²⁹; thirdly, Giuseppe Lugli, in 1940, declared that

‘Ostia and Pompeii had been well-photographed panoramically, but only partially in plan, such as that which Dante Vaglieri had carried out in 1910 (sic) to complete the plan of the city on the Tiber’³⁰; and finally, the *Survey* remained unedited, as such, until 1953 when it was published by Guido Calza – its life as a purely practical tool was finished and it began a new one as a historical document.³¹

The *Survey* as a photographic document

The *Survey*, consisting of six aristotype photographic prints³², measures 111 x 67.3 cm, and is glued onto a cardboard backing measuring 116 x 77.3 cm and itself divided into four sections measuring 55.2 x 36 cm (for the upper sections) and 55.2 x 32 cm (for the lower sections), glued onto bluish cloth to allow the document to be folded for storage and carrying (Fig.1).

The subject of the photographic coverage is clearly stated in the printed title, *Rilievo Topografico di Ostia dal Pallone* which is centred at the top; in the margin at top right is the scale, 1:2500; at top left is the responsible organisation, Battaglione Specialisti del Genio – Sezione Fotografica (Specialist Battalion of Engineers – Photography Section). The legend appears on the lower margin, where the numbers 1-52 correspond to summary captions³³; the lower right margin contains the handwritten statement: ‘Carried out in the year 1911’ and the circular blind embossed stamp on which the words ‘Sezione Fotografica / Battaglione Specialisti del Genio’ encircle the House of Savoy coat of arms³⁴.

As we have seen, in addition to the photo-mosaic, enlarged photos were sent to Vaglieri; these comprise seven aristotype prints measuring 56 x 56 cm, all carrying the stamp of the Battalion, as above, but in ink (Fig. 4). The enlargements were essentially for the rapid creation of a 1:500 scale plan from the 1:2500 survey: ‘they are the most accurate base for the detailed plan because they only have to be enlarged and one can insert whatever is required, adding the more or less conventional elements which can only be drawn.’³⁵

‘A fine portrait of the landscape’ - the *Manual* by Cesare Tardivo (1911)

The *Manual of Photography-telephotography, Topography from a Balloon* by Tardivo is the natural theoretical and practical result of the by then extensive field experience of the Specialist Battalion. Examples include the survey of 50 km of the course of the Tiber; a survey of part of the walls of

Rome and its archaeological area; and the survey of Pompeii.³⁶ It illustrates in great detail not only the required photographic technique and equipment, but also the organisational system. The manual's publication in 1911 confirms that the instructions therein were those adhered to during the survey of Ostia.

The scope of the photographic survey was, Tardivo wrote, to obtain a true 'portrait of the landscape', so as to achieve a more realistic and 'objective' representation, with the aim being to achieve a real advantage when surveying areas which already had topographical surveys on which the detail was shown by conventional means.³⁷ To this end the scale is important; it must permit the smallest detail to be read, 'the survey method used (...) gives an optimum scale of 1:4000; at most the reduction can be pushed to 1:5000, in which case 1 metre detail appears as less than one fifth of a millimetre.'³⁸ There follow guidelines for the recommended height of the balloon, to be held between 600 and 1000 m to avoid the 'veiling' effect given by air strata between the subject and the lens, and to be able to control movement caused by the wind. Also, longer anchoring cables are heavier, requiring a larger balloon which is more difficult to manoeuvre and, last but not least, more expensive to fill with hydrogen.

The camera, which needed to be suspended, had to be light: 'the shutter is fired by an electro-magnet triggered by an electrical impulse, from below, sent from a small hand-cranked dynamo situated in the control cart'.³⁹

There is an interesting description of the suspending mechanism for the camera, mounted on a metal triangle 1.5 m on each side and suspended at the corners by three 10-metre chains, which link together at a single cable anchor point under the balloon; the weight of the camera loaded with two plates, plus the metal frame and chains totalled 5 kg.

The camera was fitted with a 150 mm Zeiss Series III lens with an intermediate aperture of f9; the plates were of 21 x 21 format, and only the central part of the image was used, given that high distortion could occur at the edges.⁴⁰

Just as much attention was paid to the make-up of the restraining cable, which was of two strands, each made from fourteen very fine steel wires (wire diameter 0.35 mm, strand diameter 1.15 mm) covered with various layers of rubber and cotton and with an outer covering of coarse, strong linen. The cable, measuring 1100 metres, weighed 40g per metre and had a breaking strain of 500 kg. A

cable of this type could hold a spherical balloon of 120 m³ at a height of 1000 metres – the balloon would be of cotton, 6.12 m in diameter and weighing 42 kg.⁴¹

Other essential equipment for the team was the two-wheeled control cart with a mobile frame for the cable drum. It required four men to manage the control cart, regulating the balloon's descent on two crank handles. Before wrapping onto the drum the cable passed over a pulley wheel which maintained the tension once the balloon was raised aloft. Onboard the cart was the dynamo to fire the camera shutter and under the box seats was a case for the camera and other equipment⁴².

In every one of the photos which make up the *Survey* the oblique trace of the balloon's restraining cable can be seen as it inevitably came within the field of view of the lens. Also, on the ground, the control wagon is visible with the resting horses, and the Engineers awaiting the shot (Fig. 5).

Tardivo's manual is also detailed with respect to the organisation of the work. Predictably, weather conditions are important: in the Rome area it was possible to work only during the mornings of the hot months, until 1 or 2pm at the latest; usually, after this time, the wind became strong enough to disturb the shooting. Between 3 and 12 locations could be covered in one day, depending on the ease or difficulty of moving between them. The field team consisted of eight men: an electrician, a mechanic, a tailor (to repair the balloon or other stitching), a ropemaker (for the cable), a photographer and three balloonists; the team was divided into two groups, taking turns.⁴³

Work continued in the laboratory, because it was useful for the team in the field to have the prints from the previous day. The photos were printed on fine-grained semi-gloss paper, resistant to distortion.

After the fieldwork and prior to the joining up of the photos and their reduction to the same scale, it was necessary to set out a control framework using triangulation, with at least three surveyed points being visible on each photographic plate. The reduction to scale was then done with an ordinary enlargement camera, and the images were dry-mounted to prevent distortion. Lastly, the survey was furnished with its scale, captions and all the necessary conventions.⁴⁴ 'Finally it is best to make a plate reproduction, for example at 40 x 50, for greater ease of printing and to reduce the entire area to more regular sections'⁴⁵; the 'grandi formati' or large format prints sent to Vaglieri in 1912 were made by this process of reproduction.

Reading the *Survey*: the geological context of Ostia, between the dunes and the Fiume Morto

In 1962 the *Soprintendenza* of Ostia monitored the deep excavations for the new sewer linking the village of Ostia to the area north of the excavations, close to the Tiber.⁴⁶ The geologist Aldo G. Segré made several examinations of the long trench which cut across the ancient, infilled channel of the Tiber, the so-called Fiume Morto (Dead River), taking many samples. To outline the geological development of the various channels cut by the river in this zone, and to integrate them with his field observations, Segré studied the *Survey* closely. In November 1962 he sent a letter to the Superintendent of Ostia, A.L. Pietrogrande, together with notes and information, and enclosing ‘a sketch extracted from the photographic reproduction⁴⁷ of 1911’, signed and dated 3/11/1962, with the marginal note ‘provisional’(Figs. 6,7).⁴⁸

What we have here is in fact an extract from the draft version of Sheet 149 (Cerveteri) of the Geological Map of Italy, which was to be published in 1963.⁴⁹ The area that appears in the *Survey* is clearly marked with a hatched rectangle. Segré wrote: ‘the first breaking of ground for the new sewer has brought to light some interesting details relating to the ancient channels of the Tiber (...) everything confirms the past existence of the river channels which appear clearly on the aerial photos of 1911 and which can still be seen, albeit with greater difficulty, on present-day aerial photos.’ Further analyses and in-depth research allowed Segré to outline the complex phasing of the Tiber meander in two important works, the *Illustrative Notes of the Geological Map of Italy* of 1967, and an article published in 1986.⁵⁰

Within the area covered by the *Survey* some five different river channels are traceable (Fig. 7), including the existing channel, which show a constant tendency on the part of the river to straighten its course in the final reaches approaching the river mouth. The oldest channel, the ‘Tevere di Stagno’ (Tiber of the Marsh, numbered II) fed into a large lagoon, the future marsh of Ostia, the north-eastern edge of which is visible on Segré’s map and on the right-hand edge of the *Survey*. After this the river cut the channel of the ‘Meandro Ostiense’ (Ostian Meander, III, itself changing course several times and tending to push southwards, gradually closing the neck of the oxbow; the great flood of 1557 caused the abandonment of the oxbow for the main channel (VI) which also changed course (IV, V). The river has continued to move its position, shifting to channels outside of the area of the *Survey*. The proposed dating on Segré’s sketch has been corrected successively by various analyses, both archaeological and geological, increasing in sophistication down to the present day. The channel of the ‘Tevere di Stagno’ appears to date to 1100 BC, while the Meandro

Ostiense is the channel which lapped the edge of the city in the Roman period; it is the main channel of the so-called ‘migration period of the great meanders’, a time of remarkable changes with land being cut from one bank while new ground is simultaneously deposited on the other. This phenomenon has recently been the subject of an important study by Antonia Arnoldus Huyzendveld, demonstrating the significant channel variations in the Fiume Morto area.⁵¹ The dry meander was gradually, but not completely, infilled, so that in the late nineteenth century it was marshy and grazed by buffalo. On a map of 1880 by G. Amenduni the boggy section occupied the tightest curve of the meander and came up to the Castle; in photographs taken during draining of the marsh, around 1912, the curve of the Fiume Morto is still clearly visible (Figs. 8, 9).⁵²

One of the more extraordinary consequences of such movements of the Tiber was the gradual erosion of the left bank, causing considerable problems on the Via Ostiensis and on the land flanking it. In the last century, the destructive power of the Tiber in this area⁵³ became evident from the disappearance into the river of a good part of the ancient structures along its bank, which were still visible in many photos of late 1800s and early 1900s. To counter this continued threat the spoil from the excavations was used to consolidate and widen the Ostian bank; this had already begun under Vaglieri⁵⁴ but was a particular feature of the excavations for the Universal Exhibition of 1942.

The many changes to the Tiber’s course were due to the conformation of the land at the river mouth: the sediments accumulated by the river, and the low-lying ground, have caused, over the millennia, the formation of successive ridges of sand, the so-called ‘*tumoleti*’, and of lagoons which quickly developed within the marshland. Multiple dune lines, parallel to the Roman coastline which roughly coincides with the road to Tor Boacciana, are visible on the left side of the *Survey*. On the right side, however, close to the castle and its walled village, the already drained area of the marsh can be seen, delimited by the drainage ditches but gleaming in the sun due to the enduring presence of standing water. The low-lying area had, since early antiquity, been the sump for both river and surface water, and many campaigns of work had been carried out on its banks: for example, in the early Imperial period, a huge drainage operation used amphorae laid out as cassons, followed by the dumping of rubbish, particularly pottery, torevet the edges of the marsh. A further example is the frequent finds in this zone, and indeed across the whole Portus and Ostia territory, of Roman waterwheels which served to raise groundwater.⁵⁵ Finally, the use of the northern part of the marsh for salt pans lasted until the 1800s, when low productivity (a result of the excessive

distance to the sea) and frequent appeals to develop (from a social and environmental point of view) the Agro Romano brought an end to their long existence.⁵⁶

Reading the *Survey*: the man-made landscape

On the 1911 *Survey* the human modifications to the landscape over the centuries are clearly distinguishable. The urbanisation of the areas between the Tiber and what was then the coastline dates to the Roman period; its archaeological remains appear only partially on the surface, assuming something of a skeletal look in the rays of sunlight.⁵⁷ A very accurate interpretation of the *Survey* was published in 1957 by John Bradford, complete with a map of the ancient topography of Ostia, the Tiber and the coastline in the Roman period (Fig. 10). Its validity has been confirmed by all subsequent studies, both archaeological and geological.⁵⁸ In addition to the obvious traces, the river meander, resulting from the 1557 flood, and the dunes pushed against the ancient coastline, Bradford noted traces of a network of country roads south-east of Ostia, the so-called ‘Pianabella’: ‘...short sectors of these buried roads were in fact visible on an air view taken from a balloon as long ago as 1911 (...). They then appeared as light-toned lines across the ground, just as they do in the modern photographs.’⁵⁹ A recent study by Michael Heinzelmann has identified five lengths of road in this area, running NE-SW and delimited to the west by the Via Severiana (Fig. 11).⁶⁰ From the walls of Ostia onwards the roads are flanked by tombs, constituting an extension of the so-called Laurentina cemetery, while the Via Severiana, which follows the coastal dunes, connected numerous settlements which were identified some time ago as coastal villas. Only one of these appears on the *Survey*, though its archaeological traces are not easily seen under the modern rural settlement of Procoio Vecchio.⁶¹

Gradually, as they abandoned the city, the inhabitants moved into the hinterland, creating the first nucleus of what was to become the Borgo, or village, with the centre of the cult of S. Aurea and, later, the fortified structure of the Castello. The new Ostia was destined to the military defence of the mouth of the Tiber, particularly the control through customs when travellers landed, waiting to sail up the Tiber towards the final destination, Rome. Ostia was now also the storage centre for a precious resource, salt, extracted from the nearby saltpans. A number of renaissance structures relate to this activity; these are, in order from the sea towards the interior: Tor Boacciana and the Casone del Sale (the first on the edge of and the second encircled by the Roman ruins), the Casale di San Sebastiano, and the Casalone (north of the Castello). All of them, albeit at different times, served for centuries for the surveillance of the estuary and to house goods and people; the Casone

del Sale would be used for salt storage after the breach of the river banks in 1557, but also as a depository for various merchandise. At the time of the *Survey*, the Casone was already the headquarters for the management of the Ostia excavations.⁶²

There are numerous open quarries in the area of the ancient city of Ostia, encircled or covered by scrub vegetation: these are the traces of the various ‘*tasti*’ (pits) of the antiquarians or the pontifical archaeologists. The old excavation method, particularly when concerned only with the search for prized objects, was like mining: once a test pit was open, various underground galleries were dug to look for valuable finds. Many circular cavities can still be seen in the walls of ancient Ostia which testify to this former practice.⁶³ The vegetation, which in time covered the abandoned test pits, created a further problem for Vaglieri: ‘Amongst the ruins already brought to light, as amongst those already disturbed by the earlier excavators, have grown brambles and pernicious fig trees, so pernicious that when the cleaning work reaches and exterminates them, I cannot help but express regret that the ruins were ever brought to light.’⁶⁴;

The obstinate presence of invasive vegetation remains to this day an unresolved problem on archaeological sites.⁶⁵

The main road system is substantially unaltered when compared, for example, with that depicted on the ‘Pianta topografica di tutti gli edifici ostiensi’ (Topographical plan of all of the Ostian structures) of 1804 by Pietro Holl (Fig. 12),⁶⁶ given that both structures and the road network can be superimposed without much effort. Both the Via Ostiense and the road from the Castello towards the excavations follow the same route, and the minor routes from the Borgo to the Casone del Sale and to the Casalone have roughly the same course; in the photographs of 1911 these routes have a new feature in that they cross the new drainage channels on a series of small bridges. The *Survey* shows, on the right-hand side, the large canale delle Acque Medie, one of the first results of the reclamation and still in use today. The biggest visible difference is in the quality of the roads, which are now well-laid and no longer simple tracks.

Other differences between the Holl plan and the *Survey* are the boundaries and the names of properties. ‘Vignali’ (small vineyards) appear frequently on the Holl plan, particularly in the area near the Borgo, combined with names of the proprietors (Paolini, Chigi, Piccaluca and Vigne della Madonna, the latter probably belonging to S. Aurea) and ‘Riserva’ is also a common name, eg of S. Sebastiano, of the Casalini, of Bovacciano. It appears from the *Survey* that the splitting-up of

land has been replaced by extensions to the Aldobrandini estate, to state land, and to the remaining church property, all of which are difficult to distinguish. Below the terraces of the Castello, beyond the road, a series of small plots can be seen, cultivated by the inhabitants of the Borgo (Figs. 8, 9). In the surrounding territory a series of fences divide up the land; these were rented plots. In the early 1900s, land-holdings could be divided into plots known as ‘quarti’ or ‘riserve’ by fences, low drystone walls (‘macère’) or hedges. Every holding included a house which the proprietor rented to the tenant together with the land. A complete holding consisted of three farming elements: ‘il Campo’, the fields with extensive cultivation for grain and fodder; ‘il Procoio’, the land and buildings set aside for raising of cattle (often buffalo) and horses; and the ‘Masseria’ for the breeding of sheep.⁶⁷ On the *Survey* some of the houses (called ‘casaletti’ or ‘casalini’) can be seen with their characteristic high, narrow structure,⁶⁸ and at Pianabella a ‘Procoio’ can also be seen – it was known in the 1800s as ‘Le Capanne’ (the huts) and the Via del Mare was known as ‘Via delle Capanne’ or ‘Via delle Capanne dei Bassi’.⁶⁹ In the recollections of the *Romagnoli* (the people from Romagna who had come to work on the reclamation of the marshes) the structure of the Procoio was described as being a two-storied house in stone with an ancillary hut inside: ‘there were these rough beds; they were all made from wood, where they slept. On the beds they had straw, or a couple of rough blankets. A bit to one side there was the storage where they kept the hay. The hut was made circular but big, stone-floored inside and with a low encircling wall’.⁷⁰

The ‘Capital of the Desert’

After the unification of Italy, numerous commissions of enquiry were set up to look into the reclamation of the Agro Romano, and many gave particular attention to the socio-economic situation in the vast area requiring improvement. In 1884 the report of the agrarian commission led by Stefano Jacini painted a gloomy picture of rural Italy, putting particular emphasis on the distressing living conditions of those who worked the land⁷¹ – their ‘wild’ way of life had for some time interested and preoccupied intellectuals and politicians, while even earlier interest had come from the more perceptive of the travel writers.⁷² Because of this interest, we can today find descriptions of people and places which are of a genuinely ethnographic precision.

Charles Victor de Bonstetten, writing in 1805, said: ‘I was curious to see at last the capital of the desert... set in a vast plain without trees or cover, continually windswept, yet exhaling an odour so fetid that, although we lodged at the other side of the town, we did not dare to open the window...’.

Little had changed eighty years later:

‘Once across the Tiber and the ruins of Ostia, the rural workers from Ravenna were faced with, on the nearby higher ground, the sight of some circular reed-thatched huts, inhabited by families of ‘Aquilani’ (people from the city of L’Aquila); in their yellow faces could be read the devastating effects of malaria, while, proceeding further on, after about a kilometre the village of Ostia came into sight, with the towers of S. Gallo,⁷⁴ surrounded by greenish, pest-ridden standing water which extended to the square inside the village, there being no free drainage for rainwater. The water of the swamp lapped at the road from Rome to Ostia. The village was completely deserted, just one man, the postman called Gramadoro, stayed there for some hours each day, having the duty of collecting the post from the Fiumicino Post Office and delivering it to the Aquilani labourers and to the wardens of the nearby pine forest of Castel Fusano. Gramadoro’s greeting to the workers arriving hundreds was “disgraced ones, you have come here to die”.⁷⁵

The first phase of the reclamation of Ostia (1884-92) was carried out thanks to the efforts of labourers from Romagna, and particularly from Ravenna (the ‘Romagnoli’ or ‘Ravennati’), who followed a working method already tried and tested in Romagna, underpinned by principles of solidarity and mutual assistance typical of co-operation between manual workers.⁷⁶ From 1889, the year that the water pumps began to work and of the first experimental cultivation of the drained land, and 1891, the Romagnoli decided to establish themselves in the already partially-reclaimed area. They purchased the dwellings of the Borgo from the Brotherhood of the Saints of the Rosary, rented furniture from the Princes Aldobrandini and Chigi, and built new lodgings ‘in the style of Northern Italy’.⁷⁷ In 1898 the management of the agricultural colony of the Ravennati was practically thriving: the lands that were state property were divided into plots which the colonial families began to cultivate under sharecropping contracts.

However, decline and malaria could not be said to have been overcome everywhere;⁷⁸ Angelo Celli, the great malaria doctor responsible in large part for defeating the disease in the Roman *campagna*, characterised the causes of the decline thus in 1900: ‘Malaria and agrarian feudalism; these are the two implacable enemies of the countryman, and the reciprocal cause and effect of one on the other.’⁷⁹ Celli refers to the villages of the Agro Romano in 1881, where 12,734 people lived in 556 ‘primitive dwellings’ identical to those in Abyssinian villages: a controversial statement against the disinterest of the Italian political class for this close-to-home reality, but equally a degrading statement about the Africans, and one which had much wider nationalist echoes.⁸⁰ The primitive dwellings of the Roman hinterland were usually huts or shacks, but there was also a form of squatting within the ancient ruins.⁸¹

From approximately October to the end of July the countryside and Rome saw an influx of agricultural labourers, the *guitti* ('wretches'), who came down from the Abruzzo, Ciociaria, Sabina and Marche regions in groups supervised by the man who had assembled them, the *caporale* ('gang master') or *fattoretto* ('little farmer'). Groups could be men only (the 'selected' gangs) or formed of entire families (the 'bastard' gangs). At the beginning of the 1900s this movement numbered some 90,000 people, a fifth of whom were women. Around Rome the *guitti* created a characteristic form of settlement, the hutted village.⁸² The marshy land around Ostia was not favourable to a rational, profitable agriculture – the Aquilani, *guitti*, peasants and fence-builders were essentially engaged in breeding and farming sheep; the families of the colonists who cultivated (as sharecroppers) the limited fertile land of the noble estates were uncommon.⁸³ The *guitti* were dependent on the 'country dealers (*mercanti di campagna*)' who rented land from the landowners; one such dealer, Calabresi, rented estate land from the Aldobrandini at Ostia and Portus, farming some 14,000 sheep.⁸⁴

The huts (*capanne*)

The huts of the seasonal workers, either circular in plan with a conical superstructure or rectangular with a pitched roof, are not apparent in the *Survey* at first glance. The foundations of the huts could be made more solid with a drystone wall, from which is derived the place name 'Capanna Murata', common to this zone;⁸⁵ the superstructure was of straw, maize stalks and dried plants on a frame of poles. Used either by families or collectives, a hut could accommodate up to 150 individuals.

The hut-dwelling tradition is ancient in this region. A conical hut with multiple doorways can be seen on the right bank of the Tiber in an engraving by Hendrick Van Cleef datable between 1560 and 1570,⁸⁶ and showing the Castello prior to the 1557 flood; in this case the hut was sited in the bend of the river which was then still the Isola Sacra, becoming, after the river changed course, the so-called Isolotto di Ostia, where even today the place-name Capanna Murata can be found.⁸⁷ On the map of the course of the Tiber by A. Chiesa and B. Gambarini, dated 1749, a 'capanna' is marked on the bank, not far from the 'Magazeno da Sale'.⁸⁸

In the late 19th and early 20th centuries groups of huts, almost little villages, existed around the Borgo and at the edges of the Aldobrandini estate where the archaeological area of Ostia began. Single huts were also common, either isolated in the fields or near to houses and enclosures. Celli states that the huts around the Borgo were 'long-corridorred with a drystone wall at the base and, inside, with one or two levels of beds on the two sides, and in the middle a line of fireplaces for the different families.'⁸⁹ Cervesato also described

‘the village: near to the stone house are quite a few huts – an author recently wrote that it “does not differ from a small primitive village such as one might find, in our time, in deepest Abyssinia” – which huddle wretchedly within the strong harmony of Castello del Sangallo. Some in the village, some at a distance, these are the dwellings of the Ravennati who are attempting colonisation of the reclaimed land; the farms are arranged in the manner of north Italy. But the marsh still glistens all around.’⁹⁰

A concentration of large huts survived in the vicinity of S. Sebastiano, at the edge of the Aldobrandini estate; the group was photographed a number of times between the late 19th and early 20th centuries (Fig. 13).⁹¹ The impact of the excavations directed by Vaglieri led to their demise, in December 1910:

‘I followed [the decumanus] first of all towards Rome, where it could be presumed to take me to another gate, different from that of Visconti, which I showed should exist under the large huts, which many still remember. I was afraid that I would see the excavations halted: not for nothing was Vulcan the protector of Ostia; ...one night the hay stored in most of the huts caught fire and burnt the huts. I don’t think there were any regrets about that fire, which had no victims and which allowed to be revealed the sought-after gate as well as the last stretch of the Via Ostiense with its tombs and a base dedicated to Salus Augusta (...).’⁹²

Later (and, of course, with the problem already resolved!) Vaglieri wrote:

‘they lived in the huts, [which were] perfectly constructed models of their kind, and a return to an ancient way of life. (...) These huts, the *capanne dei monelli* [field hands] which rose up where the ruins of the porta principalis of ancient Ostia can now be seen, we still remember, as we still remember the scene they provided in the evening, when the peasants returned from their labours, the men with their proud air, the women in their multi-coloured clothes, met with their friends who played the hurdy gurdy, danced and sang the monotone songs of their mountains, heedless of weariness, of the poor and dangerous life.’⁹³

The Ravennati, too, retained memories of these huts: ‘Where they have opened the excavations, in front of the Aldobrandini palace, there were big huts, long but immense. Inside there was a long, long passage; on this side and on that side they had made all the beds with all the briars all around them; each one in his own little bed had briars, they probably had some straw mattresses but I don’t know if they did have (...) Then, they knocked everything down and underneath were the excavations of Ostia Antica.’⁹⁴

In the photograph of 1911 numerous circular ‘objects’ can be seen which throw considerable shadows: four can be detected, from top to bottom, on the visible part of the Isola Sacra;⁹⁵ eleven in the terrain south of the excavations (one inside the excavations, three to the north plus traces of one on the tomb of the Claudii, three south of the ‘Via del Mare’,⁹⁶ and circular traces on the ground of another three). The two examples lying between the perimeter fence and the tomb of the Claudii have square enclosures; nearly all those on the edges of the excavations are placed at the centre of a dense complex of paths which connect to the bank of the Tiber, to the ferry across the river (*la Scafa*) and to the main roads (Fig. 14). In all of these cases, I cannot distinguish whether they are dwelling huts or simply haystacks; the latter interpretation could in fact be preferable, given the presence of planned roads, small enclosures and the relative tidiness of the land around them, where there are no traces of life.

On the *Survey* the huts around the Castello are not clearly distinguishable either, although they certainly existed in that year; in two photos taken on the ground, in 1911 and possibly 1912 respectively, the huts (both circular and rectangular) are clearly visible, located on the edges of the Borgo and the Castello, either in groups surrounded by small houses, or isolated in the fields (Figs. 15-19). However, the huts which so distressed Vaglieri are not visible, even as traces.

‘When there exists a regular flotilla of dirigibles with the appropriate hangars, ‘topofotografia’ (i.e. aerial photography) could have a wider and more practical application, because on one voyage, in one day, a great number of plates could be exposed. In the meantime the appropriate research and preparation of equipment is being carried out.’⁹⁷ A few years after this prediction by Tardivo,⁹⁸ the Ostian skies were to be criss-crossed by dirigibles and then by aeroplanes; numerous photographs were taken, revealing profound changes across both the territory and the excavations; this race for change and progress turned the *Survey* into a last, silent record of a still-recent and yet definitively vanished Italy.

Figure captions

Fig. 1 – Specialist battalion of Engineers, Photographic Section. ‘Topographical Survey of Ostia from a Balloon, 1911’ (SBAO, AF, inv. P1).

Fig. 2 – Photographer unknown. E. Gatti and I. Gismondi surveying the Via Ostiense cemetery, 1911 or 1912. Stereoscopic pair, gelatine negative 4 x 4.5 on glass plate 5 x 10 (SBAO, AF, neg. S3).

Fig. 3 – Photographer unknown. Photo of the mounted *Survey* taken on a roof terrace of the Casone del Sale (with the Tiber in the distance). Date unknown but before 1940. Gelatine negative on glass plate 18 x 24 (SBAO, AF, neg A 1986). The *Survey*, which is upside down, is firmly fixed to a wooden backing with numerous drawing pins.

Fig. 4 – Specialist Battalion of Engineers, Photographic Section. Enlargements of the ‘Topographical Survey of Ostia from a Balloon’, 1911, seven aristotype prints 56 x 56 (SBAO, AF, Inv. AD 2227-2233).

Fig. 5 - Specialist Battalion of Engineers, Photographic Section. Detail from the ‘Topographical Survey of Ostia from a Balloon’, 1911 (in the area of the Via dei Vigili) showing the control cart and the balloonists; the clear oblique line is the cable which tethered the balloon.

Fig. 6 – A. G. Segre, May 1961. *Interpretative photo-geological sketch from the photographic survey by balloon (Capt. C. Tardivo 1911- Military Engineers)*. (SBAO, AS, fasc. 1961-62).

Fig. 7 - A. G. Segre, Sept. 3, 1962. *Provisional sketch with the historic courses of the Tiber in the area of Ostia* (SBAO, AS, fasc. 1961-62).

Fig. 8 – Photographer unknown. Borgo di Ostia, view of the Fiume Morto from the Castle of Julius II, 1912. Gelatine negative on a glass plate 13 x 18. SBAO, AF, neg B 2033.

Fig. 9 - Photographer unknown. Borgo di Ostia, view of the Fiume Morto from the Castle of Julius II, 1912. Gelatine negative on a glass plate 13 x 18. SBAO, AF, neg B 2034. On the right, beneath the castle parapet, two huts can be seen, one of which is in construction. In the distance is the Casalone, facing onto the old left bank of the Tiber which was infilled by this time.

Fig. 10 – *Ancient topography of Ostia, the Tiber, the coast-line, and Portus in Roman times* (BRADFORD 1957, Fig. 23).

Fig. 11 - New map of the Ostian suburbs (HEINZELMANN 2000, Fig. 1).

Fig. 12 – Pietro Holl. ‘*Topographical map of all the Ostian structures found during the antiquarian Papal excavations*’, 1803-1804, SBAO, AD, inv. 71. The map compiled by the pontifical architect Holl, already in the possession of P. E. Visconti, was acquired in 1891 by the Direzione Generale Antichità e Belle arti.

Fig. 13 – Alinari Brothers. ‘*Modern Ostia. Peasant farmers’ hut*’. ca 1890, Alinari archive, neg. ACCA-F-006977.

Fig. 14 - Specialist Battalion of Engineers, Photographic Section. Enlargement of the ‘*Topographical Survey of Ostia from a Balloon 1911*, (area of the Terme Marittime). Detail of hut or haystack with enclosure and paths.

Fig. 15 – Unknown photographer. View of the Castle of Julius II, 1912, gelatine negative on a glass plate 18 x 24 (SBAO, AF, neg. A 2359). The shot has been taken from the south. At bottom right the shadows of the photographer and an assistant can be seen.

Fig. 16 – Detail from Fig. 15: small huts (behind the tree to the left in Fig. 15).

Fig. 17 - Detail from Fig. 15: large rectangular hut (behind the building to the left of the castle).

Fig. 18 - Detail from Fig. 15: small rectangular hut (against the building on the right).

Fig. 19 – Unknown photographer. View of Pianabella and the excavations, from the Castle of Julius II, ca 1912. Gelatine negative on a glass plate 18 x 24, SBAO AF, neg. A 2428. On the left is the ancient road to Procoio and the sea; on the right in the distance are the excavations; in the central background, near the trees, some huts can be seen.

¹ Speech in the Senate by G.C. Argan, 2nd August 1985, during discussion of Law 413 ('legge Galasso' concerning the protection of areas of particular environmental significance); quoted in CHIARANTE 2002, pp. 131-144.

² The President of the Organising Committee was Giacomo Boni: BONI 1911-1913; Cesare Tardivo was one of the promoters. For the history of the Exhibition: *Roma 1911*.

³ TARDIVO 1911a. The First Photography Section in the military was set up on 1st April 1896 by Maurizio Mario Moris (1860-1944) within the Specialist Brigade of the Third Regiment of Engineers in Rome. The first photographic shots taken from a military balloon date to 27th July 1897. ZICAVO 1928; LODI 1976, p. 37; CERAUDO 2004, p. 48.

⁴ TARDIVO 1911 a, p. 94.

⁵ The first photographs are from June 1899; the balloon was equipped with a gondola in which were Moris and Boni. PUDDU, PALLAVER 1987; *Archeologia a Roma*, p. 33, fig. 1.7; AUGENTI 2000, p. 2; AMICI 2003; CERAUDO 2004, pp. 48-51.

⁶ At Pompeii the balloon was of the tethered type, without a gondola, with the remote-controlled (by cable) camera suspended beneath. V. Spinazzola, director of the Scavi di Pompei, is quoted in TARDIVO 1911, p. 97, and also in "La fotografia dal pallone", *Scienze e Lettere*, 13th July 1911. The photograph of Pompeii is reproduced in CERAUDO 2004, fig. 10.

⁷ The unique and cutting-edge nature of the method was also claimed by Tardivo in his paper delivered at the Third Conference, which confirmed what had already been stated in 1910 at the International Conference of Photography in Brussels: TARDIVO 1911a, pp. 90, 93. On Moris as a pioneer of aerostatics and aeronautics, see: R. G. 1945; PESCE 1994.

⁸ A. Ranza of the Specialist Battalion had already carried out surveys of the Tiber from 1902-1903. In 1906 Tardivo and Ranza initiated the execution of photographic maps from the rectification and reduction to scale of a single exposure. In 1907 the area of the Tiber delta on the outskirts of Fiumicino was photographed; in 1908 a 50 m long section of the course of the Tiber was completed by C. Tardivo, at a scale of 1:3500.

⁹ It is worth noting the survey of Venice (1911) and its lagoon (1914) which in recent years has been the subject of interesting experiments in georeferencing: GUERRA, SCARSO 1999; GUERRA, PILOT 2000; BALLETTI, MINIUTTI 2001.

¹⁰ TARDIVO 1911a, p. 97.

¹¹ The correspondence about the *Survey* between Vaglieri and Ricci, and between the Ministry for Public Instruction and the Ministry for War is in ACS (Central State Archives), DG AABBA, Div. I, 1908-12, B. 12, fasc. 159. This is also the location of all the documents cited below unless otherwise stated.

¹² Ministry for War to Ministry for Public Instruction, 19th March 1911.

¹³ Ricci a Vaglieri, telegram, 19th May 1911.

¹⁴ Vaglieri to Ricci, July 28th, 1911, manuscript note on headed notepaper of the Direzione degli Scavi di Ostia but employing a personal tone; in this Vaglieri asks that Ricci also arranges for the topographical survey of Portus. The Ministry of War responded positively to the request, but put its execution back to October because the Specialist Battalion had to participate in summer field manoeuvres (Ministry for War to Ministry for Public Instruction, 4th August 1911). Given that Italy entered into war with Turkey on the 29th of September 1911 and the Specialist Brigade was destined for operations in Tripolitania, I do not think that the photography was ever carried out, there being no trace of it in the correspondence conserved at the ACS. A photo-mosaic of Portus at a scale of 1:8220, and of smaller dimensions than the *Survey* (63.3 x 45.6, made up of numerous photographic prints ± 15x22-16x23.5 and smaller trimmed formats), and also executed by the Specialist Brigade, is conserved in SBAO, AF, inv. P2, undated. This must

be the result of the survey of 1907-1908 of the lower reaches of the Tiber: see Note 8; LODI 1976, p. 51. This photo-mosaic allowed G. Lugli to recognise the shapes of 'forte degli imperiali abbandonato' (abandoned Imperial fort) from 1557, during the 'Campagna di Roma' (Campaign of Rome) fought between Imperial troops and those of Pope Paul IV : LUGLI 1924, p. 3; LUGLI, FILIBECK 1935, pp. 4-5; LUGLI 1940 (1965), pp. 42-43. It should be noted that Lugli, in other documents, assigns a different date to this photo-mosaic (and also to the *Survey*), probably citing from memory: LUGLI, 1924, p. 3 (fotomosaico di Porto: 1919); LUGLI 1940 (1965), p. 42 (*Rilievo*: 1910). See also CERAUDO 2004, p. 51, fig. 9.

¹⁵ Note from Lieutenant-Colonel G. Motta, Commander of the Battalion, to Ricci, dated 19th October 1911 with the countersignature of Vaglieri on the 23rd of October.

¹⁶ Underlined in the original text.

¹⁷ Vaglieri to Ricci, 18th May 1912.

¹⁸ Vaglieri to Ricci, 27th June 1912.

¹⁹ On Vaglieri's personality: OLIVANTI 2002.

²⁰ With the exception of the state excavations after the unification of Italy, conducted by Rosa, Lanciani, Borsari and Gatti, which were in any case limited to the study of single structures and without any new field investigation project, due to scarcity of planning and resources: CALZA 1953, pp. 33-34; OLIVANTI 2001, p. 56, with bibliography. For the preceding period in general: BIGNAMINI 2003, with bibliography.

²¹ VAGLIERI 1912, p. 532; VAGLIERI 1912 a, p. X; CALZA 1953, p. 34; OLIVANTI 2002, p. 274.

²² All would be remembered and thanked by Vaglieri in the introduction to the *Guida di Ostia* (published posthumously), with veiled nostalgia for the pioneering years of the Ostia excavations, which were difficult but intensive, both in terms of work and human relationships: VAGLIERI 1914, pp. VI-VII.

²³ For the creation at Ostia of the archives and the photographic darkroom to support the fieldwork: OLIVANTI 2001, p. 57.

²⁴ ACS, DG AABBA, Div. I, 1908-12, B. 12, fasc. 152; copy in SBAO, AS.

²⁵ OLIVANTI 2001, p. 57. Photographs of the Royals visiting Ostia are in SBAO, AF; an interesting photo-montage representation of the King and Queen among the Ostian ruins is published in SCRINARI 1992, p. 181, fig. 3. For their passion for photography: FALZONE DAL BARBARÒ 1981.

²⁶ The stereoscopic photos are unpublished; a selection was shown at the exhibition "Con l'occhio dell'archeologo. Fotografia storica negli archivi ostiensi 1908-1950" (With the eye of the archaeologist. Historic photography in the Ostian archives), curated by E. J. Shepherd, Deutsches Archäologisches Institut Rom, Castello di Giulio II-Ostia Antica, 1999. See fig. 2.

²⁷ *Topografia generale* 1953, attached plan (subdivided into 15 plates).

²⁸ The presence of numerous drawing pin marks was observed during conservation of the *Survey*, carried out in 2001 by Silvia Berselli, Milan; the marks are not present on the enlargements.

²⁹ VAGLIERI 1914, Plate V (signed by E. Gatti and also attributed to him on p. VII), identical to the still unpublished one generously given by Vaglieri to Ashby in 1912, where only a very small amount of detail unnecessary for that text is not reproduced: ASHBY 1912, plate facing p. 194. Cfr. also CALZA 1953, p. 61; the comparison between the Paschetto plan of 1912 (drawn before the *Survey*) and that of 1914, published in OLIVANTI 2002, figs. 2 and 12; and CERAUDO 2004, p. 52 and figs. 12, 13.

³⁰ LUGLI 1940 (1965), p. 42.

³¹ *Topografia generale* 1953, p. 61, fig. 15. The *Survey* was published successively in all of the major works on photographic interpretation; in particular, see ALVISI 1971, pp. 15-16, figs. 7, 9, for a detailed account of how it was realised, and CERAUDO 2004, pp. 51-52.

³² SBAO, AF, inv. P1. The prints are mounted in a group of three in the upper half and three in the lower half; they measure, taking the prints from left to right; upper half: 45x31; 19.3x32 (divided in two by the vertical fold); 46.3x32 cm; lower half: 44.8x36; 27.2x36 (divided as above); 39x36 cm. With ageing the photographic images have become slightly faded, and there are some stains and rubbed-out pencil marks which affect legibility. The original glass negatives have not yet been tracked down: it is likely that they are conserved at the Archivio Fotografico dell'Istituto Storico e di Cultura dell'Arma del Genio (ISCAG) (Photographic Archive of the Institute of History and Culture of the Engineers Corps), though they could not be consulted.

³³ The caption numbers appear on the photographs in black ink, subsequently gone over in white ink. The city walls are also drawn in white ink.

³⁴ SBAO, AF, inv. AD 2227-2233. The documents in the ACS cited above do not say how many plates there were, but as they state that the coverage was only of the excavations, it is likely that there were only these seven. The prints were restored for conservation purposes in 2005 by Donatella Cecchin, Rome.

³⁵ The scale arrived at by the enlargements is $\pm 1:585$. For Vaglieri's letter, see Note 17.

³⁶ TARDIVO 1911, p. 90. The *Manuale* came four years after the publication by A. Ranza (RANZA 1907), demonstrating the rapid evolution of techniques in the field of photography.

³⁷ TARDIVO 1911, pp. 89-90.

³⁸ TARDIVO 1911, p. 90.

- ³⁹ The practical nature of the military can be seen from the phrase ‘in the absence of the dynamo, ten dry torch batteries connected in series can be used’ (p. 91). The apparatus is illustrated in LODI 1976, p. 53, fig. 51.
- ⁴⁰ Compare the image reproduced in GUERRA, PILOT 2000, p. 615, fig. 5.
- ⁴¹ The same cable could hold a Draken balloon measuring 100m³, weighing 64kg, at a height of 600 m. A lighter cable (27 g per metre; 250 kg breaking strain) was used to raise a spherical silk balloon of 65 m³ to 600 m (weight 26 kg, diameter 5 m).
- ⁴² TARDIVO 1911, p. 94.
- ⁴³ TARDIVO 1911, pp. 95-97.
- ⁴⁴ Tardivo also gives detailed information on the type and the ingredients of the ink used to write on the glass of the negatives, and of the varnish for retouching photographs, called ‘mattolina’: TARDIVO 1911, pp. 169-170.
- ⁴⁵ TARDIVO 1911, p. 99.
- ⁴⁶ The records of the excavation and the drawings at 1:25 scale, held at SBAO, AS e AD, are unpublished. A brief account is in ARNOLDUS HUYZENDVELD, PAROLI 1994, p. 386.
- ⁴⁷ Segre uses the plural, making reference to both the *Survey* and the 56x56 enlargements. In the letter to Pietrogrande Segre also gave much technical information about the 1911 photographs, clearly derived from the *Manuale* by Tardivo.
- ⁴⁸ On 17th July 1962 Segre had already sent a provisional version, as a drawing, of the Geological Map then being prepared. This is held in SBAO, AD.
- ⁴⁹ The first two copies of the Geological Map, numbered and with the signature of Segre dedicating them to Pietrogrande and to M. Floriani Squarciapino, are held in SBAO, AD.
- ⁵⁰ *Note illustrative*, pp. 62-64, fig. 12; SEGRE 1986.
- ⁵¹ ARNOLDUS HUYZENDVELD, PAROLI 1994; ARNOLDUS HUYZENDVELD, PELLEGRINO 2000; *Suoli di Roma* 2003.
- ⁵² AMENDUNI 1880. The photographs of the Fiume Morto are in SBAO, AD, negatives. B 2033-2034.
- ⁵³ *Note illustrative* 1967, p. 61.
- ⁵⁴ From 1908 onwards the spoil from the Visconti excavations was removed, in the area of the cemetery outside the Porta Romana, and then from the excavations of the baths of Neptune and the barracks of the Vigili; this was to fill in the marsh of the Fiume Morto, as noted in the ‘Fortnightly Reports’ (*Rapporti quindicinali*) compiled by R. Finelli, but also to reinforce the bank.
- ⁵⁵ Reclamation in the Roman period in the Longarina area: RIVELLO 2002; recent finds of waterwheels in the Ostian hinterland: BEDELLO TATA, FOGAGNOLO 2005, with relevant bibliography.
- ⁵⁶ LANCIANI 1888.
- ⁵⁷ On archaeological sites photographed from above the effect is moderated by the presence of protective roofs, various types of infrastructure and ornamental greenery; at Ostia in 1911 the cleaning and reorganisation of the old excavations, and the opening of new trenches, were still ongoing, so the structures in the photographs appear bare and desolate.
- ⁵⁸ BRADFORD 1957, pp. 237-256, fig. 23.
- ⁵⁹ BRADFORD 1957, p. 242-243.
- ⁶⁰ HEINZELMANN 1998; HEINZELMANN 2000, p. 16, fig. 1. See also CARBONARA, PELLEGRINO, ZACCAGNINI 2001, pp. 139-140, fig. 1; RIVELLO 2002, fig. 1.
- ⁶¹ The so-called villa di Procoio: LAURO 1984.
- ⁶² In 1909 Vaglieri had already had a garden planted along the east side of the building; the *Survey* shows the space articulated with curved flower beds set around a central fountain. For the history of the Casone: SHEPHERD 2001.
- ⁶³ LENZI 1998, pp. 249-250, fig. 3.
- ⁶⁴ VAGLIERI 1912, p. 530.
- ⁶⁵ BEDELLO TATA 1996.
- ⁶⁶ Reproduced in CALZA 1953, pp. 55-58, fig. 9; *Ostie Port et Porte*, p. 394, I.2 (E. J. Shepherd).
- ⁶⁷ METALLI 1903, p. 2.
- ⁶⁸ On the map by Holl the ‘Riserva dei Casalini’ is marked, in which the majority of the Ostian ruins are situated. One house is close to the saltpans («the old house of the customs officers, because behind it were the saltpans»: memories of Romanina Gualdi, in *Pane e lavoro* 1986, p. 259). The small houses were used by the labourers from Romagna as their first lodgings.
- ⁶⁹ At No.18 on the Verani map of 1804 is marked the placename ‘Capanne (presso la spiaggia)’ (huts close to the beach): CALZA 1953, pp. 58-61. In 1863 the Via delle Capanne dei Bassi was the northern limit of Macchia dei Bassi di Ostia, which continued as far as the canal of Castel Fusano (map published in ROMITI 1867, tav. A). For the placename see also PASCHETTO 1912, p. 490.
- ⁷⁰ Memories of Anna Berrettini, in *Pane e lavoro* 1986, p. 259.
- ⁷¹ CARACCILO 1976.
- ⁷² It is worth remembering that at the 1911 International Exhibition of Rome, already mentioned, the Committee for Schools for Peasant Farmers in the Agro Romano (Giovanni Cena, Sibilla Aleramo, Angelo Celli, Duilio Cambellotti and others) promoted an Exhibition of the Agro Romano, in which a ‘strange and barbarous’ habitation of huts was reconstructed. Inside it typical tools and belongings of the population of the hinterland were displayed, as well as works of art inspired by the same theme. The main body of the exhibition consisted of a large hut designed by Cambellotti,

which linked the conical structure with a pitched-roof structure. Under a lean-to roof were models of huts and farms, branding irons, domestic utensils, carved wooden objects, clothes and other exhibits, collected by members of the Committee: CARDANO 1980.

⁷³ Quoted in VAGLIERI 1914, p. 25.

⁷⁴ Incorrect reference to the renaissance architect Giuliano da Sangallo.

⁷⁵ As remembered by Nullo Baldini, published in UTILI 1960, p. 26; LATTANZI, 1986, pp. 169-170.

⁷⁶ LATTANZI, 1986, p. 176.

⁷⁷ CERVESATO 1910, p. 270.

⁷⁸ LATTANZI, 1986, p. 178.

⁷⁹ CELLI 1900, p. 68.

⁸⁰ «Our nationalists had so much to think about in civilising the African Abyssinia that they could not find time to think about the Abyssinia in Rome»: CELLI 1900, p. 15; LATTANZI 1986, p. 171.

⁸¹ A subterranean part of the Ostian ruins had been accessible for a long time, as confirmed by one of the numbered captions on the Holl map (1804). Against No.15 is written 'Workshop (*fabbriche*) accessible below ground' (corresponding to the area of the baths of Buticosus-Horrea Epagathiana). A reproduction of Holl's map, held in SBAO, AS, appears in *Topografia generale* 1953, fig. 9; see this article fig. 12.

⁸² SANTANGELI VALENZANI 2003, pp. 612-616, with bibliography. On the building typology and the diffusion within the Agro Romano: BROCATO, GALLUCCIO 2001; ERIXON 2001.

⁸³ METALLI 1903, pp. 21-24.

⁸⁴ *Pane e lavoro* 1986, p. 251.

⁸⁵ On the edges of the saltpans, too, «there was the stone-walled hut ...there by the big tree at the end of the via delle Saline, there was a ditch called the Fosso della Capanna Murata»: D. Scarfagna, in *Pane e lavoro* 1986, p. 250.

⁸⁶ Published in LANCIANI 1990, p. 128, fig. 72; the engraving proved popular and there are many variations, including that attributed to the Nüremberg publisher Christoff Reigel, dated 1691, and published in *Topografia generale* 1953, p. 28, fig. 2.

⁸⁷ The definition of 'isolotto' (islet) appears on the 1804 map by Holl. In the area of Capanna Murata a bath building dating to the Imperial period has recently been excavated: PELLEGRINO, OLIVANTI, PANARITI 1995 e 1995a.

⁸⁸ The map is published in MANNUCCI 1987, fig. 21; the hut is mentioned in BIGNAMINI 2001, p. 43: «probablement utilisée par les fouilleurs» ('probably used by the excavators').

⁸⁹ CELLI 1900, p. 22.

⁹⁰ CERVESATO 1910, p. 270.

⁹¹ There were at least four huts at the end of the 19th century – two conical and two rectangular; in 1909 Vaglieri records only two: VAGLIERI 1909, p. 232. Foto F.lli Alinari, neg. ACA-F-006977, 1890 ca. (*Pane e lavoro* 1986, p. 251, fig. 2); foto Ashby, neg. II 50, shot on 18th March 1901 (*Lazio Ashby*, p. 198, fig. 16); other unpublished photos are in the archive of the British School at Rome and in the Archivio Fotografico Comunale, Palazzo Braschi, Roma.

⁹² VAGLIERI 1910, p. 30; VAGLIERI 1912, p. 534; VAGLIERI 1912 a, p. XI.

⁹³ VAGLIERI 1914, pp. 25-26.

⁹⁴ Recollections of Romanina Gualdi, in *Pane e lavoro* 1986, p. 251.

⁹⁵ At least one of the huts on the Isola Sacra is definitely that visible in the background of the Ashby photograph: neg. 51, shot on 22nd April 1892 (*Lazio Ashby*, p. 87, fig. 2).

⁹⁶ Apart from the round structure at the bottom edge of the photo (above, caption 11) which is the *Procoio* (cattle farm) so-called *di Pianabella*.

⁹⁷ TARDIVO 1911, p. 100.

⁹⁸ On 9th July 1919 the first shots were taken of Ostia from a dirigible, from a height of 1000 feet; Colonel Carlo Bernini was in command and Guido Calza was also on board: CALZA 1920.