The Space of the City in Graeco-Roman Egypt
Image and Reality

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DOCUMENTA 22

Institut Català d'Arqueologia Clàssica
Tarragona, 2011

Biblioteca de Catalunya – Dades CIP

The Space of the city in Graeco-Roman Egypt : image and reality. – (Documenta ; 22)
Recull de les aportacions a la reunió de treball "La concepció de l'espai a l'Egipte grecoromà", que va tenir lloc a la Universitat Rovira i Virgili els dies 30 de setembre i 1 d'octubre de 2010. – Bibliografia. – Textos en anglès, francès i castellà, resum en anglès
ISBN 9788493903350
I. Subías Pascual, Eva, ed. II. Institut Català d'Arqueologia Clàssica III. Títol IV. Títol: Concepció de l'espai a l'Egipte grecoromà V. Col·lecció: Documenta (Institut Català d'Arqueologia Clàssica) ; 22
1. Urbanisme – Egipte – Història – Congressos 2. Espai (Arquitectura) – Egipte – Història – Congressos 3. Ciutats antigues – Egipte – Congressos 4. Egipte – Arqueologia romana – Congressos 5. Egipte – Història – 332 aC-640 dC, Període grecoromà – Congressos
904(32)(061.3)

Aquesta obra recull les aportacions de la reunió de treball "La concepció de l'espai a l'Egipte grecoromà", que va tenir lloc a la Universitat Rovira i Virgili (URV) els dies 30 de setembre i 1 d'octubre de 2010, organitzada amb el suport del Ministeri de Ciència i Innovació (HAR 2008-01623), la URV i la Diputació de Tarragona (2009OCO-26).

La publicació compta amb el suport econòmic del Ministeri de Ciència i Innovació (HAR 2010-10368) i de la Generalitat de Catalunya (2010 ARCS 1 00080).

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Primera edició: desembre del 2011
Coordinació: Publicacions de l'ICAC
Correcció: Josette-Noëlle Carlier Vaubourg (francès), Montserrat Coll Boada (castellà) o Paul Turner (capítol 8)
Disseny de la col·lecció: Dièdric
Coberta: Gerard Juan Gili
Fotografia de la coberta: Mapa d'Alexandria procedent de l'atles de Georg Braun i Frans Hogenberg *Civitates orbis terrarum* (vol. II, 56B)

Maquetació: Imatge-9, SL
Impressió: Gràfiques Moncunill

Dipòsit Legal: T-1649-2011
ISBN: 978-84-939033-5-0

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PRESENTATION

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The articles in this volume originate from a workshop held at the Rovira i Virgili University in Tarragona in October 2010. The aim of the meeting was to approach the Graeco-Roman city from different points of view in order to define its distinctiveness. The meeting took place as a study project with the financial support of the Spanish Ministry of Science and Innovation and the Catalan Institute of Classical Archaeology. We wish to thank both institutions for their support and also the Catalan Department of Innovation, Universities and Businesses, the Provincial Council of Tarragona and the Rovira i Virgili University for their financial contributions to the publication of this volume.

The difficulties involved in tackling any analysis of the city in ancient Egypt are widely recognised. This is true for two reasons: one obviously lies in the huge gaps that exist in the archaeological documentation, and the other conceptual reason stems from the idea of the city, which leads to widely varying positions and methods of approaching the problem. The city as a construction – a political and sociological idea, a transposition of the notion of *polis* – is clearly of no use in analysing Pharaonic settlements. It is therefore useless to compare urban patterns from the Pharaonic and Graeco-Roman periods, just as it is useless to place emphasis on orthogonal planning. However, it is worth investigating Egyptian ways of thinking about the city, as one can discover, and this is emphasised by Egyptologists, the importance attached to 'urban' life as opposed to rural living.

The fact that the term city is not a suitable one for investigating the forms adopted by Egyptian population nuclei does not mean that the Egyptians had not developed some expertise in the organisation of spaces with original principles regarding construction. And since Graeco-Roman administration relied on a hierarchy of existing settlements to expand its own networks of social and economic control, the study of the Graeco-Roman city in Egypt cannot avoid the issue of Pharaonic history.

Moreover, the classical form of the city, born in a particular historical context, was introduced in Egypt specifically for domination and exploitation, contradicting its sociological and political bases, and this is why the model could not survive unscathed. It is important to look at which urban forms were introduced by the conquerors, and under what circumstances. With Mediterranean cities what is missing sometimes expresses more than what is shared. And within this selection of planning criteria there are various factors to be taken into consideration: a general concept of the administrative and hierarchical structure and above all the natural environment in which these agglomerations were implemented.

The synthesis of these factors had to result in one or more urban planning programmes characteristic of the period and the country. Our intention is to investigate the definitions of these programmes using written records and some city ruins. It is a difficult task, not only due to the archaeological shortfall, but also because we are dealing with a working urban landscape which lasted about ten centuries, from the Macedonian conquest to the Arab conquest, with considerable sociological and aesthetic changes from beginning to end, therefore also making it necessary to chronologically distinguish different trends.

The importance of the pattern of settlement

In the field of Egyptology, the subject of the city has been of interest mainly as a framework for analysing the emergence of the state and as the seat of each of the military, civil and religious powers it comprises. However, there has been little opportunity to analyse the environmental structure in the area, due to gaps in the archaeological data. This lack of information is lamentable because, as Carole Crumley maintained, settlement patterns reveal the human interactions that allow a state to be defined.

In Pharaonic Egypt, the rural nuclei must have been very simple: just a cluster of houses. However, as simple as they were, they had to cope with the management of flood waters, access to drinking water, drainage of excess water, stabling of animals and circulation between nuclei. As for the cities, whether religious/administrative centres, military barracks or workers' settlements, they were planned spaces with different and very specific programmes. Egyptology has, therefore, taken on the sociological reading of the known urban nuclei. However, social specialisation and the organisation of work do not necessarily give rise to urban complexity, as Pierre Tallet claims. Instead, the relationship of the monarchy with the city should be regarded as significant, as the construction of a palatial environment always involves an accompanying transport infrastructure and sets trends in construction associated with the court.

From the beginnings of the Pharaonic state, the territory was divided into nomes. The nome may have originally consisted of the level of aggregation of rural communities, as flooding could not have been managed with a sufficiently high margin of safety on an individual scale. However, opinions differ as to the scale

of organisation and the role of the state, as can be seen in Ciro F. Cardoso's claims regarding the role of communal organisation. Later, however, the separation into nomes had to be adapted to a strongly centralised administrative system, with civil servants responsible for organising collective work and tax collection. This distribution brought with it a capital, one particular nucleus with greater importance, which is reflected in the lists of nomes of the Ancient Empire. Discussion will therefore revolve around whether 'cities' arose as a result of the strengthening of local control over agricultural productivity or whether the complexity of these habitats was the result of the influence, through international contacts, of civilisations which had well developed urban programmes.

The truth is that the concept of city extended throughout the valley in the first millennium. According to Herodotus (2.177.1), there were up to 20,000 cities, and he emphasises the fact (2.178) that Amasis demanded something like an annual declaration of income to the local governor, a measure which reinforces the theory that the number of cities was a function of the capacity and interest of the governments of each period to control agricultural production surpluses, as Sylvie Fanchette shows. Furthermore, during the Low Period new property owners appeared: colonisers who as military mercenaries had conquered lands on the orders of the Pharaoh. In this situation the function of taxation moved from the temples to the representatives of political power, generating a new network of movement around central points.

Urban models and ideals

Considering the form of cities in the Low Period, what is striking is the configuration of an open nucleus, without city walls, arising under the protective mantle of large temple areas used as refuges when the need arose. These areas and their approach roads were the foci of civil agglomeration, but so were their interiors, where buildings intended for civil and religious administrators became more numerous; so much so, in fact, that the enclosing wall ceased to represent a strict separation of spheres of action in day-to-day life, or even of the profane and the sacred. Only one other kind of building could compete with the temple in the articulation of a city: the palace. The palace-temple-tomb union is new, and evokes a new way in which royalty attests its proximity to the gods.

Moreover the forms of the agglomerations do not suggest any kind of elaborate or rigid urban planning. The location of palaces and temples resulted from natural constraints and religious criteria. And this is why it is important to discuss the imaginary of the Pharaonic city.

Firstly, it was important to deal with foundation. Pedro Azara reintroduces the profile of the founding god in order to investigate his mythical qualities and analyse the role assigned to him by Pharaonic civilisation. As for the significance of foundation, the importance of foundational metaphors in the formal composition of the city is often brought up. If cosmic references could be replaced by symbolic markers, as Barry Kemp suggests, other facets of the foundational metaphor, such as the emergence of black earth, would still be irrevocably linked with the region. The Egyptian temple, which embodied this idea of the emerging hill, persisted for as long as was possible, fixed with regard to location although its perimeter grew and it rose higher above the day-to-day circulation in the streets as each alteration was made on top of pre-existing buildings. The growth in the *tell* of the temple grounds led, in some cases, to a raised relief which required flights of stairs to provide access. In contrast to the classical city that harmoniously occupied the plains below the slopes of the hills we would often find an urban landscape built in an environment of steep gradients and the barriers imposed by the perimeter walls of domains. Chloé Ragazzoli has dedicated much effort to the question of the imaginary, and her studies provide evidence of, among many other things, the importance of water and the garden. The city must incorporate the delights of the countryside: flowering vegetation achieved by means of skilful care and installations providing refreshing water. This leads to fountains and tree-lined avenues, to the gardens and artificial ponds that adorn the city.

Finally, we felt it important to look more deeply into other cultural references in order to highlight the peculiarities of the Graeco-Roman city in Egypt. In Classical and Hellenistic Greece, landscape takes on greater aesthetic significance and intervenes as a criterion in the planning of the city. For example, in the Egyptian urban ideal, and also in the classical world, there is a powerful literary topos which consists of the assimilation of the city as an island. One of the objectives of the organising committee was to establish the extent to which water played a part in the definition of the city in Graeco-Roman times. Jesús Carruesco trawls the Greek lexicon, allowing him to make a reading of the significance of water in the city and the resulting imaginary.

Beyond the natural environment, Greek civilisation developed a liking for other political metaphors, such as basing the ground plan of Alexandria on a *chlamys*. In this case the symbolic object evokes the military virtues of the conqueror and has propaganda value. Tim Whitmarsh, offer us new literary aspects of the metaphors of Hellenistic Judaism in Alexandria.

Realities and contexts of urban planning

Imitation of the megalopolis may in fact have been a powerful reference in the construction of Egyptian cities in the Graeco-Roman period. Searching for the reflection of Alexandria in the metropolises should

therefore be one of our methodological options. We can be sure that Myrto Malouta's reflections on Arsinoe, Antinopolis and Hermopolis will provide insight into this question. We also expect to learn much from following the urbanisation process of the city of Oxyrhynchus, which highlights the integration of different environmental parameters (relief, water, etc.) with the premises of regular planning.

The emphasis on water evokes a reality that is barely perceptible today: the dense network of waterways that put canals and dykes at the forefront of 'urbanism'. Memphis offers important clues to the urban significance of these structures, which resulted from the need to control the river and establish and maintain a model of circulation. Returning to the different elevations within Egyptian agglomerations, we should keep in mind the significant seasonal changes the countryside underwent: from an aquatic environment to pastureland. When the water was low, the slopes descended to the banks of the canals or rivers. When the water was high, it came up to the edges of the quays and gave meaning and shape to piers. The pier or jetty always dominated the Egyptian monumental landscape, relating the temple to the river. The movement up and down was perhaps not a literary *topos* of the Egyptian city, but it seems to have been a reality as the meetings for some prayers were held at the bottom of the temple stairs.

Judging by the numerous negative opinions regarding Egyptian cities, it would appear that the Mediterranean Greek city imaginary only concerned itself with newly planned cities which had roles as metropolises. However, Graeco-Roman Egypt had numerous secondary cities which gradually evolved in terms of growth and articulation. It is perhaps at this level in the hierarchy of settlements, and particularly in the area of Fayum, that a more original synthesis of the Graeco-Roman city in Egypt took place. Paola Davoli has first-hand experience of many of these nuclei and can enlighten us on their evolution and prevailing urban planning criteria. Her work shows a different type of city, conservative in the centrality of the temple, but Hellenised in architectural typologies for civil life. Meanwhile, Katherine Blouin, knowledgeable of the Mendesian nome and its cities, as well as its geographic and economic dimensions, tells us of the situation in the Delta and its relationship with a highly dominant environment – one that is undeniably extremely difficult to assess materially.

We have now overcome the apriorisms cited by Alan K. Bowman between 'indigenous-ists' and 'classicists' with respect to the perception of the Egyptian city. The Egyptian city should be analysed for itself, conscious of different cultural traditions, but above all paying attention to a more global understanding of the region. And it must not be forgotten that, for the different periods we are considering, the construction of a country of cities stretches over a millennium. The spatial relationships of these nuclei reveal the human and political landscape, as can be perceived through the innovative studies of Katja Mueller.

Various factors are at work in the change of status of population nuclei: fundamentally economic aspects. From the moment that the country moved away from a purely agricultural economic model to one that also involved artisanal production and commerce, municipalities had the opportunity to compete and develop. Without doubt a strategic geographic position, such as proximity to a major port, could have been a decisive factor in production and sales. And we cannot forget the movements of the Nile that may have been important for some settlements which were denied access to, or were too far from, ancient ports, particularly in the area of Fayum. Others, however, could have developed with the stimulation of the great domains of the Byzantine period and monasteries converted into dynamic productive centres. However it came about, the end of the Egyptian cities was some time in coming, experiencing important transformations in monumental programmes and the idea of the urban nucleus after the Arab conquest, but remaining in use while the territory respected (albeit with other names) the old ways of the landscape. Ottoman records mention the dykes that had been in decline since the Mamluk period, which means that these comprised the flood management system in use throughout the Middle Ages, just as they had in antiquity.

To analyse these aspects, we must move on to an interpretation of the landscape, putting aside data acquired through historical geography and exploiting new remote sensing technologies to locate barely visible infrastructures. Judith Bunbury is an expert in this field and has previously shown us how to approach the shifting shapes of the landscape. Ignacio Fiz, making use of these experiences, has developed an approach to the Egyptian landscape that blends historical geography and remote sensing.

In fact, what seems most noteworthy to us about this landscape is that it is inconstant; it is subject to the movements of its waterways and the advance of desert dunes, to sensitive rhythms in the time-scale we examine: the Graeco-Roman and Early Byzantine. Changes brought about feats of engineering and stimulated creativity in the ways the flood waters were exploited: dykes, lagoons, ponds, reservoirs, canals and all kinds of structures are reflected in a lexicon explored in depth by Danielle Bonneau. And the papyri confirm that they are directly related to cities. We feel that this line of work must be one of the most striking features of the Graeco-Roman city in Egypt, and it is along this line that our study is oriented and on which, along with Ignacio Fiz and Rosa Cuesta, we have prepared our discussion on the Oxyrhynchus Nome.

The study of the Graeco-Roman city in Egypt is a complex subject that requires ideas and experiences to be shared. It is a subject shockingly absent from scientific literature and that is why we launched this initiative, not arising from Egyptology, but from classical

archaeology. We would like to thank our guests for their generosity and their valuable contributions and we hope that this publication will be as useful to its readers as the workshop from which it came.

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1. PTAH, HÉROS CIVILISATEUR ?

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Les exercices comparativistes, justifiés ou non, défendables ou non (il semble qu'ils soient de retour après une longue traversée du désert), laissent souvent de côté l'imaginaire égyptien. La complexité du panthéon, le sentiment d'étrangeté que suscite la figure hybride de nombreuses divinités, les rituels déroutants ou déconcertants (pour nous, au XX^{e} siècle), peuvent expliquer que, face aux mythes grecs et mésopotamiens, et aux légendes romaines, les récits mythiques ou légendaires égyptiens n'aient pas été souvent pris en compte (sauf par les spécialistes).

Il en est ainsi des mythes et des légendes de fondation de villes. L'imaginaire mythique égyptien de l'architecture a été peu abordé, peut-être à cause du fait que la question sur l'existence de véritables villes égyptiennes pharaoniques, et non de simples rassemblements d'ouvriers et de personnel au service des temples, n'ait pas encore été totalement résolue, bien que certains chercheurs tendent à penser actuellement que la culture urbaine n'a pas été aussi lointaine de la culture pharaonique qu'il avait semblé il y a quelques années. Peut-être qu'il y eut des villes, non des ateliers ou des congrégations dépendant des sanctuaires ; après tout, du moins dans la mythologie grecque, mais qui a dû refléter un imaginaire non-grec, Memphis fut une divinité des premiers temps, qui existait avant la Grèce et ses divinités. Une ville, toutefois, atteignit une condition surnaturelle ; cette ville (est-ce le hasard ?) fut fondée par le dieu Ptah.

La « forme » des dieux et des héros fondateurs (de villes, de sanctuaires) a été étudiée depuis les années cinquante, surtout à partir du matériel grec, moins mésopotamien, bien que la figure et les actes du roi akkadien Sargon I^{er}, et de la reine de Babylone Sémiramis aient été analysés en relation à ceux de figures grecques, ainsi que ceux de Moïse, ce qui, d'ailleurs, nous rapprocherait du monde égyptien !

Un fondateur (et, en général, tout héros civilisateur) serait une figure spéciale, désignée, montrée, dès la naissance, comme singulière, apte à entreprendre ou à commettre des actions incomparables, où la violence et la générosité, la tuerie et le don de soi-même sont entremêlés et s'interpellent. Figure mythique mais aussi folklorique, la prochaine naissance du héros signe et inaugure un changement d'ère, marqué par des bouleversements qui causeront et symboliseront la fin d'un cycle et le début d'un nouveau, que la fondation d'un espace habitable (ville, sanctuaire, comme celui de Delphes, par exemple) clôt, conclut. Auparavant, le héros aura dû prouver son courage et affronter toutes sortes de difficultés et d'obstacles : des monstres sanguinaires et sa propre peur. La victoire sur les agents du chaos, et sur son propre état troublé, aboutit et se symbolise par un nouvel ordre terrestre ou cosmique, qu'une ville nouvelle incarne.

La création succède et requiert la destruction. La ville se fonde sur le chaos. L'ordre que l'urbanisme apporte, exige un état précédent où le désordre et la nuit règnent. Rien ne peut être établi sans la destruction de ce qui existait, fût-il le vide. La figure chargée d'une telle mission devait être dotée de capacités fort singulières ou étranges. Ses dons se reflétaient sur son physique. Que le héro fût une figure qui ne pouvait être confondue avec aucune autre se lisait sur son corps et ses gestes. Le cycle où la construction succédait à la destruction était assuré par la présence et les actes du fondateur. On peut néanmoins penser que cette conclusion est banale si l'on ne recherche pas le caractère propre de chaque mythe fondateur. Les conditions géographiques, historiques et culturelles donnent tout leur sens, leur vrai sens, à des récits parfois très semblables.

À ce propos, l'étude de Francis Vian sur le fondateur mythique de Thèbes (en Grèce), il y a quarante ans, garde encore toute sa validité. Mais il est vrai, certes, que cette étude, qui s'appuyait sur le comparativisme, se centrait surtout sur la figure du prince mythique Cadmos, venu de la Phénicie, et sur sa lutte avec le dragon. L'histoire pouvait servir de modèle, mais elle était, néanmoins, fondée ou ancrée sur une réalité grecque.

Les recherches de Marcel Détienne sur Apollon comme dieu- architecte (que je poursuis aussi) montrent que la figure de ce dieu ne se démarque pas trop de celle de Cadmos, bien que les actions d'Apollon soient tournées vers la fondation de Delphes, et que le paysage où l'action se déroule soit celui, bien précis –décrit par Homère dans l'*Hymne à Apollon*–, de la Grèce centrale qu'Apollon traverse. Mais, de fait, Apollon traverse la ville de Thèbes, et une allusion à Cadmos est peut-être perçue : « Enfin tu es arrivé à Thèbes dont le sol était couvert de bois. Les hommes n'habitaient pas encore la ville sacrée de Thèbes ; aucun chemin, ni sentier ne traversaient alors cette vaste plaine fertile ; on n'y voyait qu'une forêt immense ».

Il en est de même avec le dieu à qui les mésopotamiens attribuaient l'invention et la transmission des techniques constructives, soit directement, soit à travers ses messagers les *apkallu*, des dieux-carpes, ou des Sages, sortis des eaux primordiales ou de l'Euphrate. Enki, tel est le nom de cette divinité, présentait des caractéristiques que certains chercheurs ont associé à celles des « tricksters », divinités ou héros, propres au monde nord-américain, capables de trouver des

solutions à des problèmes insolubles, ce qui démontrait leur ingéniosité et en découlait, trait qui se reflétait sur leur propre corps et dans leurs gestes, ainsi que dans leur propre façon d'aborder les problèmes quotidiens. Enki serait une divinité astucieuse, capable de créer, de recréer, de rénover, mais aussi –ou plutôt–, de détruire, de dissoudre. Les inventions, les nouveautés devaient surgir d'une table rase.

Qu'en est-il du dieu Ptah ?

Selon le complexe mais bref texte tardif de la *Théologie Memphitique*, Ptah est l'Égypte, l'incarnation de l'Égypte. Le nom du pays dérive de celui du dieu. Ce qui est logique, si l'on pense que les eaux du Nil sont sous le contrôle de Ptah (l'association entre les eaux génératrices et les héros et dieux fondateurs n'est pas gratuite), et que l'œuf cosmique, posé sur le premier tertre qui surgit des eaux originelles, et qui donna naissance au cosmos, fut brisé par Ptah. La coquille, semblable à la voûte céleste, contenait le souffle universel. Il fut même créé par lui à Hermopolis (ou par Khnoum, autre divinité artisanale, avec qui Ptah était liée, comme nous allons le voir), d'où surgirent les huit dieux, parmi lesquels… le Noun lui même. Donc Ptah. Ptah, ainsi, s'engendre-t-il lui-même ? Est-il son propre Père ? Existe-il, donc, depuis toujours, éternel en somme car existant en tant que géniteur de lui-même ?

D'ailleurs, Ptah est l'Égypte qui surgit des eaux. Il est le tertre qui émerge (Ptah est bien Tatenen) et duquel la vie fut conçue. Cette butte primordiale est Memphis, la ville de Ptah. Son fils, Nefertoum, est le lotus primordial qui fleurit et s'ouvre sur ledit tertre primordial. Ptah est le socle qui soutient le monde des vivants. Ptah est donc, à la fois, ou selon les « théologies », l'eau primordiale, et la première terre. Dans tous les cas, Ptah apparaît comme l'espace, ou plutôt comme le lieu d'origine. Il n'est pas vraiment une matière première, eau ou terre, mais une matière vivante, qui se conforme, c'est-à-dire, une matière transformée par une forme : un véritable lieu, en somme.

Ptah est donc la base de la vie. Non seulement parce qu'il crée des êtres vivants, comme nous allons le voir, mais parce qu'il crée –contient ou assume– les conditions spatiales et temporelles de la vie. Il est, non la terre, ni le tertre premier, mais bien le tertre en train de s'élever de la vie. Il dessine le cadre de la vie qu'il placera, alors, dans ce même réceptacle.

La terre, mais aussi ce qui permettait que la terre fût vivante et accueillît la vie, était l'œuvre de Ptah. Les eaux de pluie étaient sous son contrôle. « Lui qui permit que le Noun grimpât au ciel, qui permit que l'eau descende sur les montagnes pour que les autres êtres humains puissent vivre… » : ainsi chantait-on un hymne à Ptah» . À Edfou, il était dit que la pluie fut l'œuvre de Ptah à partir des eaux du Noun.

La relation de Ptah avec les eaux fécondes (les eaux primordiales et les eaux journalières) n'est pas singulière. Des joncs, des papyrus, tous deux des plantes aquatiques, avaient été plantés devant l'accès du temple de Ptah à Memphis, comme il est écrit dans la *Théologie Memphitique* (15c). La vie qui lui était offerte devait venir des eaux.

Il est surprenant de constater que certaines divinités fondatrices, comme Enki, Apollon (surtout l'Apollon romain, préposé aux fontaines) ou Janus, détenaient la clé des eaux (et des… champs), elles contrôlaient les fontaines de la vie. Elles fondaient ou elles bâtissaient des lieux aptes à la vie qui nécessitaient donc la présence de points d'eau. Cette relation de Ptah et d'autres divinités aux fonctions comparables avec les eaux douces, accentuait leur implication avec l'origine de la vie et leur contrôle de tout ce qui était nécessaire pour que la vie qu'ils avaient engendrée ou apportée puisse se développer.

Même le Noun (les eaux originelles) est parfois identifié à Ptah. Ptah existe en tant que Noun, comme Ptah-Noun, celui-ci étant, selon Sauneron[1], une hypostase de Ptah : « c'est toi qui es Noun l'Ancien », selon un hymne au dieu d'Héliopolis[2]. Ptah était aussi considéré comme ayant émergé des eaux du Noun. Il a surgit de l'obscurité qui constitue le Noun. Ptah, le dieu lumineux, a été engendré dans les ténèbres, ou plutôt, il s'est auto-engendré, comme le proclame un hymne tardif, selon lequel, Ptah est né sans père ni mère, ce qui montre qu'il s'agit d'un être différent, capable de créer.

Ainsi, Ptah est à la fois la matière originelle –les eaux primordiales– et l'agent qui active les eaux desquelles surgissent le cosmos et les divinités. Il est les eaux des origines, il surgit des profondeurs et il crée grâce à la matière liquide. *L'Hymne à la Crue du Nil* débute ainsi : « L'aimée de Geb, qui apporte Népri (le dieu du grain), qui rend florissants les métiers de Ptah ». Cette crue, essentielle à la vie : « Celle qui apporte la nourriture, fertile en aliments, qui produit toutes ses bonnes choses. Maîtresse de la frayeur, au parfum suave qui rend heureux lorsqu'elle vient ». Crue, disions-nous, qui, comme chante l'Hymne un peu plus loin, est créée par Khnoum, associé à Ptah.

En tout cas, une triple relation s'établit entre Ptah, le Noun (les eaux primordiales, qui contiennent aussi le premier tertre) et la vie. Ce sont trois entités reliées entre elles qui ont besoin chacune des deux autres. Si l'une venait à manquer, les deux autres n'auraient plus aucun sens. Ptah existe pour animer les eaux parce qu'il les aime. En ce sens, Ptah serait « supérieur » à Enki (confondu parfois, tout comme Ptah, aux eaux

1. Sauneron 1959, 25-26.
2. Sauneron 1959, 79, n. 9.

de l'Abzu, sa mère, eaux nommées parfois par le mot *id,* qui veut dire courant d'eau, rivière) et à Apollon, car il ne se limiterait pas à ordonner le monde mais il le créerait.

Cependant, son côté démiurgique, plutôt artisan, est bien marqué. Il recréerait le monde plus qu'il ne le créerait. Ainsi, Ptah présidait les fêtes du jubilé grâce auxquelles le pharaon se rénovait et récupérait les forces, ce qui permettait que, en tant que garant de l'ordre cosmique, le monde se renouvelait, évitant la déchéance.

Ptah est donc lié à l'origine du monde. On peut même dire qu'il l'a créé. Du moins, l'Égypte lui doit, soit la naissance, soit son nom, or le nom est bien l'être. Le temple de Ptah à Memphis, soutient van Dijk[3], était une métonymie de la ville. Le nom du temple désignait aussi la ville sainte, ainsi que tout le pays.

Égypte : le nom provient de Hikuptah, le temple du *ka* de Ptah. Cette relation entre Ptah et la création du ou d'un monde s'accentue ou devient plus claire si l'on réfléchit à sa vie et à ses attributs.

Un signe qui ne trompe pas au sujet du caractère exceptionnel de la divinité. De nombreuses divinités et de nombreux héros civilisateurs ou fondateurs possèdent une caractéristique qui est devenue presqu'un lieu commun. Il s'agit d'êtres jumeaux. Le fait d'être doubles signale leurs capacités créatrices, reproductrices et/ou artisanales. De plus, leur image, double ou doublée, trouble. Ce trouble que l'on ressent souvent face à une nouvelle situation, une ère nouvelle, une véritable création, n'est cependant pas toujours présent. En Grèce, Apollon, le dieu architecte, a bien une sœur jumelle, Artémis, mais Héphaïstos, l'artisan, n'en a aucun ou aucune. Néanmoins, Héphaïstos présente un aspect physique singulier : une difformité (Héphaïstos est boiteux) qui révèle son pouvoir, ou son talent, de sortir des chemins battus. Héphaïstos ne marche pas droit, il ne suit pas le droit chemin, tracé d'avance. Il peut donc explorer des espaces encore vierges, jongler avec des formes nouvelles.

Ptah eut, entre autres, deux fils. Ceux-ci, parfois, furent confondus avec lui, c'est-à-dire que Ptah se montra sous leur forme. Celle-ci n'était pas habituelle. Les Patèques ressemblaient fort à Bès. Il s'agissait de nains, aux jambes fortement arquées qui ne leur permettaient pas de marcher droit. De nombreux auteurs ont signalé la symbolique des nains en Égypte, semblable à celle présente dans d'autres cultures. Les nains étaient doués pour l'art ou l'artisanat, c'est-à-dire pour la création, mais aussi, ou surtout, pour la procréation. Signes de fécondité et protecteurs de la vitalité, la vie jaillissait autour d'eux. Ceux-ci ressemblaient à de petits enfants qui ont toute la vie devant soi, mais qui possèdent aussi, en tant qu'adultes, la sagesse. Or, il existe un type iconographique curieux des Patèques. Il s'agit de deux nains égaux, jumeaux, pourrions-nous dire. Ces frères étaient représentés unis par le dos. L'image ainsi formée ressemblait à celle d'un être bifront (deux faces orientées dans deux directions opposées), tout comme celle de Janus à Rome, ou de l'Hermès des chemins, en Grèce. Image d'êtres capables de regarder dans deux directions à la fois et d'avoir, ainsi, une vision pleine : le contrôle de l'espace était assuré. Aucun malheur ne pouvait survenir sans que les Patèques ne le découvrent.

La relation si étroite entre Ptah et ses fils, les Patèques, a donné lieu à une divinité connue sous le nom de Ptah-Patèque : Ptah en tant que nain et être double, Ptah possédant un double de lui-même.

De plus, Ptah était hermaphrodite, condition souvent associée à la gémellité, et qui témoigne de la prééminence de la divinité, antérieure à toute division. Ptah est mâle comme l'eau du Noun, femelle comme le sol arable. Selon un traité cosmogonique, « c'est l'eau qui est l'homme et c'est la butte émergeante qui est la femme ». Ptah a donc le statut des eaux boueuses du Nil, avant la « séparation des eaux », lors de l'apparition du premier tertre, avant l'émission de l'hypostase de Ptah en Tatenen.

Ces caractères singuliers présentaient une seconde manifestation physique, mais bien visible celle-là. C'était un signe visible, lisible sur le corps, qui montrait bien que le personnage était capable, ainsi qu'autorisé, à entreprendre des aventures singulières, des actes uniques. Ainsi, si la gémellité, dans de nombreuses cultures, est un signe qui annonce la naissance ou la venue d'un être exceptionnel, d'un « héros civilisateur ou fondateur » (singularité que le manque de père et de mère suggère bien), une malformation physique est un second indice qui corrobore les symptômes que la gémellité, manifestée dès la naissance, annonce. En effet, Ptah était (ou pouvait l'être, comme l'on vient de le mentionner) un nain. Un nain dont l'image augmentait la singularité. En effet, il était représenté de face, alors que les autres divinités voguent et défilent dans leur espace : un espace pictural ou de représentation, sans contact avec l'espace humain. Le nain-Path, lui, se tourne vers le spectateur ou l'être pieux, et le dévisage, établissant ainsi un contact visuel entre les deux mondes, le naturel et le surnaturel. Un pont entre les deux niveaux du cosmos se crée par le biais de la figure ou la face du nain, dont la principale caractéristique, outre la difformité, est l'importance du visage qui s'étale à la vue de tous, de tous ceux qu'il regarde et qui le regardent.

Mais Ptah était, comme le dit une épiclèse, le dieu au-très-beau-visage, expression qui évoque plus la perfection et la plénitude que la beauté, sans doute. Ptah était le dieu au visage qui dévisage, un dieu-visage, une « sainte » face.

De fait, Ptah n'était pas du tout un nain, au contraire, sa figure était bien proportionnée (sauf dans

3. Van Dick 2001, 74.

son temple à Memphis, selon Hérodote, où il était représenté comme un nain). Cependant, Ptah-Patèque (Ptah-Pataikos, selon Hérodote, III, 37) l'était. Cette manifestation ou hypostase de Ptah se confondait avec le dieu Bès, divinité protectrice des femmes et des enfants, ce qui est en accord avec l'image de faiblesse, presque non-humaine, de Bès. Or, Bès se représentait sous la forme d'un nain[4]. Les amulettes de Bès, portées par les enfants, étaient nombreuses. C'était des petits objets dont la taille minuscule se rapportait bien à la difformité de Bès. La ressemblance entre le nain à la grosse tête et aux jambes arquées, vue de face, organisé symétriquement autour de l'axe du corps, et le scarabée –ressemblance qui saute aux yeux– est peut-être à l'origine de l'association entre Ptah et le soleil. Le caractère solaire de Ptah s'accorde bien avec son talent démiurgique et avec la lumière créatrice que Ra apporte.

Ce fait, propre à l'imaginaire des êtres créateurs, ou plutôt « bricoleurs », travaillant à partir d'un matériel déjà existant, réordonné jusqu'à obtention d'une nouvelle réalité recomposée, est intrinsèque à Ptah.

Son nom le désigne inévitablement comme un travailleur manuel, un artisan. Alors que Toth, le dieu scribe, serait plutôt, un fondateur, Ptah, lui, serait un constructeur. Il bâtirait à partir de plans conçus par d'autres divinités. Il serait celui qui réalise matériellement ce que d'autres pensent ou imaginent. Le monde où il agit est le monde visible, matériel. L'action de Ptah donne lieu à un objet tangible. Son action est efficace, elle joue sur la réalité. Celle-ci s'enrichit de nouveaux êtres ou objets grâce au travail manuel de Ptah. Mais celui-ci n'est pas n'importe quel artisan. C'est un travailleur capable d'engendrer un produit qui prend vie. En effet, le verbe *pth*, dans le *Texte des Sarcophages* (647), est à l'origine du nom, Ptah, de la divinité artisane. Ce verbe veut dire modeler, façonner. Il évoque bien le travail du potier, ou du sculpteur qui, sur un tour, produit une figurine de boue à qui il ne manque que le souffle pour ouvrir la bouche. Le verbe sculpter se composait aussi à partir de Ptah, bien que ce fût un terme tardif. Certains soutiennent que ce verbe se traduit plutôt par graver, et non par sculpter, ce qui cadre bien avec l'importance du trait, de la ligne qui délimite et définit dans l'œuvre ou l'ouvrage de Ptah.

Selon Diodore Sicule (5,19), la géométrie fut inventée pour diviser les terres boueuses inondées par le Nil. Diodore ne se réfère pas à Ptah. Mais quelle autre divinité aurait pu délimiter ce qui n'avait encore aucune consistance ?

En tant qu'artisan qui pétrit, grave ou sculpte, Ptah fut le créateur ou l'engendreur de l'humanité et celui qui sut trouver les moyens de sa survie. L'humanité est modelée sur un tour de potier. En tout cas, c'est ainsi que le pharaon Seti I[er] fut engendré par le travail en commun de Ptah et Khnoum, comme le montre un relief de la chambre C du temple du pharaon à Abydos. À Dendérah, en revanche, tandis que Khnoum modèle, Ptah sculpte. Mais, dans tous les cas, il s'agit d'un travail artisanal, d'une activité technique qui (mais ce point n'est aucunement paradoxal, si l'on tient compte de l'étymologie du grec *technè*), a pour but ou pour conséquence la production d'un être vivant. Celui-ci ne surgit pas du vide, comme s'il s'agissait d'une création instantanée, ou née d'un ordre, de l'action efficace du verbe, mais d'un travail lent et manuel, d'un savoir artisanal qui travaille sur la matière. De même, Ptah est le modeleur de statues divines en bois, en terre humide et en métal. Et cette production était menée non seulement par la parole ou « de tout cœur » –de par son cœur– mais aussi manuellement. Ptah bâtissait même avec ses doigts. Les mains de Ptah, du moins depuis l'Empire moyen, étaient son agent créateur. Cette action manuelle ne diminuait, en aucun cas, ni son mérite ni sa capacité créatrice. Le verbe qui désignait la production artisanale de Ptah était le même que celui qui nommait son action génératrice d'êtres humains : *nbj*.

De quel artisan s'agit-il ? Qui est Ptah ? À quel « corps » appartient-il ?

Il semble, en parlant de façon probablement trop générale, que dans le monde ancien, le tissage, la construction, la forge et l'orfèvrerie étaient des activités artisanales (ou magiques) qui possédaient ou répondaient à un imaginaire semblable ou identique. Il s'agissait de tresser, de lier des éléments filiformes, en bois ou en fibres animales ou végétales, ou en métal. Le tisserand entrecroisait des filaments de laine, de coton ou de lin, le charpentier et le constructeur fabriquaient des statues en métal ou en ivoire sur une armature en bois, des structures architecturales (poutres et colonnes) et des panneaux (en fibres végétales sur une structure ou un cadre en bois ou en jonc) montés avec des éléments longitudinaux végétaux (bois, branchages, feuilles). Quant au forgeron et à l'orfèvre, la fabrication de fils métalliques et leur assemblage pour produire des bijoux et de plaques métalliques, sur une structure travaillée par le charpentier, ne posaient pas de problèmes. Certaines cultures comme la culture grecque connaissaient des figures divines comme la déesse Athéna ou le héros mythologique Dédale, qui cumulaient les fonctions parce qu'elles impliquaient un travail similaire et une approche du matériel et du travail semblable. C'était le travail sur des éléments à deux dimensions qui finissaient par produire un objet en trois dimensions. Le travail, la main de l'artisan,

4. Dasen 1988, 73-74.

ajoutait cette dimension qui manquait aux éléments de base, ce qui permettait de « donner du corps » à des éléments fondamentalement plats ou rectilignes. On passait ainsi de la ligne au plan et au volume. Le travail de l'artisan donnait de l'épaisseur, de la consistance à ce qui, au départ, n'en avait pas.

Il semblerait que cet imaginaire de l'artisan (ou du magicien) ne soit pas loin de celui qui existait en Égypte. En effet, Ptah était associé ou confondu avec le dieu Sokaris (symbolisé par une butte, sur laquelle Memphis avait grandi). Celui-ci était, apparemment un dieu forgeron. Ptah, voué aux travaux de construction en bois et en pierre, était mis en relation avec le forgeron qui travaillait le métal. Il ne le fondait pas toujours –moulant ainsi les chairs du Pharaon– car il le martelait aussi sur un moule. C'est ainsi qu'il produisit des cuillères rituelles. Dans les deux cas, il s'agissait de producteurs, indépendamment du matériel utilisé, mais non de la technique et de l'approche utilisées. Auparavant, Sokaris aurait été une divinité agraire, liée à la fécondité de la terre.

Dans un cas, au moins, l'attribut qui le distingue est une houe : un instrument qui sert à ouvrir et à défricher la terre, aussi bien pour donner naissance à des fruits nécessaires à la vie que pour ordonner l'espace, grâce aux lignes que la houe trace et ouvre. Il s'agit donc d'un instrument qui « ouvre » la terre à l'ordre, qui la soumet à l'ordre que Sokaris apporte.

En tant que divinité artisanale, il n'est pas étrange que Ptah-Sokaris fût représenté comme un pygmée.

Il existe donc des signes qui présentent Ptah comme une divinité capable de fonder un nouveau monde. Ses pouvoirs consistent en un travail de mise en ordre de l'espace. Un travail ou un art qui consiste à délimiter, à diviser et à composer l'espace jusqu'alors indifférencié, non-ordonné. Ptah doit agir ou se comporter comme un « architecte ».

Qu'en est-il ?

Ptah est associé à un élément architectural ou constructif fondamental. Grâce à son association avec Sokaris, il manie la houe. Ce n'est pas le seul instrument qui lui appartient. En effet, Ptah est lié aussi à la colonne. Une colonne le soutient (Ptah apparaissant adossé à elle, presque comme un atlante qui ne peut être conçu ou figuré sans ce support) ou il soutient une colonne, un pilier, le pilier *djed* (peut-être un arbre, l'arbre de vie, une image de l'axe du monde, selon un vocabulaire qui est peut-être discrédité, un arbre dont toutes les feuilles porte une inscription : le nom du Pharaon). Mais il ne faut pas oublier que le *djed* pouvait symboliser la floraison, la richesse ou la vitalité d'un règne, donc d'une ère, que la présence du Pharaon garantissait.

Symbole aussi de permanence (ce qui s'associe à des notions de sécurité et de vitalité), le *djed* est donc un attribut de la divinité, qui le distingue et permet de le reconnaître. Ptah est, en un sens, le dieu pilier, bien qu'il fût souvent représenté dans une chapelle ou sur un podium échelonné, c'est-à-dire, entouré ou accompagné de formes, d'éléments architecturaux : des espaces construits ou des éléments d'architecture qui par leur seule présence constituent déjà un espace délimité, donc architecturé, comme l'espace que délimite un podium ou une estrade. Rappelons que le dieu mésopotamien de l'architecture, Enki, était associé à une estrade. Une des caractéristiques de Ptah était ainsi : « dont l'enceinte est au sud de Memphis » –ville que Ptah avait fondée, rappelons-le–, ce qui laisse supposer que Ptah était une divinité qui veillait sur les limites. Limites qu'il est nécessaire de tracer ou de construire si l'on aspire à obtenir un espace où l'on puisse se réfugier ou habiter en toute sécurité.

Ptah est un pilier. Celui-ci est planté en un lieu. Il centre l'espace et marque la verticale. L'espace s'organise grâce à la présence stable de Ptah. Il ne fait rien, il n'agit pas, il est. Et, en étant, en étant là, tous les êtres peuvent atteindre l'être, peuvent arriver à être. La vie s'instaure grâce au port de Ptah.

Or un pilier ou une colonne est un élément architectural majeur. Perpendiculaire au plan, au sol, il introduit la troisième dimension de l'espace. Sans lui, l'espace n'existe pas, il est réduit à un plan. La vie, dans ce cas, ne pourrait surgir et se fixer. Le pilier soutient les niveaux du cosmos, il les sépare et les relie aussi. Le monde s'organise. Les directrices que la houe trace à même le plan se complètent avec cette troisième directrice verticale. Le dièdre est ainsi composé. Tout peut s'ordonner, se disposer selon des positions fixes. Le dièdre introduit les mesures : il définit des lignes de repère à partir desquelles chaque élément qui compose le monde trouve sa place. Tout se place là où il le faut, où il se doit. De plus, le pilier introduit une notion morale. La ligne droite qu'il trace est une image de droiture. Le droit que la droite symbolise permet d'ordonner justement (avec justesse) le monde. Chaque chose acquiert un lieu qui lui appartient. Les lignes qui peuvent être tracées à partir du dièdre initial de base, délimitent la place que chaque être occupe et marquent les limites qui doivent être respectées. Ces lignes contiennent le monde. Du débordement initial, on passe à un monde où règne la contention, c'est-à-dire, la justice. La norme visualisée par le biais de la ligne qui se projette dans l'espace, qui a une traduction spatiale, est créée à partir de la *norma* (latine), de l'équerre qui permet de tracer des lignes droites, équerre qui n'est pas si différente de la houe. Souvenons-nous qu'en grec *nomos* –d'où provient le latin *norma*–, signifiait loi (divine). Or la relation entre Ptah et l'éthique ne doit pas nous surprendre. La relation entre les lignes droites que l'architecte trace, et la droiture qu'elles symbolisent, n'est pas si étrange. Ptah était bien considéré comme le dieu de la justice, précisément. Ptah émergeait comme le soleil et ses rayons dispensaient la justice.

Les divinités et les héros fondateurs, surtout en Grèce, étaient mis à l'épreuve. Avant de fonder ou de construire (deux actes ou deux étapes distinctes en Égypte, tout comme en Mésopotamie et en Grèce), ils devaient prouver leurs capacités d'imposer un ordre sur un monde nécessairement désordonné, chaotique. Cette victoire sur l'obscurité qui donnait lieu à un ensemble ordonné et qui était symbolisée par ce dernier et par la fondation d'un sanctuaire ou d'une ville, se distinguait, tout d'abord, par l'affrontement et par la victoire sur ce qui représentait les forces chaotiques. Francis Vian[5] l'avait bien défini en analysant le mythe de fondation de la ville (grecque) de Thèbes : un dragon ou un serpent (*drako,* en grec, se traduit par serpent). Le combat entre le héros et le monstre est certainement un mythème ou un motif folklorique. Toutes les luttes entre des représentants de l'ordre et des forces du désordre ou de la nuit n'ont pas la même portée ni le même sens. Zeus luttant contre Typhon, Apollon contre Python, Cadmos contre le Dragon, ainsi que Marduk contre Tiamat, ou Yavhé contre Léviathan. Ces batailles cosmiques ont été depuis longtemps comparées, bien que dans un cas, l'ordre qui surgit soit cosmique et dans d'autres simplement urbain. L'ambition et les résultats ne sont pas identiques. La lutte, même si elle répond à un schéma semblable, ne signifie pas nécessairement la même chose. Néanmoins, un nouvel ordre, quel qu'il soit, surgit de la victoire des forces de la lumière sur celles de l'obscurité. Et, dans tous les cas, celles-ci sont représentées par un grand serpent, souvent associé à un cours d'eau ou à un point d'eau qui émerge de la terre, donc qui est en contact avec le monde chtonien.

Ce serpent existe en Égypte –où d'ailleurs, les ophidiens ne manquent pas–. Comme la plupart des divinités d'origine égyptienne, Ptah était conçu comme le serpent Irta (qui veut dire Créateur de la Terre), divinité primordiale des premiers temps. De plus, Ptah était parfois considéré comme étant le fils de Kematef, le serpent créateur des origines, père et mère d'Irta. Puisque Ptah pouvait se manifester sous forme de serpents, ceux-ci n'avaient aucun secret pour lui. Ainsi, bien que le serpent incarnât les forces primordiales mais aussi les forces destructrices, il était également l'animal contre lequel Ptah, en tant que divinité des forces de la lumière, luttait jusqu'à la victoire. « Tueur de serpents » est une épithète qui fut utilisée, une fois néanmoins. À Edfou, Ptah était considéré comme le Protecteur contre le Serpent. Ainsi la création des eaux primordiales succédait à la victoire sur l'ophidien. À la Basse Époque, de nombreuses figurines prophylactiques représentant un nain des serpents à la main, sans doute des images de Bès, étaient employées comme des amulettes contre le mauvais sort.

Bras étendus parallèlement au sol, avant-bras pointant vers le haut, les membres supérieurs de Ptah pouvaient prendre la pose du *ka*, afin que la divinité, debout, pieds fortement appuyés au sol, soutienne la voûte céleste.

La pose, le geste de Ptah créait le monde. Ptah plaçait le ciel grâce à son geste, les bras levés, qui l'étendait et le fixait comme une toile de fond, tout en le maintenant séparé de la terre à laquelle, initialement, il était uni. L'ordre du monde était ainsi garanti de par l'arrivée de Ptah. Un *hymne à Khnoum*[6] chantait : « Salut à toi, Khnoum-Rê, seigneur d'Esna, Ptah qui mis au monde les primordiaux (…). Il souleva le ciel, il souleva le firmament (…) Il étala la terre sur son assise (…) Modeleur des modeleurs, père des pères, mère des mères (l'androgynie réapparaît), qui fit les êtres d'En-haut et créa les êtres d'En-bas. Il fit les villes, sépara les campagnes, créa les deux pays, affermit les montagnes. Il a façonné autour les hommes, il a engendré les dieux, afin de peupler la terre et l'orbe du Grand Océan… ».

Ptah se comportait comme un pilier. Il l'était d'ailleurs, comme nous l'avons dit. Et ses bras reproduisaient l'image de la structure des façades de temples et des pylônes, qui était l'image même du *ka*. Tout son corps se transformait en un temple. Il était lui-même architecture. Ptah connaissait, néanmoins, les instruments du dessinateur et du constructeur. Berlandini-Keller, qui est la spécialiste qui a le mieux écrit sur Ptah-architecte, montre qu'un des qualificatifs de Ptah était « de l'angle divin ». Or le terme qui se traduit par angle *(q'hw*) ne désigne pas seulement une figure géométrique plane mais, tout comme cela arrive dans de nombreuses langues modernes, un dièdre : l'angle d'un mur. De ce fait, les trois directions de l'espace sont ainsi évoquées.

Or ces directrices sont sous l'emprise de Ptah. Ptah est la divinité des angles, c'est-à-dire des éléments fondamentaux dans toute construction, car ce sont les angles qui permettent d'articuler les limites d'un espace. Sans leur présence on ne se trouverait en face que d'une ligne infinie, donc d'une frontière qui ne crée en aucun cas un lieu (un lieu où vivre, se trouver, se réfugier si nécessaire).

Cette relation entre Ptah et les angles des édifices s'accentuait du fait que Ptah était lié aux quatre divinités féminines qui protégeaient l'espace, donc les quatre coins du monde. Or, tout coin est l'endroit où la pierre d'angle –la pierre qui est le fondement physique et ontologique d'une construction– est placée. Souvenons-nous que le Christ, le dieu bâtisseur, se présentait comme une pierre d'angle.

Un angle est semblable à une équerre. En fait, il n'y a pas de différence formelle. Or, Berlandini-Keller le montre bien, Ptah est celui qui érigeait les pierres

5. Vian 1963.
6. Sauneron 1959, 72-73.

d'angle et qui maniait le niveau-équerre. Un même terme égyptien, *ḥss*, se traduit par coin et équerre. L'équerre est l'instrument grâce auquel les angles sont tracés et les pierres d'angles découpées en suivant les lignes que l'équerre permet de dessiner.

Ptah est donc la divinité qui veille sur tout ce qui soutient efficacement un édifice : la structure, les murs limitrophes et les assises ou pierres d'angles qui permettent de passer du plan au volume, du dessin ou de la représentation, de l'image à la réalité, qui autorisent la projection dans l'espace de ce qui a été préalablement tracé sur un plan. Dans les deux cas, l'équerre est l'instrument grâce auquel on projette l'image mentale sur le plan, puis dans la réalité. Grâce à l'action de Ptah, la construction trouve son équilibre, bien assise sur les pierres d'angle (qui sont les assises de la construction), bien soutenue par les murs portants et par les colonnes.

Pourquoi tout cet effort ? Ptah est habituellement représenté debout. Bien droit, bien planté sur un podium, parfois. En plein air ou dans un naos mais, dans tous les cas, droit comme un pilier.

Pilier vivant : l'association entre la colonne et un arbre, un lieu commun de l'anthropologie, acquiert ici tout son sens. Il a été écrit que Ptah était associé à une ancienne divinité arborescente. Une de ses épithètes –une de ses manifestations ou hypostases– le suggère bien : Ptak-Khery-bak-ef. (Ptah qui se trouve sous l'arbre moringa. Il s'agit d' un arbre qui pousse sous des climats désertiques et qui est appelé aujourd'hui « l'arbre de la vie » ou « arbre miracle », grâce à ses propriétés médicinales et nourrissantes et aux vitamines et protéines qu'il apporte). Il alimente, il protège, il donne de l'huile, il purifie (par exemple, les eaux sales ou noires). Il redonne donc de la vie à celui qui l'a perdue.

Ptah incarne la ligne droite ainsi que les valeurs morales, comme il l'a été précisé auparavant. Ptah est, en un certain sens, un pilier, un soutien –qui porte la voûte céleste, maintenant la structure tripartite du cosmos, empêchant ainsi que celui-ci ne s'écroule et ne revienne à un état chaotique, dont la menace est toujours présente–. C'est grâce à Ptah que le monde existe en tant que tel, en tant que lieu où chaque être trouve sa place.

Mais l'effort de Ptah ne vise pas seulement à construire et soutenir le monde. Ce geste, effectué en permanence, a un autre but. La construction, l'acte architectural grâce auquel le monde est bâti, est une métaphore. Le projet et la construction visent l'édification, certes, non seulement du cosmos racheté aux forces du chaos, mais encore, et surtout, de Ptah lui-même. Ptah s'édifie, se forme lui-même. Comme le chante une salutation à Ptah, il a non seulement « modelé (son) propre corps, quand le ciel n'était pas, quand la terre n'était pas, quand le flot en crue ne montait pas encore » (description négative du monde qui ressemble fort à un hymne à Enki), mais en plus, il s'est « formé » ou éduqué lui-même. Il n'est pas étrange que la franc-maçonnerie ait vu en Ptah un modèle à suivre (les croyances, un tant soit peu fumeuses franc-maçonnes, soutiennent que les deux colonnes qui président toute loge, proviennent à la fois des colonnes du temple de Salomon, et de celles du temple de Ptah à Memphis. Certaines loges, d'ailleurs, portent aujourd'hui le nom de Ptah). Son action a pour but la construction morale du créateur. À travers ses actions extérieures, il se forme. Et l'édification ou la construction du monde est un symbole de l'élévation morale du créateur : « Tu portes haut l'œuvre que tu as faite en t'appuyant seulement sur ta propre puissance, en t'élevant toi-même grâce à la fermeté de tes bras ». Ptah est son propre créateur. Son corps est un édifice, un temple. Il n'a, en fait, pas besoin de sanctuaire, car lui-même est le lieu où il vit, lieu qu'il s'est bâti lui-même en se maintenant droit.

Ptah était donc plus qu'un architecte ou un graveur. Ou, disons plutôt, que sa « condition » (est-ce le terme correct ?) d'architecte (de sculpteur et de forgeron), de maître d'ouvrage et d'ouvrages, tout bien considéré, impliquait nécessairement qu'il avait des connaissances d'un autre art, entre la technique et la magie.

Ainsi, comme le fils d'Apollon était Asclépios (en latin, Esculape), Ptah eut à voir avec un être semblable. On a souvent dit qu'entre la mesure et le médicament, il existe une connivence étroite. Dans les deux cas, il s'agit de maintenir ou de rétablir l'équilibre, l'harmonie. L'acte par lequel on prend et on transpose des mesures, pour construire un objet droit, bien défini et solide, est semblable à l'acte par lequel on traite un malade afin qu'il se porte bien, qu'il se maintienne correctement, donc bien droit, équilibré.

La médecine et l'architecture sont deux activités qui ont une même cause finale. Si Apollon était un dieu constructeur et urbaniste, son fils, on le sait, devint le dieu de la médecine (Apollon était d'ailleurs, surtout à Rome, le gardien des eaux thermales, des eaux qui guérissent). Ptah, quant à lui, n'était pas si directement lié à la médecine, bien que, quelques fois, à une époque tardive, Ptah put guérir.

La relation entre Ptah et la médecine existait. À la Basse Époque, l'architecte de Saqqara, une figure historique, Imhopeh, fut divinisé. Confondu avec Ptah, il devint non seulement une divinité représentée assise avec un papyrus, sur lequel il devait dessiner, déroulé sur ses genoux, mais aussi le dieu de la médecine, que les grecs associèrent, précisément, à Asclépios. De plus, l'épouse de Ptah, la lionne sanguinaire Sekhmet, qui incarnait les forces terrifiantes et destructrices qui, paradoxalement, faisaient avancer le cycle vital en parachevant la destruction nécessaire avant tout renouveau, était une divinité qui savait guérir, et ses prêtres étaient des médecins et des vétérinaires pour qui toute forme de vie n'avait aucun secret.

Ptah apparaît donc comme une divinité bénéfique –ce qui n'annule pas son côté destructeur–. Les eaux, le premier socle, la première ville, tous les éléments grâce auxquels un abri, un toit peuvent être construits, lui appartiennent. Il les a créés. Tout cet effort bâtisseur visait

sa propre édification, ainsi que celle de ses créatures qu'il avait modelées avec de la glaise et de la paille : les êtres humains, pour lesquels il œuvrait, afin de les former, de les éduquer, de les soigner. Comme tout créateur, Ptah n'abandonnait pas ce qu'il avait créé, puisque, plus que la création sans fin, c'était la survie qu'il recherchait, en se présentant comme un modèle de droiture (par qui l'ordre cosmique, la séparation du ciel et de la terre, et la transformation du ciel en un espace architecturé, une tente, s'établit). Ptah contrôlait donc non seulement l'espace, sans lequel rien ne peut être créé, mais aussi le temps, c'est-à-dire, les formes grâce auxquelles la matière put être conformée. Comme toute divinité considérée comme le père de toutes les autres, Ptah fut un bâtisseur, qui forgea un monde ainsi que les êtres qui le peuplèrent, en se préoccupant aussi, ou surtout, de leur donner la vie, mais aussi de leur survie.

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2. WHY ANCIENT EGYPTIANS LONGED FOR THEIR CITIES? CITY, NOSTALGIA AND IDENTITY FASHIONING IN THE NEW KINGDOM

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In the Greek tradition, Egypt is the urban civilization *par excellence* and Diodorus spoke of the 18,000 towns of Pharaonic Egypt,[1] a view complemented by the rich administrative sources that display a dense urban network, as we can see for example in the papyrology papers of this volume. In Ancient Egyptian, two words are used for substantial settlements, *niut* (*njwt*) and *demi* (*dmj*); the latter originally meant 'port'[2] and moved by understandable usage to refer to 'town' or 'village' by the New Kingdom; it was also used for larger cities such as Per-ramesses and eventually replaced the former in the Late Period language.[3]

However, for a long time Egyptology was at a loss when trying to define the Egyptian city, mainly because of the focus of academic and popular attention on the spectacular religious and funerary stone remains. This led to the iconoclastic position of Wilson,[4] who claimed that Egypt was a civilization without cities and that the identified capitals were merely temple complexes linked by monumental highways. This view challenged a long historiographic tradition with historians considering cities as the most significant human artefact; for a Vere Gordon Childe, Egypt was precisely at the beginning of what he called the 'urban revolution'.[5] An 'Egypt without cities' remains a challenging position to the modern mind: it is difficult to imagine an organized society without the economic, political and religious centralization that goes with cities. It transpires that excavations in the last thirty years have led to a greater understanding of the Egyptian urbanization,[6] different from the modern city defined as a result of capitalism by Max Weber,[7] which is not to be found in Egypt, where cities fulfilled other functions.

This paper is about the Egyptian definition of the city according to textual representations[8] and the part played by the elaboration of these literary *topoi* in identity and self-fashioning. I will consider the importance attached to urban life as opposed to rural living and how the landscape, as a constructed representation resulting from human interactions with the environment,[9] is filled with cultural and religious references. In short, I am going to approach the city as a cultural object in order to track down its Egyptian perception.

1. The city and the world: the official discourse

The rich discourse on cities in Ancient Egypt is often founded on an elaborate theological background. From this point of view, the cosmological corpus can be seen as a reflection of the world that physically surrounded the Egyptians.

1.1. City and cosmology

The city stands for organisation over nature, and the Egyptian organized world was fashioned as a city expanding over the original chaos, conceived in the shape of a primordial and uniform soup named *nun*. This was a negative of the present and future world, which contained all the seeds of what was to be. Then came what the Egyptians called the First Time, *Sep-Tepy*, which introduced a rupture and distinction between the elements: a self-generated demiurge created an island, a mound that arose from that pre-existing sea.[10] This mound equated to a city – Heliopolis – and can be seen as the religious translation of a geographical phenomenon. Historically, whereas the settlements of the Naqada I Period "were founded along the desert edge or near wadis",[11] from the Old Kingdom onwards towns were established on mounds, "on higher ground within the flood plain, often using

1. Diodorus Siculus, *Bibliotheca Historica* I, 31.
2. Valbelle 1985; Gardiner 1968; Kuhlmann 1991, 218.
3. Müller-Wollermann 1991, p. 49.
4. Wilson 1960; Bietak 1979.
5. Childe 1950.
7. Weber 1956.
8. For another similar attempt, see Franke 1994.
9. Berque 1990, 26 uses the French word 'médiance' to describe the relationship between individual existence and its spatial context (physical and social). See also *id*. 1997; Schama 1995, 14.
10. E.g. Allen 1988, 13.
11. Moeller 2007, 57.

natural levees in the vicinity of the river".[12] The recent geomorphological studies of the historical landscape of the capital at Memphis show that at that time the city sat between two branches of the Nile, thus being surrounded by water at least on two sides[13] in the manner of an island.

In the tradition of the great funerary corpora, such as the Pyramid and Coffins Texts, the toponym associated with the creation of the world is Heliopolis and its supremacy is manifest throughout Egyptian history.[14] This status of the solar city is probably linked to the proximity of Heliopolis to the political and religious origins of the Egyptian state:[15]

> Words to say: It is Atum who manifested himself as a masturbator in Heliopolis.
>
> (Pyramid Texts § 1248a)[16]

At the cosmological level, the initial city stands as a pattern for all others. In the New Kingdom's Great Hymn to Amon from Leiden (c. 1400 BC), at a time when the metropolis was Thebes, the theme was remodelled to fit into the new royal/religious/urban system where Thebes was the centre of power:

> The norm (*mty*) to all cities (*njwt*) is Thebes,
> For water and earth were in it,
> At the First Time.
>
> (P. Leyde I 350, 2, 10)[17]

Here a strong feature of the Egyptian view of cosmology appears with this permanent pendular movement from a local scale to a cosmic one through the city seen as the dwelling-place of the demiurgic god. A pivotal centre of the world, the city appears as the point of contact between men and the cosmos. This newly created world must maintain itself against chaos.

This cosmological system finds a geographical reflection in the ever-changing Nilotic environment, which needs a high level of human activity to be managed. The city stands for the totality of the world as *creatio continua*: the world and its upkeep are the fruit of an ongoing and renewed struggle against the original *nun*, the original chaos. The city stands for Egypt and vice-versa; Upper and Lower Egypt also mirror each other in these terms, with Thebes being the "Southern Heliopolis". The use of the ideogram for "city"  – whatever the object it refers to in real life (a knot, a crossroads, canals - among other suggestions)–[18] is a good illustration of this system. As a determinative sign, it is attached to Egypt  , a civilized geographic reality[19] in contrast to what is wild, unknown, desert, non-urbanized or foreign  . This cosmological system is also a metonymic ensemble where there is a range of various equivalences between World-Egypt-Capital-Temple, any of these terms equating to each other. To quote a famous example, the Greek word *aigyptos* came from Houtkaptah, "Castle of the Soul of Ptah", which is the name of the main temple of Ptah in Memphis and was used to designate the whole city as well.[20]

1.2. Pharaoh in the divine order

In the official discourse, ruling power and theology are intimately linked and mythological texts and royal policy of city foundation answered each other: the pharaonic power was associated with the foundation of cities throughout Egyptian history, and subsequently thematized as such.

Pharaoh is the conveyor of the divine order on Earth; he is the one who must enforce order and spatial organization over chaos, according to the dynamic system evoked earlier. Therefore Pharaoh is the pillar of the world, precisely through his role as a city founder. As written by Assmann, "the founding myth of the Egyptian State is the instalment of the King on Earth for him to realize *maat*".[21] "Kingship is designed as the office of Atum (*j3wt Tmw*), considered as the continuous completion of the demiurgy and the corner-stone of the Egyptian cosmos; it is the inheritance that the last god who was king on earth, Horus, left to Pharaoh".[22]

In theological texts, the founding of cities by Pharaoh registered their passage from the ephemeral and divine realm to actual completion. This completion revealed the king in his royal dimension, a view which already appeared in the Pyramid Texts:

> It is he[23] who founded (*grg*) you (the city) in your name of foundation (*grg*).

12. Moeller 2007, 58.
13. Bunbury in this volume and Bunbury, Jeffreys 2011; Jeffreys 1996.
14. Bickel 1994, 289-293.
15. Bickel 1994, 292.
16. Sethe 1910, vol. 2, 203.
17. Zandee 1947, pl. 2; Mathieu 1997, 140.
18. Goelet 1999; Goelet 1999b; Müller-Wollermann 1991; Parlebas1983; Van Lapp 1997.
19. Moreno Garcia 1991, 123-124.
20. Wilcke 1934, 73-74; Yoyotte 1963, 119.
21. Assmann [1989], 119; translated by the author.
22. Ibid.
23. Atum.

> It is he who came, and he went to follow you in your name of city (*njwt*).
>
> It is he who saved you from everything Seth had created against you.[24]
>
> (PT § 1595a-c)[25]
>
> Pharaoh N built (*ḳd*) you as city (*njwt*).
>
> (PT § 1597c)[26]

Two complementary words are used here: *grg*, "to found, to establish order" (*Wb* V, 186)[27] and *ḳd*, "to build, to create, to perform" (*Wb*V, 72-73); they stand for the respective roles of gods and the king.[28] This is according to a relatively common sharing of tasks in the Ancient Near East: the mythological plans belonged in the divine realm, while the actual realisation was incumbent upon the king. Historically, we know that a policy of actively founding cities was concomitant with the creation of the unified Egyptian State.[29] Throughout Egyptian history, new eras are associated with the creation/recreation of a capital city. To give an example, in the dawn of the Middle Kingdom, the founder of the 12th dynasty Amenemhat I (c. 1994-1964) established a new capital near Licht, *Jtữ-tȝwy*, "the one who grasps the two lands". The Ramesside kings did not act differently when they created Per-Ramesses in the Eastern Delta, a central position in the newly extended empire.[30]

Echoes of this royal function are found in the official propaganda. For example, in a Victory Stela of Thutmosis I in Nubia, the political success is transcribed on a mythological level and the territorial victory is turned into a cosmological achievement:

> His Person, he seized his heirloom, he set himself on the dais of Horus so as to enlarge the borders of Thebes […] to tame the sand dwellers, the foreigners hated by God, the Egeans, the Retehouqabet! The southerners sail to the North, the northerners sail to the south, all foreign countries come together to the perfect god of the first time and bring their tributes, Âakheperkare, may he live forever […] His north border goes up to the front of this country; the south border to the upside down waters.[31]

This text reveals once again in the official discourse the equivalence of city and country, the borders of which had to be expanded or dynamically maintained against the hostile forces of chaos in every cardinal direction. Cities are cosmological marks for the humans, and to paraphrase Mircea Eliade, the centre and axis of their world. No distinction is to be found in the mythological discourse between the various orders of the world, whether natural, religious, political or social.

2. The landscape of the city and the garden-topos

This cosmological background, setting the city as the origin of the world and as its fulfillment, had an influence on the fashioning of the city landscape in words. The text of the border stelae at Amarna is particularly indicative of this point of view:

> Then, as for the space inside the four stelae, from the Eastern Mountain to the Western Mountain, this is Akhetaton whole. She belongs to my father, Aten, granted with life for ever, provided with mountains (*ḏww*), desert margins (*ḫȝswt*), an agricultural territory (*sḫt*), new fields (*mȝwt*), high fields (*ḳȝyt*), low fields (*nḫbw*), fields (*ȝḥwt*), waters (*mw*), settlements (*dmjw*), banks, men, herds, bushes, all the things that the solar disk makes, my father who makes them come for ever and in eternity.
>
> (Stelae, A., l. 12-16)[32]

As a spatial unit whose model is the world, the city is cardinally orientated, it is a whole which contains a microcosm. A city – and in this case not an organic city but a newly founded one – is seen as a world in reduction, with all its physical elements, the mountains and deserts at its margin. The mention of new grounds (*mȝwt*)[33] is highly significant in the sense that the extension of arable fields stands for the dynamicity of the city and is integrated into its conceptual definition. This is possibly a hint at the dynamic regulation implied by the rapidly evolving Egyptian landscape modelled by the wind-blown sands from the desert and the sediments of the river, contributing and adding to "the channel migration due to meandering of the river around the outer part of a bend".[34] Urban settlement and development involved the human management of this environment[35] and the celebration of the new low

24. I.e. chaos, which is the realm of Seth.
25. Sethe 1910, vol. 2, 349.
26. Ibid., 350.
27. Parkinson 2004, 100; Pflüger 1994, 126.
28. Grimal 1986, 339-342.
29. On this subject, see the synthesis by Tallet 2005.
30. Gundlach 2004.
31. Klug 2002, 72; Gundlach 2004, 23-24.
32. Murnane, Van Siclen III 1993, 93-94
33. Gardiner 1968, vol. 1, 12; Gardiner 1948, 27, n. 1; Bickel, Gabolde and Tallet 1998, 36, 47; Ragazzoli, 2008, 175.
34. Bunbury and Jeffrey 2011, 66.
35. See also Graham and Bunbury 2005 and Lutley and Bunbury 2008.

fields reflected in the literary and religious realm as a victory over nature.

This can be correlated to the fact that texts on cities do not describe a built urban environment, except for temples and palaces. When depicted, the landscape is not urban as modern Westerners would define it and towns appear in texts by way of a description of their gardens, a theme which exemplifies once again the management of nature by men.[36]

In the New Kingdom genre dedicated to cities, the "praises of city",[37] one of the two main variants consists of the enthusiastic description of capital cities; they contain "grandiose descriptions" mainly of Per-Ramesses and "emphasize the appeal of these places for people throughout the whole country. Descriptions of architecture are scarce, contrary to the description of the landscape and of the charming products which are consumed".[38] In these depictions, apart from the temple and the palace, there is nothing depicted which would be considered urban according to a modern interpretation. For example Per-Ramesses, which was also a display of royal and military forces,[39] was turned by the poet into an agricultural estate in the praise of the city recorded on P. Anastasti II:

> His Majesty built (*ḳd*) for himself an estate (*bḫn*),
> Great-of-victories is its name.
>
> (P. Anastasi II, 1, 1)[40]

The "estate" or "agricultural domain" (*bḫn*)[41] into which the city is changed is linked to a certain social standing in literary texts. When describing cities, scribes actually painted the lush gardens of the houses of the elite. Another eulogy in the form of a letter written by a scribe arriving at Per-Ramesses can be quoted:

> I arrived at Perramesses-Meryamun,
> the great soul of Pre-Horakhty.
> I found it in excellent condition, the throne,
> With nothing alike, on the foundation-pattern (*snṯ*) of Thebes.
> It is Ra himself who founded (*grg*) it,
> Its town (*dmyt*), sweet of life.
> Its territory (*sḫt*) is full of all sorts of seeds,
> Food and victuals are there every day,
> Its ponds are full of fish,
> Its fountains are covered with birds,
> Its gardens are green with vegetables,
> Its banks covered with dates.
>
> (P. Rainer 53)[42]

Here again appear the themes of the cosmological standing of the city and the royal foundation, with God planning it (*grg*) and Pharaoh building it (*ḳd*). The new city is built on the pattern of the First-Time city, Thebes, but the accent is on a very country-like landscape. The garden city becomes the kingdom of multitude, of endlessness, and of eternity. Food is available and unlimited every day. As the essence of the world and a meeting of culture and nature, gardens are places of plenty and abundance. Men institute their order in the city and its gardens; there they can regulate their relationship to nature. In a garden-city, man is the demiurge of this enclosed place, complete and autonomous, which contains a world inside the world. In such a perspective and in the literary texts which express it, the Egyptian city equates its territory, which might go as far as the nome borders. A parallel to the text above with an extra verse line is indicative of this:

> I found it in excellent condition,
> it is a perfect nome, with nothing alike,
> on the foundation-pattern of Thebes.
>
> (P. Anastasi III, 1, 12-2,1)[43]

These pictures open up for us the doors to the Egyptian perception of cities, defined here as a cultural phenomenon. This perception is not an objective record of a topographic reality, but the path to a cultural definition, very often complemented by the archaeological data, which have precisely revealed the presence of extensive estates within a tighter urban network.[44] As Moers writes it about the landscape of the love-songs, the topographic elements depicted in the praises of cities are the same "idealized Nile landscapes as well as spacious park-like gardens which are known from iconographic and textual sources of the New Kingdom to be specific imaginings of the Egyptian elite in terms of self-image. The construction of such an estate with gardens and pools is referred to as a status symbol"[45] in many texts, including *The Tale of*

36. Nys 1997; id. 2001.
37. Lichtheim 1980; Verhoeven 2004; Ragazzoli 2008.
38. Moers 2010, 695.
39. P. Anastasi III, 7, 5-6; cf. Gardiner 1937, 28; Caminos 1954, 101.
40. Gardiner 1937, 12; Caminos 1954, 37; Tacke 2001, 10; Ragazzoli 2008, 67-68.
41. On *bḫn*, see among others Davies 1929; Gardiner 1968, vol. 2, 204-205; Caminos 1954, 140, 403; Meeks 1979, 252-253, n. 64; Endruweit 1994; Mathieu 1996, 71, n. 183; Lacovara 1997, 52-67; Widmaier 2009, 65-66.
42. Gardiner 1937, 137; Caminos 1954, 303; Ragazzoli 2008, 53-58.
43. Gardiner 1937, 21; Caminos 1954, 73; Tacke 2003, 36; Ragazzoli 2008, 53-58.
44. At Karnak, see Abdel-Raziq 1984-1985.
45. Moers 2010, 696.

Sinuhe,[46] *The Teaching of Ani*[47] and *The Late Egyptian Miscellanies*.[48] It is striking that those features were selected as representative of a large city, but it also reveals social aspirations. Kemp has precisely criticized the view of an Egyptian city as a densely populated settlement similar to the Arab medinas of today. For him this dense, uniform and highly planned urban network is the first degree of architecture and is reserved for the lower and laborious classes of the society; they hardly reveal the ideal settlement for the Egyptians.[49] On the contrary, Kemp showed that the modest density of the Amarna's suburbs with their vast gardens could be considered as the transcription of an aesthetic ideal in this period. In an environment where water and agricultural space are scarce, how the great urban villas with their huge gardens would naturally stand for luxury and indeed a very urban luxury.[50]

3. Urban nostalgia

The settlements of the elite provide the mode for an ideal urban life in literature, which fashions in turn social aspirations. Literature gives way to the expression of subjective experiences and in literary texts the point of view about cities changes from the comprehensive cosmological perspective to the fashioning of subjective experiences. As a result, these texts are more subjected to historical changes. In literature, identity in the New Kingdom seems to be epitomized through the theme of longing and local identity by that of longing for a specific city.

3.1. The cohesive model of the Middle Kingdom

In the Middle Kingdom, in literary texts in general, and more specifically in those genres we could qualify as normative, i.e. wisdom texts and funerary biographies, references to the "city" can be understood as a concept, a spatial metaphor of the social network of which individuals are part. In this case cities are about cohesion and group identity, it is what one can respond to and, by doing so, become included in or excluded from the community.[51] Social control over individual behaviour is exercised within this framework, as we can see in the *Teaching of Ptahhotep*:

> If you rise after being humble
> if you get wealthy after shortage in the city known (*njwt*) to you,[52]
> do not boast about what happened to you in the past.
> (P. Prisse, 13,7 = D 428-432)[53]

Echoes of these prescriptions are found in biographies, so as to show that the deceased conformed to what was socially expected of him. The reward for his good deeds is a good reputation among his peers, a good name/fame (*rn*) in his city. This stands as a coherent system, where good deeds are rewarded and create social cohesion. The First Intermediary Period nomarque Montouhotep could therefore say:

> My perfect name (*rn*) shall be long-lasting in my city (*njwt*), so as for my monuments never to disappear.[54]

Here, city (*njwt*) is synonymous with a coherent society and a certain sense of community. Echoes of this are to be found in the narrative literature. In the *Tale of the Shipwrecked Sailor* this concept plays a role in the narrative when the main character, then the prisoner of a terrifying snake, uses the concept in a bargain where he makes the following promise if his captor agrees to free him:

> You will be thanked in the city (*njwt*), before the magistrates of the whole country.
> (143-145)[55]

And the snake finally lets him go, with an order:

> Make that my name (*rn*) be good in your city (*njwt.k*)!
> (159)[56]

The snake has no name in the tale and neither has the city of the shipwrecked man. Such a situation is in effect paradigmatic of how community and social networks were expressed at that time. Here, city is a concept, it is nowhere and everywhere and it refers to the community and the social network of an individual. We can wonder whether this has any historical counterpart in the administrative field. Truly, individuals are usually registered according to their nomes, but in the texts from el-Lahun, examples are found where

46. B81-85, cf. Koch 1990, 41; Parkinson 1997, 31.
47. Ani B19,1-4, cf. Quack 1996, 102-103.
48. P. Lansing 11,3-7 = Gardiner 1937, 110; Caminos 1954, 140; P. Lansing 12, 1-13a,7 = Gardiner 1937, 110-112; Caminos 1954, 412-413; Tacke 2003, 112-113.
49. Kemp 1989, 175; id. 1977, 125-126.
50. Shaw 1992; Tietze 1996.
51. Assmann [1989], 35-56.
52. (And to which you are known.)
53. Zaba 1956, 50; Parkinson 1997, 260.
54. Stewart 1979: pl. 18, l. 16.
55. Blackman 1942, 46; Parkinson 1997, 96.
56. Ibid.

the administrative identity of individuals refers to the city rather than the nome.[57] In that case, the spatial category of reference seems to be the town[58] and/or the neighbourhood.[59]

3.2. Individual perspectives in the New Kingdom literature

This theme can be tracked in New Kingdom literature, but in a slightly different perspective, which shows how literary elaborations are the subjective expressions of a specific historical situation. In the New Kingdom, with the expansion of Egypt and growing contacts with various peoples, the Egyptians experience new cultures which possibly leads to a "potentially fruitful mixture of relativisation, scepticism, dogmatism and observation".[60] Maybe as a consequence of this, in literary texts the focus is no longer on integration into the community, but on the new experience of alienation, foreignness and strangeness, which puts the emphasis on the individual and his/her relationship with the rest of the world and society. The world is rejected in favour of the local environment of the individual, depicted as "one's city". I would like to suggest that the intense development of the theme of longing and isolation in the texts of the New Kingdom is a way expressing what P. Vernus called "the great ideological mutation of the New Kingdom".[61] In this new system the royal power versus the benefit of the sole power of the personal god is questioned, which goes along with a rise in individualistic feelings.

If we track the theme of the city in the genres previously considered for the Middle Kingdom, we find echoes of this tradition, although they are tainted with the new perspective. Teachings warn their audience against potential wives unknown in their communities, rather than praising those who are known to their cities, as was the case in *Ptahhotep*:

> If you take a wife who is overweight, who has a joyful heart and is known to her fellow-citizens (*njwtyw*) do not send her away, let her eat.
>
> (P. Prisse, 15,6-7 = D 500-501)[62]

This theme reappears in *The Teaching of Ani*, a Ramesside wisdom text which has been seen as the New Kingdom heir of the *Teaching of Ptahhotep*,[63] but this time the emphasis is not on inclusion but on exclusion:

> Beware of a woman from outside (*m rwty*), who is not known in her city (*njwt*).
>
> (Ani, 16, 13)[64]

This new point of view is not a stylistic variation nor an early expression of xenophobia,[65] but rather a new social paradigm for a society which is not perceived anymore as a cohesive community, but which is much more individualized, with isolated individuals. The main change between the two literary experiences is the transition from a collective point of view to one of an individual in an adverse environment. Within scribal literature a text from the *Late Egyptian Miscellanies* stands as a mere encapsulation of this feeling. An extract reads:

> I am sitting in Hell-of-a-country (*ḳnḳn-n*(*y*)-*t3*), unequipped.
> There is nobody to mould bricks, no straw in the neighbourhood.
> What I brought as equipment is gone, there is no donkey to bring any.
> I spend my days looking at the inhabitants of the sky and I hunt,
> My eye is longing for the road to Palestine.
>
> (P. Anastasi IV, 12,5-8)[66]

The text starts on the isolation of this official from civilisation and its comforts. The extract ends in a paradox: the character would prefer to go abroad on the "road to Palestine" rather than be in this lost place which seems to be within Egypt. In the rest of the text, this isolation of the individual is worsened by the hostility of nature towards him:

> Under trees which bear no fruits to eat I spend my nights,
> Their dates were gone before they ripened,
> There is the gnat at sunset and the midge at noon
>
> (12,8-9)

The individual ends up by being threatened in his mind and body integrity as shown in the vivid description of the state of one of his assistants:

> Every vein shakes at his sight,
> the illness is set in his eye,
> worms eat away his gums.
>
> (13,6-7)

57. Quirke 1991; Andrassy 1998.
58. Quirke 2004, 40-41.
59. Kuhlmann 1991.
60. Baines 1983, 590-591.
61. Vernus 1995, 93.
62. Zaba 1956, 55-56; Parkinson 1997, 261.
63. Osing 1997, 136-137.
64. Quack 1996, 92-93, 156-157.
65. On this theme, see Cannuyer 1989.
66. Gardiner 1937, 48-49; Caminos 1954, 188-189.

In the New Kingdom, with the imperial expansion, the Egyptians faced a new experience of the world,[67] where "the Egyptians' concept of their country as the supreme culture becomes dubious along with the experience of disjunctions inside Egypt itself, with a new capital on the periphery of the Kingdom, at Perramesses".[68] This goes along with a questioning of the authority, a.k.a the State, guarantor of the cohesion of the social community. In the realm of the literature, this reorganisation of the Egyptian space finds its literary translation in the "praises of the cities".[69] In these poems, an individual, usually a scribe or an official, complains about being sent away from his city and his local identity.

See, I don't want to leave Thebes!
relieve me from what I hate!
[…]
Bring me back to your city (*njwt*), Amun,
for it is the one I love.
(O. Deir el-Medineh 1594+1641 I-II + O. Petrie 39)[70]

The city is addressed through the city god. This built a new opposition between the old capitals, each perceived as a religious metropolis, and the new administrative capital in the Delta, never called *niut*.[71]

What are they saying to themselves in their mind,
Those who are away from Thebes?
Dreaming of its name they spend their day:
'If only we had its sun rays!
The front is for the penniless,
The sanctuary for the well-to-do.
(O. Gardiner 25)[72]

The genre dates to the Ramesside period and expresses the lyrical voices of officials on missions away from their base, those missions being experienced as an exile. It is to be noted that in an early example of praise, from the first part of the 18th dynasty, the speaking voice pleads with his god that he not be removed from Thebes:

Amun, hold me in your city (*dmj*)!
Too sweet is the life as tasted by your citizens (*njwtyw*),
To spend old age in another city (*njwt*).
(O. Nakhtmin 87, 173, 1-3)[73]

The evolution of the genre through the New Kingdom, if we take the latter text as its starting point, seems to lead from the feeling of belonging to the experience of exile. This nostalgia was expressed in terms of love-sickness, a literary topos[74] used as an emblem of that treat to one's identity and whole-being:

See, my heart is gone in secret,
he hastened to this place he knows
he sailed South to see Houtkaptah
if only I were he !
I am staying waiting for my heart
So he can tell me the condition of Memphis
[…]
Come to me Ptah to take me (back) to Memphis,
To let me watch (it) freely.
Desiring sleep I spend my days,
My heart, it is not in my body anymore.
All my limbs are seized with illness,
My eye is tired of seeing
My ear is empty, my voice is rough
All my words are upside down.
(P. Anastasi IV, 4,11-5,5)[75]

The intertextuality with love-songs is striking and shows the permeability of genres in the New Kingdom.[76] Both genres used the same semantic field to express the threat to self-identity when distant to what one belongs to. As G. Moers puts it "the *laus urbis* praises provincial hometowns […] of dislocated people who, plagued by homesick alienation, are at a loss in the hustle and bustle which clouds the senses, especially in the Delta Residence"[77] and register the literary answer to the founding of a new capital in the North. Beyond literary aestheticism, the topos of estrangement expresses deeper cultural feeling. Estrangement goes along with the issue of belonging[78] and we can see how from this point of view the theme of longing raises the issue of identity fashioning.

3.3. The religious experience of the city

The genre of longing for the city shares strong stylistic and thematic features with the prayers of personal piety, especially through the incipit *mj n.j,* "come to me, God". In these prayers, the distance from one's

67. Loprieno 2001, 74-76.
68. Moers 2010, 706.
69. Lichtheim 1980; Verhoeven 2004; Ragazzoli 2008.
70. Synoptic text and translation: Ragazzoli 2008, 34-38.
71. Ragazzoli, 2008, 187-190.
72. Cerny and Gardiner 1957, pl. XXXVIII; McDowell 1999, 158.
73. Guksch 1994, 101.
74. Mathieu 1996, 222; Langrafova and Navratilova, 102-111.
75. Gardiner 1937, 39; Caminos 1954, 150; Ragazzoli 2008, 49-50.
76. Such as P. Chester Beatty I C, 2, 9-11, "It is gone, my heart, in haste, he slipped away from its place" (Mathieu 1996, 28) and 4,7 "Illness slipped inside me, my limbs have become heavy, and I have lost my own body" (ibid., 30).
77. Moers 2010, 695.
78. Assmann 1996, 77.

city is also a distance from the god of the city and it expresses the aspiration to bridge the gap between the self and the deity. Similar statements are found in the biographies of the same era. The biographical text of Samout son of Kyky, assessor of the cattle of the temple of Amun, offers a characteristic way of expressing this:

> I was a weakling (*s3*) of her town (*dmj.s*), a pauper (*šw3w*) and an outsider (*ḳrj*) of her city.[79]

The declaration of Samout is entirely focused on the privileged and exclusive relation of the scribe to his personal god, Mut. This situation is expressed in the rhetoric terms of poverty, modesty and isolation, which underlines the new situation of individuals whose life is entirely dependent on divine will. But Samout uses an unusual term in this context, *ḳ*(*3*)*rj*, "vagabonding foreigner", fashioning individual feelings through the experience of *outside-ness* and strangeness. The word *ḳrj* comes from a verb *ḳrj*[80] standing for "to dwell, to take up temporary residence". The noun involves the idea of being uprooted, a "transfuge". A later praise of the city uses the same word and seems to play with precisely that cultural environment. That way it epitomizes this historical and anthropological situation simultaneously: individualization goes along with defining the individuals' identity in terms of their attachment to a locality and possibly its god. The text originates from Deir el-Medineh and the date *ante quem non* is the end of the 19th dynasty. It makes allows an important political protagonist of this time to speak:

> Bay, royal scribe and butler
> of the king Sethy beloved of Ptah
> says to Amun-Ra, king of the gods :
> 'come to me to rescue me,
> I am only an outsider (*ḳrj*) in the Northern domain (*pr t3-mḥy*),
> Come to me so as to show me Thebes (*Ne*),
> The beauty and I will see…
>
> (O. Cairo CG 25 766)[81]

At first, Cerny took this text for a manuscript by Bay himself.[82] But, as shown by Posener,[83] the mention of Bay belongs to the text and its metrical pattern, not to the usual paratext with signatures. The text actually takes place in the literary realm and the attribution to Bay is pseudepigraphic.[84] This actually constitutes all the wit of the poem. At the chaotic end of the 19th dynasty, Bay was a indeed a key character, and a celebrity. Royal scribe and royal butler under Sethi II, he bore the very unusual title of "chancellor of the whole country" under Siptah and everything points to him having contributed to the latter's coming to power.[85] His position in the social sphere is very close to that of royalty, as the fact that he was buried in the Valley of the Kings shows; no other non-royal person was granted such a privilege. In his article, Posener pointed out his extravagant position in pictorial representations, with Bay being depicted in religious scenes alongside and on the same scale as the king![86] And last but not least, if we consider that he is the character referred to in the Great P. Harris under the appellation of *J.jr*(*w*)*-sw*, "the one who made himself", as argued by P. Grandet[87], Bay was officially perceived as a self-made man, which is a very strong statement in a god-regulated environment. The obvious conclusion about our text, where Bay is said to be a "vagabond" in the Northern political centre, is to consider the poem as a malicious pastiche by learned scribes from Deir el-Medineh, who played with the rules of an established genre, the longing for a city and the categories of estrangement displayed in literature and religious texts. His supposed longing for the religious capital Thebes can also be a criticism of a possible lack of piety on his part.

The word *ḳrj* is used as in Samut's statement. This substantive comes from a verb *ḳrj* standing for "to dwell, to take up temporary residence", the link to the noun is easy to understand. The substantive involves the idea of being uprooted, a "transfuge".

Towards the end of the New Kingdom individual identity is expressed in local terms in relation to a city in its representations, which can be understood as the expression of a new experience of civil order. Individual relationships and a feeling of belonging are questioned and it seems that the ideal of "Eigenbundenheit" as promoted in the teachings of the Middle Kingdom was challenged by a new experience of "Selbständigkeit", to quote Assmann about the official *maat ideology* where "nicht Selsbtändigkeit sondern Eingebundeheit ist das ägyptische Ideal".[88] It is striking that this new experience of the world should be expressed through local identity in the features of

79. Muhammed 1966, pl. 48, col. 10-11; see also Vernus 1978.
80. Hoch 1994, n. 428; 430; 431; Meeks 1997, col. 49-50; Osing 1976, 393, n. 535; Ward 1962, 400.
81. Cerny 1935, pl. XCVIII, 95; Posener 1977, 385-397.
82. Cerny 1966, 36-38.
83. Posener 1977, 395.
84. Posener 1977, 385-387.
85. Schulman 1976; Grandet 2000.
86. Posener 1977.
87. Grandet 1994, vol. 2, 220-225.
88. Assmann 1998, 80.

one's city, maybe one's neighborhood and local god(s). The literary topos is, as we have seen, complemented by specific religious beliefs. This theme of foreignness and piety will get expressed in an even stronger way in demotic teachings:[89]

> "Do not stay in a town (*tmj*) where you have no one. If you stay in a town (*tmj*) where you have no one, your character is your family."
>
> (P. BM 10 508, 21, x+24-25)[90]

> "The one who dies away from his town (*tmj*), he gets buried only by pity."
>
> (P. Insinger 28, 7)[91]

> "The impious who leaves the way to his town (*tmj*), his gods hate him."
>
> (P. Insinger 28, 10)[92]

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89. See also Ankhchechonky (P. BM 10 508) 18, x+13; P. Louvre 2414, l. 13; P. Insinger 25, 16; 28,8; 28,18; 28,19; 28,22; 29,8.
90. Lichtheim 2006, 176.
91. Lichtheim 2006, 2007.
92. Ibidem.

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3. WATER, TOPONYMY, AND THE IMAGE OF THE CITY IN GRAECO-ROMAN EGYPT[1]

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The main aim of this study is to analyze how urban toponyms, on the one hand, and urban water infrastructures, on the other, are related to the perception of the city in Graeco-Roman Egypt. Some important issues need to be addressed when trying to connect "objective" physical realities, like canals or fountains, with a linguistic reality, such as toponyms, where denotative and connotative (i.e. symbolic) meanings are often simultaneously present. One of these concerns the ambivalent, hybrid character of the cultural context under study, i.e. Graeco-Roman Egypt. The composite reality of Egypt in this period means that the cultural patterns valid in Pharaonic times continued to a large extent to be relevant, albeit in a new, very complex and shifting relationship with other cultural patterns, mainly Greek, Roman, and Jewish. Here, the question of the nature of this relationship arises: is symbiosis, coexistence, or conflict the most appropriate term for it? Whatever the case, in this context the analysis of any cultural phenomenon must contemplate the very real possibility of a double (or triple) meaning, or rather a single meaning obtained through different readings, connections, or interpretations, according to the Greek or Egyptian cultural code being used. In this paper I will argue for some instances of this in the construction of a shared image of the city in Graeco-Roman Egypt.[2]

Another methodological issue to consider is related to the very status of the analysis of written sources and their contribution to our research object. To what extent do the texts (documentary and literary) or the words (e.g. toponyms) inform us of existing, objective realities, or of subjective perceptions, symbolically charged notions? Here again there is a double level of meaning that must be acknowledged in the interpretation of texts, i.e. the information they give us about what we would call the factual reality (as for instance the names of town districts as administrative realities or the existing water supply infrastructures) and, on the other hand, the information they may contain about the subjective idea of the city, the perception of the urban space at a symbolic level, as a cultural construct. Of course, the dichotomy is ultimately a false one, in that these symbolic notions also underlie and fashion the reality of the city, so that in a certain sense its apparent factual matter-of-factness can easily turn out to be a misleading, only apparent transparency or familiarity. Among the papers in this volume, written sources are approached by classicists and specialists on documentary papyri and the history of Greek and Roman Egypt. Our approaches and results will of course be different, and there is no point in trying to blur or confuse two distinct levels of reality. On the other hand, however, neither should we consider them to be completely isolated from each other, as they spring from the same historical reality, even sometimes from the same document under study, and the comparison of these two sides of that same reality can help us achieve a better, more complete understanding of it.

These two approaches often correspond to two equally different kinds of written source: on the one hand, documentary texts, such as administrative documents, tax receipts, legislation, contracts, etc.; on the other hand, symbolically articulated texts, such as literary works, or religious documents. Apart from the fact that there are other types of texts whose classification would be more difficult or lie in between, such as private letters and most paraliterary documents, it must be remembered that even documentary texts can, at least sometimes, be subjected to a more general, anthropological analysis, which could study, for example, the modes of describing or naming space as betraying some cultural, constructed images, concepts or patterns that go beyond or lie beneath their declared, explicit functional use. I intend to discuss here one such – specific case, which can be obtained from the study of the urban toponymy of Oxyrhynchus, and particularly the way in which it reflects the presence and function of water in fashioning an urban landscape, but one which may lie as much in the imaginary perception as in the material reality of the city.

Thus, for example, in a third century letter giving instructions to find the address of the person who

1. This paper is a product of my research work on the project "La ciudad egipcia en época clásica: la organización del espacio en el Egipto helenizado" (HAR2008-01864), funded by the Ministerio de Ciencia e Innovación (MICINN) and the Institut Català d'Arqueologia Clàssica (ICAC). I wish to thank my colleagues at the research group and at the ICAC for their help and support in the development of the research that has led to this article. Special thanks must also go to Sonia Amaral, for her collaboration in this research, with the support of an ICAC collaboration grant.

2. Another example of this issue can be found in the study by T. Whitmarsh, in this volume.

should receive it, several place names are mentioned, toponyms in some cases, the rest being common names (though sometimes it is difficult to decide which): the Moon Gate, the Public Baths, some granaries (or is it the Granaries?), a precinct (presumably of a temple), a seven-storey house, and so on.[3] From the perspective of the perception of the urban space, such a document could be studied first as a source for the individual landmarks that can be taken as points of reference by a person moving around the city, depending on their physical visibility or their perceived importance (for instance, if they can be easily recognized by native local inhabitants who could be asked to identify them for the carrier of the message). The text can also be approached as an urban itinerary, which gives us information about the connection of urban spaces in a sequence, presumably selected as the easiest way of reaching the intended spot, not necessarily from an objective point of view, but primarily from a subjective perspective based on the visibility of the landmarks and/or the perceived highlighted axes of urban movements through the city. As Alston observes, the image conveyed by the tortuous itinerary proposed here is of a complicated network of alleys and passageways, probably in sharp contrast to the ordered image offered by the main thoroughfares.[4]

This example offers a good starting point to address one of my main concerns: the value of toponymy for obtaining a picture of the perception of urban space. This picture will no doubt be blurred by the incompleteness of our information, but it is also important to note that, by their very nature, imprecision, subjectivity and polysemy are necessarily an integral part of it. We have seen in the document just mentioned the landmark importance of the Moon Gate, probably the main western entrance to the city, as in Hermopolis Magna. We may go on now to consider the names of streets and districts. To what extent were they informative or relevant to contemporary citizens? Toponyms tend to remain long after the disappearance of the reality they originally referred to (we wouldn't necessarily look for actual pines in Pine Street). Still, I would argue that this being so, place names often tend to draw at least a symbolic image of the city, to construct a shared perception of it that can work even on a subconscious level, beyond its purely functional meaning in everyday speech. This is especially true of names related to important historical, political, or military figures or events, as well as of religious names (gods, sanctuaries, or rites), as they inscribe in the space of the community the main features of its history, beliefs or identity in the space of the community.

The situation in the cities of Graeco-Roman Egypt in this respect is far from homogeneous and raises many important questions.[5] Administrative districts seem to date from Roman times, with at least two important moments of change in the system: c. 20 BC, and c. 300 AD. In some cities they are either simply numbered (e.g. at Antinoopolis, Tmouis, or Mendes), or named according to compass quarter points (e.g. "Polis E" "Polis W", "Phrourion E", and "Phrourion W" at Hermopolis Magna), whereas in other cities (e.g. Oxyrhynchus or Ptolemais Evergetis) they bear toponyms, presumably inherited from earlier traditional usage (some of them are already attested in Ptolemaic times). This raises the question of the nature of our sources, which are mainly administrative documents, and the relationship between those districts and the local social units, i.e. the neighbourhoods. Of course, these social realities, with their traditional names, probably also existed in those cities with numbered districts, except that they are not so well attested as when they are at least partially taken up by the administrative division. It is not clear either whether there is a connection between numbered districts and regular urbanism, though we can assume this at least for Antinoopolis.

Even the most cursory look at the names of districts in Oxyrhynchus[6] allows us to see the heteroclity of the attested toponyms. This I believe to be indicative of their validity as popular names, a system kept alive in the perception of the city by its inhabitants going about in their daily lives, and not only an official, purely administrative system. Among them we find, as is to be expected, many names referring to the religious system of gods and shrines sanctuaries, others to important public buildings, and yet others to ethnic groups. Even if these do not necessarily correspond to an actual situation, the fact that the Jewish district is only attested for the first and second centuries AD, and not later, seems to indicate that at least in this case there was indeed some matching reality behind the name, as the chronology seems to correspond to the visibility of Jews and their almost total disappearance after the revolt of 117.

The toponym often suggests that there is a building functioning as a spatial focus around which the reality of the district tends to articulate. One interesting

3. *P. Oxy*. 2719. Translation: "From the Moon Gate walk as if towards the granaries and, if you will, turn left at the first street behind the Thermae, where (there is a…), and go westwards. Go down the steps and up… and turn right and after the precinct of the (temple) on the right there is a seven-storey house and on top of the gatehouse (a statue of Fortune?) and opposite a basket-weaving shop. Inquire there or from the concierge and you will be informed."

4. Alston 2002, 262.

5. For what follows, cf. Krüger 1990, 77-80; Daris 2000, *passim*; Alston 2002, 128-184.

6. Listings of the *amphoda* at Oxyrhynchus in Rink 1924, Calderini 1935-66, Krüger 1990, Daris 2000, and Alston 2002, 147. Cf. also Turner 1975, n. 50; Krüger 1990, 82; Bowman-Coles *et al.* 2007, 141-181.

indication lies in the frequency of the reference in the attested toponyms, not to the temple or to the building itself, but to the avenue leading to it, i.e. the Dromos.[7] I would argue that this is an indication of the dynamic, progressive character of the process of spatial definition the toponym reflects, as the articulating motor of the district is not so much the building itself as a static landmark, but rather the communal performance taking place and giving sense both to the building and the space around it, i.e. the procession or the sacred festival leading to the temple or taking place outside it.[8] Other written sources, scant as they are, tend to confirm this notion: Plutarch tells us of the festival in honour of Isis taking place annually in Egyptian cities on the 9th of Toth, when people ate fish before the *auleion*, probably the outdoor space in front of the temple.[9] This shows, from both the Greek and the Egyptian point of view, a continuity with the traditional dynamics of space articulation in the city since at least the Archaic and Classical periods (Pharaonic times, in the Egyptian case). This can be seen if we bear in mind the importance of the processional ways acting as the main axes defining urban space and rural territory alike, such as in Athens the Panathenaic Way inside the walls, or its prolongation as the Sacred Way leading to Eleusis.[10] This processual, performative aspect also gives sense to other toponyms referring to Greek public spaces and buildings, always with a strong component of communal gathering, *in primis* the *agora*, of course, etymologically meaning the place where *ageírô*, "gathering", is done. We can also include the Plateia, the Gymnasium, the Hippodrome and the Public Baths.[11] In some cases, this aspect is even redundantly emphasised by district names containing both the buildings themselves and the avenue or square leading to or lying in front of them: "Plateia of the Theatre", "Dromos of the Gymnasium".[12] As for the term *agora*, apart from the allusion to the main, usually central square in a Greek *polis*, it can also be qualified by a trade name, as in the late district name "*Agora* of the Cobblers" (Ἀγορὰ Σκυτέων), referring –even more than to the gathering there of members of that trade– to the gathering of citizens attracted to that particular business. Again, at least in some cases, even where the term *agora* is not explicit, we can postulate the primary perception of this "processual" notion in toponyms alluding to a group of people concerned with a common economic or functional activity (e.g. Χηνοβοσκῶν, the Goose-Sellers).[13]

In all these cases, a picture seems to emerge of urban space perceived as a living organism made up of groups or subgroups of people mobilized in collective actions that also define landmark buildings or similar features as significant spatial units, such as neighbourhoods. In this respect, earlier Egyptian and Greek traditions offered a model of continuity and a ground of convergence in naming and thence symbolically constructing the space of the city. And the process is taken on by the Christian redefinition of that space, with a network of churches being put in place, some of which occupied or substituted replaced ancient temples, and again occasionally also functioned as a district name (e.g. St. Euphemia). There were probably some forty churches in the city of Oxyrhynchus, but what interests us here is the continuity of the

7. At Oxyrhynchus, the most important seems to have been the Dromos of the Temple of Thoeris, the hippopotamus goddess, whose temple is one of the major sanctuaries in the city (*P. Oxy.* 171.8; 478.15, 25; 479.9; 1029.17, etc.). Others are the Dromos of Sarapis, the Dromos of the Gymnasium and, without indication of any building, the North Dromos. In other cases (e.g. Ποιμενικῆς, Ἰουδαϊκῆς), a feminine adjectival form (whereas ἄμφοδον is a neutre noun) points to a shortened version of the toponym, where a name meaning "avenue", "street" or the like (δρόμος, ὁδός, ἀγυιά, or λαῦρα, which significantly could also be used to mean "district"; cf. Daris 2000, n.4) must be understood. In the case of Ἡρακλείων τόπων, these *topoi* probably allude to altars, implying again an allusion to ritual and to gathering of people for that purpose.

8. Cf. a striking example of this in the article by Paola Davoli in this volume: the great Dromos in Soknopaiou Nesos.

9. Plut., *De Iside et Osir.*, 353d.

10. Cf. de Polignac 1995.

11. From the absence of the *dromos* in the district names referring to Greek (or non-Egyptian) temples (*Hermaion*, *Herôon*, *Metrôon*), we could perhaps assume that this processual definition of urban space was carried out, from the Egyptian perspective, mainly through religious realities and, from the Greek point of view, through predominantly political and economic references. But examples such as Δρόμου τοῦ Γυμνασίου and Θοηρείου Θενεπμόι, as well as the possibility of the existence of double versions of a toponym (cf. nn. 7, 12), suggest caution in this respect.

12. Inversely, as in the case of the feminine adjectival forms mentioned above, we should perhaps understand this longer version as the primary denomination, and consider the toponyms with only the name of the building as a shortened form, allowed by the implication of that notion, through metonymy, in the function of the building named. If the district Θοηρείου Θενεπμόι is to be considered as an alternative name for Δρόμου Θοηρείου, it would be a further confirmation of this phenomenon (Daris 2000, 216; Krüger 1990, 87).

13. It is significant in this context that the verbal noun παρεμβολή, suggesting a concentration of soldiers, has been selected for the district names Ἄνω Παρεμβολῆς (the Upper Camp), Ἱππέων Παρεμβολῆς (the Cavalry Camp) and Λυκίων Παρεμβολῆς (the Lycians' Camp), instead of the term κάμπος, which is attested for the Cavalry Camp in three papyri from the 1st c. AD (*P. Mich.* III, 171.16; 179.13; *POxy.* 247.21). The last named of these documents presents a composite version: ἄμφοδον Ἱππέων Παρεμβολῆς ἐν τῷ Κάμπῳ. It is especially interesting here to note how the two terms are used to distinguish the processual term naming the camp (with the plural genitive of the concerned group) from the *Campus* as a purely spatial reality (as shown by the preposition ἐν), and how it is the first one that has finally been established as the name of the district.

dynamic process of gathering people in certain places being the driving force behind the configuration and denomination of urban space. This is evident in the very name of the word ἐκκλησία chosen for these buildings, once again emphasising their being nothing more than the spatial concretion of the primary action of gathering, just as the old ἀγορά had done. The notion is further confirmed by an extraordinary document, an early sixth-century calendar of places where the bishop of Oxyrhynchus was to officiate during the year.[14] For the period of c. 150 days contained in the papyrus there are some sixty festival days in some forty different churches across the city which should be attended by the bishop. Thus, the spatial network of churches is not merely a series of buildings, but a sequence of communal gatherings taking place regularly throughout the year, so that space is cyclically redefined through the annual repetition of this circuit re-enacted by the bishop. As this example shows, there is an important link between the spatial network of places highlighted by toponyms and the temporal sequence of special days highlighted by important collective rituals or festivals.

It is interesting to note in this respect that the new name for a district to be attested by a recently published papyrus conforms neatly to this pattern: the ἄμφοδον Ἐξαγορείου.[15] Although the name Ἐξαγορεῖον, probably related to a specific building or a public space, is unattested elsewhere, we have in Oxyrhynchus itself a mention of the ἐξαγορεῖα of Thoeris.[16] In his edition of the new papyrus, R. Gonis has interpreted it as a proclamation place or building. I would like to call attention to the ἀγορά element present in the name, even if it is to be read through the verb ἀγορεύω (and not directly alluding to the *agora* as the market-place), since it still implies a public speech act (ἀγορεύω) before an ἀγορά, i.e. in the etymological sense, a gathering of people for a special occasion. Whatever the exact meaning of the name, it is again a festival day, a significant collective performance, more than the building itself as such, which constitutes the defining focus of a specific spatial unity of the city.

Another case study is the water supply network inside the city, reflected in the toponymy through allusions to urban waterways, public baths, or, implicitly, to gardens (*paradeisos*) or sacred groves (*alsos)*. From a methodological perspective, this is an interesting example of the relationship between the physical reality and the symbolically constructed image of the ancient city. An efficient water supply is a major concern for many other cities of the Roman Empire, like Pompey with its network of public fountains that functioned as a focus for a spatial unit of roughly 80 houses. In Egypt, the water supply system in the city has been studied, notably by D. Bonneau.[17] I would like here to raise the question not so much of its functional value, but of its visibility and how it affected and fashioned the image of the city in Graeco-Roman Egypt. One of the most detailed pictures of this water network within the city is conveyed by a long papyrus from Arsinoe, in the Fayum.[18] In it we find a wealth of terms concerning the structures for supplying water; from the *castella* (*aquae*), one of them at a place significantly called Alsos (the Grove), to all sorts of variously named reservoirs, conduits and pipes. In the first part of his book, which is devoted to an analysis of the terminology of water supply in Egypt, Bonneau has made a thorough study of all these terms. But the fact I wish to highlight here is the importance of open air installations. This is apparent from the repeated mention of canals of different kinds and sizes (ἀμαραί, ὀχετοί, διώρυγες). The recurrent word προβολή, sometimes followed by the genitive διώρυγος, seems to allude equally to an open air reservoir in the form of a pond where channels and conduits run into or come from (ἐκχύσεις).[19]

The presence of *castella*, pipes (σωλῆνες) and fountains (κρῆναι) draws a picture that is common to other ancient cities, but the importance of open air installations seems a more specifically Egyptian feature of the urban landscape. This is confirmed by the frequent allusion in papyri to several kinds of traditional mechanisms used to raise water from a canal or a pond to a higher level, such as an adjacent building or simply the street, most notably the water-wheel (μηχανή) and the water-crane or *shadouf* (κηλώνειον).[20] These constitute a well known feature of the Egyptian landscape from Pharaonic times down to the present day. They are very common in the rural landscape as an essential piece in the irrigation network, but, as in the example mentioned above, papyri also show them inside the city, a clue to the visibility of water in open air channels and watercourses in general across the city. Arsinoe is in the Fayum area, but we also have written references to this peculiar feature of the urban land-

14. *P.Oxy*. 1357. Cf. Alston 2002, 302.

15. *P.Oxy*. 4789.

16. *P. Mert.*, Vol. 1, 26, 5 (276 AD): … θεαγίσσης Θ̣ο̣η̣[ρ]ε̣ί̣ου ἐξαγορείων.

17. Bonneau 1993.

18. *P. Lond.*, 3.1177 (113 AD) (= Chrest. Wilck. 193).

19. Ibid., 78, 88, 96, 189.

20. Bonneau 1993, 93-115, especially 93-97 and 105-115. Another hint of the presence of open air canals in the city may be the term ἀναβατηρία in a third-century papyrus from Oxyrhynchus (*P.Oslo* 111, FrC, r, 1, 127 and 129), probably meaning a bridge with steps crossing a canal.

scape in Oxyrhynchus. In a third-century papyrus, an individual asks to be discharged from his duties (no doubt a liturgy) of raising water for the public baths.[21] The verbal noun ἀνίμησις, i.e. "raising water", implies the existence of an open air watercourse from which water is drawn up, probably by means of a water-wheel, as the feeding of animals is mentioned in this context. A passing observation in this document adds a significant element: the importance of the annual flood. Since in that year it had been uncommonly slow, it had been especially difficult for the man to carry out his duties.

The visibility of water as an important part of the urban landscape of Oxyrhynchus can also be sensed in *P. Oxy.* 43v, one of the main sources for our knowledge of the urban topography. It is a distribution of guards across the city, following a roughly anti-clockwise sequence and using important urban landmarks as points of reference to the assignation of guards charged with the maintenance of public order. Among these landmarks (e.g. the Serapeion, the Thoereion, the Agora, etc.) we find the toponym Κριός ποταμός, i.e. the Ram River.[22] As the existence of a real river inside the city is to be excluded, it must refer to a kind of channel, probably, as generally agreed, an important canal derived from the river (here, the Bahr Yussuf) and entering the city as a particularly important waterway, probably navigable, a condition to which it presumably owed its denomination as a river. As for its puzzling name, the Ram River, several explanations are possible, which, it must be emphasised, are not necessarily mutually exclusive. There is a specialized use of the term κριός, designating a particular kind of channel, in some papyri concerning repairs being carried out on them, always in a rural context.[23] According to Bonneau, the denomination here could allude to a particular form of channel, similar to the horns of a ram, which in Egypt were almost horizontal. It would thus allude to a bifurcation of the channel in two opposite directions (another kind of bifurcation, probably involving twin bridges or tunnels, receives the equally metaphorical name of ζυγός, the yoke).[24] As a well known toponym for an urban "river" in the city of Oxyrhynchus, however, this meaning of a technical term of rural water engineering seems somewhat more improbable, and even if there was indeed an allusion to a peculiar form of the course of this waterway, its importance as a landmark seems to require a further symbolic connotation of the name. A sacred allusion, in an Egyptian context, is obviously possible. In this context, we may pause to mention the name of the whole city, the City of the Sharp-nosed Fish, as providing the clearest witness both to the visibility of urban waterways and/or ponds, where the sacred fish could presumably be seen, and to their symbolically emphasised signification, at least in this case as a sacred entity. This function could of course have been carried out simply by the urban tract of the Bahr Yussuf, but the attested presence of a Potamos *within* the space of the city (and presumably also of other canals and ponds, as the allusion to a *paradeisos* in a district name suggests) seems to qualify much more plausibly for that role.

From the Greek perspective, it is probably no coincidence that there are at least two other rivers named *Krios*, in Achaea and in Asia Minor, as mentioned by Pausanias.[25] This suggests there was also a Greek connoted meaning to that toponym. According to Pausanias, the Peloponnesian Krios was said to be so named on behalf of the Titan Krios. This mythic association with a violent figure of the pre-Olympian order seems to allude to the occasional violence of these seasonal, torrential rivers, a very common feature in Mediterranean countries that often cause catastrophic floods along their short courses from the mountains to the sea at the coming of the rainy season. It is surely significant that the next such stream found by Pausanias along the coast (and described as a *pendant* to the Krios in that they define, respectively, the western and eastern frontiers of the *chōra* of Pallene) is fittingly named Suthas, i.e. the Impetuous. In this respect, we might add – although this is not explicitly stated by the sources – that the alternative reading of the toponym Krios, alluding not to a mythic primordial figure but to a simple animal, equally offered the connotation of violence, since the popular notion of the ram as a charging, potentially dangerous beast gave rise to the metaphorical naming of a widely known poliorketic device with that function.

At first glance this geographical situation seems quite out of place in Middle Egypt. We should be cautious, however, before jumping to negative conclusions. As the study by Subías, Fiz and Cuesta in this same volume shows, despite the very different geographical and meteorological conditions of Greece and Egypt, a comparable phenomenon, very common in desert environments, was also verified in the Nile Valley, and particularly in the Oxyrhynchus area, in the form of seasonal *wadis* running to the Bahr Yussuf, even, conceivably, crossing the city in their course. The Krios Potamos at Oxyrhynchus could thus be an urban waterway, a dry waterbed the best part of the

21. *P. Oxy.* 2569 (265 AD).
22. *P.Oxy.* 43v. 3,24 = Chr. Wilck., 474 v. 3,24 (295 AD).
23. *BGU* 1, 14, 3; *P. Tebt.* 352.7.
24. Bonneau 1993, 71.
25. Paus., 7.27.11.

year that turns into a torrential stream for short periods of time.[26] However, while this possibility cannot be excluded, in the absence of clear material evidence, the picture we have drawn, as suggested by the written record, seems rather to point to a more important watercourse, artificially built and maintained, and fed by the waters of the Bahr Yussuf, from which it entered the city. Contrary to what this would seem to imply, a seasonal, even drastic variation in the amount of water could also in this case be a defining feature, thus justifying, at least in Greek eyes, its peculiar name.

In rural Egypt, the crucial role of the Nile's seasonal flood in feeding the channel irrigation system is widely known, and this event could often take the form of a sudden, violent flood on the opening of the dykes. In an urban *milieu* we find a similar situation described in a literary text, albeit in a military, non-agricultural context. It is an episode of Heliodorus' *Aethiopika*, a Greek novel set in Egypt and Ethiopia: the description of the siege of Syene in Book 9.[27] The strategy of the attacking army consisted of digging a channel from the Nile to the city walls and then breaking the dyke at its mouth on the river. The water suddenly flooded the channel and charged with tremendous violence against the city, turning it into an island and undermining its walls. The defence of the besieged citizens was to dig another channel inside the city itself, thus hoping to drain the water from the exterior channel flooding the city when the walls collapsed. Several elements of this admittedly literary description point to some underlying constant features of the image of the Egyptian city, even since Pharaonic times; notably the image of the city as an island surrounded by the waters of the flood.[28]

In the less dramatic, everyday reality of a city like Oxyrhynchus we can also assume an important seasonal factor, probably involving a conspicuous variation in the appearance of the network of canals and ponds within the city, even perhaps with a dramatic moment of change if an opening of the dykes suddenly allowed water to enter the city through the Krios Potamos. Such a picture, which could be read between the lines of the dramatized, catastrophic episode of the siege of Syene, is indeed well attested, albeit for a much later date, in a description of the opening of the dykes in eighteenth century Cairo:

> «The Nile immediately rushes into the canal with great violence, and then flows into the other canals of the suburbs and the walled city. As a result, on that day Cairo resembles the city of Venice.»[29]

A similar description, a century earlier, by the French consul in Egypt, presents much the same situation, not concerning the canals themselves, but the ponds they fed in a wealthy residential quarter:

> «Nothing is more pleasant than this place [i.e. the pond] filled with water during the eighth month of the year, while during the remaining months, it turns into a smelling garden.»[30]

Taking into account the hints and allusions we have found in the ancient sources, I am inclined to take these descriptions as attesting to a typological continuity of an urban landscape across the centuries, characteristic of the image of the Egyptian city in its relationship to a specific and unique natural phenomenon, the Nile flood. This phenomenon fashioned people's lives in Egyptian cities until the 19th century and captured the imagination of foreign peoples, especially the Greeks, from the earliest times, with Herodotus or Euripides as conspicuous examples.[31]

This image of the city is closely linked to the metaphor of the garden, both in the Greek and Egyptian imaginations. Already in classical the Classical period, Euripides' *Helen* presents Egypt, identified mainly with the Delta region, as a huge garden watered by the myriad branches of the Nile,[32] and the image extends to the whole of Egypt and Ethiopia as the scene of Heliodorus' *Aethiopika*. Thus, Meroe, simultaneously described as a city and an island watered by three rivers, is seen as a huge *paradeisos* with a bewildering exuberance of plants and a variety of animals.[33] For that matter, the connection between the image of the irrigated garden and the city where water enters through one or more channels seems to be a recurrent motif in the Greek novel as a genre, and, although there are important Greek precedents for it (e.g. Alcinous' garden in the *Odyssey*), this does not exclude a connection with an Egyptian narrative tradition.[34]

On the other hand, as C. Ragazzoli has shown in her study of the Egyptian genre of the praise of the city, the motif of the ideal city as a garden, as a space flooded by water and marked by exuberant vegetation,

26. Compare this description of Mecca: "[The city] lies in a sandy wadi (…). Destructive floods often tear down the narrow valley, inundating the city, destroying or damaging everything in their path. The great mosque, *Mesjid el Haram*, lies in the bed of the wadi, in the center of the city, and all the unpaved streets slope toward it so that it stands as it were, in the pit of a Greek theater." (Shaffer 1952, 198).

27. Heliod., 9, 2 ss.

28. Cf., in this same volume, the study of the topography of Memphis by J. Bunbury. On this image in the Egyptian literary genre of the praise of the city, cf. Ragazzoli 2008.

29. Wiet 1964, 118. Echols and Nassar 2006, 207.

30. Quoted in Echols and Nassar 2006, 206.

31. On the Nile flood in Antiquity, cf. Bonneau 1971. On Greek perceptions of Egypt in pre-Hellenistic times, cf. Vasunia 2001.

32. E., *Hel.*, 1ss.

33. Heliod., 10, 5, 1.

34. On the motif of the garden in the tragedy and in the novel as an element of genre definition, cf. Carruesco 2010.

where houses are not organized in a regular pattern but scattered in a seemingly natural, non-urban landscape, was already a topic of Egyptian literature in the Old Kingdom.[35] In Roman times, the existence at Oxyrhynchus of a district called the Paradeisos of Pammenes and, in other cities, numerous toponyms and references to urban plots, orchards, trees and groves (e.g. the Alsos of Arsinoe) attest to the continuity of this image of the city in Graeco-Roman times, when it connected and merged with a similar perception of Egypt in traditional Greek thought and literature. It is important to remark that this image, which in many cities, as in Oxyrhynchus, could easily be related to at least some real features of the urban landscape (e.g. the open air channels and ponds), does not exclude other situations that are well attested by archaeology, such as regular orthogonal urban patterns, that could easily have coexisted with it.

This image of the Egyptian city, probably projected through the model of Alexandria, finds an impressive expression in Late Republican and Imperial Rome, first in wealthy urban gardens (*horti Sallustiani, horti Maecenatis*, etc.); then, under the Julio-Claudians, in the huge complex of Nero's *Domus Aurea*, proclaiming with its gardens, ponds and pavilions, an ideal of *rus in urbe* that threatened to take over and become identical to the whole city; and, finally, outside the city itself, at *Villa Hadriana*, with the explicit reference to the Canopos, the Egyptian canal, as an important symbolic axis of this *urbs in rure*. Here, at the centre of the Empire, far from the Nile, we find a powerful representation, through imitation and amplification, of a fundamental aspect of the image of the city in Graeco-Roman Egypt.

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35. P. Lansing, 12; P.Anastasi (= P. Rainer 53); P. Sallier IV, edited and translated in Ragazzoli 2008.

4. PHARAONIC ALEXANDRIA: EZEKIEL'S 'EXAGOGÉ' AND POLITICAL ALLEGORY IN HELLENISTIC JUDAISM[1]

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There was of course no Pharaonic Alexandria, the city having been founded eleven years after the death of the last pharaoh, Nectanebo II, in 342 BCE. For many of the city's numerous Jewish inhabitants, however, Biblical narratives of oppression under the Pharaohs continued to resonate loudly in Ptolemaic Alexandria; indeed, as I shall argue in this chapter, the Egyptian episodes of Genesis and Exodus provided them with a crucial repertoire of narratives allowing them to process their contemporary situation allegorically, without the need to comment directly on their overlords.

Although there is abundant evidence for a prosperous and vibrant Jewish community in Hellenistic Alexandria,[2] it is hard to know how, phenomenologically speaking, they experienced their surroundings. According to Josephus, the earliest rulers of Alexandria gave Jews equal standing to Macedonians (but probably not 'equal rights').[3] Refugees from the persecutions of Antiochus Epiphanes were rehoused by Ptolemy IV. The author of the *Letter of Aristeas* presents what is on any reading a fulsome portrait of life under the benevolent rule of the Ptolemies. Yet more discordant notes are sounded too. The Jews of Jerusalem seem to have feared an Alexandrian slide into assimilation. Ben Sirach's grandson, the translator into Greek of the biblical book that Christians call *Ecclesiasticus*, implies that those 'in the province' (*paroikia*) stand in need of theological succour; 2 Maccabees is even more explicit, representing an open letter from the Jerusalemites to their 'brother Jews in Alexandria' (1.1) and an imprecation to cleave to ancestral traditions, specifically the Festival of the Tabernacles. This suggests a profound uneasiness about life in Alexandria, with the risks of 'assimilation' (for want of a better word) foregrounded. It is possible too that there was direct anti-Jewish agitation; even if we dismiss as a fiction 3 Maccabees and its lurid description of the persecution by Ptolemy IV,[4] it is still possible that the open anti-Jewish aggression of the Roman period may have been simmering in the Hellenistic period.[5]

In the culturally and affectively complex environment of preRoman Alexandria, Jews will have responded with a mixture of pragmatism, affiliation, resistance and fear. These ambivalences can only have been heightened by the distinct symbolic role that Egypt played in the Biblical narrative, as the paradigmatic locus of oppression and idolatry, from which the Exodus marked an escape into freedom and the light of revealed truth. As Jan Assmann in particular has argued, Judaism's distinctive sense of identity rested on its status as a 'counterreligion' defined in opposition to Egypt, which 'came to represent the rejected, the religiously false, the "pagan"'.[6] The representation of Pharaonic Egypt within Alexandrian Judaism is of course heavily filtered through this biblical tradition of antinomy, but so too must have been the perception of the Ptolemaic present.

In this chapter, I read Ezekiel's *Exagogé* as one such allegorical commentary on contemporary Alexandria.[7] The *Exagogé*, covering the story of the biblical exodus under Moses, survives in 269 lines of iambic trimeters

1. I am immensely grateful for the many responses to the ideas contained in this paper that came from audiences not only in Tarragona but also in Liverpool, Nottingham, Oxford and Princeton. My interest in Ezekiel was first prompted by an invitation to speak at Froma Zeitlin's retirement conference in May 2010, and it is to her that I dedicate this chapter, however inadequate an offering it may be.

2. See e.g. the rich collection of inscriptions (some Hellenistic, some Roman) in Horbury and Noy 1992. Documentary evidence is collected in the *Corpus Papyrorum Iudaicorum*(1957-64), but none survives from Alexandria itself (damp as the site is).

3. Jos. *Ap.* 2.35, crediting the move to Alexander; see however also *Ant.* 12.8, naming Ptolemy Soter. For the limited interpretation of *isonomia* here see Kasher 1985,35n.27. More generally on the Jews of Hellenistic Alexandria see Tcherikover 1999 (1959), Smallwood 1981, 220-35, Kasher 1985, Barclay 1996 *passim* esp. 27-47, Collins 2000 esp. 64-73, Gruen 2002, 54-83. Feldman 2006 tends to focus on Palestine.

4. 2.39-30. Many see the 'persecution' by Ptolemy VIII Philometor (Jos. *Ap.* 2.53-5) as equally fictitious, and moreover derived from 3 Maccebees.

5. The Jewish War and the Bar-Kochba revolt were preceded by notorious pogroms in 38, 41 and 66 CE (see e.g. Schäfer 1997, 136-8). The *Acta Alexandrinorum* offer ample testimony to antiJewish feeling in the early Roman era.

6. Assmann 1996, 50, and see more fully 1998 and 2009. Greifenhagen 2002 argues that the Pentateuch displays a tension between the normative, overlain Mesopotamian ethnogenesis and an older tradition locating the origins of the Jewish people in Egypt.

7. For edition, translation and commentary see Jacobson 1983 and especially the wide-ranging critical edition of Lanfranchi 2006, to whom, for convenience, I refer the reader frequently for up-to-date discussion of technical issues (Lanfranchi is in general better on the biblical background and Jewish context than on classical Greek intertexts, where Jacobson has perceptive remarks). I have used the text at Snell 1971, 288-301, and adapted Jacobson's translations.

in the form of an episodic Greek tragedy (albeit with no chorus). This makes it (another point of interest) by some distance our longest surviving piece of Hellenistic tragedy, unless one counts Lycophron's *Alexandra*. The 17 fragments are preserved by Eusebius and Clement, apparently on the basis of a selection made by the Roman polymath of the first century BCE, Alexander Polyhistor.[8] The narrative as we have it begins with a prologue, in which Moses narrates the story of his birth and upbringing; it then goes through various stages of the Moses story, including his meeting with his wifetobe Sepphora, a dream in which he witnesses heaven, God's epiphany in the burning bush and prediction of the plague and passover regulations, the escape through the Red Sea (described in a messenger speech), and an extraordinary ecphrastic scene in which a scout reports back to Moses about the oasis at Elim, and a sighting of the phoenix bird. Other than this work, we know little that is certain of Ezekiel or his context. The date of the text is uncertain, although Polyhistor provides a clear *terminus ante quem*. That Ezekiel was an Alexandrian is a speculation (and it is certainly the case that scholars of Hellenistic Judaism have been unfortunately Alexandriocentric), but not an unreasonable one, and accepted by most commentators.[9] It is unclear whether the play was written for performance or for reading;[10] in what follows I make no assumptions either way, although I do in places experiment with possibilities.

At the formal level, the most immediate question posed by the *Exagogé* has to do with the choice of tragedy as a genre. What is tragic about a story that is about the release of the Israelites from slavery, and their return to the Promised Land?[11] There is little that is tragic, in the Aristotelian sense, about the *Exagogé*'s narrative: no cohesion of action (it presents at least 5 different locales and times), and no negative *peripeteia*. While there were of course Euripidean 'escape tragedies' with dynamic plots and happy endings,[12] the primary reference points for the *Exagogé* are Aeschylus' *Persae* and *Suppliant women*, and to a lesser extent Euripides' *Bacchae* and Sophocles' *Oedipus at Colonus*.[13] There are, it seems, three principal reasons why Ezekiel has chosen tragedy as his vehicle. The first and perhaps most obvious is that Athenian tragedy already models religious revelation and foundation for an entire community. When Ezekiel's God appears in the form of the burning bush (90-5 and environs), the poet seems to borrow subtly from the 'miracles' of Euripides' *Bacchae*: the fire that appears around Semele's tomb at *Bacchae* 596-9, and the slightly earlier scene where Dionysus' voice is heard but he himself is apparently not seen (576-84).[14] When God predicts the Egyptian plague and decrees the passover regulations, the model is the kind of *ex machine* appearance in which Euripides specialised, featuring analeptic predictions of retribution and cult aetiology.[15]

The second reason is that that tragedy offered him a rich repertoire of meditations on otherness, which (as we shall see in more detail below) is one of the central themes of the *Exagogé*. Aeschylus' *Suppliant women* demonises Egyptians as aggressive and sexually predatory, in a way that is consonant with biblical constructions.[16] The allusions to Aeschylus' *Persae* are particularly concentrated in the messenger speech, where the closing of the Red Sea is implicitly assimilated to the destruction of the Persian fleet at Salamis. The *locus classicus* of Greek binary selfdefinition is thus appropriated for Jewish identity; an appropriation that generates a powerful irony, given that the *Exagogé*'s Egyptians are (I suggest) implicitly correlated with the Macedonian Greek Ptolemies and their agents. The *Bacchae*, mentioned in the previous paragraph, is a particularly interesting hypotext, in that it describes the incorporation of an eastern cult into a Greek context dominated by an aggressively resistant monarchy, a narrative that no doubt had a particular piquancy for Ptolemaic and Seleucid Greeks. More generally, we can locate the *Exagogé* within a wider tradition of creative receptions of the *Bacchae*, laying

8. A papyrus fragment from Oxyrhynchus (unfortunately with no new material) testifies to the circulation in southern Egypt of either Ezekiel or Polyhistor. The fragment is unpublished at time of writing, but was trailed by Dirk Obbink at the 26th International Congress of Papyrology in Geneva, August 2010.

9. Discussion at Lanfranchi 2006, 11-13, who settles on Alexandria as the likeliest location.

10. Lanfranchi 2006, 35-8 argues for performance; see also 39-56 on the evidence for a diverse range of Jewish attitudes towards drama. As so often with this play, however, certainty will never be reached.

11. Lanfranchi 2006, 15-25 answers this question by stressing the range of types of tragedy and the genre's evolution in the Hellenistic period. As will become clear, I read Ezekiel as experimenting more confidently and innovatively with the template of classical Athenian tragedy.

12. Wright 2005.

13. Jacobson 1983, 237 emphasises particularly the Aeschylean connection; otherwise, *Bacchae* and *Oedipus at Colonus* are the plays most represented in his *index locorum*. Broadly the same distribution reappears in Lanfranchi's (2006) more comprehensive *index*, but Euripides' *Phoenissae* (a perhaps surprisingly popular play in postclassical culture) also makes a surge.

14. Jacobson 1983, 99 and Lanfranchi 2006, 37.

15. For example at the end of Euripides' *Hippolytus*, where Artemis predicts that she will assail a devotee of Aphrodite in revenge (1420-2), and that Hippolytus will receive cult on the Athenian acropolis (1425-30).

16. Greifenhagen (2002) explores the dominant, negative portrayal of Egypt in the Pentateuch, arguing that it functions to displace a more positive tradition that can still be glimpsed.

a particular emphasis on mediation between East and West.[17]

My third and final explanation for the choice of tragedy as a medium is that the play is centrally concerned with suffering, albeit of a kind that is unfamiliar in Attic tragedy. Egypt is constructed as the site of relentless misery for the Israelites, right from the prologue:[18]

{ΜΩΣΗΣ·} ἀφ' οὗ δ' Ἰακὼβ γῆν λιπὼν
Χαναναίαν] (1)
κατῆλθ' ἔχων Αἴγυπτον ἑπτάκις δέκα
ψυχὰς σὺν αὑτῷ καὶ ἐπεγέννησεν πολύν
λαὸν κακῶς πράσσοντα καὶ τεθλιμμένον,
ἐσάχρι τούτων τῶν χρόνων κακούμενον (5)
κακῶν ὑπ' ἀνδρῶν καὶ δυναστείας χερός.
ἰδὼν γὰρ ἡμῶν γένναν ἅλις ηὐξημένην
δόλον καθ' ἡμῶν πολὺν ἐμηχανήσατο
βασιλεὺς Φαραώ, τοὺς μὲν ἐν πλινθεύμασιν
οἰκοδομίαις τε βαρέσιν αἰκίζων βροτούς (10)
πόλεις τ' ἐπύργου σφῶν ἕκατι δυσμόρων.

Moses: When Jacob left Canaan he came to Egypt with seventy souls and fathered a great people that has suffered and been oppressed. Right up until these times we have been ill-treated by evil men and a powerful regime. For King Pharaoh, when he saw our people increasing in number, devised many plans against us. He afflicted us with brickwork and the hard labour of construction, and he had turreted cities built by our ill-fated men.

This passage is certainly suffused with tragic motifs, particularly the repetition of the *kak-* root (three times) and the use of the übertragic word *dusmoros*. What is less tragic, or at least less Attic-tragic, is the focus on collective rather than individual suffering. Despite the absence of a choral voice, then, Ezekiel does activate a sense of the collective. It is likely that, as so often in Greek literature, the language of pain and suffering is designed to engender a sense of empathic pity in audience members or readers, and so to align them affectively with the Israelites. This assimilation is subtly compounded: 'Right up until these times (*esakhri toutōn tōn khronōn*) we have been ill-treated by evil men and a powerful regime'. The phrase 'right up until these times' alludes to the well known Herodotean tag *eti es eme* ('even up to my own day') and its periegetic and aetiological successor *eti kai nun* ('even now'), used to mark the remarkable survival of an ancient tradition, saying or monument. But this is more than a neat 'Alexandrian' appropriation of a familiar phrase for a new use. It also constitutes a vivid example of what Christiane Sourvinou-Inwood calls the 'zooming device':[19] the strategic telescoping, at particular junctures, of spaces and times. This process is facilitated by the use of the deictic τούτων, 'these', which can be taken to be indexed either to the time of the biblical Moses or, metaleptically, to that of the audience; or, in fact, to both at once. In other words, the text invites us to identify a continuum of suffering from Pharaonic past to Ptolemaic present.[20]

The representation of Pharaonic Egypt, then, can be seen as a coded political critique of Ptolemaic Alexandria. The Israelites' sufferings in Egypt are not brought about by divine vengeance (as they are sometimes in the Midrashim), but directly by the brutality of the king, jealous as he is of their fecundity.[21] This savagery means that as in the Bible, Egypt is imaged as a kind of underworld, a place that one 'goes down' to (*cf.* κατῆλθ').[22] There is a satisfying symmetry, then, to a narrative that finally rebounds the sufferings of the Israelites onto the Egyptians themselves. On the conventional interpretation,[23] the Pharaoh is said to suffer (*paskhein*) during the divinely wrought plagues, a satisfying compensation for the earlier ills wrought on the Israelites. We can see a similar boomerang effect in the messenger's speech about the parting of the Red Sea: the initial distress of the Israelites on seeing the Egyptian army making for them ('they yelled on seeing …' ἰδόντες… ἠλάλαξαν, 211) is replicated by one of the Egyptians' own suffering at the sight of the impending tsunami ('he yelled on seeing …' ἠλάλαξ' ἰδών, 238). The narrative of suffering, then, is *both* conventionally tragic in that it solicits empathy between external audience (or readers) and internal characters, *and* unconventional, in that its reversal adopts the structure more of a comedy of release, whereby the initially pathetic suffering is transferred onto the agents of oppression.

17. Hunter 2006, 4280.

18. I do not see the use of the particle δέ in the first sentence as a decisive argument against this being the opening of the play: Ezekiel's linguistic eccentricities are numerous; see Lanfranchi 2006, 115-16 on this point. The passage has obvious similarities to the recapitulatory solo prologue of many an Attic tragedy.

19. Sourvinou-Inwood 1989.

20. Moses' 'account continues the suffering right in a direct line until the Tragedian himself' (Cohen 1993, 33). Lanfranchi counters, too literalistically, that 'le prologue est prononcé non par l'auteur lui-même, mais par le personnage de Moïse dans le cadre temporel du récit' (2006, 133).

21. There seems to be here an echo of the *Cypria*'s famous claim that Zeus brought about the Trojan War out of fear of overpopulation (fr. 1.15 Davies).

22. Lanfranchi 2006, 117.

23. Φαραὼ δὲ βασιλεὺς πείσετ' οὐδὲν ὧν λέγω… (149). I concur with Lanfranchi, however, *contra* Jacobson that πείσετ' is likelier to be from *peithein* than from *paskhein*: 'Pharaoh, the king, will be persuaded of none of my words …'

The *Exagogé* is is simultaneously conventional and unconventional, both like and unlike a classical Greek tragedy. I want to move on now, away from the narrower issues of tragedy as genre, and press harder the related question of cultural affiliation. If I am right and Pharaonic Egypt stands as a cipher for Ptolemaic Alexandria, and both are equally execrated, then a fresh question emerges: why has Ezekhiel chosen tragedy, an archetypically Greek literary medium? Why does he show himself so intimate and artful an exponent of tragic intertextuality? Surely these tactics are signs of affiliation with Greeks, and hence complicity with the very system he affects to critique? The complex play between traditions is actually thematically seeded in the text itself. For this is not simply a story of straightforward binary opposition between Israelite and Egyptian, but a testing site for different models of cultural interaction. Chief among them is acculturation. As in the Bible, Moses is nursed by his mother Mariam (and, crucially for what follows, told about his 'ancestral race (*genos patrōion*) and God's gifts', 35), but brought up in the Egyptian court:

> ἕως μὲν οὖν τὸν παιδὸς εἶχομεν χρόνον,
> τροφαῖσι βασιλικαῖσι καὶ παιδεύμασιν
> ἅπανθ' ὑπισχνεῖθ', ὡς ἀπὸ σπλάγχνων ἐῶν·
> ἐπεὶδὲ πλήρης κόλπος ἡμερῶν παρῆν,
> ἐξῆλθον οἴκων βασιλικῶν (πρὸς ἔργα γάρ
> θυμός μ' ἄνωγε καὶ τέχνασμα βασιλέως).
>
> Accordingly, for the period of my youth, during my royal nurturing and education the princess promised me everything as if I were her own son. But when I grew to be an adult, I went forth from the royal palace at my spirit's urging, to see the deeds and devices wrought by the king. (36-41)

Particularly striking here is the emphasis on the 'education' (παιδεύμασιν) he receives, *as if he were the blood-relation of the royal dynasty*. This particular detail is extra-biblical; predictably so, for the centrality of education to cultural definition is of course definitively Greek and definitively postclassical; *paideia* is a primary marker of civilised Hellenism. The claim that the princess reared him as she would have her own son indicates clearly that the education in question is gentile, and contemporary Alexandrian readers or viewers would (I feel sure) have associated this immediately with the sophisticated literary culture of the library / Museum complex, which could also be seen as a royal palace (built as it was in the Brucheion).[24] We might even see in Moses a reflection of Ezekiel's own poetic identity, as an ethnic Jew who is nevertheless deeply immersed in Greek learning (was he perhaps himself a member of the Museum?).

This emphasis on Moses' education is highly significant, not only because of anxieties, mentioned near the start of this chapter, over the Hellenisation of Alexandrian Jews and its implied threat to their Jewishness, but also because it picks up on the theme of Mosaic hybridity that can already be detected in the Bible. Biblical scholars emphasise the tension between Abraham and Moses as representing two alternative founders of Israelite identity: if 'Abraham is presented in the Hebrew Bible as the genealogical ancestor of the biblical Israel, Moses is cast as its "vocational" ancestor'.[25] This tension might be resolved by distinguishing an older tradition promoting the Egyptian origins of the Jews, which was later (during the Persian period) incorporated within the alternative, and now dominant, Abrahamic narrative of ethnic origins in Mesopotamia.[26] But even if the normative biblical account seeks to minimise Israel's genetic links to Egypt, the spectre of Moses' Egyptianness continues to haunt all subsequent accounts. Jan Assmann famously explained this phenomenon in Freudian terms as the 'return of the repressed'.[27] We can detect the processes of return and rerepression alternately in the Hellenistic stories found in Hecataeus and Manetho that make the Jews Egyptian outcasts, and in Artapanus' counterclaim that Moses, while ethnically Jewish, in fact gave the Egyptians their laws and civilisation (an argument that seeks at once to explain the Egyptian connection, to avoid assimilating Jew and Egyptian, and to make Egyptians dependent on Jewish beneficence).[28]

Ezekiel's intervention into this discourse is notable for two reasons. The first is that, as we have seen, what appears to be at stake in the education theme is not simply Israel's primordial relationship with Pharaonic Egypt, but also contemporary Jews' relationship with the GrecoEgyptian Ptolemies. The second is that the education provides a distinctively nonessentialist way of construing the problem of 'Moses the Greco-Egyptian', for education is linked both to culture rather than nature and to the liminal phase of youth (the first two lines of the passage punningly localise his *paideia* in the time when he was a *pais*, a youth). Gentile

24. We could also take the τροφαῖσι βασιλικαῖσι as a subtle allusion to the victuals provided for the scholars of the Museum. Barclay 1996, 138 similarly interprets Moses' *paideia* as a sign of 'accommodation' between Jewish and Gentile, but as will be clear I disagree with his assessment that this negotiation is smooth and unproblematic.

25. Stavrakopoulou 2010, 55.

26. Greifenhagen 2002, esp 2578.

27. Assmann 1998, 2354; Assmann is particularly struck by the possibility that cultural memory linked Jewish monotheism with the celebrated religious reforms of Akhenaten in the fourteenth century BCE.

28. Fr. 3.4-6 Holladay.

learning is thus a skill acquired and retained, but also a childish pursuit that can be left behind one when mature vigour awakens: note how Moses' 'spirit' (*thumos*) compels him to go off in search of action (*erga*). The palace represents not just Greco Egyptian culture as distilled into intellectual tradition, but also an enclosed, maternal space for nourishing the immature. Alongside the education (*paideumasin*) with which he is provided, he also receives 'nurturing' (*trophaisi*) from the princess as though he was born from her loins: palace education is thus assimilated to breastfeeding (even identified with it, if we take *trophaisi … kai paideumasin* as a hendiadys).

The passage raises still deeper questions about the metaphysics of identity. That the princess raises him 'as if (*hōs*) I were from her own loins' is suggestive: *hōs* asks us to consider *just how much* like a gentile he has become; it raises the troubling question of whether upbringing can transcend birth, ethics can transcend ethnics. These themes resurface in the romance *Joseph and Aseneth*, where the intermarriage between the biblical patriarch and his Egyptian wife is legitimised by a series of similes comparing Aseneth to an Israelite (1.4-5 Burchard), and indeed Joseph claims to love her like a sister (7.8). Such passages raise, albeit fleetingly, the disturbing possibility that ancestral blood's claim to determine identity may be displaced, that identity can be, to an unspecified degree, remade when a child passes to a new parent. Clearly, these themes will have had considerable traction in an environment where the issue of Jewish assimilation into Greek culture was, as we have seen, a key concern.

Yet if the possibility is fleetingly raised here of integration through education into the Pharaoh's family, it is dashed in what follows, where Moses powerfully reasserts his Israelite identity. Immediately after leaving the palace at line 41 we encounter the scene, familiar from the Bible, where Moses meets an Egyptian and a 'Hebrew' (Ezekiel's standard term for 'Israelite') fighting. Only the 'Hebrew' is said to be Hebrew 'by race' (*genos*). It would be open to us to take this phrase as a pleonastic addition for the sake of metre alone[29] – but for the fact that the palace narrative has centred precisely on questions of family, ethnicity and ethnic definition. The combat between Israelite and Egyptian, moreover, condenses the complexity of cultural relationships into a brutally simply polarity, and imposes on Moses a stark choice as to which side he will choose. The tough ontological and epistemological questions about belonging, kinship and acculturation are pared away here; identity politics are distilled into a simple choice, between Israelite *genos* and Egyptian homeland. Moses of course sides with the Israelite, a moment not only of reconnection but also of cultural performativity: when he narrates his choice saying 'I defended my brother (*adelphon*)' (45) he both retrospectively acknowledges and prospectively *designates* (using a deeprooted familial metaphor) his own kinship with the Jewish people.

Yet for all Moses' (and Ezekiel's) attempts to disambiguate identity, for all the teleology of the return to the promised land, there is always a constant, shadowing awareness of the possibility of sliding from genetic Israelite into hybrid identities. In the next fragment, which may follow on from the prologue, Moses meets Sepphora, his wife-to-be. The theme of miscegenation is powerful and unmissable. Moses has declared, in the prologue, that the space in which he now wanders is 'a foreign (ἀλλοτέρμονα) land' (58; a claim that, we should note in passing, interestingly identifies Egypt, by antinomy, as his homeland). When the daughters of Raguel approach,[30] we learn that this 'foreign land' is identified not specifically as Midian (normally understood to be on the Arabian Peninsula), but in Libya, said to be 'inhabited by the tribes of all sorts of races (παντοίων γενῶν), black Ethiopian men' (61-2). Now, why Ezekiel has chosen to relocate the meeting is as unclear as the exact geographical area he understands by the name 'Libya'.[31] But two things are clear. The first is that he has chosen to make Moses intermarry with an African rather than an Arabian – perhaps because he wants the drama to resonate with Alexandrians. The second is that he has chosen a toponym that resonates, in Greek, with alterity, marking an uncivilised space that was seen to demand subjugation; a phenomenon imaged mythically in the defeat of the monstrous giant Antaeus by the civilising hero Heracles, and the rape and domestication of the wild nymph Cyrene.

We have moved then from the fight that seemed to affirm his commitment to one race, one *genos*, that of the Israelites, to a situation where he is choosing intermarriage with a stranger (Moses is called a *xenos* at 67, 83), whose land represents not just ethnic difference (note the marked emphasis on pigmentation, the 'black Ethiopian men'), but also cultural pluralism ('all sorts of races'). This last phrase, moreover, cannot but evoke the familiar perception of Alexandria itself as the multicultural city *par excellence*. The exogamous marriage with Sepphora returns us to the repressed image: not quite of Moses the Egyptian, but of Moses the hybrid, fusing Israelite ancestry with (Greco-)

29. Thus Jacobson's translation, for example, omits it.

30. Like Nausicaa and her maids, observers Jacobson (1983, 85) acutely.

31. Lanfranchi 2006, 151-6 discusses the geographical difficulties raised by this passage.

Egyptian culture and social mores. Intermarriage, indeed, is one of the primary tropes of cultural fusion in Hellenistic literature, in particular among Jews for whom biblical prohibitions were vigorously debated at this time.[32]

I have been arguing that the questions around Moses' affiliation also self-reflexively explore the difficult cultural negotiations of Ezekiel and his diasporic audience or readership. I want to turn finally to two episodes that make this self-reflexivity more explicit and richer. I shall be briefer with the first. Ezekiel presents, in the burning bush scene, the story of God's mountaintop transformation of Moses' staff (*rhabdos*) into a magic device that will wreak the plagues upon the Egyptians. Let's just note in passing that, for Greek readers, this cannot but recall Hesiod's bardic initiation by the Muses on Mount Helicon (*Theog*. 22-34), where his investiture is marked by the gift of a rod. Hesiod's word is not *rhabdos* but *skēptron*; but it is likely, I think, that Ezekiel's peers understood the Hesiodic implement as a *rhabdos*, the iconic symbol of the archaic rhapsode (ancient pseudetymology linked the two words).[33] The metapoetic significance of this scene was, of course, also exploited by Callimachus in the *Aetia* (fr. 2 Pfeiffer): another token, perhaps, of Ezekiel's affiliations with his gentile peers in the world of Alexandrian poetry. There are, admittedly, no close verbal parallels that I can detect with either the *Aetia* or the *Theogony*. The Hesiodic intertext, however, lends an interesting resonance to the following exchange, where Moses (like his biblical counterpart) frets about his lack of eloquence. Whereas the Muses of the *Theogony* bestow eloquence on Hesiod for him to use in the service of kings, Ezekiel's God diverts the rhetorical ability from Moses to his brother Aaron, to use in a confrontation with Pharaoh. This appropriation marks a reorientation away from Hesiod's vision of the ideological complicity of the poet in the royal enterprise, towards a new, agonistic poetics.

I want to finish, however, by looking at the extraordinary final fragment, the description of the Phoenix (254-69). The question why Ezekiel should have done this has caused much scratching of heads. Was he perhaps aware of the tradition that a Phoenix landed at the temple in Heliopolis? Did Hellenistic Jews, as later Christian writers did, use phoenix arrivals historiographically to segment epochs at crucial junctures?[34] Multiple explanations are possible. But neither excludes a third possibility, namely that Ezekiel's phoenix serves as a metapoetic figure for the poet's own identity (and indeed I shall offer further possible explanations presently).

The phoenix is, clearly, a flamboyant set-piece description, an assertion of extraordinary literary sophistication; as Jane Heath has observed,[35] it is, formally speaking, an *ecphrasis*, a subgenre of Hellenistic and imperial Greek literature placing a high premium on vividness and selfreflexive visuality. Indeed, in imperial times avian *ecphraseis* became commonplace, thanks in part to the familiar assimilation of sophists themselves to preening birds, particularly peacocks; such descriptions thus become a *mise en abîme* of sophistic skill.[36] Ezekiel thus offers the earliest extant example of a bird ecphrasis, another sign of his poetic ingenuity. And his is equally selfreflexive.

ἕτερον δὲ πρὸς τοῖσδ' εἴδομεν ζῷον ξένον,
θαυμαστόν, οἷον οὐδέπω ὥρακέ τις. (255)
διπλοῦν γὰρ ἦν τὸ μῆκος ἀετοῦ σχεδόν,
πτεροῖσι ποικίλοισιν ἠδὲ χρώμασι.
στῆθος μὲν αὐτοῦ πορφυροῦν ἐφαίνετο,
σκέλη δὲ μιλτόχρωτα, καὶ κατ' αὐχένων
κροκωτίνοις μαλλοῖσιν εὐτρεπίζετο. (260)
κάρα δὲ κοττοῖς ἡμέροις παρεμφερές,
καὶ μηλίνῃ μὲν τῇ κόρῃ προσέβλεπε
κύκλῳ· κόρη δὲ κόκκος ὡς ἐφαίνετο.
φωνὴν δὲ πάντων εἶχεν ἐκπρεπεστάτην.
βασιλεὺς δὲ πάντων ὀρνέων ἐφαίνετο, (265)
ὡς ἦν νοῆσαι· πάντα γὰρ τὰ πτήν' ὁμοῦ
ὄπισθεν αὐτοῦ δειλιῶν τ' ἐπέσσυτο,
αὐτὸς δὲ πρόσθεν, ταῦρος ὡς γαυρούμενος,
ἔβαινε κραιπνὸν βῆμα βαστάζων ποδός.

'We saw something else too, a strange and remarkable creature, such as no man has ever seen before. He was about twice the size of an eagle, and had multi-coloured wings. His breast was purplish and his legs scarlet-coloured. From his neck, saffron tresses hung beautifully. His head was like that of a domestic cock. He gazed all around with his yellow eye, which looked like a seed. He had the most egregious voice. Indeed, it seemed that he was the king of all the birds. For all of them followed behind in fear. He strode in front, like an exultant bull, lifting his foot in swift step.' (255-9)

The language of wonder (*thaumaston*), of variegation (*poikiloisin*) and colours (*khrēmasin*, also used of rhetorical figures) are all, clearly, shared between

32. See Cohen 2001, 24162, arguing that the Bible (see Deuteronomy 7:34, Exodus 34:1416, 1 Kings 11:48, Ezra 910) forbids only specific instances of intermarriage (e.g. with Canaanites), whereas Philo, Josephus and particularly the Rabbis transform it into a generally applied regulation.

33. Graziosi 2002, 23-4.

34. Lanfranchi 2006, 290-6 surveys the possibilities; cf. esp. 292-3 for these two explanations.

35. Heath 2006. The bibliography on *ecphrasis* is now immense: for orientation see Webb 2009, and the special issues of the journals *Ramus* 2002 and *Classical Philology* 2007.

36. Dio Chr. 12.5, and see further Morales 2004, 185.

the thing described and the description itself: this is a blazon of lush, descriptive skill. The language at this point becomes ambitious, exotic and compounded (cf. e.g. the *hapax miltokhrōta*, 'scarlet-coloured' at 259), and heavily alliterative: note particularly *krokōtinois … kara … kottois … korēi … kuklōi … korē … kokkos*. In this context, the emphasis on sound and vision is highly significant, highlighting as it does the visual and auditory field of theatrical performance (whether literally in performance or by association in a *Lesedrama*). The colours (purple, red, saffron, yellow) point ecphrastically to the sight that the messenger speech represents mimetically (whether at one remove in performance or at two on the page), but cannot reproduce. The irreducibly mediated nature of this viewing experience is underlined in the messenger's acknowledgement that he has *interpreted* the visual manifestation: (*ephaineto*, 265; *hōs ēn noēsai*, 266). At the same time, however, the bird is also a viewer, peering out with its 'seed like' eye.[37] The bird is thus simultaneously object and subject of vision. The same goes for language: the marvellous display of descriptive prowess that we are witnessing is mirrored in the phoenix' possession of a 'most egregious voice' (*phōnēn … ekprepestatēn*, 264). The phoenix thus seems to embody at once the signifier and the signified of dramatic representation.

This selfreflexivity also has cultural and political dimensions. The phoenix is a 'foreign bird' (*zōion xenon*), such as no one yet has seen (254-5), a description that picks up the earlier emphasis on Moses' 'foreignness' in the eyes of the Libyans. It is attractive, then, to take the phoenix also as a cipher for Ezekiel's own alterity within the Greek literary tradition, as a rare bird whose colourful exoticism makes him an object of wonder. The phoenix, we are told, is in fact 'king of the birds', leaving all others following in his train (265-7): a clever figuration, no doubt, of Ezekiel's poetic aims, not just to partake of the tragic tradition but also to dominate it, elevating it to the highest possible state of sanctity and sophistication. The allusion to the phoenix as the 'king of the birds', moreover, seems to underline the theme of politically antagonistic poetics, offering him as an alternative to or even opponent of the oppressive kings of Egypt.

There is more that can be said about the 'strangeness' of the phoenix. Firstly, *xenon* gears us up for a puzzle; and indeed the description has something of a riddle about it, with its itemised body parts listed in sequence. The bird is never named: we need to deploy our interpretative skills and our literary know-how (specifically with Herodotus) to identify it.[38] The clue to its identity, moreover, lies in the immediately preceding description of Elim itself (251). Ezekiel's Elim is presented as a canonical *locus amoenus*,[39] a presentation that significantly expands on but also incorporates the sole detail that the Bible gives, namely the presence of palm trees. The Greek word for 'palm' is of course *phoinix*. Elim thus cleverly provides not only a disguised hint as to the bird's identity, but also an artful explication, in the form of a calque, for the poet's striking decision to stage a manifestation of the phoenix in Elim: when Hebrew *bennu* becomes Greek *phoinix*, the pun is activated.[40]

Despite the absence of a first-person, 'authorial' persona, then, and despite setting his drama in the distant past, Ezekiel actually tells us a good deal about life in contemporary Egypt. The caveat that his Alexandrian origin is uncertain bears repeating, but we have at least amassed a certain amount of circumstantial evidence that the play would have gained additional resonance in a setting in Egypt. A sense of the interpenetration of past and present was no doubt widely felt among all communities in Egypt, but Alexandrian Jews must often have felt a distinctive cultural and religious tension between the pragmatic accommodations they made in the present and their particular investment in sacred narratives of categorical hostility to this space. Dense, sophisticated poetry like Ezekiel's dramatises not just the story that is literally played out, but also the story of contemporary Jewish urban life: from the oppositional discourse of Pharaoh's cruelty and punishment to the phoenix scene at the end of our fragments, which points towards a more exuberant celebration of the poet's identity as an outsider within the Greek literary tradition. We also find Ezekiel exploring different models of hybrid identity: the conjuncture of (Greco-)Egyptian education and Jewish family (*genos*), aggressive confrontation between the two, and multicultural intermarriage. In all, the *Exagogé* reads like a crystalline prism through which the multiple and sometimes contradictory concerns of urban Jews were brilliantly refracted.

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37. Just as Achilles Tatius' peacock does, with the 'eye' emblazoned on its fan (1.16.3): see Morales 2004, 141.
38. Morgan 1994.
39. Discussion at Lanfranchi 2006, 279.
40. Collins 2000, 228. Lanfranchi 2006, 293 notes that this interpretation was first advanced by Samuel Bochart in the 17th century.

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5. URBAN CONNECTIONS: ARSINOE, ANTINOOPOLIS AND HERMOPOLIS IN THE PAPYRI[1]

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Hadrian founded Antinoopolis in Middle Egypt on the east bank of the Nile, in an area once occupied by a small pharaonic settlement.[2] Antinoopolis was organised as a Greek city with the civic structure of a *polis* and was accordingly colonised mostly by people from Ptolemais, which was also a Greek city, and the privileged class of 6475 *hellenes* of Arsinoe. Just west of the Nile lay Hermopolis, which, by the time the new Hadrianic foundation appeared in 130, had been around for well over a millennium.[3] Hermopolis was a major city with a long history and a rich tradition, which also, until then, had had sole claim to the area, its fertile land and its resources. The sudden appearance of the artificial Hadrianic construct is bound to have had a significant impact, both economic and cultural, on Hermopolis, while the colonists must have brought with them their distinctive cultural identity.

This study is based mainly on papyrological evidence either from or about Antinoopolis and is part of a monograph on the history of Antinoopolis I am currently working on. Its main aim is to detect the levels of cross-fertilisation through the various stages of the symbiotic relationship, forced or organic, that developed between Antinoopolis and its neighbouring Hermopolis. It further seeks to touch on the wider question of the geographical context in which the new foundation appeared. Archaeology only sheds light on the diachronic geographical context of Antinoopolis, namely the pharaonic settlement detectable through a temple of Ramesses II. The more pertinent question of the status of the land that the new foundation was allocated, and its surroundings, so far remains unanswered, and, since the papyrological evidence does not contain any explicit reference to it, it is rarely even asked. I am hoping to show that examination of the relationship between Antinoopolis and Hermopolis, apart from its intrinsic interest, may also hold the key to understanding the new foundation's territorial status.

Examining the sources relating to Hadrian's new foundation, one can learn a lot about the population and the laws of the new city and the privileges that Hadrian granted its citizens, either from direct references in imperial edicts or indirectly from other official documents.[4] What is strikingly absent from the sources is reference to the status of the territory that Antinoopolis was to occupy, in other words the land necessary to build the city itself and to feed its population. In this respect, and given the proximity of Hermopolis, it is also interesting that there seems to be no evidence of any intended formal connection between the cities or any practical arrangement for their coexistence. Indeed the papyri corroborate this by further indicating very limited contact between the neighbouring cities for a while after the foundation of Antinoopolis. The territorial question of course encroaches on the greater issue concerning the status of the new foundation as a nomarchy, which seems to have confounded generations of modern scholars and ancient writers alike, probably because of confusion already evident in the papyri.[5] These are the aspects in the character and development of Antinoopolis on which I believe examination of its relationship with neighbouring Hermopolis may shed more light.

Arsinoe, which, as I mentioned, was one of the main sources for the new foundation's population, is a very useful addition to this examination, since it acts as a point of reference and allows comparisons. The relative abundance of papyrological documentation from the Arsinoite nome also facilitates the attempt to draw conclusions concerning the relationship of the new city with the Arsinoite metropolis, which would be much more difficult in the case of Ptolemais, because of the dearth of documentation from that city. While Arsinoe was linked to Antinoopolis institutionally but not geographically, Hermopolis had a link to Antinoopolis that was geographical but not institutional: it was just on the other side of the Nile, while the Fayum was about 170 km away as the crow flies.[6] Not unexpectedly, as we shall see, the pattern of contact between Antinoopolis and each of the two cities is very diverse.

1. This paper was written during the year 2010, when I held a scholarship from the Botsaris Foundation at the Institute of Greek and Roman Antiquity, National Hellenic Research Foundation. I wish to thank both for their support.

2. Calament 2005, 51-53. See also the articles by Rosati and Pecchioni in Pintaudi 2008, 471-488.

3. See Bagnall and Rathbone 2004, 162-164 and Shaw and Nicholson 1995, 73-74. The antiquity of Hermopolis is evident not only on the basis of its archaeological remains, see e.g. Roeder 1959, but also its foundation myths, which identify it as the first city after the creation of the world, see Fowden 1993, 174-175.

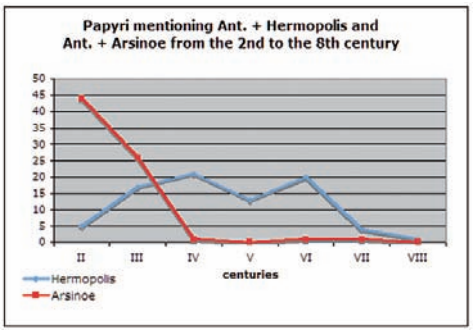
4. On the privileges see Schubert 1990, 25-29; Zahrnt 1988, 690-700; Hoogendijk and Van Minnen 1987, 71-74; Jördens 2009, 334-338; Taubenschlag 1959, 45-68; Kühn 1913, 153-161.

5. See Thomas 1970 for examples of incorrect notions of the administrative setup of Egypt in the sources.

6. The tone of P.Gron. 18, from the third or fourth century: ἄχρι τοῦ Ἀρσινοείτου ἐφθ[ακέν]αι, after mentioning Antinoopolis, implies that it was seen as quite far away.

First a word on the sources: the papyri that comprise the exhaustive body of evidence belong to a group of texts that mention Antinoopolis and Hermopolis and another group that mention Antinoopolis and Arsinoe. They are not numerous, just under 160, which precludes any elaborate statistical exercises. They are however very well suited for the main task at hand, both in form and content, and well balanced in number, since both groups contain roughly the same amount of documents. In both groups we find a mixture of petitions, contracts, letters and lists. Documents with references to names with the same roots as the cities have been excluded from these groups, with the exception of two or three cases where they seemed to have some significance.

One feature that immediately sets the two groups apart is the pattern of chronological distribution of the documents they comprise: the majority of the documents in the Antinoopolis-Arsinoe group are dated to the second century, i.e. in the 130s and soon after. There are also several documents in that group from the third century, but after that there are only some isolated occurrences, only one of which, in the sixth century, seems to have any significance at all. The pattern of the Antinoopolis-Hermopolis group is very different. There are very few documents from the second century, more from the third, still more from the fourth and the same number in the sixth century, after a dip in the fifth. There is a sharp decline in the seventh and eighth centuries.



Before drawing conclusions from this, it is important to compare each set with the overall pattern of documentation from the Hermopolite and the Arsinoite nome. Of course our evidence would not be expected to vary hugely from the wider corpus, since it is partly drawn from that. But the small variations it exhibits are significant (it must be taken into account that the texts that concern Antinoopolis and Arsinoe and Antinoopolis and Hermopolis are to a large extent drawn from the corpus of documentation of Arsinoe and Hermopolis respectively, but that many are also of Antinoite provenance). According to Habermann's calculations of the chronological pattern of papyrus documents in the main papyrus-yielding nomes,[7] Arsinoite documentation peaks in the second century AD, drops to about half in the third and again in the fourth, and, after the fifth-century dip, increases again in the seventh century. In our evidence the second and third centuries follow that pattern, but then attestations of Antinoopolis and Arsinoe together virtually disappear. The differences are more significant in the Antinoopolis-Hermopolis group, where the pattern of our evidence goes up, not down as with the Hermopolite documentation in general, in the fourth century and is also proportionately much higher in the sixth century.

This pattern eloquently reflects the nature and development of the relationship between each pair of cities. In terms of the connection between Antinoopolis and Arsinoe, the strong bond between the two cities was inherent in the very creation of the new foundation, since populating the new city involved nominating as Antinoite citizens great numbers of Arsinoites, some of whom also relocated to Antinoopolis. It is therefore to be expected that this process would leave a visible paper trail behind, as many of the new citizens found themselves with property and various responsibilities in both places.[8]

The papyri preserve evidence of Antinoites who hailed from Arsinoe, who either decided to relocate, or keep their bases in the Arsinoite metropolis, taking care of business as absentee landlords in the nome in which they found themselves less often.[9] The cases where the landlord is an Antinoite and the land is in the Arsinoite Nome are problematic in their interpretation, since usually the permanent residence of the landlord is not stated. It is therefore unclear whether he is an absentee landlord who relocated, presumably to Antinoopolis, but retained his holdings in the Arsinoite, or a local who acquired Antinoite citizenship but remained in his original place of residence and went on leasing out his holdings, adding his new designation in the way he styled himself. Loan and lease contracts, petitions and cessions can go into great detail regarding the land in question and the matter at hand, but give hardly any information regarding the landlord. Almost all papyri that contain this sort of information reportedly have an Arsinoite provenance, but this is no real indication of origin, since they are all addressed to Arsinoites, and it is reasonable that the

7. Habermann 1998, 148.

8. Braunnert 1964, 123-124.

9. BGU I 300, P.Kron. 42 and P.Mil.Vogl. III 180 and 181, P.Oxf. 11, SB XXII 15781, P.Fam.Tebt. 37, SB VIII 9906, PSI XV 1531, P.Mich. VI 422, 423 and 424 (all three about the same topic), P.Fam.Tebt. 51, P.Fam.Tebt. 52; also possibly P.Mich.Mchl. 7 and SB VI 9616, though their content is difficult to reconstruct.

documents, even if they originated elsewhere, would have been delivered and kept, or discarded, in the Fayum. Only two oblique references to a landlord's residence are preserved, one in a petition concerning the abduction of a slave,[10] dispatched by someone from Arsinoe to his brothers, Antinoites living in Antinoopolis, who owned land in the Arsinoite. The fortunate unambiguity of this papyrus however cannot help us understand other similar documents mentioned, since the brothers' residence is only referred to in order to specify the dispatched slave's itinerary. The other concerns some uninundated lands in the Arsinoite Nome[11] owned by Antinoites, but there is no reference to their place of residence. What sets this case apart is that the provenance of the papyri is considered to be Antinoopolis, but this is both uncertain and, since the document is part of an archive, only an indication of the whereabouts of the last holder of that archive.[12]

Such fragmentation of property of course complicated matters regarding census and taxation.[13] Several returns preserve cases of Antinoites who owned property in the Arsinoite metropolis, but, like the documents concerning land, no clear mention is made to whether this was the main residence of the owners. In some cases no residents are mentioned, but Youtie in the *editio princeps* of one of these documents[14] excludes the possibility that the buildings referred to are all empty. One clear case which might shed some light on the rest comes from the Family Archive from Tebtunis. We know that this family of Arsinoites obtained Antinoite citizenship, and quite enthusiastically too, if the frequent use of the name Philantinoos is anything to go by. Thus, in a document from that archive from 202-203 a return concerning a house in Arsinoe, with no mention of inhabitants, is described as a supplementary return, while the document goes on to declare property in Antinoopolis in which the authors of this return are registered, and for which they seem to have filed their main return.

Furthermore, this fragmentation of property over different nomes and the possibility of multiple residences omplicated matters when it came to paying taxes. No document illustrates this better than a letter from the nomarch of Antinoopolis to the royal scribe of the Polemon meris of the Arsinoite, from 180.[15] This is an attempt to regulate the payment of poll tax by those Arsinoites who exercised the right of *epigamia* with Antinoite women and changed their residence to Antinoopolis. As Arsinoites, they were still required by their nome of origin to pay poll tax, but as residents (but not citizens) of Antinoopolis, the local authorities would also expect them to pay poll tax (Antinoite citizens of course were exempt). In this document the nomarch of Antinoopolis asks the Arsinoite authorities to confirm that those residents of his district who refused to pay poll tax to him, because they claimed that they had fulfilled their obligations in the Arsinoite nome, had indeed done so.

Similarly matters of inheritance seem to have been made more difficult by displaced residence or fragmentation of property,[16] and several wills and petitions concern problematic cases of inherited property. The reason usually was that the heir encountered difficulties in claiming his or her rightful inheritance because he or she did not reside locally and either cunning relatives or the authorities had tried to take advantage of that fact.

Not much correspondence seems have been preserved between those who did relocate and the friends and family they left behind.[17] Of course it is not easy to ascertain whether such letters were sent at all, since the informality with which they are written would mean that neither the name of sender nor recipient would be accompanied by a full title, including their civic affiliation. So it would be impossible to tell if among the bulk of private correspondence there are some letters between Antinoite settlers and their loved ones back in Arsinoe.

Last but not least, there is the matter of implementation of the rules regarding the privileges granted to the Antinoites by Hadrian, which were a source of contention outside Antinoopolis. Whether the wider

10. P.Fam.Tebt. 37, of 167.

11. P.Fam.Tebt. 51 and 52, of 206 and 208 respectively.

12. Van Groningen 1950, 2. The persons recorded in P.Fam.Tebt. 51 and 52 are at the very end of the genealogy we know about, so they may well have been the last holders of the archive, but this cannot be ascertained. There are doubts concerning the connection of text 52 with the rest of the archive, see van Groningen 1950, 4 and Smolders (www.trismegistos.org/arch/archives/pdf/192.pdf, last accessed 6 Jan. 2012).

13. Census: SB XXIV 16013, P.Fam.Tebt. 44, P.Mich VI 370, P.Fam.Tebt. 48; real estate: P.Mich. VI 364, P.Stras. IX 894, P.Mich. XII 627 (P.Mil. II 54 would belong to this group but inspection of the plate suggests the purported reading Ἀντινοοπ(ολί)τ(η) (a *hapax*) to be erroneous. The text looks like ἀντικ(νημίῳ) ἀριστ(ερῷ), though οὐλή is missing); taxation: SB XVI 12678, P.Fam.Tebt. 42, W.Chr. 29, BGU VII 1588; registration of the first Antinoite minors: P.Fam.Tebt. 30.

14. P.Mich. VI 370.

15. P.Fam.Tebt. 42.

16. P.Diog. 17, M.Chr. 310, BGU I 168, P.Fam.Tebt. 43, P.Diog. 11 and 12, BGU VII 1588, P.Tebt. II 319, P.Tebt. II 326.

17. Possibly P.Meyer 20, assigned to the first half of the 3rd century. Meyer (*ed. princ*. introduction) suggests that we may be dealing with new settlers. P.Gron. 18 may have been such a case, depending on the document's provenance, which is unknown. The papyrus is assigned to the third or fourth century anyway, so even if a move from Arsinoe to Antinoopolis is involved, it would have had nothing to do with the original settlers.

public was aware of them or not, we know that the authorities took steps to make them manifest: we have a document that preserves the beginning of an edict issued by the prefect concerning the privileges of the Antinoites, which was to be published by the strategoi of the nomes of the Heptanomia.[18] Furthermore, a petition from 161-169[19] preserves copies of the letters of Hadrian, Antoninus Pius, Marcus Aurelius and Verus, two letters from the prefect and one from the epistrategos of the Heptanomia, all concerning the privileges of the Antinoites. However, despite such edicts there were misunderstandings. In particular the statute exempting Antinoites and their families from the obligation to carry out liturgies outside their city often seems to have caused problems, as is evident from the many petitions requesting that such situations be rectified.[20] It is to be expected that such problems would have arisen mostly at the outset, while many Antinoites remained in residence in the Arsinoite Nome, where they would previously been obliged to be appointed to liturgies. The upheaval brought about by the sudden change in their status, coupled perhaps with the lack of precedent, caused many of them to address themselves to higher officials in order to attain what was rightfully theirs.

As the years went by, those first Antinoites who identified themselves as ex-Arsinoite *katoikoi* or *apoikoi* eventually died out. Their families seem to have arranged their businesses in a way that did not require as much paperwork to travel between Antinoopolis and the Arsinoite Nome. There is also evidence for the gradual abolition of Antinoite privileges, so the civic affiliation must have become unnecessary and eventually dropped out of the self-styling of Antinoites outside Antinoopolis. The numbers of documents that deal with both locations were gradually reduced to what would be expected between two metropoleis that lie quite far away from each other.

As is clear from the graph, the chronological pattern of attestations in the Antinoopolis-Hermopolis group is the exact opposite of that of the Antinoopolis-Arsinoe group. It suggests very limited contact between the two cities at the beginning and more and more interaction as time went by. The dip in the fifth century may be symptomatic of the general dearth of papyrological material observable in fifth-century Egypt.[21] The dramatic decline of Greek papyrological evidence in the seventh and eighth centuries is due to the occupation of Egypt by the Arabs in 641.[22] Thus, in view of the fact that the volume of documentation in the sixth century is at the same level as that of the fourth century, it would be reasonable to assume that both the fifth-century dip and the later decline reflect the overall pattern of papyrological evidence, not fluctuations specific to the contact between these two cities. In fact, as was indicated before, the pattern of contact between them becomes more and more pronounced as time goes by, as evidenced by this group's documentation levels from the fourth century onwards, which are proportionally higher compared to the overall pattern of documentation from Hermopolis.

The increasing interaction detectable in the papyri is primarily territorial. From the beginning of the third century there is evidence of land and other real estate exchanging hands between Hermopolites and Antinoites on both sides of the Nile.[23] It is in these documents, the ones relating to land, that the question of the exact nature of the territory belonging to Antinoopolis, as well as its administrative status in relation to Hermopolis, becomes most pertinent. In the introduction to P.Würzb. 8, Wilcken puts forth a convincing argument on how the nomarchy of Antinoopolis was founded on the east bank of the Nile *on land that belonged to the Hermopolite nome*. He uses Alabastrine as an example, which appears in the papyri interchangeably as Ἀλαβαστρίνη τοῦ Ἑρμοπολίτου νομοῦ or τῆς νομαρχίας Αντινόου before 296 and thereafter as τοῦ Ἀντινοΐτου νομοῦ.[24] A similar case is that of Pesla, although the opinion has often been expressed that there is more than one location with that name, at least one belonging to the nome and one to the nomarchy.[25] Wilcken also places Alabastrine firmly on the east bank for geophysical reasons, namely that this is where the alabaster quarries are to

18. P.Iand. VII 140, of 151. Cf. Thomas (1970) 467-8.

19. P.Würzb. 9.

20. P.Iand. VII 140, SB XVI 12290 see Lewis 1982, P.Würzb. 9, SB V 7558. For SB XVI 12678, P.Fam.Tebt. 42, see also above, section on taxation; P.Mich. VI 425, P.Mich. VI 426.

21. Habermann 1998 *passim*, especially 147 and 155.

22. Habermann 1998, 150.

23. P.Flor, III 383, P.Lond. III 954 (=M.Chr. 351), SPP V 119, P.Herm.Landl. 2, PSI XIII 1341, SB XXII 15618, SPP XX 121, SB XVI 12948, P. Köln III 153, P.Berl.Zill. 6, P.Stras. V 338, P.Hamb. I 23, P.Stras. VIII 751, SB XVIII 13170, P.Ross.Georg. III 49.

24. P.Lond. III 1157, P.Stras. I 5, SB XVI 13030, SB XXII 15311, SB XII 15618, SB XXII 15620. Drew-Bear 1979 does not clarify this.

25. Drew-Bear 1997, 204-206. She cites Wilcken in P.Würzb. 8, who suggests that there are in fact three different villages by that name, and Kühn 1913, who only distinguishes between Pesla Ano and Pesla Kato. She explains the discrepancy of belonging to the Hermopolite nome or the Antinoite nomarchy as referring to Kato and Ano respectively. The only certain geographical reference is in the *Itin. Anton.*, which mentions a village called Pesla on the right bank, about 35 km south of Antinoopolis. In a study made by D-B for the Barrington Atlas, she identified Pesla Ano with the Pesla in the *Itin. Anton.* and placed Pesla Kato north of Hermopolis Magna (http://mail.nysoclib.org/barrington_atlas/batL077_.pdf, last accessed Jan. 2012).

be found. He argues that this would have made the Antinoite nomarchy subordinate to the Hermopolite authorities and part of the Hermopolite nome. Alternatively, the nomarchy may have been identical to a nome in all but name and would have belonged to the Heptanomia, the exact makeup of which has for a long time been quite elusive.[26] Be that as it may, it seems that whether or not the lands are *ultimately* considered Hermopolite, their immediate context is the Antinoite nomarchy. The elevation, or simply change, of the nomarchy to a nome during Diocletian's reform must have clarified matters, while the controversy about its earlier status may just be the result of inexact geographical and administrative placing on the part of the ancient sources.[27]

Therefore, following Diocletian's reform the two administrative areas obtained the same status, whatever their hierarchy may have been before. But this did not result in two separate and self-contained areas of habitation and cultivation around each urban centre. A case in point is the fourth century *P.Herm. Landl*.[28] In its list of land and payments there is a section headed Ἀντινοϊτικὰ ὀνόματα. The meaning of these is not obvious and has left room for ambiguous interpretations, namely as to whether it refers to Antinoites owning land in the Hermopolite nome, or in the Antinoite nome itself. The editors provide a discussion of this in their introduction, where they convincingly side with the former interpretation, accepted by most scholars, that the land in question is situated in the Hermopolite.[29] If this is so, in these papyri we have ample evidence that by the fourth century there was extensive Antinoite land ownership in the Hermopolite nome.

Apart from the *P.Herm.Landl.*, throughout the papyri there are also many isolated examples of Antinoites owning or leasing Hermopolite land from the third century on. Occasionally we only learn of them by chance, such as in the case of land sale contracts between Hermopolites, where, in enumerating the neighbours of the plot in question, one or more happen to be Antinoites.[30] In sale and lease contracts we also find Hermopolite land exchanging hands between Antinoites,[31] and Hermopolite land being leased to Hermopolites by Antinoite owners.[32] When it comes to the reverse, the bulk of examples of landholding in the Antinoite nome by Hermopolites are later, mostly in the sixth century.[33] In the same documents, as well as in others not relating to landholding and farming, we find citizens of Antinoopolis residing permanently or temporarily in Hermopolis and vice versa.[34] Καταμένων, παρών, διάγων, ἐφεστώς are the expressions usually used to denote this displacement, while in the seventh-century Hermopolite tax-lists (P.Sorb. II 69) several persons are described as (ἀπὸ) Ἀντινόου.

By the third century we also find the first families formed between Antinoites and Hermopolites.[35] In the earliest of these documents, when the privileges of the Antinoites are still important, the children of an Antinoite father and a Hermopolite mother are explicitly described as Antinoites. Of course, by inference, these are also examples of displaced residence, as at least one of the spouses would have had to relocate.

The evidence of trade between the two nomes is quite limited, although there are a few examples in the sixth and seventh centuries, mostly of imports from Hermopolis, but also of the export of barley from Antinoopolis to Hermopolis.[36] Much better attested are cases of commercial undertakings, mostly shipping, involving both Antinoites and Hermopolites.[37] Already in the early third century there are examples

26. Thomas 1970, 467-8, argues for a Heptanomia which eventually, in the third century, encompassed eleven nomes, a suggestion that was subsequently confirmed by P.Oxy. XLVII 3362, published a few years later, about which see Thomas 1974. Even with the knowledge gained from this document though the question regarding the status of the Antinoite nomarchy is not yet settled.

27. One should also take into account horizontal Nile migration (about which see Judith Bunbury's contribution in this volume), which would have played an important role in shaping the area of cultivable land available to the inhabitants of Hermopolis in the course of its long history. The foundation myths about Hermopolis say that it was built on an island, and it may well have been. Even the 700-odd years of the history of Antinoopolis covered by papyrological sources constitute a long enough time-span for visible migration to have occurred. The Antinoite bank remained unaltered, probably because of human intervention, according to Bunbury, while there is no evidence that the Hermopolitan side did not move. In fact, if it did, it might go quite some way towards explaining some of the information found in the papyri regarding lands of uncertain status and Hermopolite shipping.

28. Various attempts at a more precise dating have been made. The HGV dates P.Herm.Landl. 2 to after 346-347, while the editors of the texts devote an extensive part of the introduction to this question, Sijpesteijn-Worp 1978, 14-20. See also Bowman 1985, 143-144.

29. Sijpesteijn-Worp (1978) 24-26.

30. SPP V 119 iv, SB XXII 15618, SPP XX 121, P.Ross.Georg. III 49.

31. PSI XIII 1341, SB XXII 15618.

32. SB XVI 12948.

33. P.Köln III 153, P.Berl.Zill. 6, P.Hamb. I 23.

34. P.Ryl. II 170, PSI IX 1067, P.Ant. III 192, P.Herm.Landl., SB VIII 9763, P.Köln III 153, P.Stras. V 317, SB V 8029, P.Cair.Masp. II 67165, P.Cair.Masp. II 67155, P.Hamb. I 23, P.Sorb. II 69, SB XVIII 13170.

35. PSI XII 1258, PSI IX 1067, P.Lond. III 1164F; P.Cair.Masp. II 67155.

36. P.Prag. I 45, P.Prag. I 46, SB XX 14702.

37. P.Hib. II 216, SB XIV 11551, CPR V 10, SPP II p.34, P.Grenf. II 80, 81 and 81a, P.Stras. VII 654. Also in the aforementioned P.Ant. III 192 relocating to the Hermopolite nome for three months on business may well imply that the sender was involved in a business

of Antinoite and Hermopolite shippers carrying out joint ventures of transporting grain down the Nile. Later on we find examples of skippers from either nome arranging with the authorities of the neighbouring nome to transport their grain.

Examples of real interaction between the officials of the Hermopolite nome and the Antinoite nomarchy[38] first occur in the third century, although the bulk of them are post-296, when the administrative position of the new nome gains in importance. It is in a document from the year 300 (P.Panop.Beatty 2) that we find the first clear reference to the Antinoite nome listed among the other nomes in the jurisdiction of the *epitropos* of the Lower Thebaid. The new administrative make-up of the Thebaid required more collaboration among the high officials and this is recorded in the papyrological documentation, since officials and councillors from both nomes frequently featured together in the fourth century in documents referring to the affairs of the *eparchia.*

In this paper I have attempted a synthesis of the main issues that demonstrate the connection between Antinoopolis and Arsinoe and Antinoopolis and Hermopolis. As we have seen, land plays a seminal role in both pairs, but each pair displays a number of particular issues, although in the case of the Antinoopolis-Arsinoe pair those issues prove to be rather ephemeral. The conclusions are based on papyrological evidence, although material evidence can also contribute to this study, most notably for example by the attestation of Fayum-style portraits in the new foundation, a style clearly imported by the Arsinoite colonists.

While the connection between Antinoopolis and Arsinoe soon attenuates and gradually disappears, the links between Antinoopolis and Hermopolis become stronger and more significant. As was noted before, in the second century there are very few documents that indicate any connection between the two cities, and all of them are mostly incidental attestations of the cities in the same document.[39] Having investigated the issues of landownership and residence and trade and administration, which are most significant in establishing the nature of the connection between Antinoopolis and Hermopolis, we can see that it is in the third century that we find the first evidence of real contact between the two cities, which gradually increases as the two neighbouring metropoleis evolve together and as their position becomes clearer with Diocletian's reform. Disputes, mostly over the ramifications of Antinoite privileges, indicate that the acceptance of the new foundation and its citizens may not have been straightforward.

If Wilcken is right about the land surrounding Antinoopolis on the east bank initially belonging to the Hermopolite nome, it could be that it was gradually bought up by Antinoites, so that when it came to Diocletian's reform it became a de facto part of the new Antinoite Nome – which would certainly not have pleased the Hermopolites. One has to wonder if the self-styling of Hermopolis as "most ancient",[40] attested from the end of the second/beginning of the third century onwards, might not be partly due to resentment against the new neighbours.

Be that as it may, I hope to have shown that while Arsinoe played an important part in shaping the nature and character of the new Hadrianic foundation, it was Hermopolis that developed the more significant long-term interconnection with Antinoopolis. The territorial and administrative link between the cities, whether it constituted a harmonious or antagonistic co-existence, is a significant aspect of the identity of Antinoopolis, and a seminal part in the process that led to its configuration in Late Antiquity.

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venture with Hermopolites. P.Oxy. XLIII 3111, a freight contract from 257, was signed in Antinoopolis and involves the transport of wine up the Nile from Oxyrhynchus to Hermopolis, although all the parties involved are Oxyrhynchites. The editors suggest as a likely explanation as to why the contract was signed in Antinoopolis that perhaps the parties had just made a delivery there and were now arranging their next venture.

38. P.Oxy. XXXI 2560, P.Panop.Beatty 2, SB VI 9558, P.Stras. IV 296, SB XVIII 13769, P.Flor. I 95, SB X 10568, SB V 7758.

39. P.Oxy. XLVII 3362 is a list of nomes from the second half of the second century, P.Iand. VII 140, of 151, is an edict regarding Antinoopolis sent to all the strategoi of the Heptanomia, where the name of the Hermopolite nome also occurs. P.Ryl. II 78, of 157, is an official letter from the prefect to various strategoi, including the Hermopolite; it features an infuriating lacuna before *Antinoou,* which obscures the official in charge, presumably the nomarch. SB V 7558, from 173, is a famous case of wrongful assignment of a guardianship for an orphan to an Antinoite. The deceased was a Roman living in the Hermopolite nome, so the Hermopolite exegetes is asked to find another guardian. The document is also published as FIRA III 30. For the *ed.princ.* see Boak 1932 and for further comments Wilcken 1935.

40. Ἑρμουπόλεως τῆς μεγάλης ἀρχαίας καὶ λαμπρᾶς καὶ σεμνοτάτης. The only other city to style itself ἀρχαία is Heracleopolis (ἀρχαία καὶ θεοφιλής or θεόφιλος, but only in a handful of instances, mostly in the third century).

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6. LES JUMELLES NON IDENTIQUES : MENDÈS ET THMOUIS AUX ÉPOQUES HELLÉNISTIQUE ET ROMAINE

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Traversé pendant la plus grande partie de l'Antiquité par la branche mendésienne du Nil et jouissant d'un accès fluvial à la Méditerranée, le nome mendésien, et de façon particulière ses capitales Mendès (Tell el-Rub'a) et Thmouis (Tell Timai), s'imposèrent dans l'Antiquité comme d'importants centres commerciaux et culturels, dont la renommée dépassa de loin les frontières de l'Égypte[1].

Le nome mendésien est par ailleurs l'une des très rares régions du delta du Nil à être documentée par un corpus papyrologique d'importance[2]. Il s'agit pour l'essentiel d'archives fiscales carbonisées de langue grecque retrouvées à Thmouis, la métropole romaine du nome, et datées de la seconde moitié du II^e^ siècle au début du III^e^ siècle de notre ère[3]. À cette documentation directe viennent s'ajouter plusieurs allusions aux villes de Mendès et de Thmouis dans la littérature grecque et latine. En outre, les fouilles effectuées depuis plusieurs décennies à Mendès, ainsi que celles, plus récentes, entreprises à Thmouis, documentent avec de plus en plus de précision l'évolution du paysage culturel de la région dans l'Antiquité.

Par le biais d'une confrontation des données papyrologiques, littéraires et archéologiques disponibles, cet article vise à déterminer le rôle joué par la variable culturelle dans l'évolution de Mendès et de Thmouis aux époques hellénistique et romaine. Habitées dès le III^e^ siècle avant notre ère par une importante et prospère communauté grecque, ces villes jumelles n'en conservèrent pas moins un fort profil égyptien, émanant à la fois des représentations leur étant associées et des données historiques. Afin de comprendre quels impacts eurent ces interactions culturelles sur l'urbanisme mendésien, je m'intéresserai d'abord aux représentations toponymiques et aux *topoi* littéraires associés aux capitales mendésiennes, puis à ce que les données documentaires révèlent au sujet de l'identité du nome et du transfert de chef-lieu de Mendès vers Thmouis.

1. Mendès-Thmouis représentées

1.1. Toponymie urbaine

L'examen des toponymes égyptiens et grecs utilisés pour désigner les capitales mendésiennes met en lumière les représentations environnementales et culturelles sur lesquelles repose l'identité de ces deux villes et, de ce fait, nous permet de mieux comprendre la relation que les populations autochtones et grecques entretinrent avec ces espaces urbains.

Mendès, dont l'occupation est attestée dès l'époque prédynastique, apparaît à ce jour comme la plus anciennement habitée des deux capitales[4]. Le plus ancien toponyme lui étant associé est *ʿnpt* (Anpet). Ce dernier dérive d'une racine sémitique signifiant « avoir un feuillage luxuriant », à rapprocher de l'akkadien *ḫan ābu*, « croître en abondance ». Anpet se traduit donc par « Endroit de croissance luxuriante » (« Place of luxuriant growth »)[5]. L'étymologie du nom primitif de la première capitale du nome, qui est encore utilisé dans les textes religieux des époques subséquentes, renvoie à l'idée que se faisaient ses premiers habitants, parmi lesquels se trouvaient vraisemblablement des sémitophones, de la fertilité exceptionnelle de son terroir[6]. Anpet fut cependant rapidement supplanté par

1. Je remercie J. Carruesco de m'avoir offert l'opportunité de rédiger cette contribution. Je souhaite également exprimer ma gratitude à l'égard de R. Littman et J. Silverstein, qui m'ont généreusement transmis les rapports encore inédits des fouilles récentes de Thmouis (Tell Timai), et aussi à l'égard de G. Daswani, dont la précieuse expertise anthropologique en matière de migration et d'interactions culturelles a nourri ma réflexion.

2. Le sous-sol humide du delta a considérablement nui à la conservation des vestiges papyrologiques dans cette région. Outre les archives carbonisées retrouvées à Thmouis (Blouin 2007, annexe 1 ; Kambitsis 1985), le seul autre groupe important de papyrus grecs originaire du delta connu à ce jour correspond aux papyrus carbonisés de Boubastis (Frösén et Hagedorn 1989 ; Hagedorn et Maresch 1998). Des papyrus carbonisés démotiques, datés du début de la période lagide ou de la fin de la période perse, ont aussi été trouvés à Tanis : Chauveau et Devauchelle 1996.

3. À celles-ci s'ajoutent divers documents originaires d'autres endroits d'Égypte qui, bien que datés pour l'essentiel des I^er^ et II^e^ siècles de notre ère, couvrent une période allant du III^e^ siècle avant notre ère au VI^e^ siècle de notre ère.

4. L'occupation de Thmouis remonterait peut-être à la fin du Nouvel Empire : *infra*, 13.

5. Redford 1994, 202-203.

6. À propos des toponymes sémitiques mendésiens attestés dans la documentation papyrologique, voir Blouin 2007, 136-139.

Pr-Bꜣ-nb-Ḏd.t (*Ḏdwt* ou *Ḏdt*)[7], « Maison du Bélier, Seigneur de Djedet »[8], qui demeura tout au long de l'histoire de Mendès le nom égyptien de la ville[9]. Son équivalent grec, Mendès (Μένδης), correspond à la transcription grecque de l'égyptien *Pr-B.tt* et *Pr-Bn-twtw*, un dérivé de *Pr-Bꜣ-nb-Ḏd.t*. Dans les deux cas donc, la toponymie fait référence au dieu tutélaire du nome, le bélier Banebdjed.

Les fouilles archéologiques effectuées à Mendès ont révélé que le culte de Banebdjed y était assuré par un important clergé installé dans un complexe cultuel de grande ampleur, hébergeant notamment un bélier sacré. Deux hypogées, dans lesquelles furent ensevelies les dépouilles des béliers sacrés ainsi que, vraisemblablement, celles de leurs mères, ont d'ailleurs été identifiées dans le secteur du temple[10]. Les références au culte de Banebdjed présentes dans les sources d'époque hellénistique et romaine témoignent par ailleurs de la pérennité de son culte au cours de cette période[11].

La popularité de Banebdjed ne semble pas s'être limitée à la capitale du nome[12]. C'est ce qu'indiquent plusieurs noms de villages mendésiens conservés dans les papyrus carbonisés de Thmouis. Il s'agit d'abord de Πεκερκεμενδη, littéralement « L'établissement du Bélier, Seigneur de Mendès » et de Ψεσμενδη, peut-être Ψε(ν)σμενδη, « Le lac du Bélier, Seigneur de Djedet ». À ceux-ci s'ajoutent trois villages dont le nom est composé de βιηγχις, transcription grecque de l'expression égyptienne *Bꜣ-ʿnḫ* qui réfère à l'« Âme vivante » de Banebdjed : Ψενβιηνχον-περκοινις, Ψενβιηνχον ʾΕρκειρεως/Ψενβιηγχις et Ψενβιηνχον- Ε[…]ρεφους = Ψενβιηγχις[13]. À ma connaissance, hormis Mendès, qui possède un homonyme dans le nome Arsinoïte, tous ces toponymes sont uniques. Cette « microtoponymie » mendésienne doit être associée à la « régionalité » du culte de Banebdjed. Dieu bélier, dieu de la fertilité et de la fécondité, dieu associé à l'élevage et donc aux environnements humides propices à cette activité et abondants dans le nome, Banebdjed apparaît, à la lumière de la toponymie autant que de l'archéologie, comme la pierre d'assise de l'identité régionale mendésienne et ce, tout au long de l'Antiquité[14]. Cette adhésion populaire au culte du dieu bélier, qui est encore attestée aux époques hellénistique et romaine, s'exprime d'ailleurs jusque dans l'onomastique. Ainsi les noms du type de Βιηγχις et Πετεμενδης sont-ils attestés plusieurs fois dans la documentation papyrologique mendésienne d'époque romaine[15].

Si Mendès est un toponyme théophore, Thmouis procède d'une autre logique associative. En effet, comme l'a démontré J. Yoyotte, les vocables grecs θμου et θμοι proviennent de l'égyptien *tꜣ-mꜣw.t*. Largement attesté dans la documentation néo-égyptienne et encore en usage dans les sources démotiques et coptes (*qmoue* en sahidique, *qmoui* en bohaïrique), le mot *tꜣ-mꜣw.t* dérive du verbe-adjectif *mꜣwy*, « être neuf »[16] et signifie « le terrain neuf », « la terre neuve »[17]. Cette étymologie fait référence à un processus sédimentaire caractéristique de l'hydrographie nilotique qui correspond à la formation d'atterrissements alluvionnaires à la suite d'un exhaussement des plages riveraines ou, le plus souvent, d'une élévation des bancs situés dans le lit mineur du Nil, à proximité des rives du fleuve[18]. À cet effet, l'archéologie a démontré que les sites de Mendès et de Thmouis correspondent effectivement à des levées formées par le cours méandreux de la branche mendésienne du Nil[19] dont l'élévation servait de protection efficace contre la crue du Nil. D'une manière générale, ces apports sédimentaires comprenaient également, dans leur portion plus basse, des terrains hautement fertiles et donc très attrayants du point de vue agricole. Quoiqu'il en soit, la présence de plusieurs toponymes contenant Θμου- ou Θμοι- dans le nome à l'époque romaine et l'association de ce vocable à deux toparchies[20] rendent compte de l'importance des dynamiques sédimentaires dans l'anthropisation et le développement de la région au cours de l'Antiquité.

Mendès et Thmouis doivent donc toutes deux leur nom grec à une translittération de l'égyptien. Ce phé-

7. Faulkner 1999, 325.

8. *Trismegistos* Geo, L16 Egypt, L16 - Mendes (Tell el-Rub'a), pour une liste des attestations papyrologiques et épigraphiques en démotique et en grec.

9. Redford 1991, 54 et 2010, ch. 1.

10. Redford 2000, 2005 et 2010, 166-168.

11. *Cf. infra*, section 1.1.

12. Banebdjed était également connu hors du nome. On en retrouve notamment des mentions dans les temples d'Edfou, de Dendérah et d'Esna, et il est assimilé à Osiris dans le *P. Brooklyn* : *cf.* notamment Blouin 2009 a et b ; Meeks 2006 ; Redford 2010, ch. 9.

13. Blouin 2007, annexe 3 et 2010.

14. Blouin 2009b ; Redford 2010, ch. 9.

15. *P. Mendes. Genev*. 124 (Πιβηχις), 153, 227, 371, 401 ; P. Thmouis 1, 140, 6 ; P. Yale inv. 446, 27, 33, 34, 35, 58 ; cf. Verreth 1998. Des noms de ce type sont également attestés dans la documentation hiéroglyphique ; *cf.* à cet effet De Meulenaere 1976, 183-186.

16. Vycichl 1983, 108, traduit par « se renouveler ».

17. Faulkner 1999.

18. Yoyotte 1961. *Cf.* aussi à cet effet Blouin (à paraître, a) ; Vandorpe 1995, 160.

19. Redford 2005, 8 ; hypothèse précédente selon laquelle le site de Mendès était une *gezirah* : Redford 1991.

20. Θμουις (capitale du nome à l'époque romaine) ; peut-être Θμουις (top. du Néomarè) ; toparchie du Θμοιβαστιτης ; toparchie du Θμοιριβιτης ; Θμου..ε( ) (toparchie du ..ε) ; Θμουμφρεμνο (toparchie inconnue). Voir Blouin 2010.

nomène s'accorde avec la toponymie grecque mendésienne et, plus généralement, égyptienne, qui consiste pour l'essentiel en la translittération en grec de noms de lieux égyptiens[21]. Il est révélateur non seulement de l'origine et du caractère égyptiens des capitales mendésiennes, mais aussi, et surtout, de la reconnaissance par les hellénophones de cette identité. Le recours à la translittération plutôt qu'à la traduction ou à la remotivation pourrait, dans le cas de Mendès, témoigner de la forte association existant, chez les hellénophones, entre Mendès et Banebdjed. Dans le cas de Thmouis, le nom du site est symptomatique d'une origine autochtone, laquelle cadrerait bien avec l'hypothèse d'une première occupation pharaonique. Ainsi envisagés, les toponymes Mendès et Thmouis témoignent du rôle fondamental joué par les particularités religieuses et environnementales locales dans l'identité de ces villes[22], cela tant auprès des Égyptiens de souche que des Grecs d'Égypte. Il en va de même des *topoi* littéraires leur étant associés.

1.2. *Topoi* littéraires

Mendès et Thmouis, de même que le nome mendésien, sont attestés à plusieurs reprises dans la littérature grecque et latine. En dépit de l'hellénocentrisme qui se dégage de ces témoignages[23], leur intérêt littéraire et historique va bien au-delà de l'« autoréflexion »[24]. En effet, en plus de nous fournir des informations que nous ne trouvons pas (ou pas aussi clairement) dans la documentation archéologique et papyrologique, ils indiquent également ce qui faisait alors la réputation « internationale » des villes jumelles. À cet égard, l'examen des informations associées aux deux villes par les auteurs grecs et latins permet l'identification de deux *topoi* : Mendès-Thmouis en tant que centre religieux, d'une part, et Mendès-Thmouis en tant que centre de connectivité, d'autre part.

1.2.1. Mendès-Thmouis en tant que centre religieux

Plusieurs références à Mendès-Thmouis concernent le dieu tutélaire du nome et de sa capitale ainsi que les pratiques cultuelles lui étant associées[25]. Ce dernier est nommé non pas Banebdjed, mais plutôt Mendès, son équivalent grec, ou encore simplement τράγος. C'est que les auteurs grecs et latins –et sans doute leur lectorat– assimilent systématiquement Banebdjed à Pan et, de ce fait, le décrivent à tort, comme son incarnation vivante, comme un bouc.

Le fait que les références religieuses à Mendès-Thmouis se retrouvent souvent au milieu d'énumérations associant une région/ville à une divinité ou à son animal sacré montre comment l'intérêt pour Banebdjed procède d'un attrait plus général envers les croyances et pratiques cultuelles zoomorphiques égyptiennes. Ce procédé s'accorde, en outre, avec la démarche des savants grecs, qui se présentent souvent comme la « courroie de transmission » vers le lectorat grec d'un savoir plurimillénaire égyptien leur ayant été transmis par des prêtres (via des interprètes) et/ou dans des temples[26]. Le choix d'inclure l'« exemple » mendésien dans ces énumérations semble donc avoir trouvé sa justification dans la notoriété du temple de Mendès, ainsi que dans les particularités associées au culte de Banebdjed. C'est notamment le cas des soins prodigués au bélier sacré de Mendès, de même que de

21. Blouin 2007, annexe 3 et 2010. En général, hormis le cas de plusieurs métropoles et nomes qui furent renommés au moyen d'une *interpretatio graeca* renvoyant la plupart du temps aux dieux tutélaires et animaux sacrés des villes/nomes en question, les Grecs se contentèrent de translittérer les toponymes égyptiens : Falivene 2009, 522-523 ; Ruffini 2007. Ainsi, pas plus de 15 toponymes grecs sont attestés dans le nome hérakléopolite ; *cf.* Drew-Bear 1979, 389. *Cf.* aussi Calderini et Daris 1935-2007. Dans le cas du Fayoum, la prépondérance de la toponymie grecque s'explique par le fait que l'essor de cette région se produisit à l'époque ptolémaïque.

22. La toponymie égyptienne comporte à cet effet des similitudes avec beaucoup d'autres toponymies, dont celle du Québec. En effet, les noms de lieux québécois sont eux aussi principalement topographiques ou descriptifs (Blanc-Sablon, Sept-Îles, Bellechasse [en raison de l'abondance de gibier], Percé), formés d'après des noms d'hommes (Nicolet, Champlain, Jonquière) ou inspirés de croyances (fleuve Saint-Laurent, lac Saint-Jean, Saint-Maurice). En ce qui concerne les très nombreux toponymes québécois d'origine amérindienne et inuit, ils correspondent essentiellement à des termes descriptifs de l'environnement. Ainsi, pour ne citer que ces exemples, Québec est un mot algonquin signifiant « détroit », tandis que Gaspé correspond à la transcription du terme micmac « Gespeg », qui signifierait « bout », « fin », « extrémité », que Tasiujaq signifierait « qui ressemble à un lac » (donc une baie), et que Matane proviendrait de l'algonquin « Matawan », « confluent de rivières », laquelle description est fidèle à la topographie des lieux. La toponymie amérindienne comprend également des noms associés à des croyances religieuses. Pensons aux monts Torngat (« monts des esprits » en inuktituk), à la rivière Windigo (le Windigo est un monstre fabuleux ayant l'apparence d'un homme géant) ou à la rivière Petit Manitou (« rivière du petit bon génie ») ; Poirier 1982 (1967), 1982 (1969), 1982 (1971) et 1982 (1976).

23. *Cf.* à ce sujet Vasunia 2001 et plus généralement Hartog 1980.

24. Je partage en cela l'avis de Vasunia 2001, 31-32.

25. *Cf.* avant l'époque hellénistique: Pindare (518-438), *fr.* 201 ; Hérodote (484-425), *Hist.* II, 42, 46. Pour l'époque hellénistique et romaine : Manéthon (III^{e} siècle avant notre ère), *fr.* 9 ; Diodore de Sicile (90-20 avant notre ère) *Bibl. hist.* I, 84 ; Strabon (58-21/25 de notre ère), *Geogr.* XVII, 1, 19 ; Plutarque (46/49-125) *Bruta rat. uti.* 5 (989A) ; Élien (170-235), *fr.* 35 issu de Suidas v ; Clément d'Alexandrie (150-215), *Protept.* 39, 5 ; Épiphanes (315-403) *Expos. fid.* III, 12 ; Saint Jérôme (348-420) *Adv. Iovin.* ; Lexicographie de Suidas, *Epigr. Philippi*, pag. 782 (X *pr. Anth. Pal.* VI, 231).

26. Redon 2007, 130-131, qui réfère à Hérodote, Platon, Eudoxe et Solon.

l'accouplement –réel ou non– entre une femme et un bélier[27].

En plus de témoigner d'une curiosité orientaliste pour les pratiques cultuelles égyptiennes, les références littéraires au culte de Banebdjed révèlent une connaissance, tout au moins minimale, des pratiques religieuses mendésiennes, lesquelles avaient encore cours aux époques hellénistique et romaine. Elles sont d'ailleurs, à maints égards, conformes aux données écrites de langue égyptienne qui, en plus d'associer la ville à Banebdjed, insistent particulièrement sur les particularités fertilisantes et viriles du dieu mendésien[28].

Les sources byzantines soulignent également la vocation religieuse –désormais chrétienne– de Thmouis. Ainsi, vers 606 de notre ère, Georges de Chypre affirme que la ville est un des sièges épiscopaux de l'éparchie Augustamnica A[29]. Le statut de siège épiscopal dont jouit Thmouis au cours d'une partie de l'Antiquité Tardive est aussi attesté par la documentation copte, grâce à laquelle plusieurs de ses évêques sont connus. La dernière mention de Thmouis dans les listes épiscopales datant de l'an 431, il semble que la ville, abandonnée au plus tard à la fin du X^{e} siècle de notre ère, perdit éventuellement son statut d'évêché[30].

1.2.2. Mendès-Thmouis en tant que centre de connectivité

Les capitales mendésiennes apparaissent comme des centres urbains particulièrement bien « connectés » aux réseaux de communication, de production et de redistribution égyptiens et méditerranéens. Les références géopolitiques et hydrographiques aux capitales mendésiennes sont en effet nombreuses. En plus de les citer comme métropoles du nome mendésien, les auteurs grecs et latins précisent parfois comment Mendès et Thmouis sont mentionnées en relation avec la branche mendésienne du Nil et/ou de son embouchure, située (dans le cas de Thmouis) en bordure du « canal boutique »[31] ou à proximité de la mer (et de la bouche mendésienne du Nil)[32]. Références sont également faites à des produits (parfum ou huile[33], lin[34], vin[35]) et à des auteurs dits « mendésiens »[36]. Envisagées dans leur ensemble, ces informations dépeignent Mendès et Thmouis comme des centres commerciaux, industriels et intellectuels de premier ordre. Cette image, qui, comme nous le verrons, s'accorde avec les papyrus et les données archéologiques, doit être rattachée à l'idée plus générale d'une Égypte féconde, prospère et (en référence à Alexandrie surtout, quoique non exclusivement) aussi intellectuellement que culturellement raffinée[37].

L'importance donnée au religieux et à la connectivité dans les sources littéraires associées à Mendès et à Thmouis dans la littérature gréco-latine peut être mise en parallèle avec ce que les données documentaires et archéologiques révèlent sur l'histoire religieuse et socio-économique du nome mendésien et de ses capitales. Ce phénomène, comme les données toponymiques dont il a été précédemment question, suppose le partage de schèmes « représentationnels » communs entre les égyptiens de souche et les grecs (et romains) d'Égypte et d'ailleurs. Si l'origine égyptienne de ces représentations ne fait pas de doute, leur appropriation par des non Égyptiens suppose tant une adaptabilité de ces derniers aux particularités urbaines mendésiennes que, en ce qui concerne plus particulièrement les réseaux de connectivité, une mise en valeur accrue de celles-ci. À cet effet, l'image rejoint la réalité.

2. Mendès-Thmouis réelles : entre continuités et ruptures

2.1. Identité urbaine

Si l'on exclut le cas des cités grecques d'Égypte qui sont toutes de fondation gréco-romaine[38], ainsi que celui, exceptionnel, du Fayoum, dans le delta et la vallée du Nil, l'arrivée du pouvoir macédonien et l'implantation d'un important contingent de colons grecs n'affectèrent pas la géographie administrative égyptienne. En effet, la division du territoire égyptien en nomes, ces entités géographiques, administratives

27. Blouin 2009a. Textes grecs : Hérodote, *Hist*. II, 46 ; Pindare, fr. 201 cité par Strabon, *Geogr*. XVII, 1, 19 ; Plutarque, *Bruta rat. uti.* 5 (989A) ; Clément d'Alexandrie, *Protept*. 32,4 ; *cf*. aussi Cosmas de Jérusalem *in* Hopfner, 1923 et 1925, 742.

28. Blouin 2009b ; Redford 2010, ch. 9.

29. Georges de Chypre, 690. Thmouis est également présentée comme une ville de l'Augustamnica A dans *L'histoire des patriarches de l'Église copte d'Alexandrie* ; *cf. Patr. Or*. I, 9.

30. De Meulenaere 1976, 5.

31. Au sujet du canal boutique, *cf. infra*, n. 57.

32. Blouin 2007, 59-82.

33. Pline l'Ancien, *HN* XIII, 1. *Cf*. aussi Dioscoride Pédanius, *De mat. med.* I, 72 ; Blouin 2007, 257-260 ; De Rodrigo 2004 ; Redford 2010, 173-176.

34. Blouin (à paraître, b).

35. Redford 2010, 176, qui cite Pline l'Ancien, *HN*, XIV, 9 et Athenaeus, VII, 15, 688.

36. Voir à cet effet Redford 2010, 199.

37. *Cf*. à cet effet Vasunia 2001 et Walker 2003.

38. Müller 2010.

et religieuses dont les origines remontent à l'époque pharaonique, perdura aux époques hellénistique et romaine[39].

Conséquemment, le nome mendésien conserva son identité propre, ainsi que sa capitale, Mendès, dont la marginalisation graduelle au profit du proche site de Thmouis peut être considérée comme un continuum plus que comme une rupture (nous y reviendrons). Cette continuité suppose une reconnaissance, voire une appropriation, par les autorités lagides autant que par les communautés hellénophones, de la conception autochtone du territoire mendésien, ainsi que des avantages associés à la vocation commerciale et religieuse de la capitale mendésienne.

2.1.1. Vocation commerciale

Mendès s'imposa au moins dès le VII^e^ siècle avant notre ère comme l'une des plus populeuses et prospères villes portuaires du delta[40] et fut même, au cours de la 29^e^ dynastie (393-373 avant notre ère), la capitale de l'Égypte[41]. Par la suite, en dépit des violentes destructions qui accompagnèrent la reconquête perse[42], elle demeura un centre urbain de première importance.

Selon D. B. Redford, du VII^e^ au IV^e^ siècle avant notre ère, le débit important de la branche mendésienne du Nil permit à Mendès d'être facilement accessible autant de la Méditerranée que de la Haute-Égypte[43]. C'est à la faveur de ce phénomène que la ville se serait imposée comme un *emporium* international[44]. Les données céramiques ont en effet permis de conclure à l'existence de contacts commerciaux entre le nome mendésien –et de façon particulière le port de Mendès– et la Méditerranée orientale au moins dès le VII^e^ siècle avant notre ère[45]. La typologie des tessons mis au jour atteste l'importation d'huile, de vin et d'autres produits de consommation grecs et levantins dans la région bien avant la conquête macédonienne. Plus particulièrement, on note une abondance de matériel en provenance des îles grecques de Samos, Thasos et Cnidos ainsi que de la Phénicie. Par ailleurs, un grand nombre d'amphores à anses de panier manufacturées en Cyrénaïque et en Afrique du Nord a été retrouvé dans le secteur du grand port de Mendès. Ces jarres, hautes d'environ 1,5 mètre, arrivaient vraisemblablement à Mendès remplies d'huile de balanos. Or, l'huile de balanos étant un ingrédient essentiel à la confection des parfums, un rapport a été établi, à juste titre, entre ces dernières et la célèbre parfumerie mendésienne, dont la fragrance était connue en latin sous le nom d'*unguentum Mendesium*[46].

Cette appartenance de la capitale mendésienne aux réseaux de redistribution méditerranéens perdura au début de l'époque hellénistique. En témoignent les allusions littéraires relatives aux différentes « spécialités » et auteurs mendésiens[47] et, en ce qui concerne la première moitié du III^e^ siècle avant notre ère, la correspondance de Zénon. Cette dernière documente en effet l'existence, sous le règne de Ptolémée II, d'échanges commerciaux entre Mendès et les domaines fayoumiques d'Apollonios. Il y est ainsi question de la revente à Mendès de produits issus des domaines supervisés par Zénon (lin, miel)[48] et, inversement, de l'achat à Mendès pour le compte de Zénon de produits locaux, tels que des graines de lin, de lotus et de ricin[49], de l'*unguentum Mendesium*[50] et des rouleaux de papyrus confectionnés à Tanis[51]. Plusieurs papyrus font également état de la présence de Zénon à Mendès[52]. Les documents « mendésiens » des archives de Zénon indiquent l'existence de contacts commerciaux entre Mendès et le Fayoum et constituent un indice de la pleine « intégration » de la *chôra* mendésienne dans l'économie de la capitale. En effet, les sources n'étant pas explicites sur ce point, il est vraisemblable de croire qu'une part appréciable des produits agricoles écoulés à Mendès (pensons notamment au lin, au papyrus, aux graines de pavot de sésame et de ricin) provenait des campagnes du nome.

La prospérité économique de Mendès et de son port ne semble cependant pas avoir dépassé le règne de Ptolémée IV. En effet, à partir du début du II^e^ siècle avant notre ère, victime de la migration et de la

39. Husson et Valbelle 1992, 52, 231. Ce n'est que sous le règne de Dioclétien qu'on note leur disparition, qui intervient dans la foulée des réformes administratives instaurées par l'empereur à l'échelle de tout l'empire.

40. Redford 2010, 173-178.

41. *Cf.* notamment Grimal 1988 ; Redford 2004, 2005 et 2010, ch. 11.

42. Redford 2010, ch. 12.

43. Les fouilles ont révélé l'existence de trois ports fluviaux : Redford 2010, 176.

44. Redford 2019, 173.

45. Hummel et Shubert 1991-1992 et 2004 ; Redford 1994 et 1997 ; Shubert et Hummel 1991, n. 148 ; Venit 1982.

46. Blouin 2007, 257-260 ; De Rodrigo 2004 ; Redford 2010, 173-176, qui précise qu'à ce jour, aucune structure pouvant correspondre à une fabrique de parfum n'a été identifiée sur le site de Mendès.

47. Cf. supra, 7 ; Redford 2010, 173, 199.

48. *P. Cair. Zen.* II, 59823.

49. *P. Cair. Zen.* II, 59292, 661-662 ; P. Lond.VII, 1995, 180.

50. *P. Cair. Zen.* I, 59089 ; PSI IV, 333.

51. *PSI* IV, 333.

52. *P. Cair. Zen.*I, 59047 ; *P. Cair. Zen.*I, 59052 ; *P. Mich.*I, 10 ; *PSI* IV, 329 ; *PSI* V, 491. Ce dernier faisait alors partie de la délégation officielle qui, dirigée par le dioecète Apollonios, effectuait une tournée dans plusieurs villes de province : *P. Cair. Zen.*intro., 20-21.

marginalisation de la branche mendésienne du Nil, le site fut peu à peu abandonné au profit de Thmouis qui s'imposa dès lors comme le centre économique et la métropole du nome[53]. À l'heure actuelle, nous disposons de peu de sources relatives au rôle commercial de Thmouis à l'échelle égyptienne et méditerranéenne[54]. La découverte sur le site de sculptures en marbre pentélique de datation ptolémaïque[55] et d'une tétradrachme athénienne datée du IV^e^ siècle[56] avant notre ère semblent toutefois indiquer des contacts, directs ou indirects, avec la Grèce. En ce qui concerne l'époque romaine, le témoignage de Flavius Josèphe relatif au voyage de Titus depuis Alexandrie jusqu'à Jérusalem via Thmouis, de même que l'*Itinéraire Antonin* et les *P. Ryl.* IV, 627-628, indiquent que, tout au moins entre le I^er^ et le IV^e^ siècle, Thmouis, qui était alors située le long du « canal boutique »[57], constituait une étape importante dans le réseau de communication reliant la vallée du Nil et le delta à la Syrie-Palestine. Les sources romaines, byzantines et arabes relatives au lin produit et transformé dans le nome indiquent, par ailleurs, comment l'expertise textile mendésienne perdura tout au long de l'antiquité et de l'époque médiévale[58]. La reprise récente des fouilles sur le site de Thmouis –dont la taille témoigne du dynamisme passé– contribue peu à peu à éclairer ce pan moins connu de l'histoire urbaine mendésienne, de même que les dynamiques inhérentes au changement de chef-lieu intervenu sous le Principat[59].

2.1.2. Vocation religieuse

Le basculement du pôle économique et démographique du nome de Mendès vers Thmouis ne s'accompagna pas d'une migration simultanée de son pôle religieux. En effet, les fouilles effectuées dans le secteur du temple de Banebdjed révèlent que ce dernier, dont l'origine remonte à l'époque prédynastique, demeura en activité au moins jusqu'au début du Principat. Ptolémée II Philadelphe (283-246 avant notre ère) semble avoir été le dernier souverain à laisser une empreinte d'envergure sur le temple. C'est ce dont témoignent les restes du mur construit par ce dernier autour du temple de Banebdjed[60] ainsi qu'une stèle hiéroglyphique connue sous le nom de *Mendesstele*[61]. La réalisation de cette stèle trouvée à Mendès fut commandée par le roi lui-même, afin de l'installer dans le temple du dieu bélier. Le texte, rédigé dans la plus pure tradition pharaonique, révèle comment Ptolémée II se rendit à Mendès vers 280 avant notre ère, afin d'y visiter le bélier sacré et d'y fonder un culte conjoint de Banebdjed et de la défunte reine Arsinoé II[62]. Nous y apprenons également que dans la foulée de cette visite, le roi s'intéressa à la restauration monumentale et économique de la ville[63]. Le fait que Mendès fut la première ville égyptienne visitée par Ptolémée II, de même que le rôle que la *Mendesstele* attribue à Banebdjed dans l'accession du souverain au pouvoir, témoignent du respect de ce dernier pour les institutions et croyances religieuses égyptiennes. Plus encore, la dernière dynastie indépendante du joug perse (la 29^e^ dynastie) ayant été mendésienne, Ptolémée II se comporte comme le restaurateur d'une tradition politico-religieuse perçue comme bafouée par l'occupant perse. D. B. Redford souligne à juste titre comment cette attitude de Ptolémée II envers Mendès exemplifie la « bienvenue discrétion » avec laquelle les souverains lagides se comportèrent en général envers les pratiques religieuses égyptiennes. L'exemple mendésien n'est donc pas en ce sens exceptionnel[64].

Parallèlement, lors de sa visite, Ptolémée II ordonna la levée de la taxe sur le transport par bateau dans le nome mendésien, de même que le transfert des revenus alimentaires jusque-là versés à la maison royale au « domaine sacré de Banebdjed et son district »[65]. Ces mesures fiscales, ainsi que la procession fluviale à laquelle le roi prit part lors de sa visite au bélier sacré, sont indicatrices du lien intime qui existait entre, d'une part, l'environnement fluvial et religieux du nome et, d'autre part, sa vitalité économique.

Nous connaissons peu de choses sur le sort réservé au temple de Banebdjed après le règne de Ptolémée

53. Redford 2010, 199-202.

54. L'essentiel des sources papyrologiques concernent l'économie agraire et fiscale du nome, tandis que les fouilles archéologiques sont encore trop embryonnaires pour permettre une compréhension satisfaisante de la géographie urbaine, industrielle et commerciale du site.

55. Edgar 1915.

56. Ochsenschlager 1967, selon qui, la découverte d'une *unguentaria* fusiforme semblable à des spécimens retrouvés à Athènes pourrait aussi aller dans ce sens.

57. *Cf.* à ce sujet Blouin 2007, 302-308 ; Redon 2007, 256-259.

58. Blouin (à paraître, b).

59. Les résultats des campagnes menées en 2009, 2010 et 2011 sous la direction de R Littman et J. Silverstein sont actuellement en cours de publication.

60. Le souverain lagide dota également le temple de plusieurs sphinx : Redford 1998.

61. Caire 22181. Brugsch 1875 ; De Meulenaere 1976, 174-177 ; Kamal 1966 ; Redford 2010, 194-196.

62. À propos du culte à Arsinoé II, qui avait de son vivant été prêtresse de Banebdjed, voir Höbl 2001, 101-105.

63. De Meulenaere 1976, 173-177.

64. Redford 2010, 194. Voir aussi Huss 1992 ; Höbl 2001, 84-90, qui replace cet événement dans le contexte plus général du règne de Ptolémée II, notamment marqué par un riche programme architectural, et Manning 2010, 94, qui rapproche la *Mendesstele* de la stèle de Pithom.

65. De Meulenaere 1976 trad.

II. Hormis Ptolémée IV Philopator (222-205 avant notre ère), aucun autre souverain lui ayant succédé n'y a laissé de trace[66]. L'attestation d'une prêtrise au début de l'époque romaine et la découverte dans le temple de statues dédicatoires de datation romaine indiquent cependant qu'il était encore en activité au moins jusque vers l'an 50 de notre ère[67], tandis que les données iconographiques, littéraires et onomastiques témoignent de la pérennité de l'adhésion populaire au dieu bélier au cours du Principat.

Les sources disponibles montrent donc comment l'évolution de Mendès et de Thmouis ne s'accompagna pas de changements brutaux, en ce qui a trait à l'identité des capitales mendésiennes. L'idée d'une quelconque « imposition », à partir de la conquête macédonienne, de normes urbaines grecques au détriment des usages égyptiens ne saurait donc être valable. Il ne s'agit pas ici de nier les changements socioculturels et économiques qui accompagnèrent l'immigration grecque massive consécutive à l'instauration du royaume lagide, mais plutôt de souligner comment ceux-ci se produisirent de manière organique.

2.2. De Mendès à Thmouis

L'existence de contacts diplomatiques, militaires et commerciaux entre le nome –et plus généralement le delta[68]– et le monde grec dès la première moitié du premier millénaire avant notre ère ne doit pas être sous-estimée. En effet, ces interactions favorisèrent, comme il a été prouvé ailleurs dans le delta[69], l'établissement sur plusieurs siècles de rencontres culturelles directes et indirectes, du moins parmi une certaine frange de la population mendésienne[70]. En outre, si l'on se fie à la présence de marchands et de mercenaires à Memphis et ailleurs en Égypte au cours des époques saïte et perse[71], il n'est pas à exclure que des étrangers –Grecs, mais aussi Phéniciens et Juifs[72]– se soient installés à Mendès à la même époque[73]. Ce sont sans doute ces interactions et la présence « rassurante » de compatriotes qui, jumelées à la prospérité de Mendès, convainquirent nombre d'immigrants grecs de venir s'installer et faire des affaires dans la ville au lendemain de la conquête macédonienne. Se développa ainsi un « langage urbain » commun, qui allait donner naissance à la dynamique agglomération égypto-grecque Mendès-Thmouis des époques hellénistique et romaine. Un « lieu de rencontre »[74] à la fois fondamentalement semblable et éminemment différent.

Si la capitale mendésienne demeura un pôle économique et religieux au cours des époques hellénistique et romaine, le transfert de chef-lieu qui survint alors constitue une évolution urbaine significative dont les fondements sont à chercher à la fois dans les dynamiques fluviales en cours à cette époque et dans le nouveau profil ethnoculturel du nome (et de l'Égypte en général).

L'anthropisation de Thmouis, qui pourrait remonter à la fin du Nouvel Empire[75], semble toutefois s'être accélérée à partir de l'époque ptolémaïque. Le nom même de la ville, dont il a précédemment été question, indique cependant une occupation initialement autochtone. L'analyse conjointe des données historiques et paléo-environnementales a montré comment l'essor de Thmouis résulta en grande partie de la migration et de la marginalisation de la branche

66. De Meulenaere 1976, 177 ; Redford 2010, 199. Ce dernier souligne comment le matériel numismatique retrouvé dans le secteur du port de Mendès indique une activité intensive d'Alexandre le Grand à Ptolémée IV.

67. Redford 2010, 202. La découverte d'une croix gravée sur un bloc de l'antichambre pourrait indiquer que l'édifice fut converti en église. Une monnaie à l'effigie d'Honorius (395-423 de notre ère) constitue la preuve la plus tardive de son utilisation, tandis qu'une pièce à l'effigie des Vandales d'Afrique du Nord suggère que des pillages eurent lieu à cet endroit, au début du VI^{e} siècle : Redford 1998 et 2010, 202-210.

68. Voir notamment Blouin 2005, 31-33 ; Briant et Descat 2008 ; Manning 2010, ch.1 ; Müller 2010, 224-227 ; Redon 2007, qui distingue les contacts diplomatiques des contacts militaires, commerciaux et culturels.

69. Redon 2007 est à cet effet essentiel. Vasunia 2001, 27-29, souligne comment ces interactions eurent aussi des répercussions en Grèce (et nous pourrions ajouter également au Proche-Orient).

70. *Cf.* Manning 2010, ch. 1 ; Müller 2010 ; Redon 2007, 97-98 et 129-130.

71. Manning 2010, 23 ; Thompson 1988, 82-105. Ces contacts transparaissent notamment du caractère multilingue des papyrus de datation perse et hellénistique, qui incluent des documents en égyptien, en araméen et en grec, en phénicien et en carien : Thompson 2009.

72. Les contacts plurimillénaires entre l'Égypte et le Proche-Orient doivent aussi être soulignés : *cf.* notamment à ce sujet Grimal et Menu 2008, section I ; Ray 1992. Ces contacts semblent avoir été particulièrement intenses dans le delta oriental, et aussi dans le nome mendésien.

73. Les mercenaires alliés d'Inaros, auxquels fait référence Diodore (XI, 27), pourraient bien avoir été des Grecs déjà installés dans le delta, et notamment dans le secteur de Mendès, où se déroula vraisemblablement une partie des opérations entourant la bataille de Paprémis (454 avant notre ère) : Redon 2007, 69-70. Une tentative d'invasion perse eut aussi lieu par la bouche mendésienne du Nil en 373 avant notre ère : Diodore *Bibl. hist.* XV, 42-43.

74. J'emprunte ici l'expression utilisée par B. Redon 2007, 219 et n.320.

75. Redford 2010, 176 et 226 ; Yoyotte 1961, 125 et 1962, 9 (qui, comme le souligne à juste titre Redon 2007, 41 n. 129, ne s'appuie que sur la découverte à Thmouis de l'inscription d'un linteau de porte datant du règne d'un certain Ioupout, seigneur de Mendès (Caire JE 43339). À ce jour, cette hypothèse n'a, d'autre part, pas été confirmée par l'archéologie. La plus ancienne mention relative à Thmouis dans les sources écrites se trouve chez Hérodote, qui réfère à un nome thmouite (*Hist.* II, 166). La ville elle-même est mentionnée pour la première fois par Flavius Josèphe (*Bell. Jud.* IV, 659).

mendésienne du Nil vers l'Est qui, dès le II^e siècle avant notre ère, fut à l'origine du déclin de Mendès[76]. Disposant toujours –du moins jusque sous le Principat[77]– d'un accès fluvial et étant située en bordure du canal boutique, la ville était administrativement unie à Mendès. Les archives carbonisées de Thmouis révèlent à cet effet que les deux agglomérations se partageaient le même basilicogrammate et que leurs habitants payaient la taxe de capitation (*laographia*) au taux réduit consenti aux métropolites. On y note également une mention de la « métropole Mendès »[78] contre 8 de la « métropole Thmouis »[79]. Enfin, les villes jumelles y apparaissent comme divisées en *amphoda* numérotés : on en compte au moins 20 à Thmouis (dont certains subdivisés en plus petites unités), et 9 à Mendès, pour un minimum de 29 *amphoda* au total[80]. Ces informations tendent à confirmer la préséance démographique (et, sans doute aussi, la plus grande superficie) de Thmouis à cette époque[81].

Si, tel que vu précédemment, les origines de la communauté grecque de Mendès-Thmouis sont sans doute antérieures à la période hellénistique[82], ici comme partout en Égypte, l'immigration grecque (dont l'ampleur exacte nous échappe) connut son principal essor après la conquête macédonienne. Ce phénomène joua un rôle certain dans l'évolution de l'urbanisme mendésien. Les papyrus grecs ainsi que nos connaissances actuelles du site révèlent en effet la présence, aux côtés de la communauté égyptienne, d'un fort contingent grec dans le nome au cours des périodes hellénistique et romaine. Bien que majoritairement égyptienne, l'onomastique et la toponymie mendésiennes attestent pour leur part une présence grecque autant dans la capitale que dans la *chôra*[83]. À cet égard, les nombreuses références à d'anciennes terres clérouchiques dans les archives carbonisées de Thmouis (et particulièrement dans le *P. Mendes. Genev.*), pourraient témoigner de l'implantation de vétérans (policiers et soldats) dans la région à l'époque hellénistique[84]. Si les catégories recensées correspondent à des vétérans autochtones, la présence de mercenaires grecs, d'autre part documentée ailleurs dans le delta, est aussi fort envisageable[85].

Thmouis, elle, a été organisée selon un plan en grille, plus typiquement associé aux fondations grecques (contrairement à Mendès, dont le plan est irrégulier)[86]. Le site a également livré de nombreux vestiges gréco-romains de grande qualité qui témoignent du dynamisme de la culture grecque dans la ville[87]. La qualité de certaines des mosaïques de datation hellénistique retrouvées à Thmouis pourrait témoigner de l'importation dans la ville d'œuvres d'art issues des ateliers alexandrins ou de la mobilité, à travers les villes d'Égypte, de mosaïstes professionnels originaires de la capitale égyptienne ou formés à cet endroit[88].

Les données paléo environnementales, matérielles et papyrologiques relatives aux capitales mendésiennes

76. Blouin 2010 ; Reford 2010, ch. 11.

77. L'envasement de la branche mendésienne semble avoir mené à l'abandon du site à l'époque arabe. Ce phénomène fluvial s'inscrit dans le contexte plus général de la bipolarisation de l'hydrographie deltaïque qui se déroula vraisemblablement de l'Antiquité à l'époque arabe : *cf.* notamment Stanley et Warne 1998.

78. *P. Thmouis* 1, 133-12 (164-165 de notre ère).

79. *P.Ryl.*, II, 214, 5, fr. 1, 6 (fin du II^e siècle de notre ère) ; *P.Thmouis* 1, 91, 14 (168-169 de notre ère) ; 113, 15 (167-168 de notre ère) ; 119, 19 (166-167 de notre ère) ; 143, 4 (162-163 de notre ère) ; 145, 10 (161-162 de notre ère) ; 146, 10 (161-162 de notre ère). Voir à ce sujet Blouin 2008, 120.

80. Alston 2002, 130 et n.

81. Alston 2002, 331, estime la population de Thmouis à l'époque de la rédaction des archives carbonisées à 24564 habitants, tout en reconnaissant la nature hautement spéculative de cette hypothèse.

82. Redon 2007, 97-98, évoque la possible existence d'un camp militaire grec à Mendès, hypothèse qui n'a cependant pas à ce jour été confirmée par l'archéologie. Les 6 toponymes « défensifs » attestés dans le nome mendésien à l'époque romaine, renforcent cette idée d'une appartenance originelle des lieux du delta ainsi nommés à un réseau de surveillance défensive pré-romain : Blouin 2007, 137-141, Yoyotte 1963.

83. Blouin 2010 ; Kambitsis 1985. L'onomastique n'est certes pas, et cela est particulièrement vrai en ce qui concerne l'Égypte ancienne, un indicateur fiable d'ethnicité. Elle fournit néanmoins une idée générale de l'évolution du profil ethnolinguistique de ses habitants, de même que du degré d'interaction culturelle qui avait cours : *cf.* notamment Bagnall 1993, 230-235 ; Thompson 2009, 398-399. Une comparaison intéressante peut être faite avec la toponymie québécoise qui, composée à la fois de toponymes d'origine autochtone, française, anglaise et, quoique dans une moindre mesure, écossaise et irlandaise, témoigne des différents pouvoirs politiques qui exercèrent leur souveraineté sur la totalité ou une partie du territoire (nations amérindiennes, France, Angleterre) ainsi que des vagues successives d'immigrants venus, au fil des siècles, s'installer durablement au Québec : Poirier 1982 (1967).

84. Blouin 2007, 173-174.

85. Dans la mesure où notre échantillon est très partiel, l'absence de terres catœchiques (terres consenties aux vétérans non autochtones) du corpus mendésien ne saurait être significative à l'échelle du nome. Cependant, le fait qu'aucune terre de ce type ne soit recensée dans le village sur lequel porte le *P. Mendes. Genev.*, qui contient pourtant des références à une grande variété de terres clérouchiques, pourrait être symptomatique de l'implantation originelle, sur ce territoire, de vétérans essentiellement autochtones. *Cf.* aussi, plus généralement, Redon 2007, 78-99. À propos du rôle des Égyptiens dans l'armée lagide, voir notamment Van't Dack 1992.

86. Alston 2002, 131.

87. De Meulenaere 1976 ; Redford 2010. Les résultats des campagnes récentes de Tell Timai (Thmouis) vont également en ce sens (je remercie R Littman et J. Silverstein de m'avoir donné accès aux rapports de fouille encore inédits).

88. Blouin 2007, 261-270 et (à paraître c).

sont symptomatiques, non pas tant d'une quelconque initiative gouvernementale visant à favoriser Thmouis au détriment de Mendès, que de la reconnaissance par les administrateurs de l'Égypte de « l'état de fait » de la prééminence de plus en plus affirmée de Thmouis. La pérennité de l'occupation civile de Mendès au IIe siècle de notre ère contribue d'ailleurs à nuancer l'idée de déclin qui se dégage des données archéologiques disponibles (données portant principalement sur les secteurs du temple et du grand port). L'identification récente d'une structure romaine à vocation cultuelle et funéraire (possiblement un *collegium funeraticium*) dans le secteur du port extérieur[89] montre l'adaptabilité des pratiques urbaines locales aux fluctuations de l'environnement fluvial mendésien. C'est à mon sens dans cette optique que doit être envisagée le transfert de chef-lieu vers Thmouis.

Conclusion

La confrontation des représentations toponymiques et littéraires associées à Mendès et Thmouis avec les données historiques disponibles met en lumière la richesse et la complexité des influences qu'eurent les interactions culturelles sur l'urbanisme mendésien. Marquée dès ses origines d'une empreinte sémitique, Anpet devenue Mendès fut, à partir de l'époque pharaonique, le théâtre d'une vibrante activité économique et religieuse dont la renommée dépassa de loin les frontières de l'Égypte. La vie urbaine mendésienne était vraisemblablement centrée autour du grand temple de Banebdjed et du complexe portuaire de Mendès, où se mêlaient Égyptiens de souche et « étrangers », de passage ou non, en provenance du Proche-Orient et, au moins à partir du VIIe siècle avant notre ère, du monde grec. Profondément ancrée dans le milieu fluvial et les croyances et pratiques religieuses lui étant associées, l'identité de Mendès –et, bientôt aussi, de sa proche voisine Thmouis– sut survivre aux vicissitudes environnementales et culturelles qui, à partir du IIe siècle avant notre ère, remodelèrent le paysage du nome. En témoignent notamment les *topoi* littéraires leur étant associés dans la littérature grecque et latine.

L'anthropisation du secteur de Thmouis, qui pourrait dater du Nouvel Empire, est encore mal connue. L'origine égyptienne du nom de la ville indique cependant une fondation autochtone, tandis que les vestiges de surface et les résultats des fouilles récentes documentent, avec de plus en plus de précision, l'importance de l'empreinte grecque dans ce secteur aux époques hellénistique et romaine. L'essor de la ville jumelle de Mendès, qui s'imposa graduellement, en association avec cette dernière, comme la nouvelle métropole du nome, résulta à la fois de la migration orientale de la branche mendésienne du Nil et des contraintes spatiales dues à la forte immigration grecque ayant suivi, dans la métropole comme dans la *chôra*, la conquête macédonienne.

Bien que visiblement importante, la présence grecque à Mendès et Thmouis ne semble pas avoir été accompagnée d'une remise en question du modèle urbain en place ni de ruptures brutales. Les données écrites et archéologiques vont plutôt dans le sens d'un processus interactif en vertu duquel les populations grecques surent graduellement s'adapter à l'environnement physique et culturel mendésien, voire mettre à profit les avantages lui étant liés, tout en parvenant à conserver les lieux, institutions et pratiques leur étant chers. Les données relatives au passage de Ptolémée II à Mendès ainsi que, dans une optique administrative romaine, celles conservées dans les archives carbonisées de Thmouis, montrent comment l'attitude du pouvoir central alla aussi, pour l'essentiel du moins, en ce sens. Ces conclusions, qui supposent également une adaptation de la part des Égyptiens de souche, s'accordent avec ce que nous savons plus généralement de la question des interactions entre égyptiens et grecs dans la *chôra*[90].

L'évolution de Mendès et Thmouis aux époques hellénistique et romaine semble donc avoir été le produit non pas tant de bouleversements urbanistiques et culturels subits que d'un enchevêtrement complexe d'interactions socioculturelles, économiques et politiques dont les subtilités nous échappent encore. Si le transfert de chef-lieu de Mendès vers Thmouis ne se fit certainement pas sans heurts, la nature plus évolutive que disruptive de ce processus montre comment les villes jumelles mendésiennes surent se distinguer sans jamais se perdre de vue.

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90. *Cf.* notamment Bingen 2007, part II ; Johnson 1992 ; Lewis 2001.

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7. REFLECTIONS ON URBANISM IN GRAECO-ROMAN EGYPT: A HISTORICAL AND REGIONAL PERSPECTIVE

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During the Ptolemaic and Roman periods, many new settlements were established and those already existing continued to flourish, though sometimes remodelled to reflect a change in lifestyle. A historical analysis of the urbanization of the country and of the urban models that spread during these periods is inevitably subject to a high degree of generalization because of our imperfect archaeological knowledge of the settlements (Davoli 2010 a).

There are three main causes that affect our knowledge and that must be taken into consideration when studying archaeological sites. Firstly, we can list the continuity until modern times of settlements within the same areas, due to the necessity of building at higher elevations than the annual Nile flood. The majority of the settlements disappeared, having been continuously rebuilt or buried under modern ones, as was the case of Thebes or Alexandria. This also implies the reuse of building materials such as stone, wood and mud bricks (McKenzie 2007, 8-18).

A second cause is also connected to the modern re-anthropisation of fringe areas, which had been abandoned since Late Roman or Byzantine Periods. There, ancient settlements were buried under the sand of the desert and were preserved for centuries until the beginning of the political and economic process that transformed Egypt into a modern nation. Mohammed Ali (1811-1848) set the basis for the economy of modern Egypt. Agriculture was the primary source of revenue and the economic revolution took place beginning with new land reclamation projects throughout the country. Fertile land quadrupled between 1820 and 1880 and at the same time the population increased and villages, towns and cities expanded. In this period, many ancient sites, except those in the oases, were used as quarries for building material for the new settlements, and for *sebbakh* as fertilizer for the new industrial agriculture. As a result, a number of *kiman* were dismantled and had disappeared by the mid-20th century (Davoli 2008).

The third reason for our imperfect knowledge of urbanism in the Graeco-Roman period is the scarcity of large-scale archaeological excavations. It is well known that in the past, Egyptologists paid little attention to Graeco-Roman features and in many cases ignored settlements and necropolises of those periods completely. On the other hand, they were the focus of several excavations carried out by papyrologists who, beginning with B.P. Grenfell and A.S. Hunt in the Fayyum (1895), were interested exclusively in recovering papyri and written evidence. These scholars were not trained archaeologically and, because of their interests, they did not document the archaeological contexts (Davoli 2001, 7-15). During the last 20 years this trend has changed (Bagnall 2001; Bagnall and Davoli 2011), although many Graeco-Roman settlements have disappeared, either completely or partially, and modern methods of excavation require many years of work before reaching a good deal of knowledge about a settlement.

Our understanding of urbanism in Graeco-Roman Egypt improves considerably if we combine our partial archaeological data with textual evidence such as Greek and Egyptian documentary and literary sources. Papyri, *ostraka*, epigraphic texts, classical authors, and the so-called 'geographical lists' of the Graeco-Roman temples (e.g. Dendera and Edfu) provide a large number of place names, references to public buildings and sometimes descriptions of houses, temples, streets or other urban features (Lukaszewicz 1986). It would be a terrible methodological mistake not to take into account all these sources, and our understanding of urbanism would be incomplete if we failed to place the geographical landscape, geomorphology and water sources in the historical context that such sources reveal (McKenzie 2007, 151-154).

After these preliminary remarks on the degree of knowledge about Graeco-Roman urbanism in Egypt, we should consider what kind of evidence we have, beginning with the concept of urbanism.

The categorization of an ancient settlement as a city, town or village is a matter of debate, as is the question of whether the Egyptian civilization can be considered as an urban civilization or not. From my point of view, which is mainly archaeological, we must consider Egypt as an urban society from its very beginning, but we should be aware that the concept and functions of the Egyptian urban settlements were different from those of the Near East, or of the Greek and Roman worlds. This peculiar situation is mainly due to the nature of the Egyptian kingdom, a vast territory governed by a central power through a network of local offices, which were organized in a hierarchic sequence that, generally speaking, never substantially changed. Moreover, the geography of Egypt, the distribution of water, the climate and the annual flooding of the Nile contributed substantially to the peculiarity of what we can call "Egyptian urbanism".

Poleis (Alexandria, Naukratis, Ptolemais Hermiou, and Antinoopolis) and *metropoleis*, the capitals of the

nomoi, can be fully classified as cities, with public spaces and buildings and a conspicuous architectural and monumental apparatus. They differ in juridical status (*metropoleis* did not have a *boule* until Septimius Severus, 201 AD), but not from an architectural point of view, as we can certainly deduce from written sources (Lukaszewicz 1986, 20-22). Recently, scholars have tended to consider these Roman-period cities as very similar to other provincial cities of the Roman East and probably influenced by Alexandria as a model (Bailey 1990, 121; McKenzie 2007, 154).

All the other settlements are commonly classified simply as villages. However, there is a series of them still preserved in the Fayyum and the Oases, such as for example Soknopaiou Nesos, Dionysias, Tebtynis, Philadelphia, Karanis, Trimithis and Kellis, that cannot be considered as simple villages.[1] Their complex plans and the impressive monumentality of their main temples – *temenos*, *dromos* and related buildings and monuments – prevent me from considering them as simple villages. They should be thought of as towns or small towns, settlements of a third rank in the Egyptian hierarchical government of the country. From a juridical point of view, they cannot be classified as towns or cities, but this is also the case of the *nomoi's* capitals before the 3rd century AD.[2]

Therefore such towns will be considered in this paper as urban settlements.

Unfortunately, *poleis* and *metropoleis* are not well preserved, or are hidden below later settlements, except for Antinoopolis and a few others (Davoli 2010 a). Therefore, we cannot compare their pre-Hellenistic urban layout with that of the Hellenistic and Roman periods.[3] Their plans and monuments are sometimes only known from scant archaeological remains and texts that suggest a change in the urban landscape in the Ptolemaic period, with the introduction of pure Classical-style buildings[4] side-by-side with those of Egyptian and Alexandrian-style. Archaeological and textual evidence is more explicit for the Roman period, when the cityscape became progressively more Classical in style and very similar to that of other Roman cities in the East. Papyri attest to an intense building phase between the 2nd and the 4th centuries AD in some *metropoleis*, like Hermopolis Magna, Oxyrhynchos,[5] Antinoopolis and Herakleopolis (Lukaszewicz 1986, 140-141).[6] Colonnaded streets, triumphal arches, *tetrastyla*, theatres, baths, hippodromes were built here in different kinds of stones and some of their parts are still preserved. It is assumed that *poleis* and *metropoleis* had the same general structured plan, with orthogonal streets and the same kind of public buildings, as mentioned in texts of the Roman period, also before the concession of the *boule* to the capital of the *nomoi* (201 AD).[7]

The urban layout and monumental apparatus of Alexandria and the above mentioned *metropoleis* have been studied and analyzed in several recent publications[8] and there is no new evidence that can modify or improve our knowledge, unless we turn our attention to the smaller towns, or third rank settlements, of which several examples still survive. Their monumentality cannot compete with that of Alexandria or the *metropoleis*, but their better state of preservation allows us to appreciate otherwise unknown urban and architectural features and to suggest new perspectives.

In an attempt to do this, I will examine some case studies located in the Fayyum and the Dakhla Oasis.[9]

1. Fayyum examples (Fig. 1)

The Fayyum is usually described as the most Hellenized region of Egypt because of the presence of a high number of Hellenes as settlers and the impressive Greek documentation on papyri that speak about people, institutions and culture. Could we also recognize these characters in the organization and architecture of settlements?

From the beginning of the Ptolemaic period, a series of new settlements was founded throughout Egypt, particularly in the less densely populated areas of the *chora* and the Fayyum. The latter region was the subject of an impressive land reclamation project during the reigns of Ptolemy I and II (Manning 2003, 103-8). Our knowledge of this region is fairly good,

1. According to Alston (1997, 202-9), there were only two ranks of urban settlement, the *poleis* at the top and then the nome capitals. A third rank defined as urban on the basis of quantitative and qualitative data is added by Davoli (1998, 30-1) and Mueller (2006, 100). I would list such Fayyum settlements in this third urban rank.

2. As already stated, we cannot base our classification and terminology on those used in ancient texts because they are ambiguous (Bowman 2000, 174) and not intended to convey technical meanings (Mueller 2006, 99).

3. They were better preserved in the 18th cent. and were documented during the Napoleonic expedition. The appearance of these cities in the 3rd cent. is well described by Bagnall 1993, 45-48. Krokodilopolis is not preserved, but we can have a glimpse of its buildings from papyri: Daris 2007, 20-42. On its hydraulic system: Habermann 2000 (P.Lond. III 1177).

4. They were both public and domestic buildings, public spaces like *stoa, agora*, new temples to Greek gods and to the royal cult.

5. Calderini and Daris 2003, 103-104.

6. This situation contrasts with other areas of the Empire that suffered an economic and political crisis. For a discussion on this topic see Lukaszewicz 1986, 139-57.

7. On *boule* and the textual evidence of its institution in Egypt cf. Bowman 1971, 7-19.

8. See at least Bailey 1990; Pensabene 1993; Bowman 2000; McKenzie 2007.

9. A general view of Graeco-Roman settlements in Egypt is in Davoli 2010*a*.

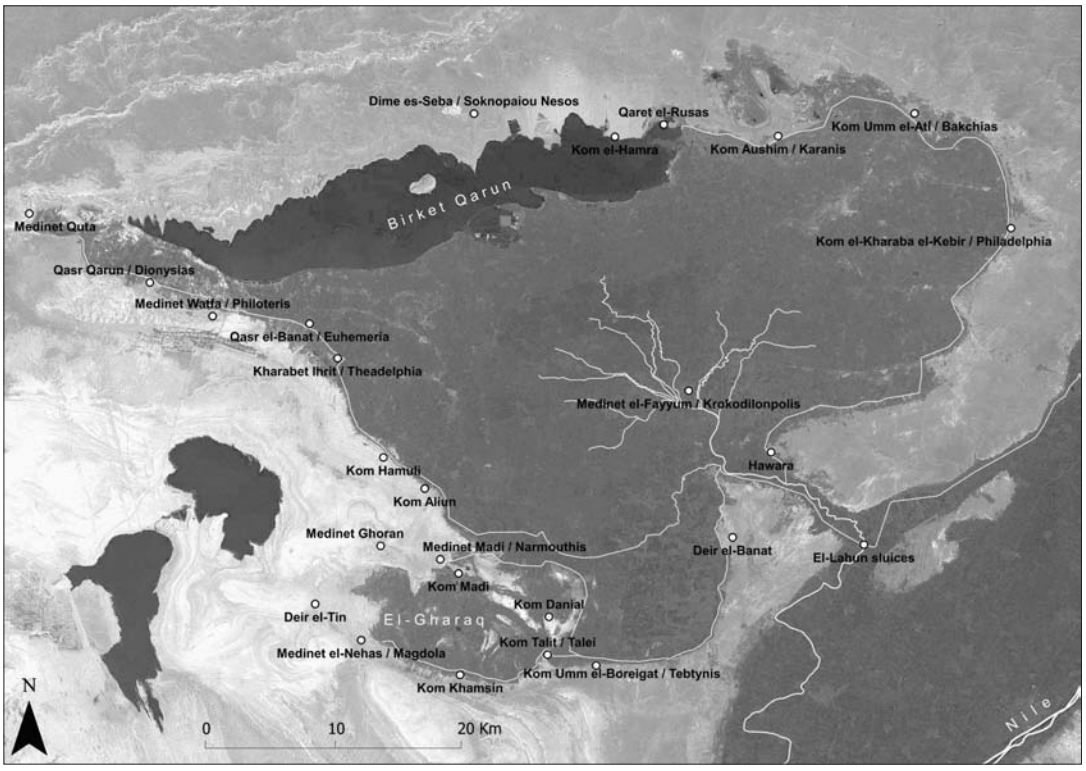

Figure 1. Satellite view of the Fayyum with Graeco-Roman settlements (map by B. Bazzani).

especially for the Hellenistic and Roman periods and in comparison to other *nomoi*. However, we do not have a precise idea of its development in other periods.[10] The distribution of the settlements and their plan layout are only partially known, and often it is unclear whether there are older settlements below the Hellenistic foundations. For this reason, we cannot compare plans, distribution and urban strategies before and after the Ptolemaic land reclamation project.

The location of buildings and settlements in the Fayyum is influenced not only by the annual Nile flood, as it was in the Nile Valley and the Delta, but also by the presence of marshes, natural canyons and channels, and by two lakes that fluctuated over time, one in the north (today Birket Qarun) and one in the south (in El-Gharaq basin). As is well known, the Fayyum is a pseudo-oasis fed by the water of the Nile through the Bahr Yussuf, but above all it is a vast natural depression in the desert (from + 20 m to – 55 m asl). The cultivable areas are thus distributed over a territory that is partly irrigated artificially and in which slopes changes quite rapidly. This geomorphology conditioned the network of canals and therefore also the presence of settlements. The artificial origin of vast portions of the agricultural land entailed a great commitment to its maintenance by the government and the foundation of artificial settlements of colonists. These were strictly connected with each other because of the exploitation of the water and the maintenance of the canal system that was certainly managed by the local communities.[11]

I will not deal with settlement distribution in the Fayyum,[12] but I will focus on some characteristics of the plans and the architecture of some of these towns. This will allow us to establish comparisons with other regional contexts.

The preserved settlements in the Fayyum are located on its fringe, where the anthropization was not continuous and the desert sand covered the ancient remains and protected them until the end of the 19th century. On the other hand, the wet climate and dense population contributed to the destruction or concealment of the centrally placed settlements.

Considering the state of the archaeological work in this region and our knowledge, I do not think it is yet possible to write a history of Fayyum urbanism: many sites need deeper exploration and the documentation of previous excavations needs to be revised, as is the case of Karanis.

Of the ancient metropolis of Krokodilopolis, a few buildings and monuments are poorly preserved, out of any stratigraphic context and completely isolated. They consist of some ruins of a great *temenos* (the temple of Sobek), four bathhouses, statues of Ramses II,

10. Butzer (1976, 92-3) suggests that the cultivated area of the Fayyum before the Hellenistic period was 450 km^2, increasing to 1300 km^2 after the reclamation program. However, it is unclear on what evidence he bases this estimate.

11. On this subject in 4th cent. Fayyum see Bagnall 1993, 141-42.

12. A tentative study of the settlement distribution is in Mueller 2002, 2003; Mueller; Lee 2005. See also Hoffman and Klin 2006.

and fasciculate columns of Amenemhat III.[13] A Greek inscription carved on a segment of a freestanding wall made of limestone blocks seems to testify to the presence of a theatre built by a Ptolemy. Several Egyptian temples, an Adrianeyon, a Sebasteyon, *agorai*, a *stoa*, a *nympheum*, and a *capitolium* are mentioned in papyri (Daris 2007, 20-42), but we do not have the possibility of placing them on a plan and discussing the urban development of the Fayyum capital. Classical-style architecture was probably built side by side with pharaonic style buildings, as happened in other Fayyum settlements. Scattered pieces of stone decoration are the only evidence of such buildings, together with the remains of some bathhouses.

The published plans of the preserved towns are in most cases misleading as they document the preserved buildings visible on the surface when the plans were drawn.[14] These buildings could have been exposed by human intervention, such as *sebbakhin* activity, and could thus be part of different layers and periods and not consistent. A good example of this kind of situation is Bakchias, where the poor condition of the site was caused by intense *sebbakhin* activity that destroyed a large part of the settlement. Many buildings are visible today on the surface, but at different elevations, and they clearly belong to different layers and chronological phases. (Fig. 2) Therefore, the general plan recently published (Giorgi 2004, fig. 1) shows buildings of different building phases, from Hellenistic to the Late Roman period, side-by-side. (Fig. 3) This complex stratigraphy, consisting of several layers of buildings, is quite common in the Fayyum fringe settlements that are real *kiman* or *tell*. The major causes of this progressive increase of levels were the accumulation of sand blowing from the desert and a sequence of phases of abandonment and reconstruction.

Other sites are not *kiman* and their transformation occurred only in one layer. This is the case of Philadelphia, Theadelphia, Euhemeria and Dionysias, settlements that were built inside the cultivated area and not surrounded by the desert sand. Traces of old canals that testify to the presence of cultivations around these towns were still visible in the 20th century (RAF aerial photographs). Without the deposition of windblown sand, these settlements developed horizontally, with progressive changes in the already

Figure 2. Bakchias: in the foreground the foundations of a Roman-period temple; in the background the dunes surroundings the central area damaged by *sebbakhin*.

13. Davoli and Nahla 2006. Recently the Ramses II statues and *stelae*, the Amenemhat III columns and other monuments have been removed to the archaeological area of Karanis.

14. In a few cases, such as Karanis, Soknopaiou Nesos and Tebtynis, we also have the plans of the excavated buildings layer by layer.

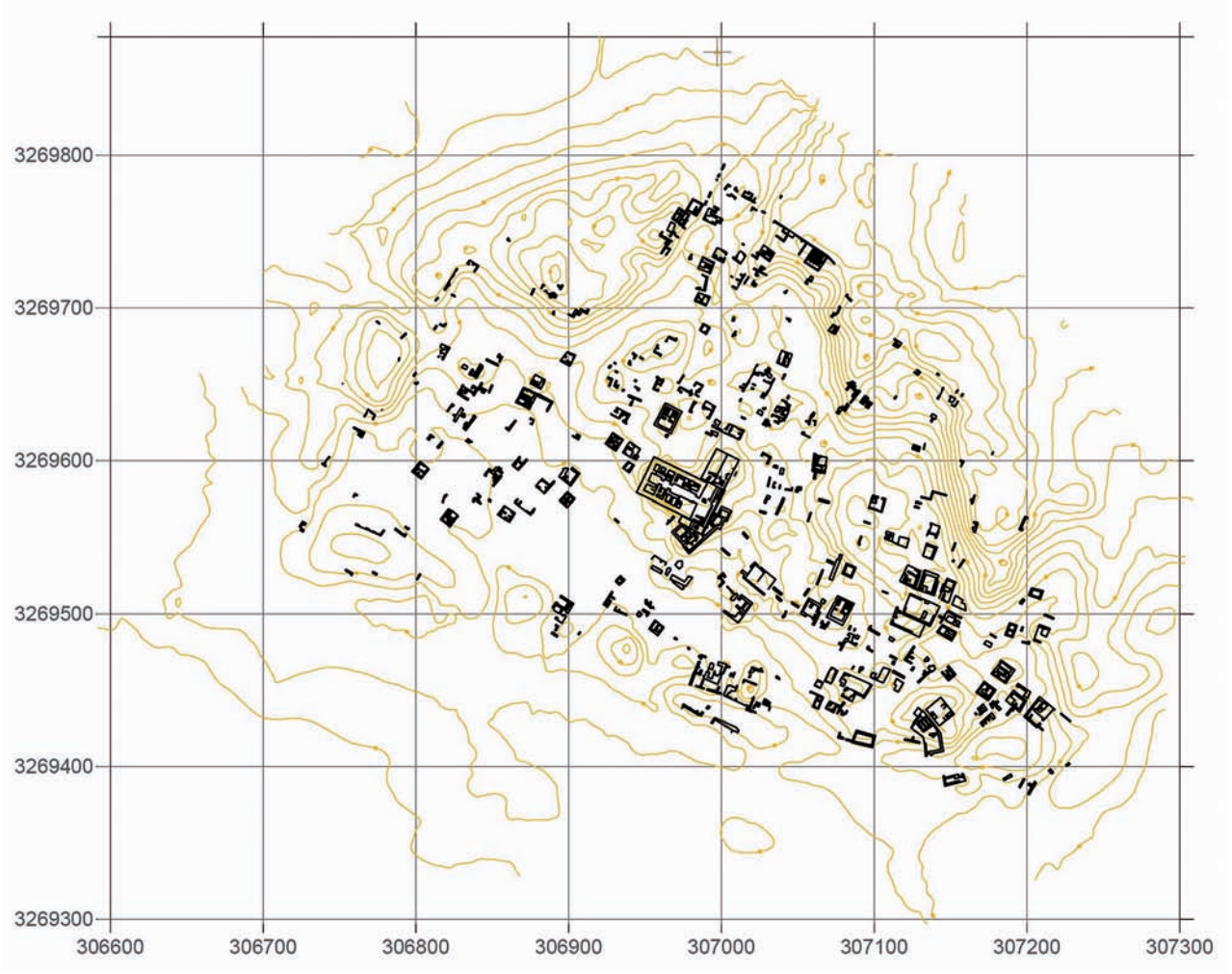

Figure 3. Bakchias/Kom Umm el-Atl plan (in Giorgi 2004, Fig. 1).

existing buildings, demolition and re-building. For this reason the topographic plans we can document[15] reflect the degree of preservation of the last phase of occupation.

The excavation of the multi-stratified sites, or *kiman*, demonstrated their progressive transformation in terms of dimension, number and density of buildings. Complete diachronic plans are not available, and only in a few cases and for limited areas do we have sequences of plans according to layers, for example at Karanis (Husselman 1979), Soknopaiou Nesos (Boak 1935), Bakchias (Davoli 2005, 218-9) and Tebtynis (Hadj-Minaglou 2007). The dimension of the towns and the density of the buildings start to increase at the end of the Ptolemaic period. A substantial change in the urban layout was probably produced by a significant growth in the urbanized population in the first half of the 2nd century AD. The geographic environment and the presence of some features, such as channels, the *dromos* and the main temple precinct, influenced the basic lines of this transformation.

Philadelphia has been described as a town built according to a Hippodamian grid plan and therefore not Egyptian. However, we must be cautious because this interpretation is based on the only plan we have of it, which is very schematic and incomplete. (Fig. 4) Moreover, it shows the layout of the last occupational phase and we cannot verify that of its foundation level as Philadelphia no longer exists (Davoli 1998, Figs. 60-61). What we can see in the plan and in an aerial photograph taken in 1925 is a regular chessboard plan built up with regular blocks of 100 × 50 m. Two small temples are marked on the plan and they are set inside the schema. The major temple and its *dromos* have never been identified, but this does not mean that they were not there.

15. Theadelphia and Euhemeria are now completely destroyed and we do not have any plan or documentation for them. Philadelphia also disappeared, but it was excavated by German papyrologists who published a summary report from which we can argue that there was only one layer: Davoli 1998, 139-148. Dionysias is still quite well preserved and the excavations revealed only one layer: Davoli 1998, 301-323.

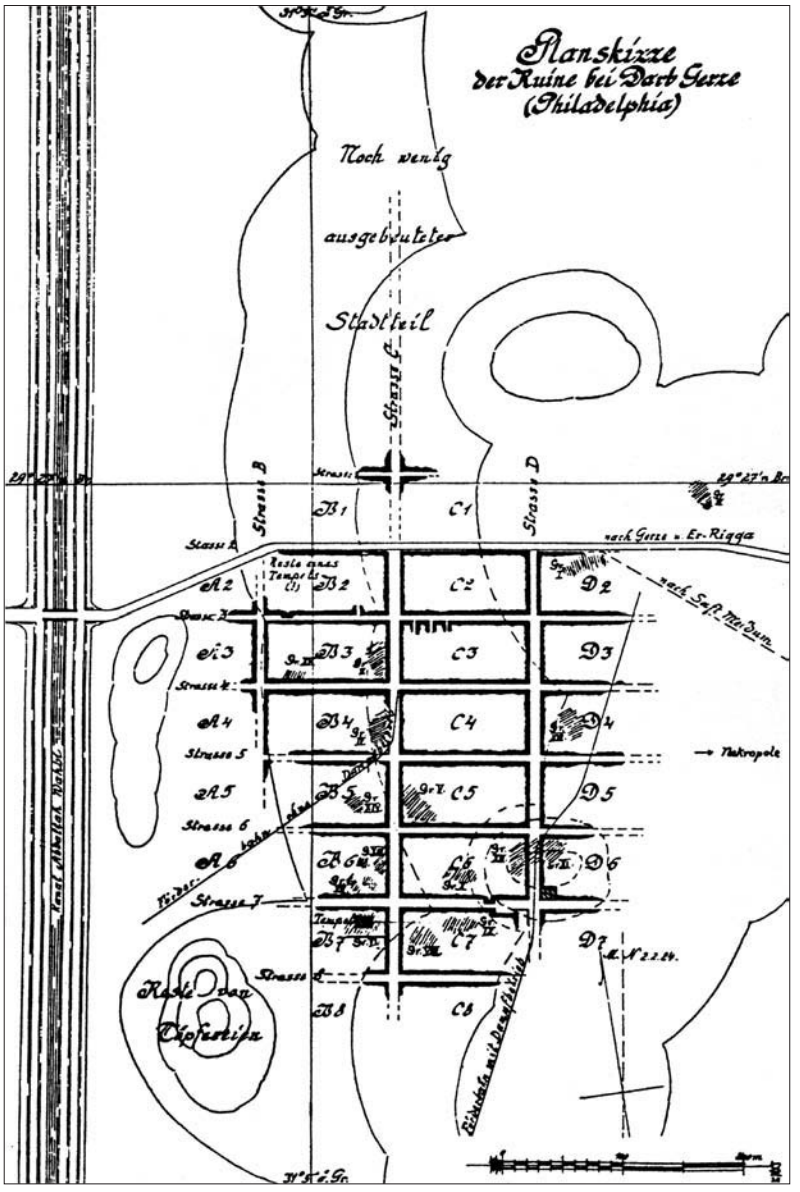

Figure 4. Philadelphia/Kom el-Kharaba el-Kebir (in Viereck–Zucker 1926, Taf. I).

The orientation of the settlement follows the course of the main local canal, rather than a theoretical compass orientation of Vitruvian tradition. Dionysias is based on a similar urban layout. Also in this case it was a new foundation from the 3rd century BC and apparently the street network is strictly orthogonal. (Fig. 5) It seems that the blocks of houses were quite regular and it is clear that the orientation of the roads follows the main local canal. The temple and the *dromos* are not in the very centre of the settlement, but are perfectly inserted into a regular grid.

Another town that developed at the time along an axis is Soknopaiou Nesos (Davoli 2010 b). (Fig. 6) The first settlement was probably built around a hill on the top of which the temple of Soknopaios was built and the *dromos* was, from the beginning, a suspended paved street and the main axis of the settlement. The domestic area expanded in time towards the south on both sides of the *dromos*. (Fig. 7) The direction of the expansion was determined, presumably, by the presence of the lake to the south, which was the main way used to reach the most productive part of the region. The *dromos* (originally 397 m long) is one of the most extraordinary features of this town. It was built on top of a foundation structure more than 3 metres high that constituted a real barrier in the middle of the domestic area. Two parallel streets ran on both sides of the *dromos* – but ca. 3 m below it – and were connected with the street network by means of tunnels under the *dromos* and stairways. (Fig. 8) Therefore, the *dromos* was used only as a monumental processional way and not for common or domestic purposes.[16]

16. The Soknopaiou Nesos Project of the University of Salento, directed by M. Capasso and P. Davoli, began the excavations in 2003. See the annual reports at: http://www.museopapirologico.eu/snp.htm.

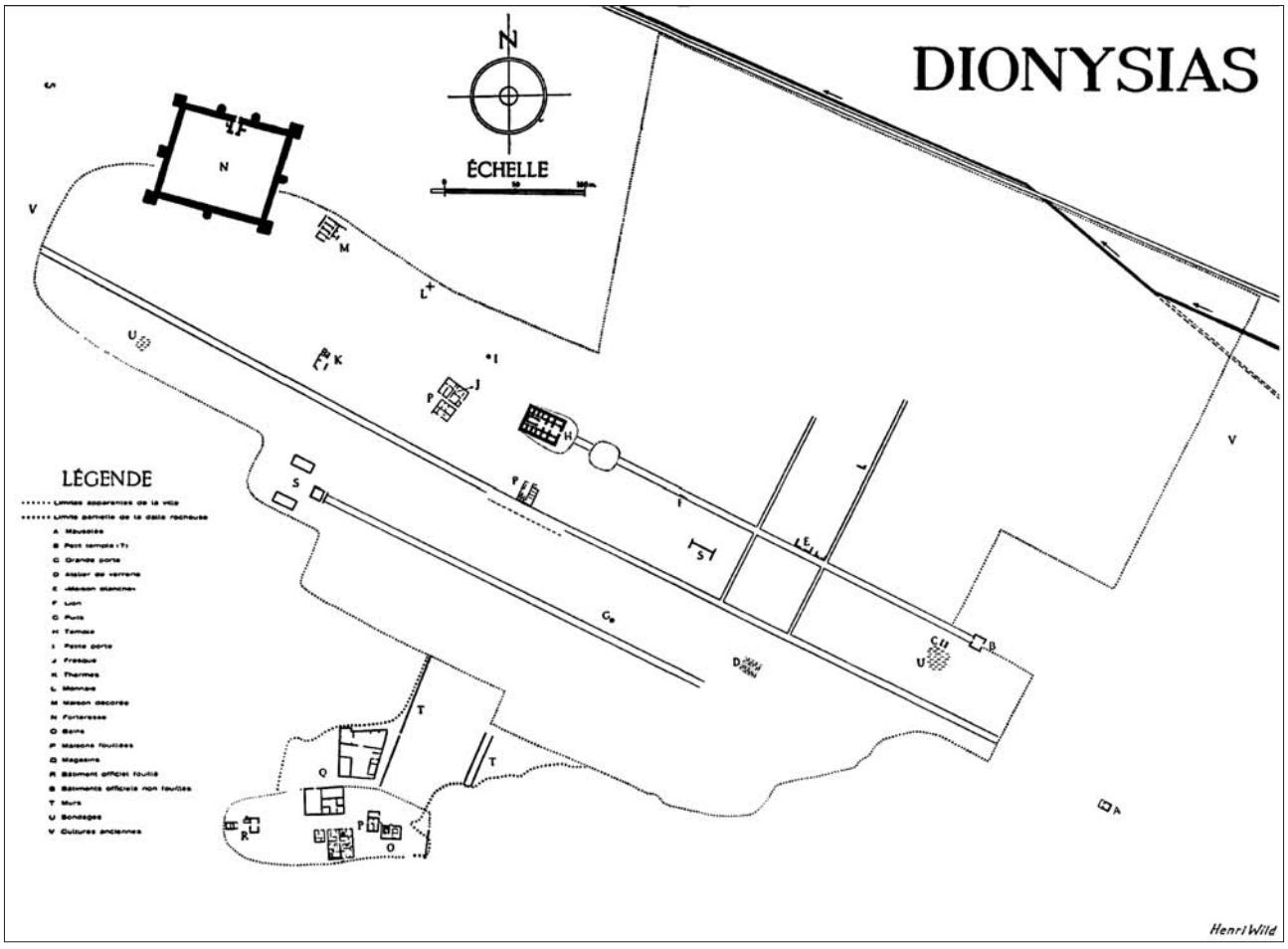

Figure 5. Dionysias/Qasr Qarun plan (in Schwartz-Wild 1950, Pl. II).

Dromos and temple also formed a unit at Tebtynis, where they were part of the Hellenistic foundation of the town and continued to be transformed until the reign of Trajan. Three floor phases have been identified (Rondot 2004) from Ptolemy I to Augustus, along a length of 210 m. The temple and *dromos* are located on the south-western border of the town, with domestic and public buildings on both sides of the *dromos*, although the settlement expanded mainly towards the east. The town plan is not regular and the streets follow two slightly different orientations. (Fig. 9) The *dromos* is oriented north-south and was probably orthogonal with the main canal.[17] Similarly, the Middle Kingdom temple of Renenutet at Narmouthis/Medinet Madi is located outside the town centre. The temple continued to be active during the New Kingdom until the Hellenistic and Roman periods, when it was enlarged and a *dromos* built in front of it. The paved processional way is well preserved to a length of 230 m and runs southwards, where the cultivated land is currently found (Bresciani and Giammarusti 2009). (Fig. 10) The general plan of Narmouthis visible on the site surface is quite regular, with a network of orthogonal streets oriented to the compass points following the orientation of the *dromos* (Bresciani, Giammarusti, Pintaudi and Silvano 2006, 257). (Fig. 11)

Karanis seems to be a completely different case in the urban landscape of the Fayyum. In fact, its Roman period plan (Layer C) looks different with regard to the street layout. (Fig. 12) There are only two streets running north-south towards the fields and the canal, and none crossing the entire town from east to west. The blocks are of different shapes and sizes, with narrow orthogonal alleys that often form a T-shape crossing. In the centre of the *kom* there are two stone temples apparently without *dromoi*.[18]

Numerous are the Roman-period public and semi-public buildings excavated at Karanis, including temples, granaries, dovecots and bathhouses (Husselman 1979; Castel 2009). These kinds of buildings were also present in other Fayyum towns, as we can

17. On the orientation of the Fayyum temples, see Davoli 1998, 359-370, where different possible reasons are examined.
18. The central part of the *kom* was destroyed by *sebbakhin* and it is not possible to establish what was there, including the *dromoi*.

Figure 6. Soknopaiou Nesos/Dime es-Seba plan (2010, courtesy of The Soknoapaiou Nesos Project).

Figure 7. Soknopaiou Nesos: *dromos* from north to south.

Figure 8. Soknopaiou Nesos: *dromos* west view with one of the tunnels.

Figure 9. Tebtynis (Kom Umm el-Boreigat) plan (in Rondot 2004, plan 1).

Figure 10. *Dromos* and temple at Narmouthis.

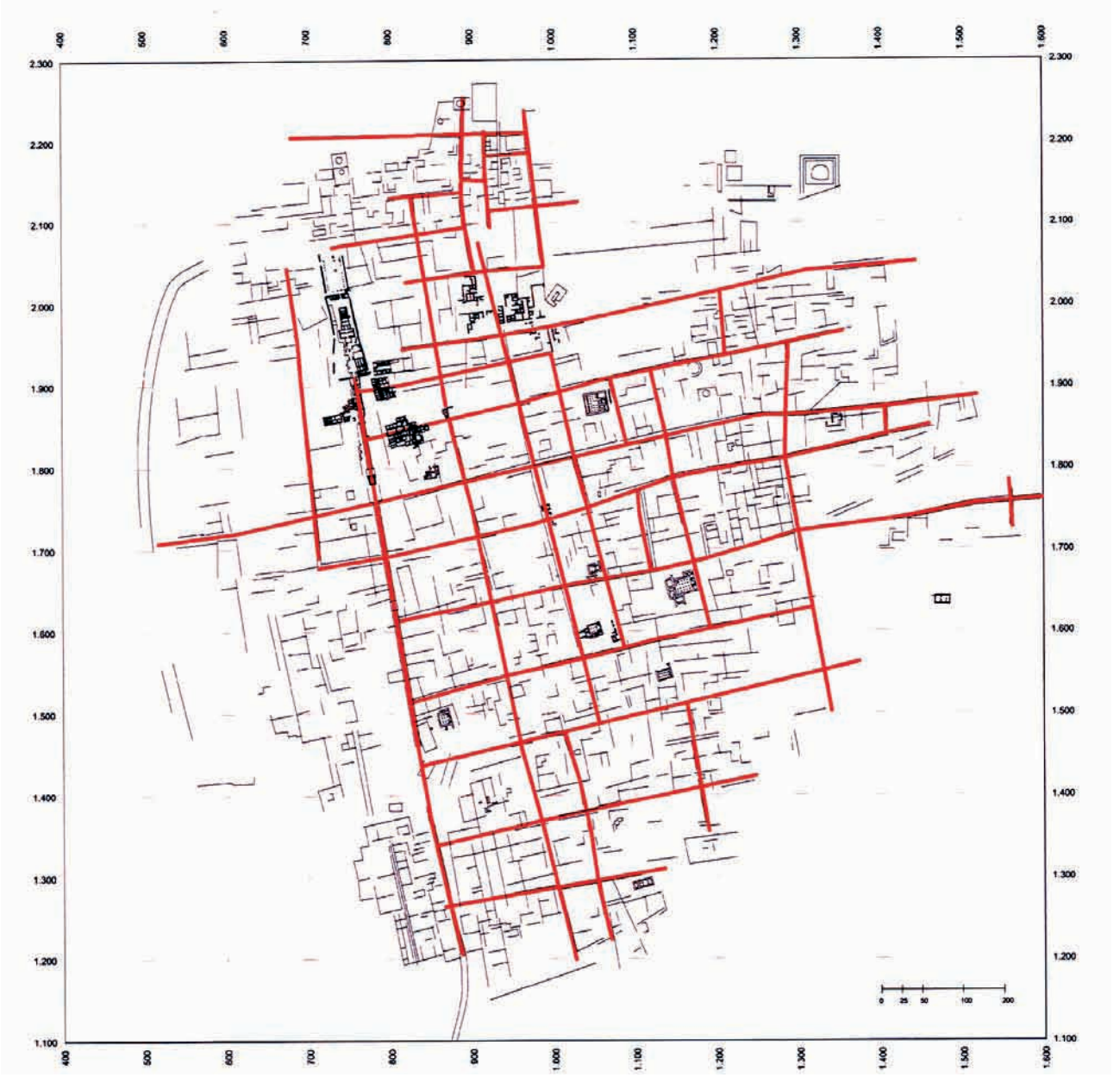

Figure 11. Narmouthis/Medinet Madi plan with street network (in Bresciani-Giammarusti-Pintaudi-Silvano 2006, 257).

Figure 12. Karanis/Kom Aushim plan of Level C (collage from Husselman 1979, Map 11-12).

see at Tebtynis and Bakchias following recent excavations.[19]

The main features common to these small towns in the Fayyum appear to be the temple surrounded by a *temenos* – which sometimes has monumental dimensions – and the *dromos* paved in stone and equipped with one or two kiosks. The processional way was a continuation of the temple inside the town and was used during the numerous feasts to local gods. The foundation of these temples dates back to the beginning of the Ptolemaic period:[20] *dromos* and *temenos* were parts of the same project carried out during the foundation or re-foundation of the settlements, and were probably royal foundations. In the Hellenistic and Roman periods improvements to the temple-*dromos* system can be attributed, in certain cases, to private funding. These cases are known thanks to inscriptions and are expressions of the so-called euergetism.[21]

The plans of these Hellenistic towns are not known in their entirety and thus it is difficult to determine what was new and, therefore, Greek. Papyri attest to the presence of public spaces in the Ptolemaic period, such as the *agora* used as marketplace (Litinas 1997). This is quite understandable as these settlements were neither political nor administrative centres. To my knowledge none of these *agorai* or market places has so far been found or identified. The only monumental public space was found in front of the contra temple of Renenutet at Narmouthis and dates back to the Roman period. It is a rectangular area surrounded by a Corinthian colonnade and is interpreted as a *stoa* by A. Vogliano.

It can be suggested that in these towns the main public space was the *dromos*, a ceremonial road and a religious and social meeting place where people attended and participated in the processions during

19. For the bibliography see Bagnall and Davoli 2011, 117-120.

20. Tebtynis and Narmouthis' *dromoi* have been fully excavated: Rondot 2004, 145-204; Bresciani and Giammarusti 2009. On Bakchias temples with *temenos* and *dromos* see Davoli 2005, 217-224.

21. Inscriptions with dedications of monuments by private individuals are numerous in the Hellenistic and Roman periods. See at least Van Minnen 2000.

the local feasts. Therefore, the *dromos* and the temple complex are the main places where royal power and private euergetism were able to express themselves through monumental apparatus. It is probably not by chance that the only known public square – the *stoa* in Narmouthis – is located in front of a temple, opposite the *dromos*. It has been suggested that a market place was located on both sides of the Tebtynis *dromos* (Rondot 2004, 200) during the Ptolemaic and early Roman periods (before the building of the *deipneteria* under Trajan). This interpretation of the archaeological evidence is consistent with the sources that in some cases combine the *agora*-markets with temples (Litinas 1997, 601).

Great *temenos* and *dromos* are not Hellenistic or Greek inventions, as they are present at many sites in Pharaonic Egypt. They became common features in the *metropoleis* (e.g. Tanis, Pi-Soped, Bubastis, Mendes, Sais, Hibis), especially during the Late Period (26th-30th dynasties). Their presence in third-rank urban settlements can be considered as new for Egypt, but this interpretation could simply reflect our ignorance of older settlements of the same kind and function.

Two pre-Hellenistic settlements have been excavated in the Fayyum, and they are both royal foundations of the Middle Kingdom, built for specific purposes: Kahun, the town of El-Lahun, the pyramid of Sesostris II, and Qasr el-Sagha, a workmen's village north of Lake Qarun. Both of them were planned settlements, built in mud-brick, with parallel rows of houses.[22] Here, there is no evidence of a *dromos* or of a monumental *temenos*. In the first case, the main temple was dedicated to the royal divine cult and was located partly outside the grid.[23] At Qasr el-Sagha the unfinished temple is outside the settlement and at a certain distance from it. In this case, heavy erosion prevents us from gaining a correct idea of the original landscape and the street network that connected the village to the temple and the cemetery.

The famous temple of Renenutet at Gia/Medinet Madi is all we know of the Middle Kingdom settlement there. However, this temple, and probably the settlement around it, continued to be active during the New Kingdom and was expanded in the Ptolemaic period, when courtyards and monumental gates were built in front of the temple. At the same time, altars, kiosks and sphinxes were set up on the paved *dromos*. It would be extremely interesting to dig the layers below the *dromos* and investigate the previous phases.

What we would expect from massive new foundations of settlements in the Hellenistic period in an artificial agricultural district newly developed by royal intervention is the use of uniform schematic plans, with an orthogonal or chessboard schema. This appears to be the most efficient way of building artificial settlements, as had already been done in the Pharaonic period (*i.e.* Kahun, Qasr el-Sagha, Amarna East: Kemp 2006, 211-31). However, this was not the case as far as we can see in Hellenistic-period Fayyum, where the plans we know are different from each other.

The plans of the Fayyum settlements are not uniform, although the architectural styles and the building materials are common in both domestic and public buildings. The houses are mostly built of mud-brick and have similar characteristics in plan, architecture and technique from the Hellenistic to the Roman periods. They are generally multi-storey, self-contained, with deep foundations in which cellars are set. These are barrel-vaulted, while the upper stories are always flat-roofed. Houses are provided with open spaces outside the building and attached to it. The mud-brick building technique is very similar everywhere and in every period in the Fayyum, with a few recurring bonding patterns. The most common bonding schema is the so-called English bond. A very common technique is to add a narrow empty space or channel in the thickness of a course and fill it with sand, rubble or mud. A similar channel is placed in the upper course on the opposite side.[24] This technique was applied in Kahun houses (12th dynasty) and is quite common in buildings of different periods in Egypt.[25]

Wood was used in modest quantities in the flat roofs, inside the walls to strengthen them, and as decorative panelling in niches, doors and windows. The use of potsherds in the bonding or inside the bricks was not common.

The mud-brick building technique goes back for millennia in the Egyptian tradition, both for domestic and public buildings. This deeply rooted tradition was not replaced in the Hellenistic and Roman periods in areas where clay and water to make bricks were fully and freely available. This is certainly an Egyptian, rather than Greek or Roman, way of living and building. Mud-brick architecture in Classical-style, with

22. On Middle Kingdom artificial settlements and the interpretation of their regular plan see Kemp 2006, 211-244.

23. Unfortunately, Kahun is not completely preserved and thus the precise location of the temple within the settlement is unknown. The temple had already been dismantled in antiquity, but its foundations seem to place it half inside and half outside the perimeter wall of the settlement.

24. The most common bonding schema I could register prior to the Late Roman period in the Fayyum settlements are A3 and A12; A17 is also attested. For the numbering of the bonding types see Spencer 1979.

25. The same A12 bonding was used at Trimithis (Dakhla Oasis) in 3rd and 4th century houses.

columns, pilasters and painted gypsum plaster is not frequent, to my knowledge, in the Fayyum.[26]

The absence of Classical-style domestic buildings in the Fayyum does not mean that they were not built, although they were probably less common than elsewhere. In Tebtynis a *peristilium* structure has been found, as well as a few buildings with Classical-style paintings in Narmouthis.[27] Roman period houses with stucco decoration in Classical-style around niches are found at Karanis, while stone elements and painted plaster have been found in a few houses at Dionysias and Theadelphia. Diotimos' villa in Philadelphia is described in some Greek papyri from the Zenon archive (255 B.C.): the *hypodioiketes* built a Greek-style villa with stone foundations and mud-brick walls. Theophilos, a painter from Alexandria, was commissioned to execute the paintings in three rooms and they are described in some Zenon papyri as a "masonry style" variant (Whitehouse 2010, 1014, 1022-23). However, Husson noted that despite the general look of this villa, many are the Egyptian-style elements, in the building techniques, in the disposition of the rooms, and also in its decoration (Husson 1983, 306).

According to papyri and inscriptions, non-Egyptian temples and public buildings were built at several sites, including baths, customs houses, *gymnasia* (attested at Philadelphia and Theadelphia), *grapheia*, banks and public granaries. Only few of these have been found or identified as public buildings. We do not have any idea of the shape and style of the *gymnasia* or of the *grapheia* and the customs houses. On the other hand, *deipneteria* were found at Karanis and Tebtynis, a possible *stoa* in Narmouthis[28], and several fragments of architectural stone decoration in the Classical-style were collected at some places in the Fayyum, pointing to the presence of monumental buildings.[29]

Some public baths of Greek tradition with different *tholoi* for men and women are well attested in Fayyum, not only in written sources but also archaeologically. The bathhouse is a new building introduced to Egypt by the Greeks in every rank of settlement from the 3rd century BC. The available evidence suggests a wide use of the new practice, which spread all over the country until the Late Roman period and onwards.[30] Their dimensions varied, but they were generally of small to medium size. Baths were built among the houses and their heating system would have created a lot of waste and smoke. Hips or thick layers of ashes and glazed materials are often piled nearby. The majority of the baths known in the Fayyum are of the *tholos* type, but one with a hypocaust system was built in Karanis in the 4th century (Castel 2009, 229-45).

Urbanism in the Fayyum appears to be a mixture of Egyptian and Greek principles, but not particularly Hellenistic or Classical-style oriented, as one would have thought. The most important temples were Egyptian and the common houses are far from being of Greek tradition. The reasons could be found in the functions of the surviving settlements, founded to host farmers who were mainly of Egyptian origin, and probably in strong local traditions.

2. Dakhla Oasis examples (Fig. 13)

Different plans, architecture and materials show up in other regions, probably in response to different climates, local traditions and available building materials. For example, the building materials used in Alexandria and the settlements to the west of it along the Mediterranean coast are mainly local stone and baked bricks. Sloping roofs with tiles are also attested, because of the wet Mediterranean climate and more frequent rains. Rough stones are the basic material used in the eastern desert and on the Red Sea coastal settlements. In contrast, mud-brick is the most widespread material in the settlements of the western desert oases in all periods.

These oases are in a completely different environment to that of the Fayyum, the Delta and the Nile Valley. The water comes from deep aquifers and the soil is not Nile silt. Ongoing archaeological surveys of Dakhla and Kharga are plotting the human features from all periods on geographical maps, in order to establish site patterns and distribution, as well as population and resources in the different periods. This will give us an insight into the major environmental and landscape changes. Excavations of some major sites are providing useful data, as are texts spread over a wide range of time, but not yet enough to have a clear picture of the historical development and economy of these communities.

At the Dakhla Oasis, the Old Kingdom and First Intermediate period settlements are under excavation

26. Some evidence was found at Tebtynis, Narmouthis, Dionysias, Theadelphia, and Karanis. Domestic buildings with painted rooms (with "panel style" and imitation stonework decorations) are not as frequent in the Fayyum as they are in the Dakhla Oasis. For a view of domestic decoration in Graeco-Roman Egypt cf. Whitehouse 2010.

27. Cf. Bresciani 1976, 25-27; Bresciani, Giammarusti, Pintaudi and Silvano 2006, 245; Silvano 2008; Davoli in press.

28. A stone-paved square, surrounded by a 1st century AD colonnaded portico and then rebuilt in the Late Roman period, was discovered at Marina el-Alamein by a Polish archaeological mission: Bagnall and Davoli 2011, 108 with bibliography.

29. Pensabene 1993, 221-41 lists fragments from Theadelphia, Dionysias and Tebtynis. Some other places must be added to these, including Soknopaiou Nesos, Kom Niqula, Kom Ruqaia, Kiman Fares. A limestone lintel with a Greek inscription mentioning the building of the *gymnasium* gate was found at Theadelphia: I.Fay. II 103. It was built in 150-149 BC in Classical style.

30. According to the Balnéorient research project about 70 baths are known in Egypt to date.

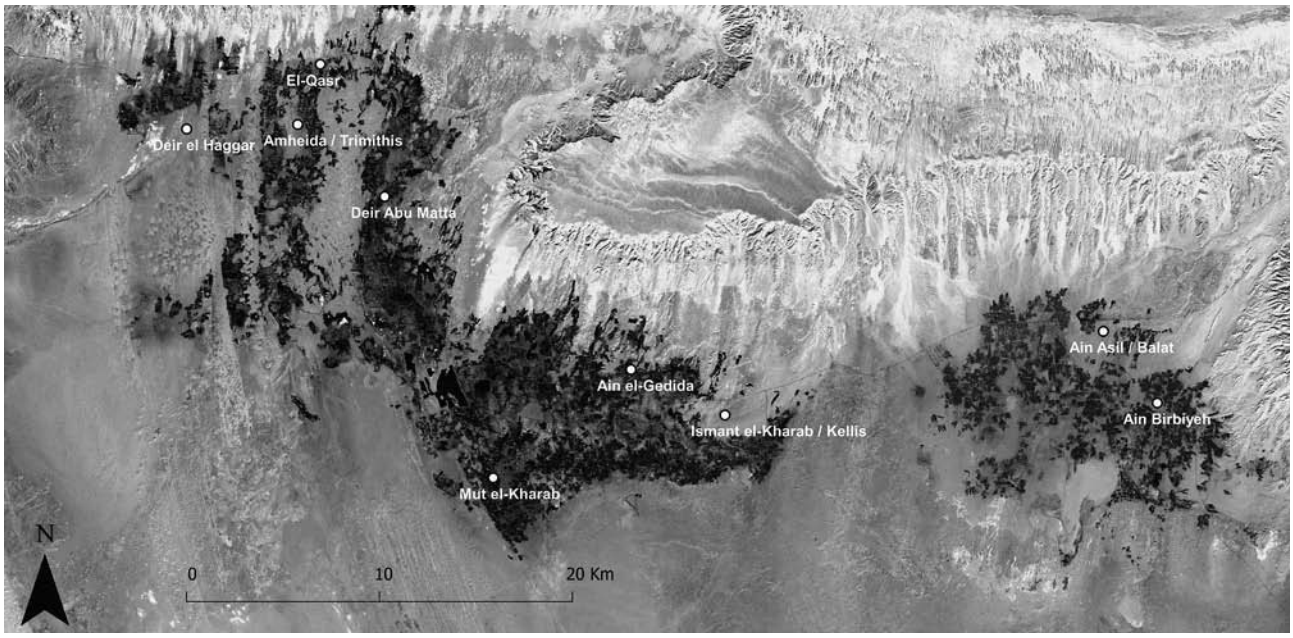

Figure 13. Satellite view of Dakhla Oasis showing the main ancient settlements (map by B. Bazzani).

at Ayn Asil (Balat) and Ayn el-Gezzareen, although artefacts also attest to the presence of New Kingdom, Third Intermediate, and Late and Persian Period settlements. So far we do not have a full knowledge of the oasis in the Hellenistic period. The best preserved phases are the Roman and Late Roman: around 250 sites datable to the first five centuries AD, including farms, hamlets, villages, towns, cities, cemeteries, temples, wells, monasteries and fortresses, are spread throughout Dakhla.[31] This evidence testifies to flourishing settlements and a rich agricultural activity in the oasis during the Roman period.[32] A number of Egyptian-style temples were built in the 1st century AD of local sandstone blocks. The temple at Deir el-Haggar was dedicated to the Theban triad by the emperors Nero, Vespasian, Titus, Domitian and Hadrian. It is still standing and surrounded by a mud-brick *temenos*. A colonnaded courtyard in front of the sanctuary and the *temenos* walls are decorated with Classical-style paintings.[33] In the temple at Ayn Birbiyeh, dedicated to Amon-Nakht and Hathor, the recorded emperors are Augustus, Galba, Titus, Domitian and Hadrian. Mothis, the oasis capital, is not preserved, but a great *temenos* still survives and testifies to a long history of Seth's temple and city going back to the Old Kingdom.[34]

The urban contexts of another two Roman-period temples are still preserved: the major Roman settlements in the Dakhla Oasis, Trimithis (Amheida), in the western part of the region, and Kellis (Ismant el-Kharab) in the east.

A team from New York University[35] has been excavating at Amheida/Trimithis since 2004. According to the pottery and the excavation data, the buildings visible on the surface belong mainly to the 4th century phase. Pottery and objects from earlier periods, found all over the area, point to the presence of a settlement from the Old Kingdom onwards. It was possibly located on the central hill where the temples of Thoth were built in the 23rd and 26th Dynasty and in the Roman period. These temples were dismantled but many blocks were left. The Roman-period temple of Thoth was built by Titus and Domitian in Egyptian style. A great *temenos* surrounded the sacred area, while the *dromos* has not been identified. The complex layout of streets does not reflect a Hippodamian schema or what we could expect from a Late Roman *polis*. (Fig. 14) The settlement is oriented north-south and it once

31. Mills 1999. For reports and bibliography see the DOP website at hyperlink http://arts.monash.edu/archaeology/excavations/dakhleh/index.php#reports. For the temples see Kaper 2010.

32. For a bibliography see Bagnall and Davoli 2011, 140-141.

33. The contemporary use of Egyptian and Classical style motifs in the decoration of temples seems to be peculiar to the Roman-period settlements in the Dakhla Oasis: Whitehouse 2010, 1025.

34. Only part of the temple and the cemeteries survive of the capital of the oasis, Mothis (Mut el-Kharab). The excavations there are being undertaken by Monash Unversity under the direction of C.A. Hope: reports are available at http://arts.monash.edu/archaeology/excavations/dakhleh/mut-el-kharab/index.php.

35. The mission is directed by R.S. Bagnall and myself as archaeological director: for annual reports and bibliography see www.Amheida.org.

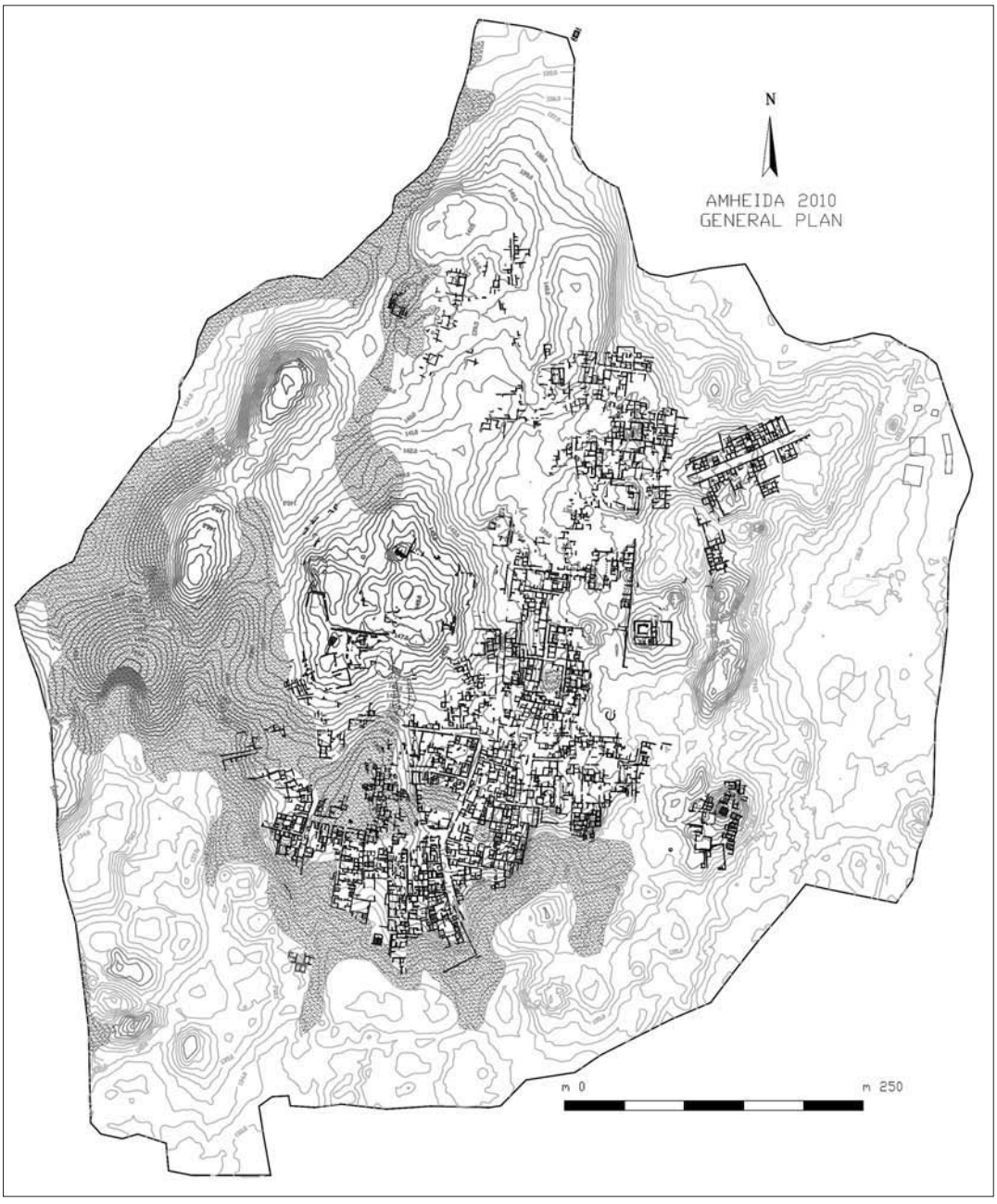

Figure 14. Trimithis/Amheida plan (2010, courtesy of R. S. Bagnall).

expanded around the main hill following the natural terraces and fossilized sand dunes. The main or wider streets seem to follow the natural slopes and dunes rather than a planned layout. The widest one has a completely different orientation to the others, and appears to be isolated or not directly connected to other streets. Its considerable width (7 m) suggests that it was the most important road, but it ends abruptly and the buildings on both sides are common houses and workshops from the 3rd and 4th cent AD. There appears to have been only one street, of which we can follow some segments running north-south through the city. It was not straight and cannot be defined as a monumental street.

Hundreds of alleys, often very narrow, connected the buildings and draw a confused network rather than regular blocks. The two streets recently excavated look like private passages, closed at one end with walls or buildings and gates linked to houses. Moreover, they turned out to be covered with flat roofs made of palm beams and in part with a mud-brick barrel vault. These two streets bordered on and gave access to the house of Serenos, a member of the city council in the 4th century. This house was located in the central residential area of Trimithis and is now preserved at ground level for about 3 m. It was richly decorated in Classical-style with painted plaster in the main room and in three smaller rooms, although its plan is not properly Greek or Roman. (Fig. 15) The dining room was decorated with geometric panels, different for each wall, at their base and with superimposed rows of figures with Greek mythological motifs (Bagnall; Davoli; Kaper;

Figure 15. One of the painted rooms in Serenos' house at Trimithis (courtesy of R. S. Bagnall).

Whitehouse 2006, 26-8). (Fig. 16) An open-air dining area with a sigma feature or *stibadium* was found in front of the house, in the street to the east.

The adjacent building was originally a school, which was then transformed into a working area with a number of mud-brick bins. There remain some benches for the students and painted Greek texts on two walls. The most striking find was the red painted text in Room 15 – a teaching rhetorical verse composition (Cribiore, Davoli and Ratzan 2008) –, which was annexed to the Serenos house and changed its function to a storeroom with a raised wooden floor. The house and the school were built on top of a demolished Roman public bath, whose full extent and precise chronology are still to be defined. Of this public bath a *piscina* or *cisterna,* a *latrina*, a round *laconicum* with hypocaustum, and a great hall with a squared water tub and a *labrum* have been found so far, although the baths were certainly more extensive.

The central area of Trimithis is densely inhabited, with a considerable number of rich and articulated buildings: some of them have wide halls with columns, and many others have a specific plan characterized by the presence of two massive pillars. Most of these buildings are painted in Classical-style and sometimes have decorative appliqués in moulded stucco.

At Ismant el-Kharab/Kellis, several buildings and houses have been excavated since 1986 by a Monash University team directed by C. A. Hope.[36] The settlement was founded in the 1st century AD and flourished until the end of the 4th century AD. Thus, no previous buildings or street network influenced its original plan. (Fig. 17) The published general plan of Kellis concerns only the excavated areas and the canals, wells and ditches surrounding the settlement. Thus, it is not possible to have a full picture of its layout and of the street network. However, it is quite clear that the plan was not based on Hippodamian principles or a chessboard schema.

The main temple complex, dedicated to Tutu by Hadrian (?), Antoninus Pius and Pertinax, is not placed in the centre of the settlement and the *dromos* has not been identified. The annexed *mammisi* was built in mud-brick in the 2nd century, covered with a barrel vault and decorated with paintings that are half-Egyptian and half-Classical (Kaper 2009). A large bathhouse has been identified by a magnetic survey in Area A.

Fourth-century common houses in mud-brick with external courtyards have been excavated (Houses

36. See the web site of the project at http://arts.monash.edu.au/archaeology/excavations/dakhleh/ismant-el-kharab/index.php.

Figure 16. The main room in Serenos' house at Trimithis (courtesy of R. S. Bagnall).

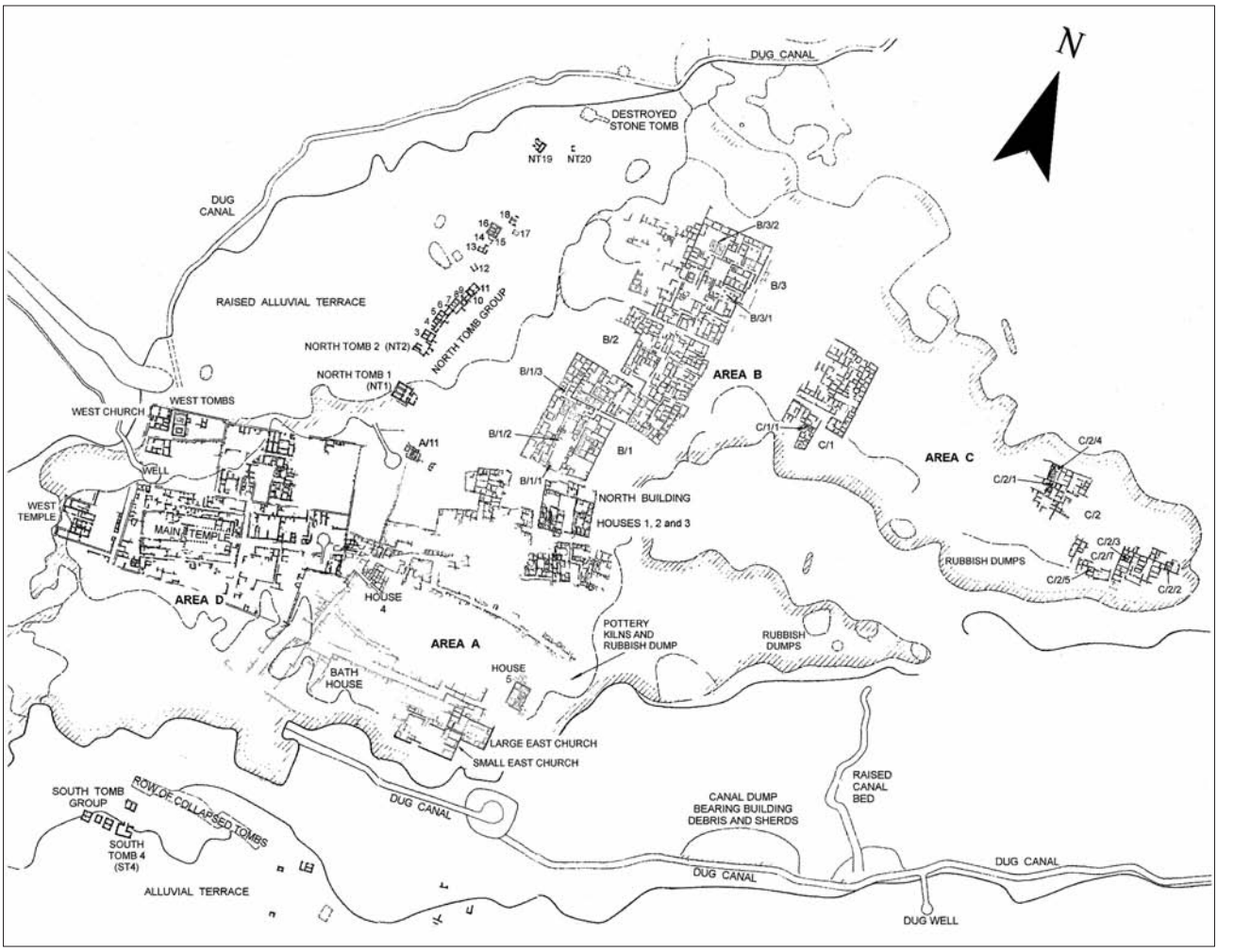

Figure 17. Kellis/Ismant el-Kharab plan (courtesy of C. A. Hope).

1-3, Area A). They appear to have been single-storey structures, with no basement rooms and sometimes with a *stibadium* (Hope 1997).

Area B consists of three or more large complexes, of which two are partially excavated. One of them has been interpreted as a possible grand residential building from the late 1st to the 3rd century AD. The other (Structure 1) had two levels and was made up of more than 200 rooms. It was probably used from the 2nd to the late 4th century. Large rooms painted in Classical-style with plant and geometric motifs in bright colours are the most striking features of these impressive buildings (Hope-Whitehouse 2006). In some rooms there are large mud-brick columns, painted and once topped with Corinthian capitals in stucco, of which many fragments remain (Figs. 18, 19).

The architecture, decoration and building techniques are quite similar at Kellis and Trimithis: mud-brick is the main material, made of the local iron-rich clay and including potsherds. Potsherds were heavily used in bonding, especially in the vaults and domes. This is the most common roof shape used to cover rooms, perhaps due to local tradition influenced by the scarcity of wood. Nonetheless, palm beams and palm leafs were also used on the flat roofs of wider rooms. The houses had shallow foundations and no underground rooms, as was common in the Fayyum houses. The richest houses and building complexes had columns and white plaster painted with polychrome paintings; Classical-style capitals and other decorations were made of stucco.

I would say that architecture and decoration at both sites show a combination of local Egyptian and Classical traditions. The same trend is attested in the Roman period cemeteries at Dakhla. A number of monumental tombs in mud-brick are still well preserved at Mothis, Trimithis and Kellis.[37] They are built with mud-brick and sometimes rich decorations with stucco and paintings in Egyptian and Classical styles are still preserved.

At Kellis they have a temple-like plan, with two or more vaulted rooms above ground and a portico in front of the entrance (North Tombs, 1st-3rd cent. AD at Kellis). Mummified bodies and Egyptian funerary equipment testify to an Egyptian cultural environment.[38]

Figure 18. Kellis, building B/3/1: collapsed roof and wall paintings in Room 6 (courtesy of C. A. Hope).

37. See also the Roman tombs at Ezbet Bashendi: Yamani 2001.

38. Pyramids and monumental tombs are also present in the cemeteries of the Valley, for example at Tuna el-Gebel, the Graeco-Roman cemetery of Hermopolis Magna. Here the first examples are temple-like tombs (e.g. that of Petosiris) built with stone and dated to the 4th cent. BC. In the Roman period, another kind of tomb appears; they are called house-like tombs and were built of mud-bricks until the 4th or 5th cent. AD (Lembke 2010, 234-40). The house-tombs continue to combine Egyptian –and Classical– style decorative elements made of high quality stucco imitating stonework and painted plaster. At Tuna el-Gebel, Egyptian style paintings became rare from the 2nd cent. AD buildings. This trend towards the prevalence of Classical-style architecture and decoration is consistent with what happened in urban contexts. However, the traditional mummification of the bodies bears clear witness to the continuity of Egyptian funerary beliefs.

Figure 19. Kellis, building B/3/1:
the "wallpaper" in Room 1a (courtesy of C. A. Hope).

A great variety of tombs remains unexcavated at Trimithis; they derive from the three millennia of the settlement's existence. Among the various kinds of burial we must mention two truncated-pyramids built of mud-brick. (Fig. 20) Both were built on top of natural hills and are surrounded by several tombs. Another kind of burial is a tower-like shape, with an underground vaulted burial chamber and a superstructure built in Classical style and covered with a dome. At Mothis other pyramid-like tombs have recently been excavated and restored by the local Inspectorate. The general concept is Egyptian, with the burial apartments built in the subsoil, a superstructure in the shape of a truncated pyramid, side chapels and altars. The burial chambers are barrel-vaulted and painted with Egyptian funerary iconography in quite a rough Egyptian style. However, some elements, like the open-air altars and the external painted decoration (with marble-like panelling revetment), are Classical. Mummification was the most common funerary practice attested. The use of pyramid-like tombs was thus apparently quite common in Roman Dakhla. The reuse of a Pharaonic symbol on large-scale buildings during the Roman period on the fringe of the empire is a rather interesting social phenomenon to study.[39] At Trimithis, they were certainly landmarks and thus must have had a special significance.

2. Conclusion

The evidence collected so far in Egypt concerning urbanization in the Graeco-Roman period is far from being enough to draw an exhaustive picture of this important cultural phenomenon and of its changes in time and space (Renfrew 2008). However, we can try to suggest some general lines of interpretation of Egyptian urbanism, taking into account the remains of cities and towns.

Settlement hierarchy was a matter of fact in Egypt from the time of the Old Kingdom (Bard 2008). *Poleis* and the *nomoi* capitals must certainly be considered as cities, while smaller but complex and densely inhabited settlements can be considered as a third rank towns, followed by villages, which were smaller and simpler. Our picture of Graeco-Roman urbanism in Egypt is not complete if we do not take into consideration the third rank settlements.

As we have seen, the structural layout of the Graeco-Roman settlements of Egypt is not, as one might

39. Small truncated pyramids in mud-brick have recently been found in a cemetery at Karanis in the Fayyum and are dated to the beginning of the Late Antique period; another pyramid-like tomb in stone has been explored at Tuna el-Gebel and dates back to the 2nd cent. AD (Flossmann and Schütze 2010).

Figure 20. Truncated pyramid at Trimithis (courtesy of R. S. Bagnall).

have expected, uniform and rigorously planned. Chessboard plans and Classical-style architecture can be seen in cities, and perhaps in a few towns, and can be considered as an imposed or imported cultural model introduced by the Ptolemies and later by Roman emperors (Davoli 2010 a, 359-61).

In small towns, the solutions adopted for their plans are not standardized and show regional peculiarities. Archaeological evidence points to the fact that during the Hellenistic period Fayyum settlements must have been smaller and less densely built than in the Roman period. This led to a series of transformations in the urban layout, which became more densely built and organized in blocks. The network of streets and blocks formed, as we have seen, plans that are not uniform and rigorously planned. The orthogonal street plan is the most widespread model in towns from the Ptolemaic to the Byzantine period. However, orthogonality does not mean a rigorous chessboard or a Hippodamian layout. An orthogonal network of streets and alleys can give rise to a less geometric pattern in small or medium-size towns, where uniform blocks generally do not exist. There were also cases, such as Tebtynis, Trimithis, and Kellis, in which quarters with different street alignments co-existed in the Roman period. Fourth-century Trimithis and Kellis were densely inhabited and built with a street network that is difficult to define as "Roman" (DeLaine 2008, 95-97). Roofed alleys and labyrinthine layout are similar to those of the local medieval-period settlements (known as Qasr in the Oases). Nonetheless, architectural decoration, types of public buildings and textual evidence reveal a widespread Classical culture.

In terms of architecture, we are inclined to think that public buildings in Hellenistic and Roman cities were built with stone and precious materials, as we are used to seeing in the cities of the Mediterranean and the Near East (Gros and Torelli 1988, 373-426). However, these kinds of monumental public buildings are not preserved or archaeologically attested in all cities and towns. For many of the Egyptian cities we do not have any evidence at all, and for some only one or a few monuments are attested. Thus, the question of their monumental apparatus is still open (Bagnall 1993, 47). The remains (not particularly abundant) of monumental Classical stone buildings spread throughout the country has contributed to the idea that at least the Roman cities in Egypt had the same cityscape as elsewhere in the empire, with the introduction of innovations coming from other areas of the empire and particularly from Asia Minor (Bailey 1990). However, we must not forget that most of these cities were built of mud-brick and had few stone monuments. Stone buildings were very expensive,

both in terms of building time and cost, and therefore were limited in number.

The monumental appearance could have also been achieved using less expensive materials, such as bricks and stucco. This technique is well attested in towns and where stone was not available or unnecessary for climatic conditions. Mud-brick continued to be the most widespread and cheapest building material for public or private domestic and monumental buildings, in line with an Egyptian millenary tradition.

Some kinds of buildings, including the office of the *strategos*, the archives, *gymnasia*, *bouleuteria* (city council), *prytaneia* (town hall), *dikasteria* (court of justice), and *macellum* are not attested archaeologically, but they existed and are mentioned in the texts. These circumstances should make us think about the possibility that they were built with perishable and cheaper materials than stone, such as mud-brick, wood and stucco, not only in towns but also in cities.

Examples of Classical-style architecture built with mud bricks still survive, especially in the Oases, thanks to favourable environmental conditions. Tombs, houses, and palaces built in the Roman and Late Roman periods in Trimithis (a *polis* in the 4th cent.) and Kellis show classical decoration, moulded in stucco or painted on plaster. These buildings are neither strictly Classical nor Egyptian in style. Large columns in mud-brick or baked-brick, either simply plastered with mud or richly painted, populated large buildings, temples and churches. They seem to be local evolutions toward an urban Roman style.

Mud-brick monumental architecture was not confined to the Oases, but can be found in the Valley, too.[40] It has been noted that building techniques in Ptolemaic and Roman Egypt were influenced by local traditions, sometimes deeply rooted in the Dynastic period, sometimes derived from the Late Period masonry, originally employed in Egyptian style temples and then also in Classical-style stone buildings (McKenzie 2007, 132-34). During the Dynastic period the great majority of buildings, and sometimes also temples, were built of mud bricks. For example, the pharaohs' palaces, as well as offices and other administrative buildings, were not built of stone. Thus, it is not surprising to find continuity in this tradition in Ptolemaic and Roman Egypt.

Following these considerations, we can recognize some peculiarities in the Hellenistic and Roman-period urbanization of Egypt. Hellenistic and Roman cultures expressed themselves through urbanism and architecture above all in the cities, where the cityscape became, in some respects, very similar to that of the other cities of the Roman Empire, particularly through the use of regular plans and key stone monuments. However, Egyptian traditions and culture were not completely abandoned, as we can see in building techniques, in mud-brick architecture and in religious and funerary customs.

A different situation can be seen in the towns, even those of new foundation, such as those in the Fayyum and Dakhla Oasis. In these settlements we cannot recognize a Classical model plan used as a reference and it seems that local or regional traditions dominated, not only with regard to building techniques and materials, but also to the urban organization of streets and buildings. The *agora*-market did not have peculiar architectural features, while the processional roads-*dromos* became the main public space with a monumental apparatus, at least in the Fayyum towns. In this monumental road we can recognize a synthesis of both Egyptian and Classical traditions. Hellenistic and Roman styles and types of buildings are fully present in these towns, which took on an Egyptian-Classical appearance. In my opinion, the concept of a schema – the so-called top-down model – imposed by the new authority in a conquered country in order to communicate a more rational way of life and administration is not a reality in the towns or third rank settlements (Butzer 2008, 83).

In the towns, the combination of different traditions led to a general homology among settlements in the same region due to local customs, as well as to a national homology due to the new non-Egyptian-style architecture, which reflected new institutions and a new lifestyle. The peculiar character of urbanism in Graeco-Roman Egypt derived from the combination of regional traditions within a Classical framework.

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40. Tombs are better preserved than other buildings in the Nile Valley, but their presence suggests that a monumental building in mud-brick would also have been present in the settlements.

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8. OXYRHYNCHOS: METROPOLIS AND LANDSCAPE

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There are few sites where it is possible to combine the papyrological and archaeological study of the Graeco-Roman city in Egypt. Oxyrhynchos has produced many documents that have been and continue to be used by papyrologists. For some years now it has also been producing archaeological data. However, unlike other ruins, the informative value of Oxyrhynchos lies in its particularly well-preserved natural setting, which has only fairly recently begun to undergo major transformations. These factors have made the site a laboratory for investigating a complex and surprising urban situation.

Strangely enough, although at first sight the ruins appear discouraging, their reconstruction through the analysis of aerial photographs and documents reveals an interesting city and surroundings. Consequently, our proposed reintegration of the Graeco-Roman city, returning to and studying in depth the subject matter we chose for the Workshop,[1] contains more imaginary archaeological elements than material ones. Nevertheless, we believe that in view of the dangers facing Egyptian sites, archaeologists should make this restoration effort and advance their theories in order to point research in the right direction before it is too late.

Based on the emerging data, we are able to obtain a picture of a special city, one that is different in certain aspects to other Mediterranean and Egyptian settlements. As a result, our goal is to give a succinct analysis of this urban layout in relation to those of other Egyptian cities, especially in the light of the work carried out in ancient times in the area surrounding the city, which no doubt modelled the urban landscape of Oxyrhynchos.

1. The programme of hellenistic cities in Egypt

There is a strong current of thought affirming that the cities of the Valley are comprised only of large villages,[2] as they were not originally classified as *polis*.[3] Even metropolises, the Nome capitals, the places of residence of the new elite classes and administrative centres were considered as such in the absence of true municipal magistracies. Paradoxically, written texts bear witness to the complex, monumental nature of these cities, which were set up with the appropriate facilities for the Greek, and later, the Roman ways of life. We believe that the conceptual debate about the categories of settlements during the Ptolemaic and High Imperial period in Egypt should not lead us to ignore the enormous degree of development in Hellenistic settlements and thus disregard the origin of their urban planning systems.[4]

In truth, judging from the scientific literature, urban planning in the Hellenistic cities of Egypt appears to have been focused almost exclusively on the reorganisation of worship and temples. Apart from places of worship, work would have begun on some of the facilities usually found in Hellenistic cities, although the monumental facets of the urban landscape mostly belong to the Roman era. This poor perception of cities can probably be related to the imprint of a strong "Egyptian dimension" of Ptolemaic colonisation seen, for instance, in certain toponyms: the dynastic foundations were associated with real names, but often also kept their Egyptian names.[5] It is interesting to note that important metropolises in Middle Egypt, such as Oxyrhynchos, Heracleopolis or Hermopolis, had no dynastic names. Does this mean that the Ptolemies showed respect for the religious tradition of the Late Period? Or should we take it that the transformation of the Nome capitals into Hellenistic cities was not conceived as a re-foundational act stemming from the monarchy? Indeed, the founding of cities belonging to the Ptolemaic period would be carried out by persons close to the monarchs, who sometimes acted in their own names.[6] If the creation of a framework of urban life in the Hellenistic world was so important, how can we consider that the work executed in the old metropolises was not important enough to be considered re-foundational? If the metropolises were not subject to pre-established planning, we should probably consider

1. This document was drafted as part of the Ministry of Science and Innovation R+D Project HAR2008-01623 "The Egyptian City during the Classical Period: Organisation of Space in Graeco-Roman Egypt" with the assistance of the Rovira i Virgili University and the Catalan Institute of Classical Archaeology.

2. Bowman 2000, for example, refers to "country towns".

3. However, some think that speaking in these terms is a modern and inappropriate formulation. Cadell 1984.

4. Bingen 1975. The author is also opposed to the reduced image of the metropolises.

5. Mueller 2006, 1-7.

6. Heinen 2000.

that the ancient centre of the Nome capital grew of its own accord with the arrival of the new inhabitants and that the communities took it on themselves, with no guidelines or planning, to establish facilities that were considered essential, such as gymnasiums, baths and theatres.[7] It is difficult to image a city that had these facilities but lacked a comprehensive road and service structure. Perhaps the work carried out in the metropolises was not worthy of the designation foundation or re-foundation and such interventions were likely to have been staggered over time. However, to understand the development of the cities, it is necessary to accept that there was some notion of planning in a more or less broad sense, depending on the category of the settlement.

It may seem provocative to suggest the existence of an urban programme in the reorganisation of the metropolises, since it would appear to mean that the Ptolemiess had a very clear idea of their interventions in Egypt from the outset. In actual fact, the papyri show above all a concern for maintenance and the consolidation of farming and craft activities, while there is little evidence that points to a foundational policy based on establishing a framework for municipal life. To explain this lack of interest it has been argued that Macedonians were not concerned with the polis idea and that Pharaonic despotic power did not encourage citizenship.[8] However, Macedonian domination made it necessary to exert control over the territory from the standpoint of internal and external peace, giving rise to a policy based on settlements.[9] We need to elucidate which type of settlement formed part of that occupation strategy that, rather than being military in nature, appears to have been based on encouraging industrial and commercial structures, which were without doubt essential for the city framework. Indeed, studies have recently begun to highlight the role of agglomerations as business centres.[10] Opening ourselves up to this idea of Ptolemaic colonisation makes it possible to analyse the urban activity of agglomerations with similar criteria to those used in other areas of the Hellenistic kingdoms, i.e. as a privileged scenario of the monetary economy.

Although before the conquest the country enjoyed an administrative structure which was respected to a large extent, it became necessary to set up a social body that remained loyal to the new sovereigns, since they were not willing to govern the country personally.[11] Emphasis has often been placed on the rural nature of the country's colonisation through clerucs, but civil immigrants and successive waves of soldiers or mercenaries without the right to land also undoubtedly inhabited the settlements, both cities and villages. The arrival of these new inhabitants would certainly have had an effect on the planning of the metropolises, as suggested by some urban toponyms that link ethnic names to specific quarters.[12] In this respect, it is important to note that both in Philadelphia and the Red Sea port of Ptolemais the city was inhabited by military settlers,[13] which to a certain extent led to the allocation of urban houses, thereby justifying land parcelling strategies.[14]

On the other hand, hardly any material information exists about the building of military camps, although they may have been relatively numerous in border areas or in the valley itself during times of crisis. For example, we know there was a *phrourion* inside the agglomeration or perhaps even inside an ancient temple in Hermopolis.[15] The persistence of the term as a toponym until a later era in the case of Hermopolis has led to the proposal that there was a kind of dipolis.[16] Nonetheless, archaeology provides no significant or clear architectural and urban planning data for that temple-barracks union. In the absence of significant archaeological data, it is not clear whether the Egyptian city of the Ptolemaic era was able to include military structures within its enclosure, as would be the case of many of these during later periods.[17]

Regardless of the identity of the new settlers ruled by the Ptolemies, they are important in terms of their

7. Although the papyrological information on the Ptolemaic period is relatively poor, we do know that the theatre

8. Jouguet 1968, 68-70.

9. Katja Mueller, analysing the Ptolemaic policy of colonisation, has stressed the importance of foundations and re-foundations as an instrument of control and territorial dominion, as opposed to other Hellenistic kingdoms. Mueller 2006.

10. Manning 2003, 6 and Manning 2006, 257-274.

11. As indicated by Clarysse 2000, who says that on one occasion Ptolemy III would have gone to the Fayum and to Oxyrhynchos between 243 and 242 BC (*Pap Teb. III, 748 and 749*).

12. In the case of Oxyrhynchos, the existence of *amphoda* has been confirmed, with names that allow it to be assumed that those immigrants existed from the start of the Ptolemaic period. Rowlandson 2007, 211 and note 7 quoting from Whitehorne 1995, 3053.

13. Heinen 2000, 146.

14. In Evergetis, the assignation of a *stathmos*, understood as a dwelling, has been documented. Cohen 2006, 347.

15. Justified by the close relationship of Ptolemaic soldiers with the construction of temples, particularly in Upper Egypt. Dietze 2000, 81-82.

16. Schwartz 1977, 59-63. That division is inferred from the city's titulature of high priest, which during the Pharaonic period referred to two squares based on the record of a persistent distinction between phrourion and polis until the later period. Also, Dunand 1989, 146.

17. *Praetoria* are documented by papyri in Antinopolis, Arsinoe, Hermopolis, Oxyrhynchos and Panopolis, according to Lukaszewicz 1986, 177-178. Camps, archaeologically confirmed in Luxor, Dionysias, Narmouthis, etc.

numbers and they settled in both urban and rural areas.[18] However, apart from Alexandria, few Egyptian cities have a regular land reparcelling scheme based on the Hellenistic system. These examples include the well known case of the colony of Philadelphia. There is no doubt that the vitalisation of the Fayum corresponds to a very special case of value enhancement through a region based on royal intervention. It is however obvious that urban development also took place in other zones during the Hellenistic period, as a resource for the settlement of colonists.[19] In our opinion, the urban planning discovered at Oxyrhynchos, which is analysed in more detail below, could correspond to a similar value enhancement process and therefore the suggestion that the city had a founder called Apollonios[20] would certainly make sense. Apart from this reference, nothing is known about the birth of the Hellenistic city, in which it is assumed that immigrants arrived along with veterans and that there was an assimilation of Egyptians who wished to become part of the urban community.[21] In fact, the allocations granted to veterans could have included household structures of an urban nature.[22]

Returning to the suggestion of a re-foundational programme, the truth is that parallel, regular urban parcelling is only observed in a few examples in Egypt, while other cities show an orderly, but less systematic structure. In this respect, we could mention some of the towns of the Fayum, such as Tebtynis, Narmouthis or Soknopaiou Nesos. Thus, for example, in these cities the housing blocks have units with similar surface areas and façades aligned along the streets. The repetition of those modules cannot be merely spontaneous and they must correspond to an urban layout, in this case adapted to a type of house with its origins in the local adobe construction tradition and to streets with no vehicular traffic, which are typical of secondary settlements. That planning is not the "hippodamic" type in the sense of being regular, parallel and supported by a hierarchy of streets and avenues, but tends to be so due to the existence of certain streets that connect the space and also due to the appearance of blocks of dwellings.[23] Thus in Tebtynis the definition of blocks and adjacent constructions can be seen around the *dromos*, one of which corresponds to an aristocratic, Mediterranean-type dwelling, i.e. a columned porch, resulting from a design of a house that is closely linked to that of the plot.

Nevertheless, we should recover the hierarchy of the settlements to assess the planning methods and avoid detecting a single programme. In the case of Hellenistic Egypt, three levels are considered: that of the polis, which is highly restricted, that of the metropolis and that of large villages or rural settlements. Some of the settlements, which we could consider as secondary, offer the most complete and original image of the urban planning methods used in the Graeco-Roman period, both in the Fayum and the Oases, as explained by Paola Davoli in this volume. The extraordinary importance acquired by the *dromos* in connecting urban space is proof of its originality, since it is the scenario of the ritualised processions and civic-religious acts performed in banqueting halls.[24] However, it is not just a question of the *dromos* controlling civil life, but of how a general form of planning is imposed throughout the whole city. The truth is that although blocks of regular or modulated constructions emerge around the avenue, as in Tebtynis or Narmouthis, the temple-*dromos* binomial is a unit which is relatively isolated from the rest of the agglomeration. Although it is the fundamental reference of the urban landscape, sometimes reinforced by an eminent position, the temple and its *dromos* do not act as elements that connect these cities as a whole. The city extends around them in a more or less rational manner through its thoroughfares and the emergence of public space. For instance, in Narmouthis the plotting of the streets seems to be particularly systematic.[25] Moreover, the main temple is not in a pre-eminent location and the highest part is occupied by an extensive agglomeration. The problem lies in attributing these organisational elements to the foundational period or considering that they may have been an exercise for enlarging the settlements.

The sacred way maintained its importance during the Roman period, giving rise to acts of patronage and monumentalisation. It is sufficient to analyse where the kiosks and pavilions were built at better known sites such as Tebtynis. However, excavations will probably add new elements of the control of civic life, for instance, the square behind the temple in Narmouthis. The nuances and changes in the design of this holy

18. There are extensive references to the demographic problem which is the subject of debate, for instance Clarysse and Thompson 2006.

19. Rathbone 2000, 49, indicates the continuity of the foundations and relocations of clerucs during the 2nd and 3rd centuries BC.

20. Krüger 1990, 82.

21. The preference of colonists for urban life during the Roman period, particularly in Oxyrhynchos, was demonstrated by Whitehorne 1990, 544.

22. In Antioch there is documentary evidence for the assignation of household plots to veterans. Launey 1987, 684 note 2.

23. See for example Soknopaiou Nesos. Maehler 1978.

24. In Tebtunys the *dromos* of the temple of Soknektynis is flanked by cohabitation facilities but they date from Roman times (Trajan). Galazzi, Hadji-Minaglou 2004, 197-204.

25. Planimetrics in Davoli 1998.

avenue would be essential in transforming smaller cities and also in the transformation of metropolises. Indeed, the topographic references to the city of Oxyrhynchos mention several *dromoi* and in some cases it is clear that they are integrated into the urban network, with another in the form of a monumental street and finally as the axis of a whole quarter.

Judging from the written documentation, monumentalisation in the cities was a slow process. Some elements which might appear to be essential took more than a century to materialise, as is the case of Dionysias, whose *dromos* is later than the date on which the city was founded.[26] And the references made to the facilities in Oxyrhynchos also have later dates; the first of these being a reference to a hippodrome dating from 1 BC.[27]Nevertheless, the gaps in the information relating to the start of the Ptolemaic era may be due to the difficulty of discovering archaeological finds relating to that period. Moreover, the dedication of monuments depended largely on private euergetism, a custom closely linked to the acquisition of citizenship rights. It is therefore no surprise that the most prolific and visible monumentalisation phase of the city in Egypt coincides with the later Roman period.

Although there is little urban data available about the Ptolemaic foundational phase, the category of the interventions appears to be reasonably sufficient to pinpoint the urban planning issue as occurring during the Ptolemaic era, i.e. references to founders and facilities (particularly baths) and visible urban planning at some sites.[28] There are also documents referring to munificence showing the importance of Hellenistic cities as a way of life[29] The information emerging on the city of Oxyrhynchos is fundamental for clarifying the perception of the classic city in Egypt, although it is still too soon to know whether its monumental aspect is due to an extra element of Hellenism displayed by its inhabitants, as maintained by some authors.[30]

2. Elements from the Alexandrian and Roman tradition and from Pharaonic imaginary

Unfortunately, we know very little about the urban tissue of the metropolises. As we have already mentioned, the first impression, based on the planimetric surveys of the cities, leads one to conclude that there was no planning and to stress the persistence of the Pharaonic tradition in the Nome capitals. Thus, the evolution of the metropolises would have given rise to cities concentrated on the hills around temples and palaces. As a result, we could well consider an ideological contraposition between a traditional city model and a Hellenic one promoted by Alexandrian imitation.[31] However, a debate in general terms is futile and we need more urban exploration elements than those currently available, although this does not mean that we cannot trace reference models in the existing urban data.

From the orographic point of view, the planning of Alexandria contains two prominent elements: the hilltop of Rakhotis, occupied by the Serapeum, and the palace, set on the hills of the north-east grid. This is an imposition that clearly contrasts with previous options, since the capitals of the Late Period were characterised by the proximity of the temple and palace enclosures acting jointly as a focus of agglomeration. It has been said that through this co-existence the differences between the profane and the sacred would have been reduced during the Late Period,[32] although we could also consider that proximity is evidence of a new way used by the royal classes to emphasise their closeness to the Gods. As regards the case in point, the essential objective is to record that the temple and the palace were near each other, as would also be the case in the Hellenistic city of Memphis. The difference between the models stems from a Greek demand in relation to the palace: the opportunity to provide it with a special port that was not to be used for general commerce, but as an entrance reserved for certain goods.

Nevertheless, the absence of monarchs in the metropolises makes it unnecessary to lay out a palatial area, although appropriate places of worship were needed, particularly the Serapeum. The documents from Oxyrhynchos lead us to believe that the Serapeum was on the summit of the most prominent hill, in the same location as the tombs from the Saitic period.[33] As a result, one could imagine, as in Alexandria, the definition of a political-religious "acropolis" dominating the city as part of an ideal urban programme. However, the position of the Serapeum in other cities is not known, despite the importance it would have

26. An inscription indicating a dedication to the dromos of Dionysias, dating from around the end of the 2nd -1st century BC, by an epistates. Wagner, Gascou 1978, 259-266.

27. Lukaszewicz 1986, 172.

28. Evaluating the impact of urban design during the Ptolemaic period. Heinen 1997, 129, n.9.

29. Van Minnen 1997, 447, particularly in relation to the gymnasium.

30. Montevecchi 1997.

31. In this respect, it has been said that in Roman times the city of Hermopolis, with a classical language for architecture already in use, still partly conserved a physiognomy derived from the division between the holy domain and the residential sector. Schwartz 1977 and Dunand 1989.

32. In the last instance, Leclère 2008.

33. Presumably the Serapeum of Oxyrhynchos would have been in the north-western grid of the city, coinciding with the acropolis where the High Necropolis is also located. Krüger 1990, 10.

had in new foundations such as Philadelphia, which goes to show that it is difficult to generalise. In addition, in other cases the temple of Serapis was added to a traditional religious site, as in Luxor, and in other cases it forms the centre of a suburban sanctuary such as in Memphis or Kanopos. In any case, the position of the Serapeum in relation to other cults and topography must have been fundamental in new cities.

On the other hand, the Hellenistic city promotes the monumental nature of the urban framework, with constructions of perspectives and the integration of architecture into the landscape. Furthermore, new cities stand out for the planning of their thoroughfares, in which the efficiency of communications and movement was taken into account. Thus, Alexandria would have been planned on the basis of a main axis running in a mostly east-west direction, with one or two large transverse streets running from north to south, thereby dividing the city into districts. In fact, Strabo (17.1.8) emphasises the intersection of just two main streets, which some have attempted to relate to the cardinal sense of space in Egypt. His opinion appears to be confirmed by a late initiative of Antoninus Pius, who highlights two gates in the city as a cosmic denomination, those of the Sun and the Moon.[34] Moreover, the same astronomic denomination appears in Hermopolis, the organisation of which is also based on two main streets.[35] However, even assuming the cardinal symbolism of the main streets as part of an ideal urban plan, the planning of large cities such as Alexandria and Antinopolis, and even Oxyrhynchos, would surely have been based on a greater number of main roads. As evidence of this, mention is made of the streets of Oxyrhynchos with different *dromoi*: the north gate, the south gate, the Pse gate, and those which appear to be more directly related to the temples of Taweret or Serapis.[36]

In addition to the form of the agglomeration, to understand a city from the Hellenistic period it is essential to see how and where the civil, administrative, leisure and commercial facilities are located and which routes are the most highly valued. Although the papyri indicate the existence of all manner of public, religious and private buildings, few cities allow this analysis, not even Alexandria itself. However, the scant visibility of the agora in the cities of Egypt is worth noting, with it being confined to purely mercantile functions. As an important metropolis, the ruins of Hermopolis could serve as a reference and in this case the position of the agora does not appear to be prominent either; it is significant that even though the central space is planned in a regular fashion, with the intersection of the most important streets, it is occupied by the square of the *kómastérion*.[37] In the case of Oxyrhynchos the site of the agora is also not prominent and more references are made to the gymnasium, which, as the central focus of civil life in Graeco-Roman Egypt, would have occupied an important place in the city's topography and its monumental areas. In the Hellenistic world the gymnasium was surrounded by new facilities with different functions, particularly buildings used as meeting places and service facilities, forming the real centre of civic life, also from a material standpoint.

A succession of leisure facilities including the theatre, the hippodrome, the baths and commercial buildings was integrated into this city scheme. The subsequent evolution of Egyptian cities led them to be integrated more homogeneously with Roman urban culture and in particular with Eastern culture, so that the facilities would also have taken on new meanings and relative degrees of importance. Seen in that light, the Egyptian city is associated with the classical tradition, using the language of orders for the porticoes and temples of foreign divinities.[38] However, the final image of the city would be influenced by the appearance of the pylons, *dromoi* or obelisks, as in the Caesareum of Alexandria, and by the preponderance of mud-brick domestic buildings. Such buildings included in an urban setting constituted a new and essential type for the urban image, as they were built at a height in relation to regular plots, regardless of their traditional appearance.

Lastly, it should be said that most Hellenistic metropolises had a city wall, which was contrary to local tradition as the Pharaonic city could be open.[39] This fact allows us to emphasise the significance of the wall as an influence of Hellenistic models in Egyptian cities. Nonetheless, there are few signs of interest in poliorcetics, not even in Alexandria, and so the wall does not seem to be an overriding defensive need. This appears to have been met by a strategy of small forts, except perhaps along the edges of the valley,[40] where cities could include a camp. The absence of walls in smaller agglomerations could stress their function as status-defining elements, although we should not forget that the argument of archaeological silence does

34. Drew-Bear 2006, 200 n.7.

35. Krüger 1990, 98. That papyrus has also been attributed to Oxyrhynchos.

36. Krüger 1990, 98.

37. Bailey 1991, in particular Chap. 9. The author suggests the agora was located in the south-western grid, near the supposed site of the gymnasium.

38. Pensabene 1993. A review of the appearance of the most ancient decorative elements, Doric and Ionic capitals from the 3rd and 2nd centuries BC shows how Middle Egyptian cities were incorporated into classical language.

39. Kemp 2004.

40. Syene could be an exception, due to its border situation. Jaritz and Rodziewicz 1994, 120.

not allow the wall to be completely excluded. Moreover, some centres considered as secondary, for instance Soknopaiou, Narmouthis and Dionysias, have walls despite their lower status. As suggested, in these cases the wall would have been a method of protection from nature in exposed cities located in deserts, sheltering them from sandstorms or razzias.[41] Likewise, it is possible that dykes and walls could be confused with each other, as in Memphis, and serve as protection from flooding or, in other cases, from the flooding of the *wadis*. It would be particularly interesting to study the structure of the wall of Antinopolis in the sector where the *wadi* stream enters the city.

Obviously, in the ideal Graeco-Roman period city water is an essential reference. Water entered Alexandria through canals that were mostly underground and led flood water to large tanks. Other canals crossed the city above ground, supplying water to ponds and other leisure features. In this respect, it is important to consider the suggestion of the erudite programme of urban landscapes with gardens, as in the palatial quarter of Alexandria that evoked the River Meandros.[42] Canals, lakes and fountains formed part of the Pharaonic idea of the palace, comprising a fundamental system for accessing the traditional temple. What is remarkable is that through the Hellenistic experience this situation can be extended to the idea of the hole city.

In addition, the Egyptian agglomeration has an important seasonal component: the city is completely shaped when the water runs through its canals and reaches the edge of its quays. In the wet season, the appearance of the streets is relatively homogeneous as regards horizontal elevations, while low waters accentuate the uneven nature of the ground. In any case, water circulation is fragmented by bridges, steps and ramps, particularly with respect to the main temple, which is connected to the river or canal by navigable channels, as in Memphis or Athribis.[43] The aesthetic values of that landscape are obvious, but water was also a threat and required constant surveillance to be exercised on its course and on the ability of the infrastructures to adapt to it. Memphis, especially, was a changing city during its millenary history and had to adapt to the variations of the river.[44] Resistance and adaptation are two sides of the same environmental coin, which in this case was quite decisive.

3. The city of Oxyrhynchos in its geographical surroundings

The location of Oxyrhynchos is to a certain extent anomalous, as it is to the west of the Bahr Yusef Canal and open to the Libyan Desert. It is the only important city of the Middle Kingdom of Egypt with such a location, far from the fields and the opposite of the traditional Egyptian settlement pattern concentrated on farmland. It is currently almost buried under the sand. In fact, a 19th-century English traveller, Sir John Gardner Wilkinson (1797-1875), had already indicated that its position was not beneficial, since it is set on a gentle slope and has no other obstacles to prevent the desert sands from advancing towards the valley.[45] At the time of its foundation, the advance of the sand was not noticeable, as that process was only observed during the Roman period.[46] On the other hand, in the eyes of a governor wishing to establish a large metropolis, the site would have had its advantages, including precisely that of not invading the farming areas.

The great strength of Oxyrhynchos was, however, of a strategic nature, since it formed a communications node between the small oasis of Bahariya, about 100 km to the west, and the valley. It was a caravan centre, which historically meant that the city was open to Nubian and Libyan influences. Later, Oxyrhynchos also needed other overland accesses and in particular a route through the desert to Tebtynis, although its location is not known today.[47] The strategic importance of the metropolis was also obvious in a north-south direction, on the route between the Fayum and Upper Egypt. That relationship is more complex and comprehensive than would first appear, since the Bahr Yusef would not merely be an alternative route to the Nile, but also connect with it through the dykes and canals that multiplied the links between the series of towns. The Antonine Itinerary, which gives the Roman itineraries and routes, mentions the towns of Takona, Oxyrhynchos, Ibiou and Hermopolis along this route. This sequence includes towns situated between the Bahr Yusef Canal and the Nile, meaning that it would have been necessary to cross the valley. During times of flooding the route would have been difficult unless the dykes or other water courses were used. In this case, the existence of the Apollophanes Canal in the middle of the valley is particularly interesting

41. Davoli 1988.

42. Pensabene 2007, 177 and following, quoting Adriani 1966.

43. Summary by Leclère 2008, 61-90.

44. Bunbury 2008.

45. *Hand-book for travellers in Egypt; including descriptions of the course of the Nile to the second cataract, Alexandria, Cairo, the pyramids, and Thebes, the overland transit to India, the peninsula of Mount Sinai, the oases, &c. Being a new edition, corrected and condensed, of "Modern Egypt and Thebes"*, 285-286, at http://scholarship.rice.edu/jsp/xml/1911/9190/1095/WilEgyp.tei-timea.html#index-div2-N3A8AD (last accessed Feb. 2012).

46. Butzer 1959.

47. Adams 2007, 33.

because of the major repairs that were made to it.[48] It could be considered that the alternative to the fluvial route was precisely that of other courses which would have allowed the route to be shortened and two important ports (Oxyrhynchos and Athychis) to be connected. These channels may have been navigable or have provided a pathway along their banks.

The site of Oxyrhynchos has given rise to much thought in terms of the country's political and religious history.[49] Before its foundation, the nome capital was *Seper-meru*, which would have been located further north (on the boundary with the Heracleopolitan Nome), but the religious dispute between the followers of Osiris and Seth could have led to a radical change in its pantheon and perhaps its location. The predecessor of Oxyrhynchos (*Per-medjed*) is not documented until the 8th century BC, when the Saitic dynasty makes it the Nome capital. Therefore, the city is new. What is of interest to us now is that, apart from the political motivations, the abandoning of the old capital, possibly located near Safaniya or Shinaro,[50] could have been due to a gradual separation from the Bahr Yusef Canal owing to the shifting of its course to the east.

Little is known about the Late Period settlement in Oxyrhynchos. There is a necropolis containing the tombs of priests from the Saitic period in which a sanctuary is mentioned (*Per-khef*), which would have corresponded to an *Osireion* outside the city dating from the beginning of the Ptolemaic era (Ptolemy II Philadelphos). This necropolis, which we will refer to as high, is set on a large acropolis. The hill has not been fully explored, but its shape is suspiciously geometrical and a section of wall has been discovered that leads us to think of a large rectangular enclosure oriented in keeping with its cardinal axes. As a hypothesis, we could imagine that during the Late Period a religious and palatial settlement once stood on this hill. The sacred nature of the site would have favoured the continuity of its funeral uses, even after the necropolis had become integrated into the perimeter of the Graeco-Roman city.

The oldest Hellenistic remains on the site are fragments of a relief dating from the time of Alexander IV Aegos-Ptolemy I Soter.[51] There is no record of a foundational act during the Ptolemaic era, but there was a settlement of cleruchs, coinciding with intense foundational activity in the Fayum. There is no doubt that this context led the city of Oxyrhynchos to benefit from the interest of the monarchs, as, according to W. Clarysse, it might have been visited by Ptolemy III.[52] Under these circumstances, given that there are monuments from the period, we should consider that major projects, such as the parcelling out of land, were carried out, as would be the case in a city foundation. The date on which the parcelling was carried out cannot be checked by archaeological means, due to the proximity of the phreatic level, but to confirm the Hellenistic period of the settlement, suffice it to say that some of the streets are quoted using the Ptolemaic term *aguia*.[53] Another argument in favour would be that the name of a founder is also mentioned.[54] However, the chronology of the new planning must be suspended and other arguments point to the fact that the Ptolemaic city developed mainly around the Serapeum, presumably in the area surrounding the old acropolis.[55]

As for the transformation of the city, land division that was occupied during the Saitic period can be observed at the foot of the hill. That hill is about 39m above sea level, while the low area is around 33.5m. This low area would have flooded naturally or without the need for major work, thereby justifying the fact that the Late Period city would have chosen the elevation. At that time the plain would have contained arable land along the river, as can be seen from an analysis of the aerial photographs, which show a series of oblique marks that precede the construction of the city. The inclination of the straight lines is from northwest to southwest, following the predominant orientation of the valley, which suggests a strategy based on using the current to irrigate the fields. To lay out the space for the future city, it would have been necessary to isolate this area from the course of the floods by means of two dykes, one to the north and another to the south. Later we will see the evidence that points to the use of these infrastructures. (Fig. 1)

Regular urban planning was possible in the event of having a healthy plain. The first signs of planning were observed after flying a kite fitted with a camera device over the site, using a system perfected by Y. Guichard and T. Sagory. These photographs were extremely valuable for stimulating the research and targeting the direction of our studies. Today, we cannot accurately define the area of the city based on the

48. Built or renovated during the Ptolemaic period: Rowlandson 2007, 210. For the course, Rowlandson 1996, 11-12.

49. Goyon 2008.

50. Safaniya according to Gomàa 1986, 349 note 4, quoted by Padró 2008, 7 n.2.

51. Mascort 2007, 77 n.5.

52. See note 11.

53. Krüger 1990, 94.

54. Krüger 1990, 82.

55. Daris 2000, 212 emphasises the proximity of the quarters, which were apparently older, to the contour of the Serapeum. Krüger 1990, 98, indicates that the parcelling could date from Roman times.

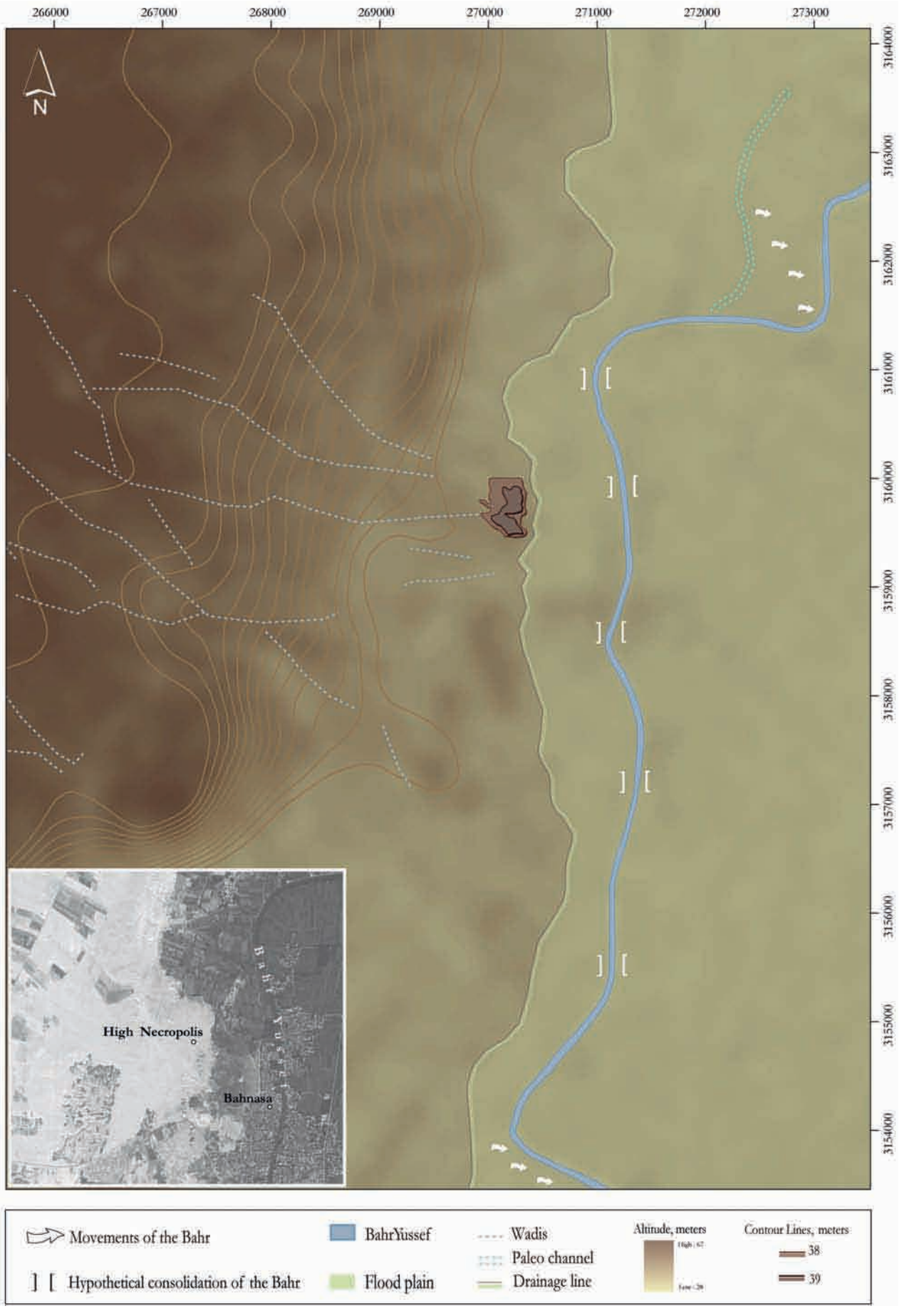

Figure 1. Topographical sketch of the layout of the Oxyrhynchos landscape.

archaeological remains, but we can obtain an idea of the surface area occupied by urban ruins. Those authors who have expressed an opinion state that this area is no more than 200 hectares and in general they have tended to minimise its importance. However, the remains of the wall and the spread of the terraces and archaeological remains lead us to think that at some point the city occupied an area of 300 hectares, not including the suburban area, and contained impressive monuments and domains.[56]

Having said this, it should also be noted that the traces of planning can only be observed with a certain degree of precision over an area of about 70 hectares, with the western zone being the least documented, as it is completely buried below the sand. Even so, other more diffuse traces enable the city's area to be extended. We could consider that an initial plan focused on that area and then later the guidelines were extended towards the west. However, no stratigraphic studies have made it possible to determine without a shadow of doubt which zone may correspond to a Hellenistic foundational monument, since excavating in the low area of the city is quite difficult due to water filtration.[57] We do not know the boundaries and general shape of the Hellenistic settlement because the known section of the wall in the northwest sector of the city appears to be later, as it includes the high necropolis and a whole built-up sector on the northern and western foot of the hill. However, by observing some old aerial photographs we have been able to learn something about the eastern side. The oldest photographs in particular show a very clear contour of moisture in the protected area of the site. (Fig. 2a) The plotting shows without doubt that there was once a structure (now absent) with a significantly geometrical shape, which we interpret as being the first city perimeter. Inside this area we find most of the traces of the parcelling, which has been partially fossilised in the trails that still cross the site today. Based on these signs, we propose the theory of the location of a Hellenistic city, which would have been established at the foot of the hill occupied since the Saitic period. (Fig. 3)

This planned settlement would have had walls which are only documented in Roman times. In fact, a papyrus dating from the 3rd century AD refers to the use of night guards and mentions five gates: the North Gate, the West Gate, the Pesor Gate, the South Gate and the Pses Gate.[58] With these references and the mention of other unique constructions, it is clear that the list of guard duties includes practically the whole city, with one or more gates on the eastern side missing. To comprehend that absence in the foregoing relationship, it could be considered that there is a gap in the text, or an urban planning interpretation could be applied. In this case, it is significant that the list of guard duties mentions city buildings which, according to Krüger's proposal, run along the eastern side (gymnasium, *tetrastylon* of Thoeris, Thoereion).[59] The depiction of an internal route, ignoring the wall, could indicate the absence of a wall or of gates. In our opinion, the second option is correct (with certain reservations), since an eastern gate is documented at a later period, although it must have been situated much further to the north.[60] An equally interesting fact is the distinction between the northern and southern quays, as if there were no fluvial facilities in the prolongation of the central part of the city towards the river, presumably the most important. The lack of relevance of those gates could be due to the need to protect the fluvial front of the city in the case of serious flooding. The eastern wall could have acted in some way as a fluvial front and a retaining dyke, rather than as an actual wall.[61]

Archaeological documents and papyri allow for the inclusion of all the typical facilities of the Graeco-Roman city inside that walled enclosure: the acropolis, quarters, a gymnasium, royal worship sites, aristocratic homes, markets, baths, granaries and the like. Exhaustive research by papyrologists and historians suggests a relative layout of the monuments and a "virtual reconstruction" of the city that archaeology is as yet unable to confirm. However, the image obtained is that of a large city with no less than twenty quarters.[62] The urban planning sense of the term *amphodon* is dubious and it can be seen that each of those entities could have housed an average of 300 citizens.[63] Nonetheless, perhaps not all of them are included within the walled enclosure, as there is also a hippodrome quarter, which is usually outside the walls. Even so, the urban agglomeration must have experienced certain growth, as there is documentary evidence for the construction of a new street. Moreover, the intersections of the larger streets gave rise to new monuments, such as the *tetrastylon* of Thoeris, which is documented in the papyri. In the south, part of one of those monumental columns that formed part of a *tetrastylon* still

56. Subías 2008, 13.

57. Our excavations in a street with porticoes in the south of the city revealed few finds and a single stratum, thereby making it impossible to evaluate the results with any precision.

58. P. Oxy I 43, 295 AD.

59. Krüger 1990, schematic plan.

60. *Foutouh Al Bahnasa, 207.*

61. Our thanks to Judith Bunbury for her suggestions.

62. That organisation emerges in the documentation dating from the 1st century AD. Daris 2000, 211.

63. Daris 2000, 213.

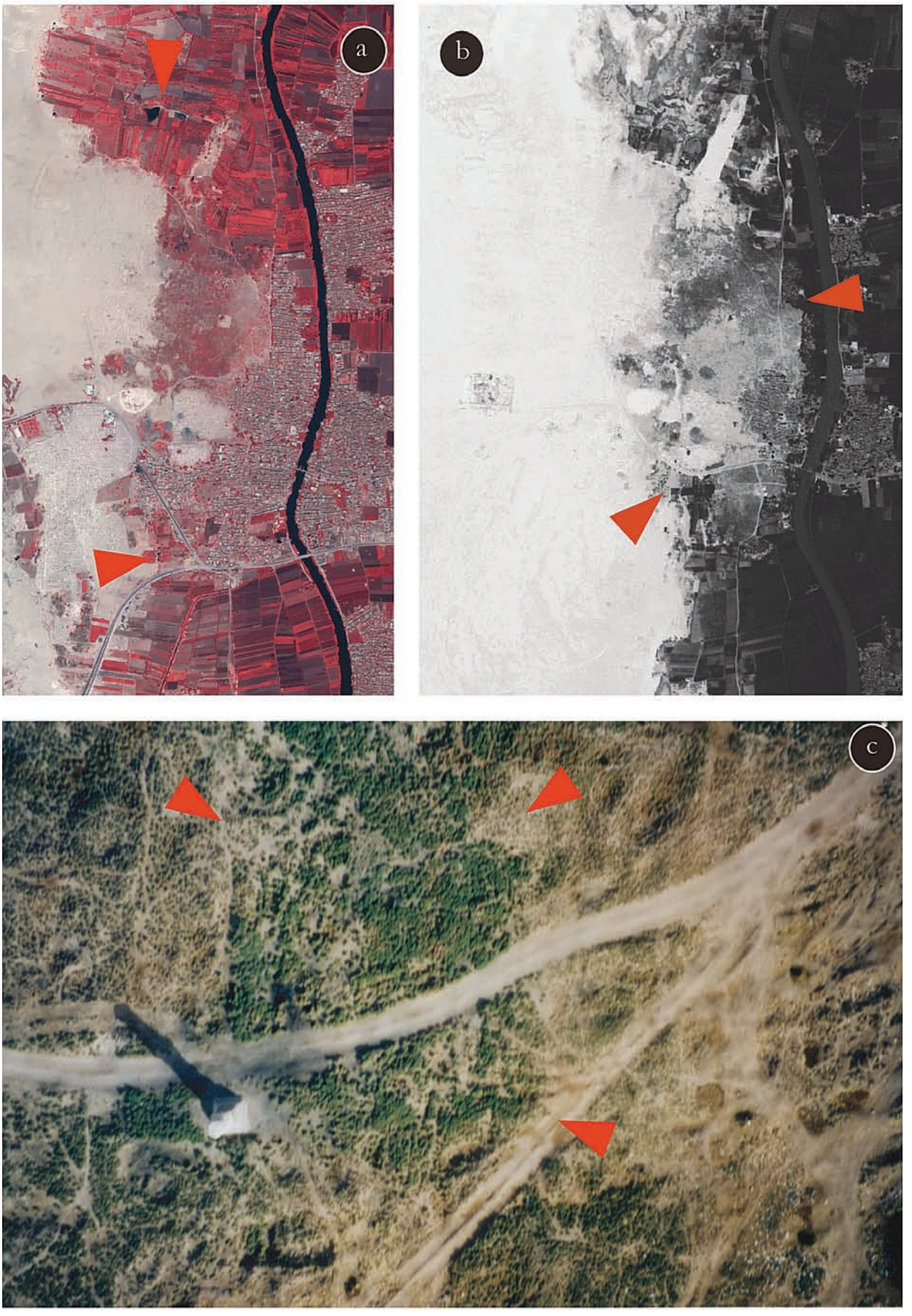

Figure 2. Aerial images of Oxyrhynchos: a) satelital image Worldview 2 (23-06-2010) 843 bands, with little lagoons revealing a dyke and trace of a regular pond south of the city; b) satelital image Corona (Id: DS1023-1025DF079, 17-08-1965) with the waterfront position and hypothetical watercourse south of the city; c) shot by kite over the tetrastylon (author: Y. Guichard).

Figure 3. Sketch of the Saitic Settlement and Hellenistic urban layout.

exists and in the aerial photographs we can discern three tracks, showing us the width of the larger streets, which is around 30 metres.[64] (Fig. 4)

Also of interest is an *Osireion* outside the city, on another small hill to the west about 39m above sea level, with which a visual relationship is established from the high necropolis. Based on the aerial photographs, that relationship appears to be materialised in a road, which offers us a way of understanding the relationship between the Greek city and a suburban sanctuary along a processional route. The area surrounding the city also has different necropolises from the Graeco-Roman period, with cremation and individual burial sites around the hypothetical route that leads to the sanctuary. Other funeral monuments scattered throughout the zone must have had a monumental appearance, as the many known funeral sculptures indicate an architectural tradition of Graeco-Roman mausoleums. That suburb created around the city, at least during Roman times, generates an unusual space in Egyptian cities, which are usually distanced from their sanctuaries and necropolises.

Be that as it may, the Roman and Palaeo-Byzantine period would contribute to making that suburb denser and giving it its own intermediate sense in the city-territory dualism that was in fact alien to the Hellenistic city in Egypt. During Roman times new territorial concepts, such as the term *proastion*, would arise with reference to the "proximity of the city" or the suburbs.[65] It was only after Diocletian's reform that the notion of "civic territory" arose, denoting a new relationship as *civitates/territorium*.[66] The appearance of large suburban domains indicates a class of citizen who would not have been willing to give up urban life or the material comforts of their vast possessions. The suburbs would also have been inhabited by religious domains or monasteries, which were also productive units. In this respect, Oxyrhynchos also contributes a very important archaeological find: an estate with a surface area of more than a hectare combining different functions, including a religious one. The size of the complex and the proportion of surface area excavated are not sufficient to be able to determine which of the two options, monastic or palatial, is possible. Neither it would be surprising to find both in a single enclosure, since the larger families controlled the religious classes.[67] It is tempting to think that there may have been a large *oikos* like the one on the Apion estate, which must have been located in the surrounding area. Also of interest is the mention of a palace to the west of the city, in north Bahnasa, as recorded in the narration of the Arabian conquest of the city.[68]

Finally, around 320 A.D. the term "metropolis" gave way to that of *polis*.[69] This term no longer had its original legal content and simply explained the prestige of the town to which it referred. Other terms were used to enhance most illustrious cities from the Byzantine period, including *lampra* that was also used to refer to the city of Oxyrhynchos, which, in the 6th century AD, was even awarded the title of "Justinian City".[70] The term *Iustinou Nea Polis* could perhaps allude to another process that can be confirmed in archaeological terms: the establishment of a new quarter in the north-western part of the city. The surface survey and aerial photographs show a land parcelling operation with an oblique orientation, different from the original one, which was late partly replaced by a large curved wall overlooking the western part of the desert. The topographic approximation was made with the assistance of J. Segarra by taking the moisture traces in the walls as a reference. The remodelling of this part of the city during a later period gives certain credibility to the mention that it was divided into two parts, one in the north and the other in the south, at the time of the Arabian conquest.[71] (Fig.5)

4. Aspects regarding the urban division of Oxyrhynchos

Little information is available about the parcelling criterion of the Graeco-Roman period in Egypt and what does exist is unreliable. The city of Alexandria has been the subject of many different hypotheses. The most recent is apparently based on oblong plots of 1/3 of an *aroura*, while others consider them to have been almost square and measuring 600 × 500 Egyptian cubits of 52.5 cm.[72] Earlier hypotheses were quite different and proposed plots of 120 × 100 feet.[73] The use of the Egyptian cubit seems to have been accept-

64. A very long distance, if compared to the proposal of 20 m for Hermopolis. Bailey 1991, 29-32.

65. Husson 1983, 235.

66. Based on the opinion of Bell (1940) p.145.

67. Subías (in press).

68. *Foutouh Al Bahnasa*, 32. We should also invoke the documentary confirmation of an imperial palace dating from the 4th century (P. Oxy. LXIV 4441), recorded by Bowman 2000, 182.

69. Bowman and Rathbone 1992, 245.

70. Krüger 1990, 67 n.90 and Hagedorn 1973, 277-292.

71. *Foutouh Al Bahnasa, 23.*

72. Mckenzie 2007, 24. The author says that the Egyptian cubit is used and that the elongated plots correspond to the criterion of occupying one aroura with three blocks of surface area, while the new blocks would have measured 600 × 500 cubits.

73. According to Caruso 1984, the plots would have been 35 × 60 metres, i.e. 120 × 200 feet (of 29.16 cm), in a ratio of 1.2: 2, although the deduction was made using 1:5000 mapping as indicated by the author himself.

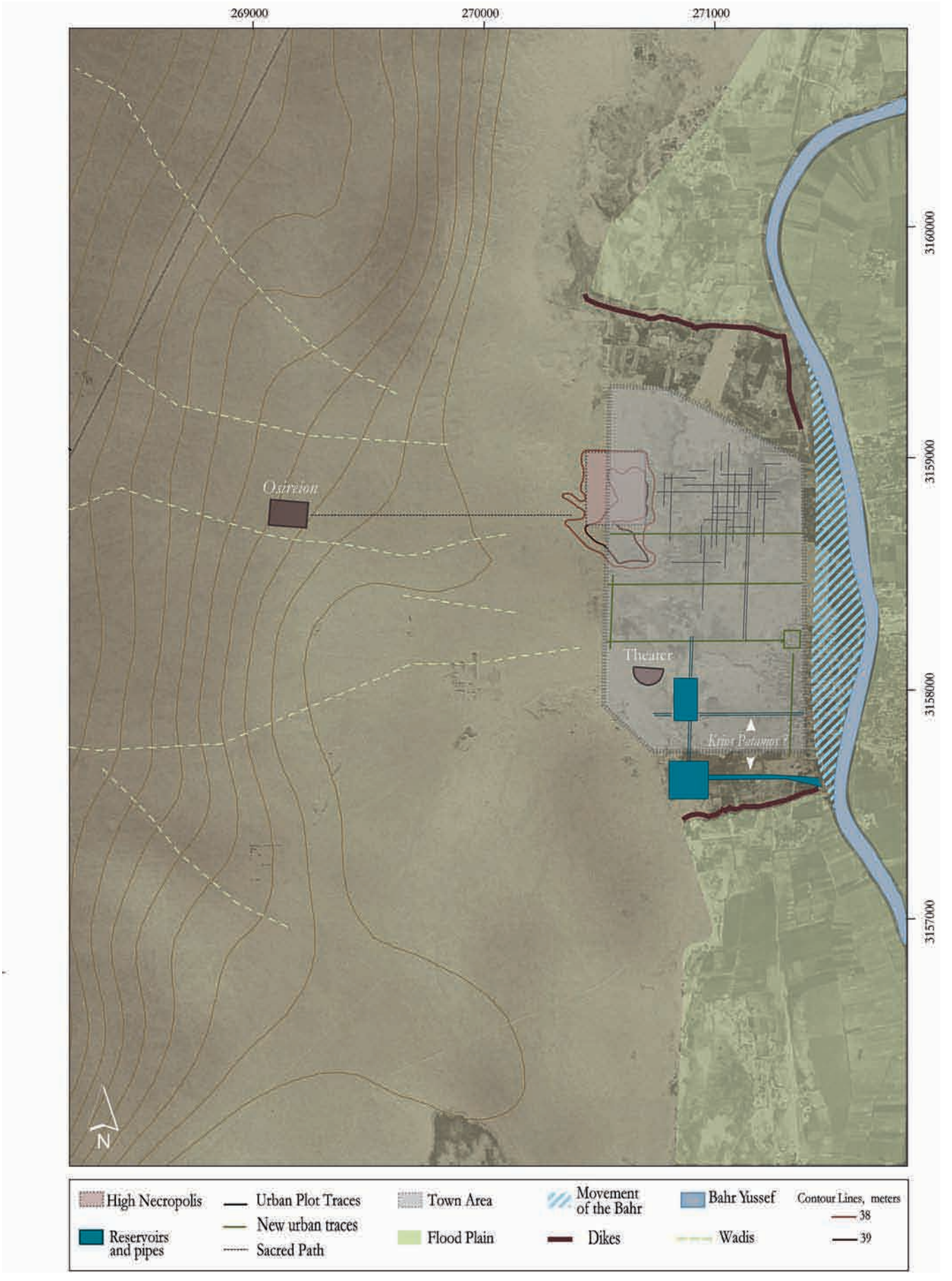

Figure 4. Roman extension of the town and hypothetical hydraulic system.

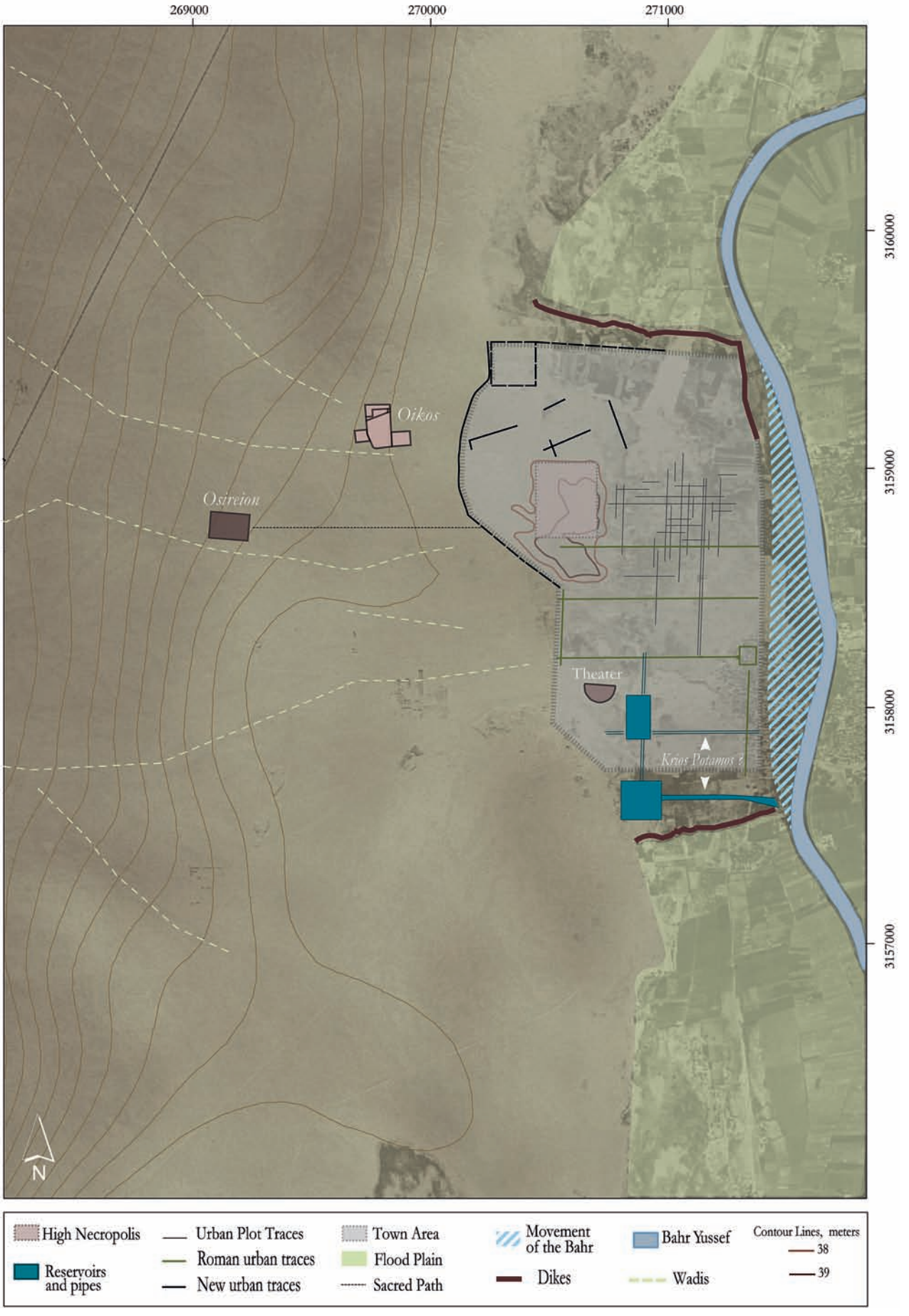

Figure 5. Sketch of the Byzantine extension of the town and suburbs.

ed almost unanimously for interpreting the plotting of the graeco-roman cities. An example is Philadelphia where the plots occupy roughly 50 × 100 m[74] and where Judith McKenzie states that the *plintheia* would have measured around 200 × 100 Egyptian cubits.[75] However, the evaluation of that module must be reviewed, as Borchard refers to an area with elongated plots, whereas as Paola Davoli correctly confirms, based on the aerial photographs, that the plots should be regarded as square.[76] As far as I know, no other attempt has been made to study land parcelling in Egypt during the Graeco-Roman period.

Of the cases examined, there is an information gap with respect to knowledge of urban parcelling systems from the Hellenistic period in Egypt, even starting with the measuring unit. As a rule the references to metrology in Graeco-Roman Egypt are quite confusing, due to the duality of the system and the variable nature of the Egyptian *schoinos*.[77] When experts refer to the metrology of the Ptolemaic period, they usually only consider the 52.5 cm cubit and the Ptolemaic foot that stems from it. In the event of doubt, all that can be done is to multiply the measurements systemically and accurately. At present, there are very few references and they appear to be confined to the use of that unit during the Hellenistic period. For example the use of the 0.35 m foot (which has a ratio of 2/3 of the 52.5 cm Egyptian cubit) has recently been demonstrated in the construction of the lighthouse, the city's most emblematic monument.[78]

However, the importance of another foot known as the Alexandrian or "Attic" foot during the Hellenistic period in Egypt is shown in Eratosthenes' calculations and by deduction from the work of Hyginus Gromaticus it can be seen that this was the measuring unit used.[79] There are few references to that foot, also known as Cyrenaic, but there are also very few metrological studies of the Hellenistic period. In all cases, its appearance would be prior to the reign of Augustus.[80] Furthermore, that foot would be useful for coordinating the Roman linear measurements, since a ratio of 1 to 8 can be established between the mile and the *stadium*, when it is based on a foot of 30.83 cm.[81] In the calculation of the separation of the parcelling signs observed at Oxyrhynchos and included in the appendix to this paper, Neus Gasull identifies the Alexandrian foot of 30.8 cm as the measuring unit. If this value is accepted, regardless of its chronology we should also try to understand the interest in using this new unit in urban parcelling.

In fact, whereas the Ptolemaic foot of 0.35 cm maintains a comfortable ratio with the Roman foot for the purpose of making the calculation, the new foot would appear to be a superfluous novelty. Thus, 600 Ptolemaic feet are equivalent to 400 elbows and the diagonal of a square with these dimensions is equivalent to 1,000 Roman feet.[82] The advantages of the Ptolemaic foot in terms of division are clear, since the idea is to obtain simple geometric figures that allow work to be done with areas or surfaces. As other authors have shown, the most important aspect of a colonial land distribution is that the plots have an identical surface area, which sometimes gave rise to different geometrical traces within one planning system.[83] However, from the classical period, urban division is usually orthogonal, meaning that it can be based on linear units. Furthermore, the plot usually has a square shape from that time on, as in Halieis or Rhodes, measuring 1 *stadium* or 600 feet per side.[84] It must be emphasised that a geometrical figure of this type may give rise to an interior subdivision with plots or lots of 120 × 100 feet, which would result in a *schoinos*, the habitual unit of area in Greek cities.[85]

We cannot accurately restore the parcelling of Oxyrhynchos without making new checks in situ, but the regularities observed by Neus Gasull appear to indicate the possibility of regrouping the traces, obtaining modulation rates. Personally, I feel that apart from the proposals analysed by the author, it is also possible to make out blocks of 600 × 500 feet, meaning that we would be in a similar situation to that described for Alexandria, although with another linear measuring unit. I propose a modulation using this figure based on the main lines of the urban landscape of Oxyrhynchos, such as the column of the *tetrastylon* and diffuse lines crossing the city, which I believe to be main streets. (Fig. 6) Thus, a division formula is shown which makes it possible to obtain two elongated

74. Mueller 2006, 116 and following.

75. Mckenzie 2007, 24, note 30, based on the old mapping.

76. Davoli 1998, 143.

77. Engels 1985.

78. Empereur 2002, 928.

79. Engels 1985, 308-9.

80. Stazio 1959, 547 and 552.

81. In fact, an inscription from Schedia in the Delta, dated 10-11 AD and written in Greek and Latin, allows it to be established that 250 milliaria were equivalent to 2000 stadia. Kayser 1984, n.15.

82. Guy 1996, 189.

83. Tréziny 1999. In Megara Hyblaea the plots correspond to figures of 9 × 7 or 8 × 8 modules and the general size of the plot is 25 elbows.

84. Boyd and Jameson 1981, 333.

85. *Ibidem*, 335.

plintheia in the Greek tradition, as would be the case of Philadelphia. There is a 3rd-century-AD document that allows the area of a plot to be reconstructed, giving rise to a rectangular block.[86]

With respect to another planning characteristic, it appears that a relationship can be established between parcelling and the designation of quarters in the metropolises. We found these topographic names in Egypt at sites where the regularity is feasible (i.e. Alexandria and metropolises from Middle Egypt such as Oxyrhynchos or Hermopolis). The fact that in Oxyrhynchos some twenty quarters make up the main core of the city could be related to another twenty larger urban plots. It is also interesting to note that a relationship can be established between the *amphodon*, another name for a quarter, and access to the water.[87] In fact, the presence of canals crossing the cities, both in Alexandria and in a more modest but regular city such as Philadelphia, favoured geometrical rigour in establishing the underground canals for supplying water from the phreatic level.[88] Thus, for instance, there is a papyrus that refers to a *hyponomos* or underground water pipe in a temple in Philadelphia.[89]

Finally, other canals may have run above ground, such as the one documented in the Fayum in a papyrus dating from the 2nd century BC, which tells of the digging of an urban canal for use by dyers.[90] In the case of Oxyrhynchos the appearance of the term *Krios potamos*, an important topographical reference regarding urban circulation, is significant. It leads us to believe that a bridge would have been needed to cross the canal. Be that as it may, the parcelling must have been matched to the rationalisation of pipes and drainage elements. The same idea is valid for other Graeco-Roman cities in Egypt, such as Arsinoe, and it would be interesting to see how they were integrated into the planning.

5. An urban landscape modelled by water?

The image of a green fertile area surrounding Oxyrhynchos transmitted through the mentions made of its vineyards leads us to propose a theory regarding access to and management of water. For this purpose we will increase the scope of our view and try to understand the measures that may have been taken. The position of Oxyrhynchos is highlighted due to the following characteristics:

1. Oxyrhynchos is located on a site where the desert advances most into the valley, meaning that there was scarcely enough land for cultivation around it. On the other hand, to the north and south of the city there were two farming valleys to the west of the Bahr Yusef, defined by the *potamos* (Tomis) and the foothills of the Libyan Mountain Chain. From the region of Lahun, a wet strip of land is observed at the foot of the mountains, denoting a concentration of moisture arising from the inclination of the valley towards the ends. Certain sections of that strip, which forms the prehistoric bed of the Nile, contains and formerly contained canals or prehistoric canals, fluvial courses and seasonal streams from flooding[91] or *koilómata* to use the Greek terminology.[92] On several occasions, it has been said that there was once a palaeo-course of the Bahr connecting to the town of Sinara.[93]

The land to the south and north of Oxyrhynchos must have been made up of green areas. In fact, in the chronicle of the conquest of the city[94] it is said that the territory of Bahnasa is good, as it benefits from flooding, even during dry years, since the water rises considerably and, moreover, the Bahr receives water from underground springs that provide it with wetlands or running water by segments and give rise to branches of streams. However, to the west the situation is quite different because, as already mentioned, the terrain rises towards the Libyan Mountain Chain. Thus, while near the river, the land would have tended to be isolated from the flood and artificial wells or canals would have been necessary to irrigate the western suburb.

The relief to the west, outside the walls, was rounded, with small emerging hills that must have been important in the past. There was the *Osireion* hill that would have been embellished with trees, a hill to the south of the site where tradition has it that an Arabian victory took place at the time of the conquest (which is still commemorated today with a column) and lastly an elongated crest to the northwest of the city extending for 4 or 5 km and occupied during the late period by religious structures and a necropolis.

Thus, the suburb would have been a green area where vineyards were cultivated and there were funeral

86. Krüger 1990, 73. P.Oxy. 3300.

87. Du Bouchet 2004, 46, in particular a passage from Gallienus.

88. Davoli 1998, 142 includes the mention of early excavation reports.

89. Bonneau 1993, 29.

90. Bonneau 1987, especially note 23.

91. Linant de Bellefonds 1873, 19. For Nili channels, see the in-depth study by Fiz in this volume.

92. Bonneau 1993, 18-19.

93. P.Oxy LI 3638 line 12, to the north of Oxyrhynchos there must have been an old canal located to the west of the Tomis canal, next to Sinara, according to the editors' comment.

94. *Foutouh Al Bahnasa*, 4. Note 4.

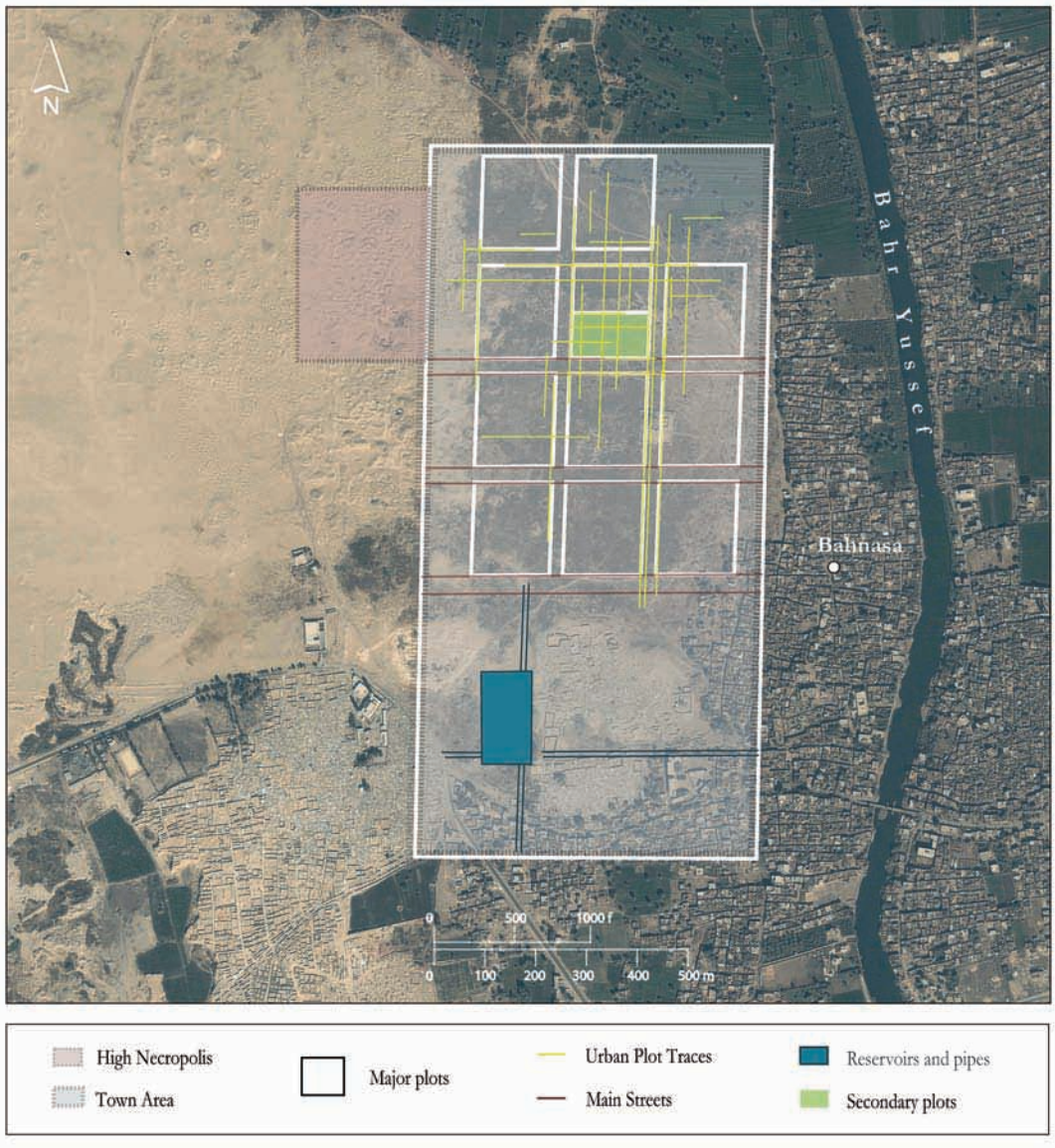

Figure 6. Suggested modulation of the town based on 500 × 600 ft plots.

gardens in the suburban domains of the most important families.

2. If we look again at the landscape in which the city is set, we see that the shape of the Bahr Yusef at this point is quite surprising, with two meanders that maintain it as a straight line, while the rest of the course shifts towards the east. The general shifting of the Bahr Canal has been highlighted on several occasions, indicating a shift of up to 3 km from the foothills of the Libyan Mountain Chain.[95] To understand that permanence of the course of the Bahr near Oxyrhynchos, we can only imagine that this section was channelled and regularly consolidated. The most plausible explanation is that the project was undertaken at the same time as the city was planned, creating a fluvial front at the time of its construction in the Ptolemaic period, although it is known that there would have been large longitudinal dykes to hold back the floods, even before the Macedonian conquest.[96]

It should be said that Oxyrhynchos acted as a river port and had extensive dykes (*krepidos*) along its river façade. In fact the city had two quarters named North Quay Quarter and South Quay Quarter, at least during the Early Roman Empire period.[97] he importance of the metropolis as a trading place would have justified this consolidation work executed along a stretch of 8 km. There is still no archaeological record of that project, but the consolidation of canal banks was frequent and gave rise to a specific vocabulary. For instance, a *skelos* is the lower part of a dyke reinforced with trees due to the existence of a river mouth that

95. Butzer 1976, 35.
96. Bonneau 1993, 49-50. The Greek term is *tainia*.
97. Krüger 1990, 79.

requires greater resistance. It is interesting to note that a *skelos* is documented for Oxyrhynchos. This infrastructure gave rise to a small town, *Epoikion Skelo*s, from the Paleo-Byzantine period.[98]

3. Graeco-Roman Oxyrhynchos extends partly along the fluvial terrace, where the settlements were protected from flooding but not from the damp. In fact, during years of serious flooding, the subsoil of the zone could be flooded as it is on the prehistoric bed of the Nile. The damp areas perceived today in Oxyrhynchos could have been much larger and longer-lasting than in ancient times, as the phreatic level has risen since the building of the Aswan Dam. However the aerial photographs show how the terrain at the foot of the hill where the necropolis stands, which is the final spur of the Libyan Mountain Chain, is darker and damper than that near the river, which is the result of a section of the valley being inclined towards the ends. According to Bonneau, the *koilas* can be used from the economic standpoint, for instance, by potters who would have benefited from the dampness.[99] In Bahnasa the mud brick industry was precisely in that area until a few years ago, behind the Graeco-Roman city's theatre, where there is a lake at the foot of what is now the cemetery. On the other hand, we do not know whether that dampness required drainage or channelling work.[100]

4. As mentioned above, in Graeco-Roman Egypt urban channels were quite common for supplying water to the city quarters. For this reason it is no surprise to see that a canal called *Krios potamos* began at the river and crossed the city from east to west.[101] In his hypothetical topographic layout, J. Krüger places the canal to the south of the city and associates it with a series of baths. The baths would have required plenty of water, which suggests that there must have been a tank or a canal near the facilities from which the water could be raised using the appropriate mechanisms. On the other hand, it seems to be accepted that this is an element that in Oxyrhynchos was integrated into the urban planning.[102]

The aerial views of the site show us a series of accentuated traces of dampness and a zone clogged with sand, which leads us to believe that there may have been a canal crossing the city in the direction suggested by Krüger in the scheme or diagram he drew up based on the directions given in the papyri. That canal would have carried on to the area behind the theatre, the same place where we have described the marks of a tank and wetlands associated with the *koilas* running from north to south in the foothills of the Libyan Mountain Chain. At this point we also observe a rectangular damp shape that leads us to believe that there was a large water cistern or lake there, perhaps a *hypodocheion* or the terminal vessel of a canal. A tank would have been necessary to supply the baths and it would have needed an elevation system for filling the cisterns. In fact it is known that during certain years there were problems in supplying water to the baths. (Fig. 7)

According to J. Krüger, the word *anabatéria*, which suggests the idea of steps, documented in the Oxyrhynchos papyri, means that we can assume that a canal would have crossed the middle of a district in the western half.[103]However, an internal canal that was full during a large part of the year would have been very troublesome in terms of passage, since it would also have required bridges or walkways to cross it. In this respect we could consider that the *Krios potamos* might almost have constituted a city boundary to the south and that the gates in the wall would have been near the canal. In fact, in the above mentioned list of guard duties there is a gate in the wall near the "royal baths", which presumably would have benefited from the water supply of the *Krios potamos*.[104] Therefore, in this case, certain geomorphological traces help to consolidate the image built up by Krüger from the papyri.

The traces to the southeast of the theatre, which we have interpreted as a pool, suggest that the city would have been supplied from the south, in accordance with the logic of the current. In this respect, apart from the mentions of gardens and fountains fed by the water supply system, there is a description of the city at the time of the Arabian conquest that speaks of a large lake in the city centre with water brought from the Bahr Yusef and many references to the idea of palaces with gardens.[105] On the other hand, the aerial photographs show a conspicuous damp site outside the walls to the south, which we could extrapolate to

98. Bonneau 1993, 16-17. P.Oxy 2244, 50, 61, from the 6th and 7th centuries AD.

99. They were depressions that were filled during flooding and water remained in them for a longer time, forming lakes. The idea of the palaeo-canal or dry canal has its own terminology in Greek: *Koilas-Koilóma*. Bonneau 1993, 18.

100. It is significant that in his work Linant de Bellefonds mentions the building of a long drainage channel alongside the Libyan Desert when referring to the subject of the modernisation of the hydraulic structures of the middle valley.

101. The exact meaning of the term is the subject of debate. Bonneau 1993, 71. Krüger 1990, 115-116. Bonneau indicates that the installation of the *krios* corresponds to a lock associated with a distribution canal or *paralysmos*, which allowed the water to be distributed in opposite directions. See also Carruesco in this volume.

102. According to Bonneau 1993, 11. Potamous Kriou has given its name to a street P. Oxy 43 V iii 24 (295 dC).

103. Krüger 1990, 90.

104. P.Oxy 43 v iii, 24.

105. *Ibidem*, 32.

FIGURE 7. Aerial images south of Oxyrhynchos: a) Quick Bird satellite image with suggestion of the position of the ancient wall south of the city, the *krios potamos* and a large, regular pond; b) shot from a kite over the theatre (author: Y. Guichard).

the idea of a large external water tank. We also know that Oxyrhynchos had a vivarium during the Graeco-Roman period.[106]

5. Further to the south of Oxyrhynchos there was a valley, an extensive zone which we know was used during the modern period as a flood area, as in the northern zone. In fact we believe that in ancient times the area to the south of the city must have taken advantage of the flooding to establish a system of basins. A sign of this would be that a water inlet that is normally associated with the flooding system is documented in Greek (*diakomma*) in Pela (Billa-al-Mustagada), to the south of the city.[107]

The systematic flooding of this fertile suburban valley obliges us to search for the traces of a dyke that could have retained the water and protected the city from the floods. To the south, the city planning is difficult to follow, as it is necessary to place the wall with its gates in a relative position, along with the *krios potamos* and a retaining dyke. The traces are difficult to interpret, as they are indirect; our opinion is that the wall was positioned at the end of the group of modern houses, which appears to have maintained its alignment up to recent times, with the position of the *Krios potamos* in the damp area indicated above. The oldest aerial photographs allow us to observe a series of geometrical lines that do not correspond to the modern buildings. (Fig. 2a)

In this topographic relationship, the toponyms *pse* and *pesor*, which appear in relation to the wall of Oxyrhynchos, may give a clue. In fact, we know that in the Fayum, the same toponym, *pse*, is the name of a dyke mentioned in a papyrus.[108] It therefore bears some relationship to water.[109] In the list of guard duties, both names, *pse* and *pesor,* appear to be related to two gates that complete the entrances in the south of the city. We feel that *pse* and *pesor*, rather than being urban gates for the passage of people, are openings related to a water dyke. Imagining an architectural solution for this infrastructure would be somewhat extreme, but there is an indication that leads us to believe that the wall or dyke had a gate or some kind of passage or floodgate for the water. In fact, at the time of the conquest of Bahnasa, the Arabs found an underground passage beneath the walls "…where the river water runs, near the south gate, that leads to the city market".[110] If this is the case, the wall could have had an exit from the *Krios potamos* to the south, although there are no traces that allow us to suggest a precise path at present. (Fig. 4)

7. It is also interesting to note that the supposed location of the *Krios potamos* of Oxyrhynchos coincides with that of another significant geomorphological line: that of a *wadi* coming from the Libyan Desert. The traces of *wadis* are located along the desert strip and filtered satellite images allow their importance to be accentuated from the dampness standpoint (see the paper by Ignacio Fiz in this volume). Even though it is not important, the trace of the *wadi* that would emerge to the south of Oxyrhynchos has a course that we believe to be significant. It runs near the road that leads from the desert, emerging in the area to the south of the city, near the facilities mentioned above. It is likely that its bed served as a pathway during long dry seasons, although during heavy rainfall the water would have reclaimed it. Although torrential rainfall is not a common phenomenon, it did sometimes cause considerable damage. Antinopolis, for example, took the precaution of channelling that bed at the point where it passed through the city. In Oxyrhynchos we know that some houses installed bronze ducts for the rainwater,[111] so that during certain seasons this solution was used more often than can be imagined. In fact, there seems to have been an increase in rainfall during the Byzantine period.[112] The topographical position of the torrential flood coincides with the southwest corner of the wall. It may be that a decision was taken to reinforce the wall to protect it, or even to change its course, by curving it like the path that encircles the town today, the origin of which is attributed to the site of a section of railway.

8. With respect to the north, we know that the city was protected by a dyke, as in the narration of the conquest in *Foutouh Al Bahnasa***,** one of the strategies consisted of destroying the dyke (which they call the bridge, with the same ambiguity that is found in the term *gephyra*). This was apparently near the city, since stones were thrown at the Arabs from the walls as they were crossing the water. Other papyri mention

106. Bonneau 1993, 57; a *lakkos* can be used as a hatchery. P. Oxy 2234, 5 and 15.

107. P.Oxy 3269, 3. Bonneau 1983, 80.

108. Discussed briefly by Préaux 1963, 125, but the meaning of the toponym is not determined.

109. Perhaps it can be related to the "*paasu*" dyke in Memphis, which would be called "that of the ram", translated from the demotic text that is suggested by Leclère 2008, 82 n.396. The author's suggestion creates a new relationship with the previously quoted term *Krios potamos*, since it has been suggested that that duct would have been related to a temple dedicated to a divinity – a ram – or the forked shape of the duct.

110. *Foutouh Al Bahnasa*, 180, own translation based on the French version.

111. According to Bonneau 1993, 32, the term *exombristér* is a sophisticated way of referring to the drainage of rainwater. It is documented at Oxyrhynchos.

112. Butzer 1959, 79.

a bridge that connected the *oikos* and glorious *domus* of the famous Apion family to the hippodrome, which leads us to believe that this bridge was also a dyke or a wall, or even the same thing. It should be remembered that a dyke was usually associated with a canal and that this infrastructure permitted the installation of irrigation using elevation mechanisms in areas far from the flood. Thus, we know that the "*gloriosa domus*" had water-elevation mechanisms. Thanks to the satellite images, we found traces of hydraulic elements indicating the position of a dyke, specifically a series of small lakes which, judging by their shape, correspond to openings in the dykes holding back the waters (*diakopos*).[113] (Fig. 2 b) On the other hand, the traces of walls in the northern part of the city lead us to believe that there was a large structure in the north-western corner, thus providing a coherent image of the defensive system. (Fig. 5)

9. Nothing remains of the Graeco-Roman wall to the east, but it must have existed and it is likely that its proximity to the river would have put it at risk of being eroded. The book *Foutouh Al Bahnasa* mentions, for instance, that on one occasion the river destroyed part of the bank, which led the authorities to transfer the remains of a martyr of the conquest inside the city.[114] In the scheme we propose for the Palaeo-Byzantine situation, the old wall is connected to the dyke retaining the flood water to the north, starting from the traces of paths observed in the aerial photographs.

10. The zone occupied by the city of Oxyrhynchos had a counterpart on the other side of the Tomis, as was often the case during the Graeco-Roman period (Pela-Antipera, for example). Since they were two different towns, the image of each is confused with the other and in the imaginary Late Roman period there is the impression that the city was crossed by the river.[115] Paradoxically, during mediaeval times the city began to shrink, leading to an increase in a *tell* near the river, on the Bahnasa side and on the Sandafa side, with two settlements having the rounded appearance of rural towns. Both towns have the appearance of traditional settlements, ruling out the image and planning of a Graeco-Roman city.

Recapitulation

This document is supported by pictures from different sources used to detect what we believe to be the most significant traces and shapes of the landscape from ancient times. In formulating occasional theories about those traces and interpreting them in the light of written references to hydraulic structures, we have constructed a general framework for the analysis of the site of the city and its urban planning system.

Based on that framework, it should be emphasised that as a population settlement for colonising and obtaining the maximum benefit from the Middle Valley, Oxyrhynchos offered the advantage of being easily protected from flooding. This meant that a settlement could be built in the classical style, with urban elements of civic life and suburbs that could be used for necropolises, palaces, gardens, woods and orchards. The city can thus be considered distinctive due to the absence of elements belonging to the Pharaonic tradition, such as canals leading to the temples of the Egyptian divinities.

Even though it is a beneficial position for building a city as far as the Graeco-Roman tradition is concerned, the environmental conditions imposed the need to take certain precautions with respect to channelling the flood waters or even the sporadic torrents from the *wadis*. Thus, it was necessary to build dykes and paths to drain the land while making water available inside the city. Such an intense modelling of the landscape gave rise to the imagined role of water and greenery, also present in the ideal city of the Hellenistic period.

During the ancient period and the beginning of the mediaeval period, the city was able to maintain its structure and use it to its advantage, but the historic changes gradually modified its physiognomy and a small *tell* emerged near the river. That contraction must have been strategic; to protect the city from flooding when the infrastructures could no longer be maintained, which can also be read in terms of new ideas for civic life. The city then underwent a ruralisation process that has continued to the present day, in which the town again emerges as a communications node protected by the desert highway.

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113. Bonneau 1993, 82. *Diakopos* is also an opening made voluntarily which must be repaired with earth after the water has entered it. One is documented at *Paeimis*, where there is also a *diazóma*.

114. *Foutouh Al Bahnasa*, 3, note 7.

115. *Foutouh Al Bahnasa*, 7. The canal crossed through the middle of it "…le canal la travessait en son milieu du sud au nord jusqu'à l'époque de l'Islâm…".

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APPENDIX. METHODOLOGICAL CONTRIBUTION TO THE LAND PARCELLING STUDY. THE CASE OF OXYRHYNCHOS

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1. Introduction

The following paragraphs describe how we have established a proposal for the land parcelling of the Egyptian city of Oxyrhynchos using aerial photography principles. Instead of taking photographs from an aircraft, we used a kite. The images obtained were placed on a topographic base prepared by the team and the result was a mosaic of extremely detailed photographs. This allowed us to easily locate ancient parcellation traces. By discerning the clearer lines of the remainder, we were able to see a regular section with measurements based on Alexandrian standards.

1.1. The location of Oxyrhynchos

The archaeological site of Oxyrhynchos is in the city of El Bahnasa, some 200km to the south of Cairo. Today, it is part of the province of Minia in Upper Egypt. Two centuries ago the city was made famous by the discovery of an enormous collection of papyri.

Oxyrhynchos is about 15 kilometres to the west of the Nile, bordering the desert. However its inhabitants enjoyed the benefits of the waters of the river *Tomis* (which is now known as the Bahr Yussuf Canal, or Canal of Joseph), which provided water at the same rate as the Nile; nonetheless, the fact that it is a canal could lead us to believe that it would not have been liable to flooding had it been adequately maintained.[1]

There were traditionally three yearly seasons subject to the situation of the Nile: the flooding, germination and sowing seasons. The Egyptians lived based on this natural pace and knew what tasks had to be carried out during each season. Perhaps preparing for the floods was the most arduous task, as it was necessary to reinforce and condition the dykes and drain the canals to prevent the water from flooding the whole region. During the summer months, when the flooding occurred, it was important to keep the dykes under control to create areas for storing the water. In November, when the river had gradually returned to its bed, the fields were ploughed and made ready for the future harvest between April and May. Afterwards, new flooding would take place. During each new rise of the waters, the physiognomy of the terrain changed, and so a system was established to control the changes in the boundaries and measurements of the land.

1.2. A brief summary of the history of the excavations

The discovery of Oxyrhynchos in 1802 by Denon brought to light the potential of a site which, two centuries later, still holds many hidden secrets. During six seasons of excavation work, Grenfell and Hunt obtained more than half a million pieces and fragments of papyri and household objects. Paradoxically, this huge amount of information is insufficient to respond to all the doubts raised for the purpose of explaining the origin of this city.

The subsequent archaeological interventions carried out between 1982 and 1992 by different researchers and from then on by a combined mission[2] have made it possible to undertake a more refined study of the site occupied by different zones within the city. Nonetheless, to date, no proposal has been made as to its original appearance in the Graeco-Roman period (probably the era of its greatest splendour) or in earlier or later periods.

A great deal is known about the work of Grenfell and Hunt and Flinders Petrie regarding the location of unique sites explored in the area and presented in the form of a schematic map.[3] This shows the position of tombs, cemeteries, mosques, the remains of walls, etc. However, they provide only a little information, mostly on the location of the mountains of rubble excavated and the relative situation of the elements observed.

Subsequently, graphic information produced during the archaeological work was focused on topograph-

1. The fact that the Bahr Yussuf was a canal might have offered the option of controlled flooding, in other words, limited to the flooding of the fields near the city, and maintaining the inhabited areas safe from the rising waters.

2. Following the interventions of Ali Hassan, Mahmoud Hamza carried out work on the necropolis over a period of ten years (1982-1992) and Prof. Fehérvári during the years 1985 to 1987, as well as the Antiquities Service. Since 1992 the Archaeological Missions led by Dr. Josep Padró have received the support of the Ministry of Cultural Works, the Catalan Government, Barcelona University, the Rovira i Virgili University, the Catalan Institute of Classical Archaeology, the Catalan Egyptology Society, Paul Valéry Monpellier III University, and Cairo University.

3. Petrie 1925, Bowman 1983.

ic maps and successive series of aerial photographs. In view of the need to obtain an idea of the appearance of the original city, we decided to combine these graphic resources to obtain as much information as possible from them.

2. Objectives

2.1. The city we want to know

Egypt occupies a fairly large region, with an extremely long chronology. However, the interesting combination of civilisations it has experienced during its history is a disadvantage when it comes to postulate which civilisation has influenced the specific process that concerns us here: the use of a specific measuring unit for the development of its urban planning. Was the city of Oxyrynchos shaped by secular Egyptian tradition? Or was it shaped by the contributions of the Greeks? Or as a result of the reform work carried out by the Romans? Each of these currents of opinion is based on a different way of understanding the measuring of things. Although the name of the measuring unit is the same (the foot, for instance), the fact that this measuring unit is not always the same poses a problem. This has led to confusion among authors in compiling information; in ancient texts, it is often clearly understood which type of *foot* is being used, but this is often not clear to modern readers. To all the above, we should add that in each culture, the measuring units also changed, and were enlarged or reduced in size.

Specifically, in reference to measuring systems and the way in which these measurements are understood and applied, today (2010) no specific proposal exists for the units and the systems used as a standard in building Graeco-Roman cities in Egypt.

Not even in a city such as Alexandria, which has been studied in great depth in terms of aspects such as architecture, urban planning, art, material objects, etc., is it possible to find information about the measuring standards used to establish its urban area.[4] Apart from Alexandria, Philadelphia is another Egyptian city that is comparable to Oxyrhynchos due to its type and the fact that it has been observed to contain land parcelling. In this case also, it is necessary to conduct an in-depth study on the measuring system used.

We intend to discover this measurement standard in Oxyrhynchos and we believe that the method presented below is a good method for achieving this. Our aim is to ascertain where the city's main axes were located, the influence they had on nearby streets, the measurements established for a housing block and in short, what the city looked like during Graeco-Roman times.

3. Methodology and work process

3.1. A customised method

The following paragraphs describe the way in which we worked on the images and maps to formulate a land-parcelling proposal for the ancient city of Oxyrhynchos.

We used the aerial photography method, adapting it firstly to our needs and secondly to the available resources. This method is, roughly speaking, based on taking a series of vertical photographs from an aircraft, making different sweeps in straight lines over the zone to be studied. Later, the images obtained from each series were joined in the laboratory to form a mosaic of the whole area studied.

From the standpoint of the extension, it must be said that our aim was not to analyse the site as a whole. We concentrated on a specific zone where traces of ancient plots are quite evident if observed from certain places. We would be referring to a surface area of approximately 48 hectares, representing practically 16 % of the total space occupied by the site, based on the understanding that the boundaries are quite diffuse.[5] Although we do not know the complete size of the space occupied by the traces, the zone studied has helped us explain the measurement standard used in this city.

In view of the limits as regards space, we will deal with the time limits: the excavation work in Oxyrhynchos is usually carried out during the last few months of the year, although the available time for each study group is less (approximately three weeks). It is necessary to carry out as many tasks involving the compilation of graphic information as possible during this time. For that reason, it was essential to try and perform the archaeological intervention at the fewest number of sites, in all cases taking advantage of the information obtained from existing excavation sectors, depending on its relevance. In this respect, one of the zones explored in the southernmost part of the High Necropolis was extremely useful, since a section of 27 metres of the side of a street was located, which on the one hand provided guidance and on the other allows us to compare similar data in the area.

4. McKenzie 2003, 45 refers to the archaeological confirmation made by Mahmoud-Bey in the 19th century regarding a Ptolemaic urban zone (basic) and a Roman zone (adapted to it). The system established for it is still valid today.

5. Subías 2008, 13 proposes a surface area during the later period of around 300 hectares, based on the space occupied by the archaeological remains: some 1500 m in width and approximately 2000 m from north to south.

During each year, the obtaining of information is concentrated on the topography and the aerial photographs. The series of photos taken between one year and the next allow us to observe the changes in the landscape from year to year, which tends to become more humid and lush in the places where the vegetation has advanced.[6] It was not possible to study the site during different times of the year, but if we had had a series of photos of the rest of the seasons, it is certain that the appearance of the site would allow us to fill in certain gaps in the information.

3.2. How the method was applied

This last point, in reference to the seasons of the year during which the information was obtained, has to do with the available resources which we have referred to above, in which we would also include the limitations of the type of photograph taken. It is at this point that the adaptation of the method is applied: an automatic digital camera was used, fitted to a kite guided by expert hands.[7] After flying it over the area under study, a large number of vertical and oblique photos were obtained at low and medium altitude.[8] They all give a very important level of detail, and are *a priori* very useful for locating the traces of ancient plots and the reference points we were able to observe on the terrain. The next step was to treat and correct these photographs to create a flat mosaic covering the whole area, with as much level of detail as possible. We can only be precise in terms of deciding where the lines of the ancient plots are and how far they extend.

However, difficulties arise in locating these large-scale photographs within a more general context. The process followed is similar to that of piecing together a jig-saw puzzle in which we are about to lay the first piece, but where the reference photograph has such a low level of detail that we cannot accurately determine its place within the frame. Our piece is an image with a lot of information and the reference support is not a photograph but an archaeological map containing a limited amount of data. Positioning the photograph under these conditions leads to a lack of precision. A perfect ally would be satellite photographs, but we had none available until a very advanced stage of the study, and with a very poor level of detail to allow us to join the photos taken at a lower altitude with the satellite images. In addition, we had no general or regional cartographic maps at our disposal and for that reason we had to rely entirely on the archaeological topography generated and on the topography work executed especially for this study.[9]

In accordance with the basic principles of aerial photography, we wish to mention that a view point located at an altitude makes it possible to clearly see the relationship between a specific site and its surroundings in great detail. Vertical photographs have maximum verticality in the centre of the image, and can be observed by pairs with a stereoscope to achieve a 3D effect. However, there must be a superposition of 60 % between one image and the next to allow the necessary correspondence for producing this 3D effect.[10]

In our case, the short-term objective was not to view the space in 3D, although we had to follow these basic guidelines used in aerial photography: to obtain the maximum verticality of the shots, to always consider that the ends of the photographs accumulate the greatest distortion, to remember the key aspects of archaeological photo-interpretation and to complete the photographs by surveying and sample analysis.

3.3. The topography

The step between viewing the photographs and placing them in the place they occupy in the world was finally solved by the combination of topographic sessions on the terrain. The topographic files prepared during previous archaeological years[11]

6. This increase in humidity is due to the rise in the phreatic level, since the adjacent zone is formed by desert. Thus the vegetation advances more than the desert. In some areas, this has been aggravated by the construction of modern pipes, increasing the humidity of the surrounding areas.

7. For more details, visit http://www.du-ciel.com (access on 15/01/2011).

8. The photos taken by Yves Guichard and later by Thomas Sagory comprise more than 4,500 image files that partly cover a surface area of about 3 sq km. Approximately two-thirds of the images are vertical and have been used to prepare the mosaic. The rest (the oblique images) helped us locate the others and specify certain aspects of changes in level, location, etc.

9. Guy 1996, 180 describes the tools used to study the regular plots. His observation method is based on maps and photographs. He regrets not having any topographic elevations. The methods we used were satellite photographs, aerial photographs taken from a low elevation and topographic elevations. However, one of our handicaps was the fact that we had no maps. However, modern technology should permit them to be substituted by satellite photographs. Thus, it would appear that we have all the visual tools for obtaining more rigorous information about the parcelling system. Even so, the problem is on the terrain itself, at the point where the traces fade.

10. Cosci 1988. Bitelli and his team experimented with a variety of tools designed for photogrammetry, which allowed them to develop a GIS of the archaeological site of Soknopaiou Nesos (Fayum, Egypt). The results obtained may help achieve a better interpretation of the site, thanks to the level of detail obtained from the photographs taken at a low altitude and the subsequent editing work and referencing of those photographs (Bitelli *et al.* 2004).

11. Documents prepared by the topographers Rogelio López Bravo and Antonio López Cano, were used. A new specific topography was created with the collaboration of the topographer Jordi Segarra.

were reinterpreted, updated and completed by non-archaeological reference points. During year 2006, we prepared a type of complementary topographical map consisting of creating a grid of points that did not consider outstanding elements of the territory. In other words, we placed a series of markings on the surface of the terrain, with a separation of 50 metres between each, forming a square with four of these markings and then extending it to the northern and eastern sides. In that way, we covered a surface area of 5.19 hectares over which the kite was then flown and the photographs taken. Each of the markings was processed topographically and given a name.[12] In this way, we obtained a series of correspondences between the points marked on the ground and the photographs of that zone. The creation of the system meant that during 2008 and 2009 we succeeded in completing the topography of a wider extension, referencing only selected points based on observing the aerial photographs and exploring the surface of the site: the measurements were taken at the intersections of some pathways, important archaeological remains which were fully visible, shafts of light, marked changes in the colour of the terrain, etc. At the sites where there was no possibility of using any of these features as a reference point, it was decided to mark the highest points on the ground, or those which delimited a certain area. Once its position had been recorded, by means of a new photographic sweep with the kite, this darker zone was photographed and pinpointed.

The synthesis of the different topographical documents resulted in a document containing all the necessary information, with only three sketching types: dots, lines and text. The elements shown here are classified by colour so that it is not possible to confuse the intersection of a pathway with an opening in the ground, or a shaft of light with a small stone structure.

3.4. Creating the mosaic

ArcGIS Desktop 9.3 is a series of products from the Geographic Information Systems (GIS) field which groups together applications for capturing, editing, analysing, processing, designing and publishing geographical information. Although our aim is not to create a GIS, it is true that we have used the functionalities of this package to effectively solve our main problem: the geo-referencing of the aerial photographs. To obtain a mosaic, it was essential to place the images on the topography as exactly as possible, as the whole study depended on that precision. During the image geo-referencing process, the distortion arising from the difference in the distance between the view point and the different points photographed of one image was also corrected.

ArcMap, one of the branches of ArcGIS, allows you to work with layers of information which can be activated or deactivated, ordered and grouped together at your convenience. Thus, we compiled all the images selected to make the mosaic in one document, placing the photographs from each year in a group of layers. We also divided the study zone into four squares, in order to be able to work comfortably in each area. In that way, when working with the image of square one, we had four groups of layers corresponding to the years when the photos were taken: 2004, 2006, 2008 and 2009.

3.5. Geo-referencing

Each photograph included in ArcMap was subjected to a prior selection process to determine whether it was sufficiently vertical to be used. Then it was given a specific spatial reference, so that all the images shared the same coordinates system.[13] Once the photograph was in the workshop, we sought the most homogeneous set of points of correspondence between the image and the reference topography. This shifted the photograph and changed its measurements and appearance; from being rectangular, it changed to having the sides curving towards the centre of the image. The average number of correspondence points (also known as control points) for each photograph is twenty. Whenever possible, we tried to use control points on the basic topography, but when this was not plausible, we completed it with another image that was already in place, which we considered was correctly positioned.[14] The final acceptance of the site of an image on the work plan generates different files in the programme which store information about the appearance, location, certain statistical data, stacked bar graphs and metadata.

During the process of positioning the images, we checked the usefulness of using photographic series

12. Scheritz-Dietrich 2002, 1590 plan the distance for flying over their study area with an aerostatic balloon (between 600 and 800m) and calculate that to obtain good visibility of the control points located on the ground, they must be greater than 2 metres (they use circles with a diameter of 2.5 m). In our case, the markings used as control points on the ground were squares of 30 cm, and the maximum altitude for flying the kite was 600 m. This proportion was sufficient for the markings on the ground to be seen in the photographs obtained.

13. For both the photographs and the topography we selected the UTM coordinates system known as *European Datum 1950 UTM Zone 36N*.

14. The pictures taken at sites near those where there was no topography or those which, due to having been taken at low or very high altitudes, have areas in which the distortion cannot effectively be corrected. For that reason, it was not possible to use some of these photographs in the final mosaic, otherwise they would have shown a picture that has nothing to do with reality. In studying the margin of error generated by the correspondence points, we considered a residual value of less than 0.35 m sufficient for confirming that the image is properly situated.

from one flight, because in this way we were able to take advantage of the light and elevation characteristics they shared. In the resulting mosaic there are zones in which the measurement of the images is smaller (low altitude flights) and others in which the measurement is larger (higher altitude flights). There are also changes in the shadows, as, depending on the time or atmospheric conditions on the day when the photograph was taken, the appearance of the observed and photographed area changed considerably in terms of the shadows. Another factor breaking up the overall appearance of the mosaic is the combination of images from different years; thus, as already mentioned, the changes in vegetation or human intervention on the land are quite considerable from one year to the next.

The incorporation into the work of two satellite images showing the city of Oxyrhynchos and part of its surroundings served to speed up the process of referencing the photographs taken at low altitude.[15] However, the precision of the satellite images was not sufficient to accomplish this task.

3.6. Location of traces

With the mosaic of photographs defined and covering a large area of land, we observed the sets of photographs from each year. We drew lines drawn on these photographs following the traces of ancient plots. As a general criterion, we started by tracing only the sections of these lines that were completely identified. As several orientations and lengths appeared, we preferred to order them in layers, depending on whether they were orthogonal or oblique traces. Thus, for each group of photographs there are two layers of traces. We wanted to separate the lines observed and drawn on the basis of the year of the photograph, and so the traces observed in the photographs of one year can be completed, confirmed or ruled out with respect to those of another.

On completing the review of the photographs of all the years, the number of lines drawn is so vast as to be unintelligible. For that reason, we extracted some of these traces (the ones that appeared to be the most important) and tried to lengthen them. By lengthening them we wanted to be able to see certain types of logical patterns in the urban sections. However, this attempt proved useless because many of these lines ended by intersecting with each other or taking steep inclinations. We attribute this to a potential accumulation of inaccuracies in the drawing and/or the short length of the line itself, which is insufficient to mark its orientation. To correct this, the information layer containing these long lines was converted into a file that can be opened and worked on with both ArcMap and AutoCAD. The combination of these two programmes allows us to change the AutoCAD file and see the results in the ArcMap file.

At this point, we concentrated on the southern part of the city, near what is known as the Pillar of Phocas and the Eastern Gate, where the monumental remains allowed us to try out combinations of different alignments. We used these elements in combination with the position of the remains of the theatre and the lines marking a potential main road from north to south, which would have had one of its ends running towards the Pillar of Phocas. The preliminary results gave us a series of measurements that had often correctly fitted in for this sector, located at an elevation of approximately 30.8m. This figure is related to the Alexandria measurements standard, in which one *plethron* is equivalent to 30.8 metres.

Since it is the distance most often repeated on the terrain, we tried to find the maximum number of equivalent points in it, by drawing a series of orthogonal lines with squares having sides of 30.8m[16]. However, although the coincidences are near the sites where we observed traces of urban planning, the network did not exactly fit in with the vertical traces or all the horizontal ones. We observed that the traces taking the north-south direction were slightly oblique and the lines going from east to west also sometimes had a certain deviation, although most of them are completely horizontal. Again, by combining the AutoCAD and ArcMap programmes, we found an alternative by working only with groups of parallel lines running from north to south, with different orientations. Thus we succeeded in finding the most appropriate proposal, which is that of a deviation of 2º in the north-south direction.

Now, all that remained was to find out what happened with the horizontal lines. We performed the same test as with the vertical lines, with groups of parallel horizontal lines with different orientations. Although there was clear evidence of some traces which had an effective deviation of between 1º and 2º, most of the horizontal lines detected are flat. Therefore, in the city of Oxyrhynchos the urban area is not completely orthogonal, but has a deviation of 2º on the N-S axis, but only in that axis. Perhaps later a justification can be found for the existence of the horizontal traces with slight deviations, but to do this, we would have to analyse the lines in greater depth.

15. Satellite images loaned by Subías, Fiz and Cuesta.

16. We also tested this network of orthogonal lines with other measurements which could be found, within reason, at Oxyrhynchos, such as those proposed for other Egyptian cities (Alexandria, Ptolemais) and eastern cities, and with other measuring systems. Of all the tests performed, the one which fitted best was the Alexandrian metric system.

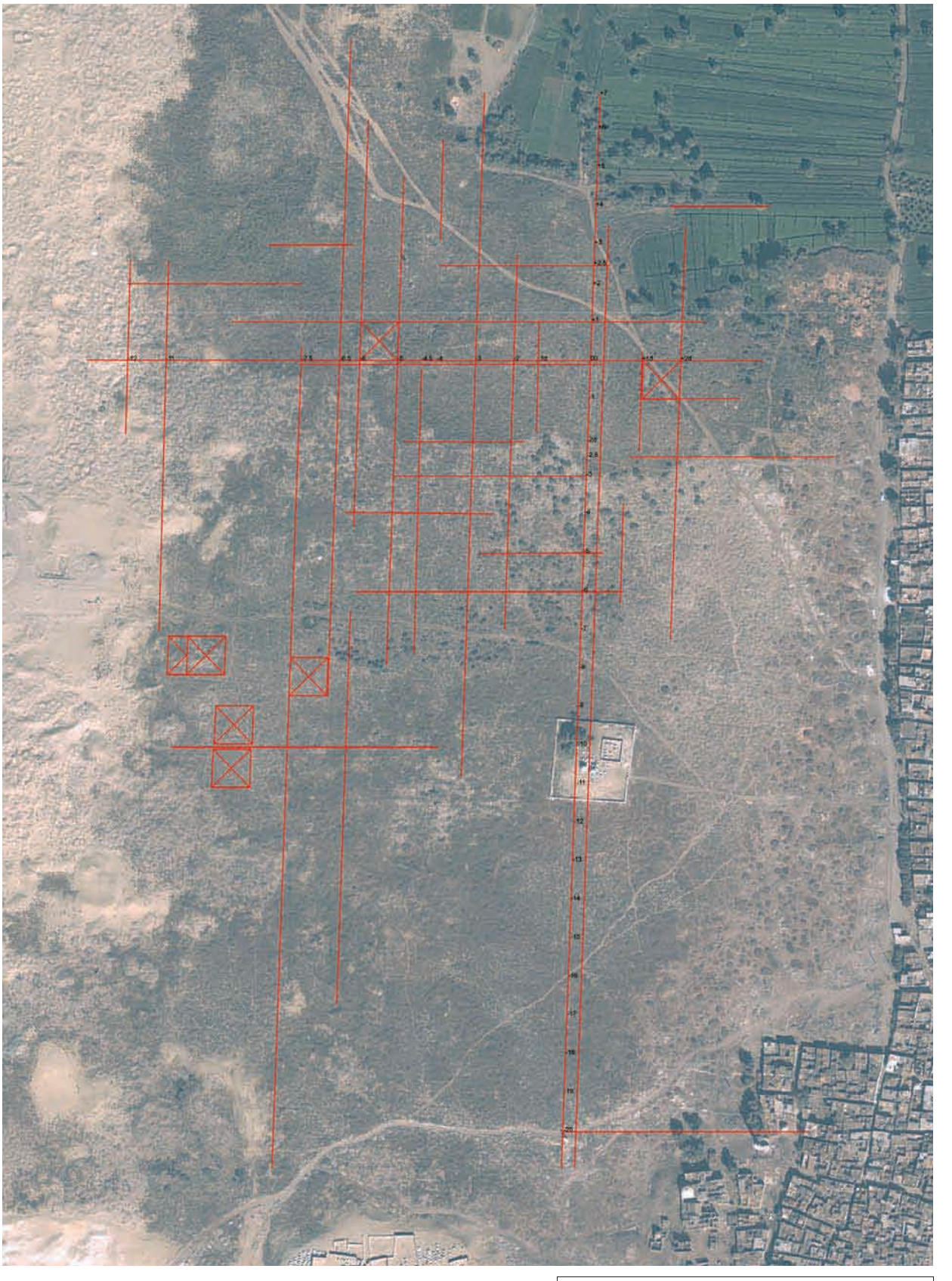

Figure 1. A hypothetical urban pattern for Oxyrhynchos (Egypt) according to Alexandrine measuring units (1 plethron = 30.8 m). Source: Prepared by the author based on data from ArcMap compilation images.

4. Obtaining results

This image shows the traces located in accordance with the steps described up to now. This is the first proposal made on the structure of the urban section of the city of Oxyrhynchos, and for the time being we wish it to continue being a proposal, as we consider that the study zone should be enlarged to confirm whether this standard is repeated in other areas. It would also be useful to locate its boundaries.

The lines traced belong to the site where we found evidence of a clear horizontal or vertical trace, which is in keeping with the Alexandrian measurement standard (1 *plethron* = 30.8m). The length of these lines, as already mentioned, corresponds only to the stretch of the line observed in the aerial photograph mosaic.

In all there are 31 lines, including both vertical and horizontal lines. Most of them have a relatively sequential position, i.e. starting from one axis, we found the first, second and third trace and so on. However, there are also cases in which the lines located are not in the expected position, but further forward or a little further backward. But there is always a shifting, with a measurable proportion in parts of a *plethron* (1/3, ½ or 2/3).

4.1. Statistics

The following table shows the names we have given to the located traces. We have established a coordinate system in which the ordinal axis coincides with the vertical mark detected from the correct principle (which crosses the site from north to south). The horizontal axis is placed on one of the clearest horizontal traces of which we found remains on the terrain.[17] Based on this centred system, the lines we have drawn take the name of the ordinal position they occupy.

Vertical lines located

-12	-11	-7.5	-6.5	-6	-5	-4.5	-4	-3	-2	-1	**0W**	**0E**	0.5	1	2

Horizontal lines located

4	3	2.5	2	1	**0**	-1	-2	-2.5	-3	-4	**-5**	**-6**	-10	-11	-20

Below is a description of the measurements of the site where the located traces should be positioned, compared to the site that they actually occupy. In the third column we have added what this difference represents. As can be seen in the final mean, we are speaking of quite a small percentage. These smallest differences (between 0.1 and 1.99 %) are attributed to an error of precision in taking the measurement or at the time of drawing the line in the ArcMap programme. With respect to differences greater than 2 %, we believe that it would be a good idea to check whether this trace is actually in relation to the one we have used as a reference for measuring it, or perhaps we could find a correspondence with another line that has not been located.

Vertical Traces			
Number	*Value*		*Margin of error (%)*
	Theoretic	*Actual*	
+2	61.6	61.44	-0.26
+1	30.8	30.68	-0.39
+0.5	30.8	30.76	-0.13
0	—	—	—
-1	41.06	41.64	+1.40
-2	61.6	61.03	-0.93
-3	92.4	91.9	-0.54
-4	123.2	123.73	+0.43
-4.5	*138.6*	*133.8*	*-3.46*
-5	154	154	0.00
-6	184.8	184.54	-0.14
-6.5	200.2	200.44	+0.12
-7.5	231	231.42	+0.18
-11	338.8	338.77	-0.01
-12	369.6	369.54	-0.02
		Mean	-0.26 %

Horizontal Traces			
Number	*Value*		*Margin of error (%)*
	Theoretic	*Actual*	
+4	123.2	123.29	+0.07
+3	92.4	92.56	+0.17
+2.5	77	75.99	-1.31
+2	61.6	61.3	-0.49
+1	30.8	30.97	+0.55
0	—	—	—
-1	30.8	30.74	-0.19
-2	*61.6*	*64.83*	*+5.24*
-2.5	77	76.98	-0.03
-3	92.4	92.44	+0.04
-4	123.2	121.93	-1.03
-5	154	154.07	+0.05
-6	184.8	184.78	-0.01
-10	308	308.74	+0.24
-11	338.8	351.74	+3.82
-20	616	616.42	+0.07
		Mean	+0.48 %

17. Specifically, we found the remains of two walls running parallel to each other, coinciding with the path of one of the lines observed in the aerial photography, which fit in perfectly with the proposed measurement standard.

We have divided all the vertical lines located into three groups.

a) Firstly the lines that fit in with the site where they should be. These are +2, +1, 0E, 0W -2, -3, -4, -5, -6. Those with the positive sign are measured in relation to the east vertical axis and the ones with the negative sign are measured in relation to the west vertical axis. This fact only occurs for this group of vertical traces, and so in this axis the marking of the two sides of a main road or avenue can be clearly seen. The influence of this axis on the lines parallel to it on both sides is clear and shown by the precision of the measurements themselves.

b) Secondly, there are lines in intermediate positions: one-third, half or two-thirds of the site that the line would occupy in theory. They would be: +0.5 (at 2/3 of its reference axis), -1 (1/3 beyond its expected position), -6.5, -7.5, both shifted to the west by half a *plethron*. Due to the foregoing, we contend that one of them could be a main road and thus affect the position of the other.

c) Lastly, there is a group of lines that does not fit in. With respect to the reference axes, they are at a measurable distance in *plethra* or parts of one, but do not appear to be related to it. These would be lines -4.5, -11 and -12.

As regards the horizontal lines located, we also find the same groups:

a) Those that fit into the sites where they should be: +4, +3, +2, +1, 0, -1, -3, -4, -5, -6, -10, -20. In this case, the horizontal line passing through 0 must not be considered a main road, and therefore all the measurements have been taken on one line of reference. The trace corresponding to -20 is the one that passes through the site where the Pillar of Phocas is located, and is aligned with the Eastern Gate.

b) Those in the intermediate positions: +2.5, -2.5. The first of this group, +2.5 has such a short length that it does not emerge at the site where traces +3 and +2 start. Perhaps there was an element that prevented it from being longer. Line -2.5 does not interfere with line -2 or with line -3, therefore, whereas the first is on the east side of the main road, the other two are on the west side.

c) The ones which are clearly marked on the terrain but do not fit in with the rest are the -11, with regard to which we have found no plausible explanation for justifying its position.

4.2. Interpretation

We will now describe our interpretation of the results obtained to date, taking into account both the lines found and all those we have not found in the study area. There are cases in which the traces delimit blocks or plots and, on other occasions, the identification of a quadrangular shape that fits in with the measurements of our standard has allowed us to mark the course of some of these traces.

As seen in the attached proposal (Fig.1), the number of vertical traces in relation to the horizontal ones is quite similar. However, there are many differences in terms of quality. In other words, the course of the vertical lines located totals 5632.31 m, whereas the figure for the horizontal ones is 3443.51 m (39 % less). On the photographs, this points to a concentration of horizontal traces in the northern half of the area studied and the homogeneous layout of the vertical lines throughout the whole area.

Therefore, the vertical lines appear to be more visible or easier to find than the horizontal ones. In this regard, we believe that the reference line, 0 vertical, would be part of the main roads system of the city of Oxyrhynchos. Along a route of just over 800 m it is possible to see the marks of two sides of the road. We also contend that there is another important vertical road on the site of trace -7.5, and, as we have already indicated above, it appears that the presence of this road affects the position of the other roads near it in metric terms. Thus, at present, we would have located two straight main roads.

Likewise, based on the horizontal traces, we believe that this space could also have two even more important roads. It appears reasonable to place one of them in the vicinity of the Pillar of Phocas, in line with one of the entrance gates to the city. The other would be located near position -6.5 or -7, but we have not been able to narrow down the site, due to the existence of a pathway in use along this stretch[18]. Indeed, this is an important fact in justifying the presence of an ancient main road in the city at this site, which would have remained over time. We are trying out different possibilities near this pathway, by making it the same size as the vertical road (around 1/3 of a *plethron*) or with larger measurements, but it has not been possible to adjust its position. However, whatever its size, we believe that the route of this axis would have encompassed a circular structure of which a view in negative exists today (perhaps a well or fountain?). At the western end of this road, Dr. Padró suggested that there was an open space, possibly a large square. However, to date it has not been possible to define the boundaries of this space, despite the discovery of a stretch of wall in a nearby street during archaeological work carried out in 2007.

To the south of this pathway, the orthogonal traces are very faint. In fact, we have only clearly observed some vertical lines which are the prolongation of

18. If this axis is near the indicated positions, the distance separating it from the road passing near the Pillar of Phocas would be about 13 *plethra*, but it would make more sense for it to be 12, given the division into twelfths practised at that time (Segré 1942, 322).

others that started out further to the north. With respect to the horizontal traces, the position of the ones found in this strip between the pathway and the Pillar of Phocas is rather dubious. On the other hand, the clearly visible remains of diagonal lines have been found in this area, the like of which we have not been able to locate with such clarity in other zones.

To the west of the area studied, where the vegetation gives way to the desert, the method used to locate the traces of roads is complex, due to the lack of visible traces in both the photographs and on the terrain. At all events, a clearly-drawn line can be seen which divides the greenest region from the desert, outlined clearly in a vertical trace that corresponds to position -11 of our reference axis.

We have yet to discover the relationship of the city with the location of the High Necropolis, currently being excavated. The archaeological topography of the zone shows a necropolis that is higher with respect to its surroundings, possibly enclosed by a wall around its perimeter. It is precisely the position of the contour lines traced by this area that has attracted our attention. To the east of the Necropolis, running from north to south, there are two curves with parallel levels that coincide with positions -13.5 and -14.5 of our reference axis, maintaining a relationship with the proposed axis in -7.5. As regards the horizontal traces, the southern border of the Necropolis would be near the positions of lines -10 and -11, while again, due to this type of trace, it is more difficult to find the exact location.

Figure 2. Diagonal trace superimposition on the urban pattern proposal for Oxyrhynchos (Egypt). Source: Prepared by the author based on data from ArcMap compilation images.

The relationship with the ancient preserved remains and plots again leads us to the zone of the Pillar of Phocas. Accepting that the central point of the pillar is aligned with one of the preserved sides of the Eastern Gate, and in accordance with the proposal that this pillar would have formed a tetrapilon with three more columns, we have only found one plausible possibility to explain the layout of the four columns of the assembly. The one standing would have been located in the north-east corner. The one parallel to it to the south would also have been aligned with the other jamb post of the Eastern Gate, and the two additional columns on the west side would have been in line with the main road we have referred to as 0 vertical.

4.3. Concerning the measuring units

Although we usually count to ten using the fingers on our hands as a reference, in ancient times, the practice used was to indicate the phalanges of the fingers on one hand with the thumb to make twelve. Since ancient times, measuring units have been based on parts of the body (fingers, hands, thumbs, feet, steps, etc.), but it became necessary to agree on standardised units to avoid confusion and establish references to one basic unit, based on a series of simple relations.

As Stazio says (1959, 539-540), when speaking of the unification of measuring systems, an authoritative figure must be created with sufficient power to establish those relations. Thus, when different cultures enter into contact and coincide in having similar measuring systems, a process of mutual exchange of relations and influence results. This phase may entail, for each culture, changes of a theoretical nature in the names of the measurements, in the criteria used to organise divisions or changes of a practical nature and adaptations of the basic routine system.

As a result of short linear distances, such as those we have mentioned, up to now it appears to have been simple to find a point of agreement, but for longer lengths on surface areas and above all, volumes, a more objective system had to be found to ensure precision.

Compiling these relations, studying them and proposing equivalences is a task that has often led to dispute among scholars of this subject.[19] From attempts to reconstruct fixed schemes for each historic period, we have passed to a detailed examination of the fragments of information about measurements that have been conserved. In this regard, during recent decades attempts have been made to reconstruct each system separately, depending on the factors that could have influenced it. At present, studies in this direction have yielded few results.

As regards the case in point, in a city in Graeco-Roman Egypt we may have found measurements from the eastern linear system,[20] including Filaretan, Alexandrian or Roman. Without being sure of the existence of a single system, and only based on the references of the sources or studies made for the city of Alexandria, we have insufficient data to assign a measuring system in use in the city of Oxyrynchos during this period. For this reason, we have decided to use the reverse procedure, by studying the measurements located at the site and comparing them to those that might have existed at that time. In this way, the Alexandrian system prevailed over all the others.

According to Segré,[21] the use of Alexandrian linear measurements in Roman Egypt is due to the adopting of the measure based on the *artaba* which had a capacity related to the Alexandrian cubit in use. The measurement of this Alexandrian cubit would have resulted from the legacy of ancient, exclusively Egyptian measurements, but could have been compared and related to the Alexandrian foot.[22] Therefore, one cubic Alexandrian foot would be equal to the volume of one *artaba*.

Based on this unit of volume and its relationship with the Alexandrian foot and cubit, it is possible to find equivalences with other units, such as the *kalamos*, the *akaina*, the *plethron* or the *stadion*. Of these, the one most often referred to in the design of the city of Oxyrhynchos is the *plethron*, which is equivalent to 100 Alexandrian feet.

The basic division found in Oxyrhynchos for a block is 1×1 *plethron* with a side of 30.8m, or 100×100 Alexandrian feet. Based on this, we have found points in which a block measures 1×1.5 *plethra* or even 1×0.5. This basic square most certainly formed part of a larger subdivision, but the located traces do not allow us to confirm the measurements of this subdivision without a shadow of doubt. At present, it is not possible to discern which traces correspond to roads and which correspond to partitions between houses. We have analysed various possibilities, applying to the basic square sections with different sizes and lengths, both with square modules and rectangular ones, as can be seen in the following table.

19. For details about the metrological problem see Segré 1928, Segré 1942, Stazio 1959.

20. Stazio (1959, 345) shows the fundamental difference between eastern systems (including Egypt) and the Greek systems. For the former, the measuring unit was the cubit and a sexagesimal division into sixtieths; for the Greeks, on the other hand, the measuring unit was the foot, with the decimal division prevailing.

21. Segré 1942, 342. We can also reach the same result with the equivalences established for the Roman mile, which is related to the stadion based on a ratio of 1/8, which confirms that the foot used in the calculation is the Alexandrian foot (Stazio 1959). However, we agree with Segré on the process adopted for using weighing measurements to reach linear ones, justified by the fact that Egypt, as a supplier of grain for the Romans, had to have fixed equivalence systems for units of volume (Segré 1942, 325).

22. The measurement of the Alexandrian foot (0.308 m) was also the subject of debate until Segré attributed it to the Alexandrian system (Stazio 1959, 550).

Plethra	*Coincidences*		*Total*	*Total sections*	*Adjust*
	Vertical	*Horizontal*			
2×3	6	5	11	19	58 %
2×6	6	2	8	13	61 %
3×3	4	5	9	17	53 %
3×5	4	4	8	13	61 %
3×6	4	2	6	10	60 %
3×7	4	1	5	12	42 %
4×3	3	5	8	15	53 %
4×6	3	2	5	10	50 %
5×3	2	5	7	15	47 %
6×3	3	5	8	13	61 %

We have combined the coincidences on the located sections, both horizontally and vertically, and extracted the percentage they represent of all the sections we could trace in the work space. An adjustment result is shown, with similar values for all the combinations. The value that most often appears is 3 or multiples of 3, both in the options where it is part of the first factor and when it is part of the second factor. Thus, this number takes on great relevance in establishing a plot. Although it is true that it is easier to find coincidences when using factors with small numbers (such as 2 or 3), we believe it would be feasible to think of blocks with larger measurements. Thus, a block of 3×6 plethra might make more sense than one of 2×3 or one of 3×3. The following image shows the options which we think could better fit into the urban centre of Oxyrhynchos. Whereas in the first three, the long side of the rectangle runs from north to south, in the last one, it runs from east to west.

5. Conclusions

This study explains how we applied a method based on the principles of aerial photography for analysing

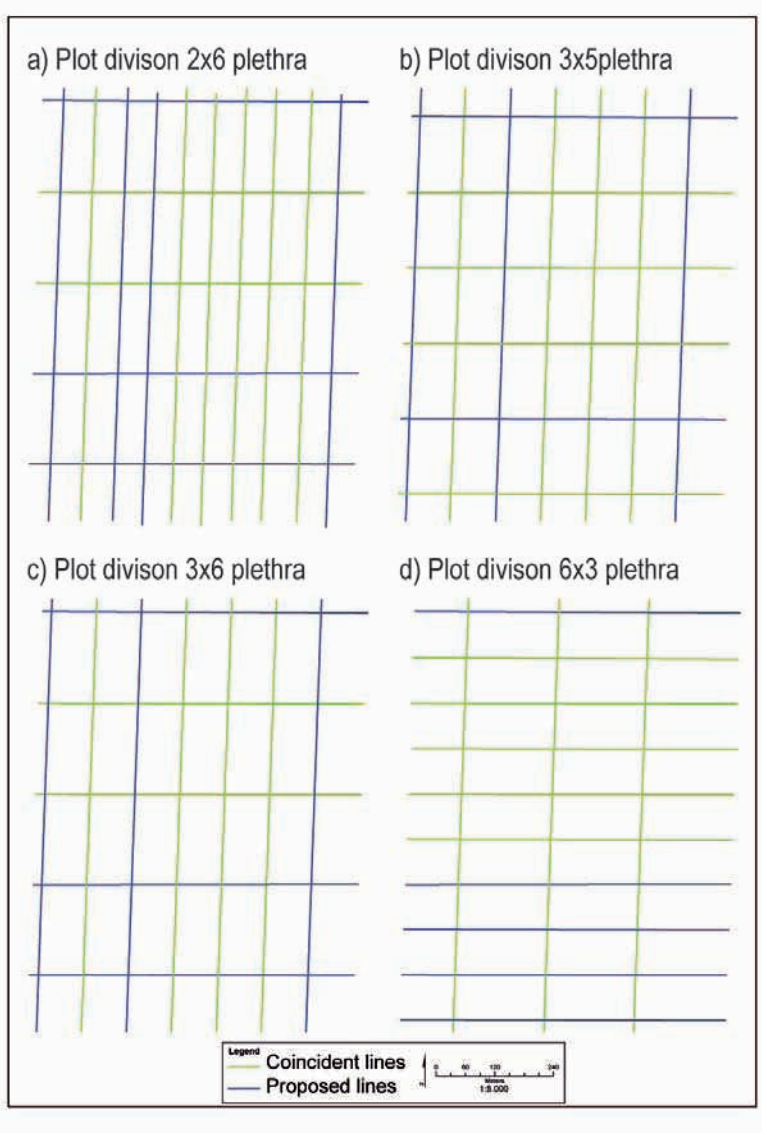

Figure 3. Possible plot divisions in Oxyrhynchos (Egypt). Source: Prepared by the author.

the parcelling of the Egyptian city of Oxyrhynchos. On site, several aligned traces that could correspond to property divisions can be seen, and on the aerial photographs these lines are even more marked. Using this basic information, our objective was to determine the measurement standard used during Graeco-Roman times to plot the urban design of this city.

We have used the archaeological topography from the Archaeological Mission excavation works, adding specific topographical information selected from observed photographs taken with a kite. We used a series of vertical photographs taken at low and high altitudes on which the lines of the plots could be seen. We then combined them with topographic information and created a mosaic with all the images referenced to this topography. Upon it, we again drew all the traces that might correspond to an urban section and of these we selected those that seemed to be more important. We then studied the measurements of the distances between them.

We were able to establish regular modules between some of the lines and to highlight certain main axes corresponding to different roads in the city, both in the north-south direction[23] and in the east-west direction. The measurement standard coinciding with the section located corresponds to the dimensions of the Alexandrian system. Specifically, the unit we believe served as a basis was the *plethron*, which is equivalent to 100 Alexandrian feet of 0.308 m.

We prepared several plot approaches, grouping blocks comprised of different *plethra* units, in the knowledge that they could all be valid for the city of Oxyrhynchos, and that it was also necessary to make a more thorough study in this sense, to see whether others existed that we had not been able to locate.

We also observed that in a small zone in the area of study, there is another type of section that is inclined with respect to the orthogonal plane. We propose this is from a time prior to the Graeco-Roman period.

The overall results were scant, considering the size of the site, due to the lack of reliable reference points in the photographs and the need to complete the topography. Furthermore, as mentioned by Guy (1996, 191), the measurements we established for Oxyrhynchos are theoretical, since we were not able to measure in situ a *plethron* of 30.8m or to know the precise measurements during ancient times or during the period when they were used for this city.

Earlier we mentioned the scant results available today with respect to the study of measuring units. Through this analysis, we hope to have made a small contribution to this overall research. We have tried to remain true to its criteria, without being influenced by any type of specific measurement tables and, above all, by observing the setting in which our work was executed and the possibilities that exist therein.

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23. As already mentioned, the north-south axis has a deviation of 2º, while the east-west axis appears to be completely horizontal.

9. PAST AND PRESENT POPULATION TRENDS IN THE FAYYUM REGION

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1. Introduction

The Fayyum region today faces problems that stem from the exponential growth of its population since the second half of the twentieth century AD. But the Fayyum is not the only region in Egypt suffering from population pressure. Modern Egypt is faced with the dilemma of where to accommodate its people without jeopardising its agricultural base and how to feed its population. One official response has been to restrict residential building on agricultural land. This has rarely been enforced and has caused the emergence of illegal settlements. Other measures, such as constructing new satellite cities on the desert margins have made little difference in easing the pressure on the housing market or in preventing housing development swallowing up agricultural land. Egypt has, of course, tried to increase agricultural land and the carrying capacity of the existing land through technical improvements and changes in water management strategies. However, in the long term, and indications of this are gradually surfacing, these measures seem likely not to increase, but rather to decrease agricultural land. Changes in water management have already led to large-scale salinisation and agricultural land has turned unproductive across the Fayyum region.

It is difficult to put a figure on how much agricultural land has been lost to population growth and through attempts to increase carrying capacity. Are population trends and its effects in the modern period unique and without precedence? Key and a starting point to answering this and other questions is a reconstruction of the population size and its spatial distribution within the Fayyum region – for the modern period as well as for the centuries that preceded the twentieth century AD. This article will reconstruct the population size of the Fayyum region in different centuries.

With regular population counts becoming available only from the late nineteenth century AD, any reconstruction of historical population changes have to fall back on population estimates and other sources that may point to significant changes in population trends. The first section reviews past population estimates, their sources and methods, aiming to establish the total population living in the Fayyum during various historical periods. The second part will then explore in more depth the relationship between population growth and its impact on land use patterns, in particular the growth in built-up area.

2. Population measures and other problems

2.1. Methodologies and muddles

Estimates for ancient population sizes have a long tradition. The current trend is probably to view such estimates as mere sport and, in any case, with some suspicion. This distrust is founded upon two issues: the scarcity of actual ancient population figures and the sheer disparity of earlier estimates. Modern population data are not spared such suspicion. Discussions of methodology and accuracy are common here too. Ancient estimates are pursued through several main approaches:

(1) archaeological remains,
(2) literary texts,
(3) papyrological evidence and
(4) 'guesstimates'
(5) population, geographical or statistical theories.

A common approach, for instance, is to combine approach (1) and (4) when multiplying the spatial extent of an archaeological site by a constant – anything from 100 to 600 persons per ha.[1] On the other hand, papyrologists have worked with a similar method, combining (3) and (4) by applying multipliers to population-related artefacts or information. Figures for adult males preserved in ancient tax registers are, for instance, multiplied by a constant of 2.909 or 3.1.[2]

For the size of Graeco-Roman settlements in the Fayyum, both papyrological sources and archaeological evidence are available. Davoli (1998) has compiled an archaeological gazetteer of Fayyumic sites for some of which she provides the size and spatial extent of archaeological remains.[3]

Another set of data for ancient population size is now available through the publication of new Ptolemaic tax registers from the mid to the end of the third century BC. These papyri attest the population size of 23 settlements during the early Ptolemaic period.[4]

1. Zorn 1994, table 1.
2. Bagnall and Frier 1994, 103 n.35; Rathbone 1990, 131. Clarysse and Thompson 2006, 94.
3. The size of Magdola is probably wrong and should be excluded. Philoteris has recently been surveyed, see now Römer 2004. Rathbone 1996, 54: on the identification of Kom el-Khamsin with Berenikis Thesmophorou.
4. Clarysse and Thompson 2006, II Table 4.4; Mueller 2002, Table 3.

For the Roman period, information on population size has remained scarce.[5] The different data sources for the population size are not without problems and difficult to bring into convergence. The archaeological record is complex, with site size commonly representing multiple layers of accumulated habitation. When the site continued to be inhabited from the Ptolemaic to the Late Roman period, there is little chance of deriving accurate measures for the extent of habitation for each individual period. In the rare case in which both types of source – papyrological and archaeological – are available, large discrepancies result in the estimated population size.

Without exact figures, another approach leads from a set of theoretical assumptions to a theoretical outcome. One such example is Tacoma's study (2005). He investigates the relationship between Egypt's urban and rural population in the third century AD. He is not, however, the first to do so. A range of scholars has estimated the size of Roman nome towns, putting them between 15,000 and 25,000 people.[6] But in contrast to earlier research, Tacoma wraps his estimates into geographical theory, advancing the idea of ranking all Egyptian nomes by area size and deducing the population size for each nome town from the area it appeared to serve. The Late Roman urban system of Egypt, in which all nome capitals are urban centre due to their administrative status alone, would then basically fall into four categories at ratios of 1 : 10 : 25 : 50. For example, Alexandria would be ten times the size of Hermopolis. For the Fayyum, and based on the assumption that the Fayyum of the fourth century AD extended over 900 sq km,[7] Tacoma suggests a population size of 44,000 for the capital.[8]

This estimate of a 44,000-strong population in the Roman city of the Fayyum is significantly higher than has been suggested earlier. Part of Tacoma's estimate rests upon the idea that the level of urbanisation in Roman Egypt ranged between 20 and 30 %, and in any case was not lower than this.[9] This raises an important issue which, if we could find a solution, would provide us with a figure for the total population of the Fayyum in that century and not just its urban population.

Survey archaeologists distinguish two main spatial phases of settlement: nucleated and distributed settlement patterns. In the course of millennia, settlement patterns shift in and out of these two phases with intermediate stages indicating the direction of that change.[10] In the case of a strong trend for nucleation, the majority of people in a region live in one or two main settlements, with very few rural sites being occupied. Dispersed settlement patterns are marked by a large number of small sites that are used for permanent habitation and a few large sites that act as centres for the region. If one takes these large settlements as a form of urban centre for that region, the degree of urbanisation would be high in nucleated phases and low in phases of dispersed settlement. But population estimates can be disconnected from the issue of urbanisation, that is, of how many people lived in rural and urban spaces. I am suggesting here that population distribution is a measure of the level of people clustering across a region. The discussion of what is a rural and what is an urban settlement is a qualitative assessment of the form and function of settlements. Rarely is it a quantitative assessment of the population size and continuum across a region. Nucleation does not inevitably reflect a high level of urbanisation, but a high level of clustering of people. Dispersed settlement patterns show a lower clustering of population. These populations need not differ in overall size.

Population clustering may vary significantly between different phases of settlement. For areas that have been subjected to intensive surveys, as in Greece, Turkey or Cyprus, population figures are not available. Here the ratio between small and large archaeological sites could provide an indicator for the distribution and clustering of its population. In general terms, this relationship may be expressed in Fig. 1. The larger the number of small settlements the smaller the percentage of people living in the main regional centre becomes.

2.2. A reconstruction of macro trends in population

Despite the best efforts and different methods applied to estimating the population size for the ancient Fayyum, the results are patchy, inconsistent and have rarely been applied to more than one or two periods. The situation has a number of causes. Sources are not available to support any one of these approaches used across a wider time span. The only truly long-term reconstruction of population changes in the Fayyum is still Butzer's environmentally focused study.[11] Starting in 4,000 BC and ending short of 150 BC, unfortunately not even his macro-trend study covers all periods of the Fayyum. On a macro level, and based on Butzer 1976, the Fayyumic population would have kept growing from 3,000 to 312,000. (Table 1)

5. Alston and Alston 1997; Rathbone 1990, 134.
6. Rathbone 1991, 121: 15,000 people. Bagnall and Frier 1994, 55: 25,000 people. Alston 2002, 333.
7. Bagnall 1993.
8. Tacoma 2005, 51-55.
9. Alston 2002, 334.
10. Bintliff 1997, 10-14. Sallares 1991.
11. Butzer 1976, 83 Table 4.

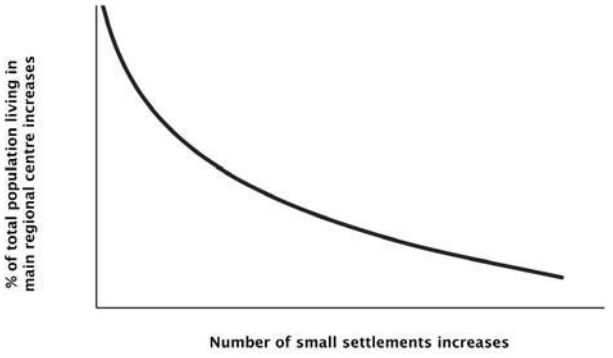

Figure 1. Schematic relationship between the population of the main centre and a number of small settlements in a region.

Time	Cultivable area in sq km	Population density per sq km	Hypothetical population in 000's
4000 BC	100	30	3
3000 BC	100	60	6
2500 BC	100	90	9
1800 BC	450	135	61
1250 BC	400	180	72
150 BC	1300	240	312

Table 1. Estimates of population size and cultivable land: 4000 BC to 150 BC. Source: Butzer 1976: 83 Table 4.

Although the number of archaeological sites and toponyms that are attested for various centuries is a good indicator for population trends, these are not a substitute for actual population figures. But in combination with other factors and observations these provide a useful indicator for estimating the total population of the Fayyum. What follows below is a set of observations that allow us to define parameters and constraints in a process of estimating the total population from the average number of sites for each period. Each site is considered to have been a place of permanent habitation (= village or farmstead), no matter how small. So taking stock of some constraints for each period:

For the Pre-Ptolemaic centuries (4000 to 300 BC)

– No population data is available.

– The large surface of the lake and low availability of cultivable land does not support a large group of population.

– The large surface of the lake shapes a nucleated settlement pattern with a high population density located in few places.

Ptolemaic and Roman centuries: (300 BC to 300 AD)

– Papyri from the early third century BC suggest an average settlement size of 513.[12]

– The cultivable area was extended and agricultural activities intensified, leading to a highly dispersed settlement pattern and a low percentage of urban population. About 5,000 people or 8 % of the total population may have lived in Krokodilon Polis in the early Ptolemaic period.[13]

– Across Egypt and the Fayyum, papyri indicate that the average village size increased significantly up to the second century AD. Urban centres expanded too. This has led many scholars to believe in a process of increasing urbanisation with higher percentage of population living in urban centres.[14] But this process was not fed by rural-urban migration. Population increased throughout the countryside and towns of the Fayyum at roughly the same magnitude, with a slight increase in the percentage of people living in Krokodilon Polis compared to earlier centuries.[15]

– The population in the latter half of the second century AD declined by up to 50 % due to the plague.[16]

– In the two centuries that followed the Antonine plague, the population did not recover, nor did immigration into the area take place which would have allowed the total population to bounce back to earlier levels. Large-scale desertification set in along Fayyum margins also partly caused by climate change.[17]

Byzantine/Islamic Period (400 AD to 1800 AD)

– No population data is available.

– The population makes a partial recovery. Agricultural intensification leads to an expansion of the

12. Clarysse and Thompson 2006, 106.

13. Clarysse and Thompson 2006, 100 suggest that a very conservative figure for the population size of Krokodilon polis would be around 4000, amounting to about 5 % of the total population in the Fayyum living in Krokodilon polis.

14. Alston and Alston 1997.

15. During the first century AD, the average prices for houses in villages and larger settlements were 600 and 1050 drachmas respectively. By the second century AD, these figures increased to 950 and 1600 drachmas (Alston 2002, Figure 3.10.1). Although showing signs of inflation, urban housing did not become significantly more expensive than rural housing. The demand for urban housing tends to increase with urbanisation driving up urban house prices.

16. For instance, the population of Soknopaiou Nesos shrunk from 1350 before 178 AD to 760/ 520 immediately afterwards: Hobson 1984, Van Minnen 1989, 43, Van Minnen 1995.

17. Van Minnen 1989, 45 draws attention to papyri that suggest the reduction of agricultural land under cultivation around Karanis of 81.5 % or more from the late second century to 308/309 AD.

settlement pattern, but not to a growth in settlement size.

– El-Nabulsi writes his account on the Fayyum oasis in the mid-thirteenth century AD. A reconstruction of tax notes implies that Fayyum City contributed about 14.8 % of all taxes, providing a maximum threshold for the percentage of the total population living in Fayyum City at that time.[18]

Modern Period (1801 AD to 2000 AD)

– Regular population data is available for all village districts since 1882.[19]

– Significant growth in level of urbanisation from 9 % in 1882 to 23 % in 1996.

– Exponential growth in population from 230,000 to 2 million between 1882 and 1996.

– The average village stood at around 4,000 people for the first half of twentieth century AD.[20]

Taking all these observation together, the total population for the Fayyum P_i may be calculated as:

$$P_i = \frac{(S_i - 1)v_i}{1 - \alpha_i}$$

Equation (1)

where S_i is the average number of sites at time i, v_i is the average population size of a settlement (excluding Fayyum City) and α_i is a nucleation coefficient that represents the fraction of people living in Fayyum City out of the total population in the Fayyum. This nucleation coefficient should not be viewed as a measure of the level of urbanisation in the Fayyum. v_i it is an estimate based on the assumptions set out above.

The number of sites indicates the state of the settlement pattern in the Fayyum between its two extremes: total nucleation and total dispersion. This relationship may be expressed mathematically through a power function (Fig. 1) and the estimation of coefficient α_i which is here calculated as:[21]

$$\alpha_i = 1.2115(S_i^{-0.5522})(1+\mu)$$

Equation (2)

where μ signifies an urban migration coefficient that allows for scaling the nucleation coefficient when migration processes are expected to alter the relationship between the number of settlement sites and the total population size. Here I assume that this does not apply to the periods before 1947, hence $\mu = 0$. These equations were only applied to data for the centuries before 1882. From 1882 population statistics from partial or national census takings first become available. (Appendix A - Table 4)

2.3. Population estimates for 2000 BC to 2000 AD: trends and discussion

The resulting population estimates presented here are based on the various assumptions and observations stated above. The results (Fig. 2) suggest that the Fayyum region passed through several stages of settlement and resettlement which frequently caused severe changes to its population base. The number of sites indicates that human activity was limited and localised before the Ptolemaic period. Butzer's (1976) hypothesis is that the Pharaonic population increased from as little as 3000 people c. 4000 BC to 72,000 people c. 1250 BC. Based on my own analysis and on developments in the Ptolemaic period, I suggest that this is far too an aggressive assumption. Even when one uses the average settlement size of the early Ptolemaic period, when there was massive immigration into the Fayyum, the total population fails to rise beyond 10,000 to 14,000. (Appendix A - Table 4)

The Fayyumic population history gained its early dynamics from the Ptolemies when, over a period of 300 years, population increased to around 70,000 in total. The settlement pattern that developed was highly dispersed and suitable to an intensive form of agricultural exploitation. Fayyum City most certainly provided the economic and administrative focus of the region, but in terms of its population, it accommodated a relatively low fraction of the total in the Fayyum. As evidence from Karanis and other settlements under Roman rule highlights, neither did Fayyum City grow at the expense of rural settlement. With a small hiatus in the first century BC, the Fayyumic population kept growing in all areas in and outside Fayyum City. The population peaked in the second century AD with some 160,000 people living in the Fayyum.

The later second century AD saw the Fayyum lose substantial population to the plague. It did not recover, but continued on a downward spiral. Desertification, the abandonment of cultivable land, neglect of the irrigation system and shrinkages of settlement from the desert margin inwards towards the core of the region all combine to paint a bleak picture for the third and fourth century AD. Population size may have shrunk by as much as 233 %, from 160,000 to 45,000. Calcu-

18. Cahen 1977, 198. Keenan 2005.

19. Cuno and Reimer (1997, 202, 212 Appendix A) pointed out the remainder of regional census registers for the year 1849 which represent the earliest evidence of some form of modern census taking in Egypt. A set of 78 documents has survived that were part of the 1849 register for the al-Aqalim al-Wusta province comprising Bani Suwayf, al-Minya and al-Fayum.

20. CAPMAS (Central Agency for Public Mobilisation and Statistics), various years. For an overview of Egypt's population growth in the nineteenth century AD, see Panzac 1987, McCarthy 1976, Scheidel 2001, 202-212.

21. Ideally, we would want to calculate this formula based on fitting it in with some current data. However, as discussed above, only estimates are available for historical periods and the relationship has to remain a mathematical one.

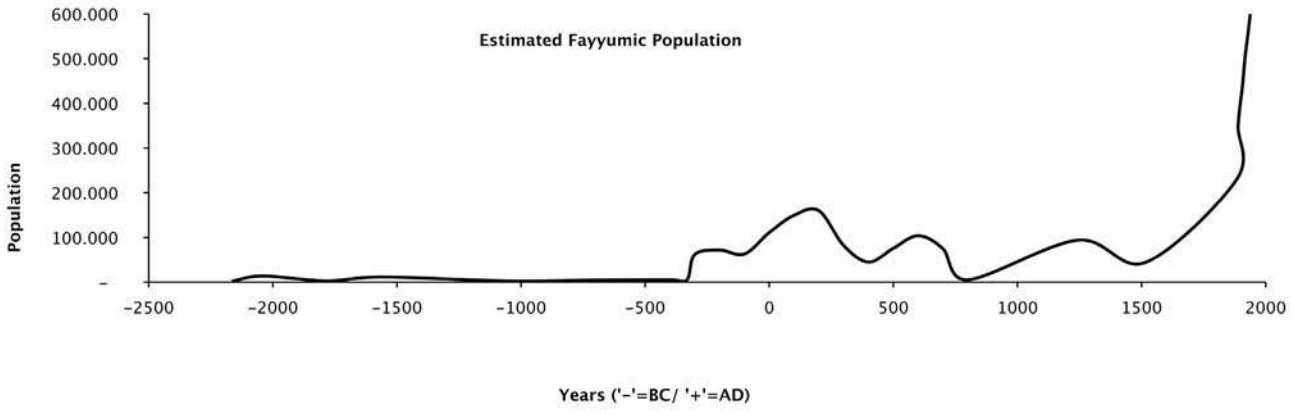

Figure 2. Estimated total population in the Fayyum: 2000 BC to 2000 AD.

lated as an annual rate of loss over 150 years, this loss of about 2% per annum looks reasonably manageable. But most of the loss was caused within a few years of the Antonine plague, which ravaged through the Fayyum and large parts of Egypt, stripping out whole generations in a short span of time in the later second century AD. It took the Fayyum region several hundred years, up to the sixth and seventh centuries AD, to bounce back. It had still not reached to the same level as in the second century AD, but came close with up to 100,000 people.

Plague returned to Egypt again and again, costing thousands of lives and depopulating whole landscapes in the process. The first major epidemic outbreak is recorded in 541-542 AD and is known as Justinianic plague, which in the Eastern Mediterranean may have cost the lives of up to quarter of the population.[22] Egypt is thought to have been the source of this outbreak and it appears to have lingered there until about 750 AD. Seasonal waves of plague kept erupting in Egypt between the sixth and eight centuries AD. Major waves are on record for the years 639 AD, 686 AD, 703 AD and 746 AD.[23] With only localised effects, some of these waves were not as severe as the Justinian plague, but they left their mark on Egypt's population. To this day, it remains unclear how many people died from the plague during this period. Scheidel (2001, 101) has pointed out that, on their own, such localised plague incidences might not have had detrimental effects on Egypt's population, but they may have intensified the effects of other more common deadly diseases, such as malaria and typhoid. The Fayyumic population most certainly did not escape unscathed from either the various waves of plague or the other epidemic diseases. As a result of high mortality rates the population size remained at moderately low levels throughout the sixth to the eighth centuries AD, never reaching the heights of the Roman period.

The next few centuries were free from epidemic plague until its return to Egypt in the mid-fourteenth century AD. From then onwards, plague remained a major cause of demographic change in Egypt until about the 1840s. We might guess that what followed this somewhat brief interlude of plague-free centuries could have resembled El-Nabulsi's picture of the Fayyum. In 1243 AD, El-Nabulsi describes the Fayyum as an agriculturally fertile, but a political backwater notorious for the phlegmatism of its inhabitants and marshes that cause 'miasmatic vapour' to fill the air. The Fayyum of the thirteenth century AD kept the local economy going and population paid a reasonable amount of taxes that suggest a healthy network of human activities and settlement at that time.[24] Malaria has been a persistent, if less deadly, feature of the Fayyum region ever since antiquity.[25] Today's travellers to the region are still advised to take precautions.

Kept in check by waves of plague and other epidemics, the figure for the Fayyumic population then started oscillating between about 45,000 and 90,000 until the late nineteenth century AD. Although the figure is similar to that of the early Ptolemaic period, with fewer sites to its settlement network the Islamic and Ottoman Fayyum was a much more densely packed region than under the Ptolemies.

Today, the whole of the Fayyum Oasis forms one single administrative entity, the Fayyum Governorate. It encloses both inhabited and cultivated areas, as well as considerable stretches of desert. Currently,

22. Hays 2007.
23. Scheidel 2001, 100.
24. Cahen 1977.
25. Scheidel 2001, 83-84.

the cultivated part is divided into five regional districts (*markaz*).[26] Table 2 shows the population change for the Fayyum governorate. Between 1897 and 1960, the population grew moderately at 0.8 % p.a. From the 1960s onwards population growth accelerated with annual growth rates ranging between 2.19 and 3.70 %. The latest official estimates by CAPMAS suggest that the Fayyum accommodated some 2.37 million people in 2004. With an area of 2,262 sq km it is a medium-sized region and relatively densely settled (1048.53 persons per sq km).

A recent population census was carried out in November 1996. In that year, 13.1 % of the 2.37 million lived in Medinet Fayyum, the main city of the Fayyum governorate. Throughout the twentieth century, this percentage has continuously increased from an initial 8.9 % in 1897 to a peak of 14.6 % in the 1960s and 70s. This already indicates an increase in urbanisation. In Egypt, the distinction between what is an urban and what is a rural settlement is made solely on an administrative basis. By definition, centres of a *markaz* are urban centres and so the Fayyum is home to five urban centres: Medinet Fayyum, Ibshawây, Itsa, Sinnûris and Tâmiyah.[27] In 1907, 12.5 % of the total population lived in these urban centres compared to 22.45 % in 1996. This change underlines the trend towards urbanisation. The Fayyumic population has steadily become more urbanised throughout the twentieth century. But in a national context, this represents a comparatively low level of urbanisation. The Fayyum was and still is a region with a largely agricultural character. In Egypt as a whole, the urban population rapidly rose from 17.2 % to 33.5 % between 1907 and 1947. In the years following 1947, this percentage continued rising moderately up to 1966 when it lost momentum. From 1966 onwards it has remained stable at 43.0 %.[28]

3. People and places

Knowing how many people lived in the Fayyum region in past centuries is important. But beyond each such population figure there stands a multitude of relationships between people and the places they lived in. People lived in a particular place. They shaped that space and their local environment in various forms, sometimes driven by sheer necessity, at others by deliberate intent. Understanding the nature of that relationship and its trajectories lies at the centre of population geography. In its basic form, it is no longer sufficient simply to understand how many people lived in a place at a particular point in time. Knowing how many people lived at any one point is the first stepping stone to assessing how people related and still relate to their surroundings. This can encapsulate very practical day-to-day forms of using space. For instance, how and why do people avoid certain places and not others? Why and how does traffic move through a town at different times of the day? How and why do people choose to live in certain places and not in others?[29] Not all of the issues raised are equally applicable to antiquity. Some may be judged to be more relevant than others, given the indisputable shifts in the nature of socio-economic, cultural and technological relationships between people and their environment. One relationship that has not changed and which has remained a vital pillar of ancient and modern societies in Egypt is that of people's dependence on land. People still need land to build their homes on and they need land that can be cultivated to provide them with food.

3.1. Settlement size: a spatial theory of settlement packing

People need space in which to live and work. With a growth in population, the pressure for opening up new land, new resources and space increases. But inevitably the built-up areas of a settlement increase too. Geographers have long since demonstrated that built-up areas of settlements can be estimated with a considerable degree of accuracy from the number of inhabitants. In short, the built-up area of a settlement is proportional to its population. Tobler (1969) has turned this empirical observation into theory, testing his assumption on modern settlements in the US, Spain, Turkey and Egypt. For Egypt he used the 1960 census results, as well as Gemini photographs (G5-Ri-44) taken in 1960s to verify whether the estimated built-up area fits the observed. He found that during the 1960s Egyptian towns were 16 times more compact than towns in the US. Not only was it possible to estimate built-up areas, but it became feasible to derive coefficients that allow comparisons between countries and their urban systems. These coefficients provide an objective measure for distinguishing and evaluating the various spatial patterns that emerge when societies

26. Table 6: (1) Source: McCarthy 1976, 27, Table 22; Tanada 1997. (2) Source: estimated by author. (3) Source: CAPMAS 1937-1996. (4) Source: CAPMAS 2004.

27. The existence of these urban centres in the modern Fayyum is one reason why we should try to distinguish between the population living in Fayyum City in relation to the total population in the Fayyum (nucleation coefficient) and, on the other hand, the relation between people living in urban centres and the total population of the Fayyum, i.e. the level of urbanisation. Today's Fayyum City is not the only urban centre in the Fayyum. The question is whether it ever was even in antiquity. For a discussion on potential urban settlements in the Graeco-Roman Fayyum, see Mueller 2006.

28. CAPMAS 2000, 1996, Egypt Census.

29. Holloway and Hubbard 2000.

Governorate	1882(1)	1897(1)	1907(1)	1917(1)	1927(2)	1937(3)	1947(3)	1960(3)	1966(3)	1976(3)	1986(3)	1996(3)	2004(4)	Area (sq km)	Pop Density (2004)
Alexandria	231.396	319.776	332.247	444.617	562.048	685.736	919.024	1.290.000	1.801.000	2.318.655	2.917.327	3.328.196	3.755.901	3.471	1082,08
Aswan	224.392	240.382	272.422	293.340	297.562	305.096	290.842	340.000	521.000	619.932	801.408	973.671	1.098.870	203.685	5,39
Asyut	562.137	782.720	907.435	981.197	1.087.207	1.205.321	1.374.454	1.203.000	1.418.000	1.695.378	2.223.034	2.802.185	3.351.057	10.129	330,84
Bahr al Ahmar						9.914	15.929	-	38.000	56.191	90.491	155.695	182.526	1.827	99,9
Beni Suef	219.573	314.454	372.412	452.893	504.296	561.312	612.027	793.000	928.000	1.108.615	1.442.981	1.860.180	2.208.082	1.942	1137,01
Buheira	415.234	636.825	792.242	892.246	971.513	1.061.596	1.244.495	1.484.000	1.979.000	2.517.292	3.257.168	3.981.209	4.604.443	2.679	1718,72
Cairo	374.838	570.062	654.476	790.939	1.045.697	1.312.096	2.090.654	3.358.000	4.220.000	5.084.463	6.052.836	6.789.479	7.629.866	1.442	5291,17
Damietta	34.044	31.515	29.354	30.984	35.461	40.332	53.631	333.000	432.000	557.115	741.264	914.614	1.056.324	85.105	12,41
Daqahligya	586.033	780.480	912.428	986.643	1.096.469	1.218.502	1.413.905	1.849.000	2.285.000	2.732.756	3.500.470	4.223.655	4.839.359	1.532	3158,85
Fayyum	**228.709**	**371.006**	**441.583**	**507.617**	**551.798**	**602.122**	**669.696**	**765.000**	**935.000**	**1.140.245**	**1.544.047**	**1.989.881**	**2.371.780**	**2.262**	**1048,53**
Gharbiyah	936.276	1.297.656	1.484.814	1.659.313	1.803.564	1.967.894	2.327.031	1.567.000	1.901.000	2.294.303	2.870.960	3.404.827	3.859.378	214	18034,48
Gizah	283.083	401.234	460.080	534.442	606.511	685.331	818.168	1.117.000	1.650.000	2.419.247	3.700.054	4.779.865	5.535.498	1.001	5529,97
Ismailia	3.364	6.886	10.373	15.507				-	345.000	351.889	544.427	715.009	844.091	55	15347,11
Janub Sina'											28.988	54.495	63.834	376.505	0,17
Kafr ash Shaykh								832.000	1.118.000	1.403.468	1.800.129	2.222.920	2.541.124	4.180	607,92
Luxor												360.503	414.389	17.840	23,23
Matruh						52.576	74.839	-	124.000	112.772	160.567	211.866	262.210	679	386,17
Menufiyah	721.297	864.206	971.016	1.072.636	1.109.990	1.159.701	1.165.015	1.260.000	1.458.000	1.710.982	2.227.087	2.758.499	3.171.058	1.553	2041,89
Minyia	314.818	550.971	663.144	763.922	841.407	928.259	1.044.201	1.476.000	1.706.000	2.055.739	2.648.043	3.308.875	3.960.656	1.322	2995,96
Port Sa'd	16.560	42.095	49.884	70.873	115.368	161.146	245.932	416.000	283.000	262.620	399.793	469.533	529.684	72	7356,72
Qalyubiya	271.391	371.602	434.575	528.581	566.217	610.157	693.908	758.000	1.212.000	1.674.006	2.514.244	3.302.860	3.804.188	589	6458,72
Qina	386.249	681.202	698.860	840.317	923.801	1.017.569	1.106.302	1.219.000	1.471.000	1.705.594	2.252.315	2.441.420	2.876.746	33.140	86,81
Shamal Sina'						18.011	37.670	-	131.000	10.104	171.505	252.750	302.077	3.437	87,89
Sharqiya	464.655	748.972	886.346	955.497	1.032.415	1.120.826	1.345.829	1.635.000	2.108.000	2.621.208	3.420.119	4.287.848	5.009.690	212.112	23,62
Sohag	521.413	688.011	797.940	865.695	986.557	1.118.402	1.283.468	1.449.000	1.689.000	1.924.960	2.455.134	3.123.000	3.730.894	1.796	2077,34
Suez	10.919	17.173	18.347	30.996	40.118	49.686	107.244	163.000	264.000	194.001	326.820	417.610	478.553	27.574	17,36
Wādi al Jadid						29.109	32.503	-	59.000	84.645	113.838	141.737	166.211	1.547	107,44
Totals	*6.806.381*	*9.717.228*	*11.189.978*	*12.718.255*	*14.178.000*	*15.920.694*	*18.966.767*	*23.307.000*	*30.076.000*	*36.656.180*	*48.205.049*	*59.272.382*	*68.648.489*	*997.690*	

(1) Source: McCarthy 1976:27, Table 22; Tanada 1997

(2) Source: estimated by author

(3)Source: CAPMAS (Central Agency for Public Mobilisation and Statistics), Egypt Census, various years, 1937-1996

(4)Source: CAPMAS (Central Agency for Public Mobilisation and Statistics), Population Estimate, 2004

Table 2. Population size of Egyptian governorates: 1882-2004. (1) Source: McCarthy 1976, 27 Table 22; Tanada 1997. (2) Source: estimated by author. (3) Source: CAPMAS (Central Agency for Public Mobilisation and Statistics) 1937-1996, *Egypt Census*. (4) Source: CAPMAS (Central Agency for Public Mobilisation and Statistics), *Population Estimate*, 2004.

organise themselves and their activities. Schwart and Warntz (1958) saw their notion of population potential confirmed in this relationship between population and space. The equation is not primarily just a spatial measure of population clustering, but it can also be understood as a measure of individual space consumption when applied to one individual, rather than to the group of individuals that we tend to term population.

3.2. Some modern equations

Tobler (1969) suggests then that the built-up area of a settlement can be estimated from its population by the function:

$$A = \alpha P^{\beta}$$

Equation (1)

where A is the built-up area, P is the population of a settlement, α and β are numerical coefficients. The population density D of a settlement can be derived as:

$$D = \frac{1}{\alpha} P^{1-\beta}$$

Equation (2)

If we assume an ideal settlement to be circular then the radius r of its built-up area is:

$$r = (\alpha / \pi)^{1/2} P^{\beta/2}$$

Equation (3)

Estimates for the population or built-up area depend on the value of the coefficients α and β. Empirical studies have shown that these two coefficients can differ from one culture to another. Whereas β is kept constant at a value < 1, frequently 0.88, α can vary considerably. This variation in α is an expression of the compactness of a settlement. The higher the population packing the lower is α. Western European and US cities of the 1960s and 70s appear to be significantly less densely populated than Egyptian or Japanese settlements. The latter two are about 16 times more densely populated than settlements of a similar size in Western Europe and the US. For Egypt's cities in the 1960s, Tobler (n.d.) suggested α = 0.000241 and β = 0.88, when estimated as area in square kilometres.

3.3. Data sources: satellite images

Accurate measurements for the built-up area of settlements are difficult to source for Egypt. Egyptian census publications provide the area of settlement district as a whole, which may include agricultural land and not just the built-up area. Such data is not suitable for assessing the relationship between population size and built-up area, which takes us back to satellite imagery. Earth observations from space through satellites have come a long way since Tobler conducted his research in the early 1960s. Numerous earth observation satellites are now orbiting the globe, which allows the monitoring of whatever can possibly be monitored, starting from minute changes in weather and cloud cover to forest fires in Siberia and long-term changes in landholding patterns throughout Thailand. Although all these observations are clear and visible as pictures, to quantify such observations from satellite images requires the application of procedures that reclassify the visual data into a set of variables.

Using remote sensing techniques and data for an analysis of population changes requires one to make a number of decisions and design choices. For instance, a distinction has to be between 'land use' and 'land cover'. Although sometimes used as synonyms, these two terms are different. Land cover is what covers the surface of a particular stretch of land, the term 'land use' describes how that land is being used. Land cover classes may include water, grassland, bare soil, forest or sand. Land use may be agricultural, urban, roads, parks and so on. Built-up areas describe how land is being used. They may include features that are used such as roads, housing, irrigation canals and industrial complexes. As a consequence, image classification needs to take account of these sub-features. My aim here is to create a map of land use in the modern Fayyum that consists of two classes: built-up areas and non-built-up areas, with the aim of measuring the built-up area and its relationship to current population census results.

3.3.1. Pre-processing, classification and field work

There are many approaches to land use classification. Some approaches use satellite images, some use satellite-borne photography,[30] some aerial photography and again others use a hybrid approach of field surveys and remote-sensing data. Since we need a measure of built-up area for the whole of the Fayyum, aerial photography would provide a far too detailed and labour- and cost-intensive data source. I have opted for using colour satellite images taking by the SPOT satellite. The first image was taken on 21 August 1991 and the second on 14 June 1997. Both cover the same area, but omit the western edge of the Fayyum depression, which has been mainly used for agriculture (Figure 3).

Both SPOT images were used to conduct an initial visual as well as digital image interpretation. Preprocessing of each image was kept to a minimum. Both images arrived in excellent technical quality, with no

30. See Bitelli 1999 for such an application to reconstruct terrain changes in the north-east of the Fayyum.

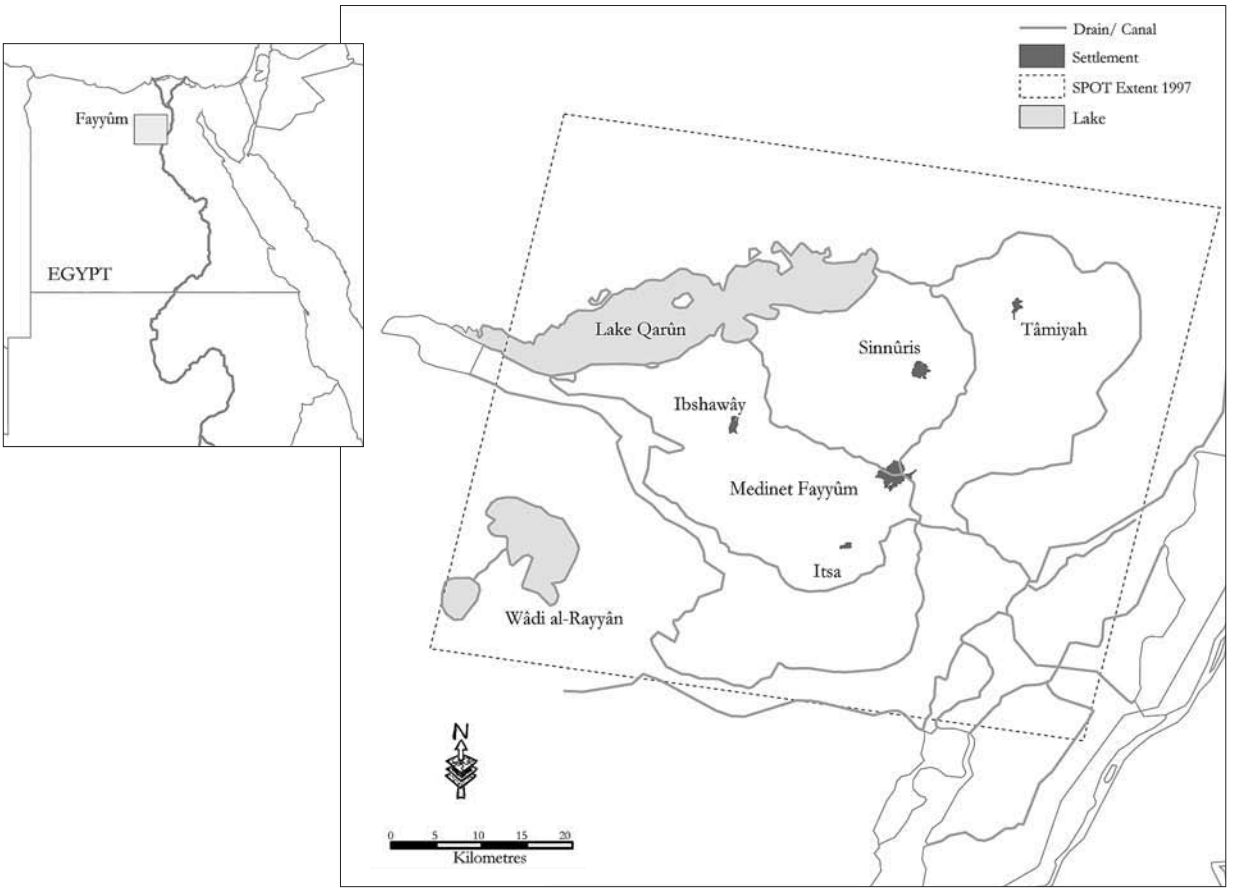

Figure 3. Modern Fayyum irrigation and drainage system: an overview.

cloud cover and already projected (= calibrated against a geographical coordinate system). Compared to many mountainous regions in Egypt and across the globe, the inhabited area in the Fayyum is also a relatively flat area. Sun reflections are absorbed and scattered more or less uniformly across the area. Hence, pixel values are rarely distorted by factors independent of surface cover, and radiometric processing that adjusts for terrain factors was not necessary.

The actual classification process involves assigning each land-use category particular pixel values in the satellite image. There is no one solution for this, since built-up areas are made up of different materials and mixed groups that result in a spectrum of pixel values, rather than one specific pixel value. There is also the issue of fuzziness that needs to be addressed. So for instance, should a levelled courtyard with trees be counted as built-up, semi-built-up or not built-up? A hybrid approach of digital image classification, visual interpretation and field work will probably yield the most accurate picture. Both images were initially subjected to a supervised pixel classification which used pre-defined pixel samples of built-up areas to train the automated classification algorithm that was later applied. The automated classification also created a small class of pixels that could be assigned either to built-up or not built-up. Further fieldwork was carried out during the summer of 2005 to sample these semi-built-up areas and to verify whether they should be classed as built-up or not built-up.

3.4. Results and discussion

The urban built-up area has been estimated from SPOT images for 1991 as 65.79 sq km and in 1997 as 74.18 sq km, which amount to a 12.74 % increase over five years and an annual increase of 2.55 %. To recap, between 1986 and 1996, the total population in the Fayyum grew from 1.54 million in 1986 to 1.99 million in 1996, and to an estimated 2.37 million in 2004 – an annual increase of 2.97 %. Population growth slightly outpaced the growth in built-up area. This observation already gives an indication of what to expect in terms of settlement packing.

Given that population and built-up area grew disproportionately, population density should have continued to increase. This may be tested by applying Tobler's equations and earlier work on Egyptian towns as a result of the 1996 Egyptian census for settlements in the Fayyum. Tobler's derived coefficients α and β provide a benchmark for population density and settlement packing in the early 1960s. Figure 4 highlights that if we apply Tobler's original coefficient

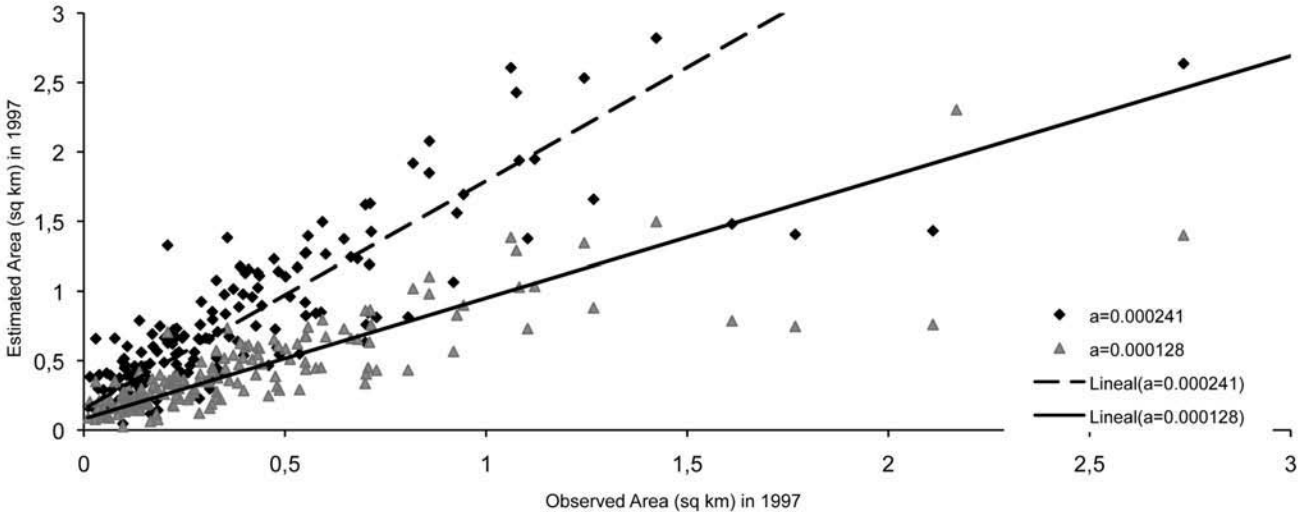

Figure 4. Estimated built-up area for the Fayyumic settlements in 1997.

Census Year	*Population*	*Estimated built up area in sq km (a=0.000241,b=0.88)*	*Estimate built up area in sq km (a=0.000128, b=0.88)*
1907	441,583	***28.5***	18.24
1947	669,696	***43.23***	22.97
1976	1,140,245	88.79	***47.23***
1996	1,989,881	146.07	***77.58***

Table 3. Estimated built-up area: 1947-1996. Source: calculated by author, based on CAPMAS 1947, 1976 and 1996, for settlement population size.

to 1996/1997 population data, the built-up areas in the Fayyumic settlements would be considerably overestimated. Leaving β constant, α would have to be reduced from 0.000241 to 0.000128 to fit the 1996 census data to the built-up area estimated from the 1997 SPOT images.

Since Tobler's analysis in the early 1960's, the built-up area of settlement has not grown in proportion to its population. Population growth has not led to the forecasted expansion of new settlement. Whereas in the 1960s Egyptian settlements were 16 times more compact than Western European and North American towns, they are now some 30 times more compact.

Differentiated population data for the Fayyum has been available since the late nineteenth century AD, when the first census was conducted. Assuming two scenarios for earlier decades, equations (1) can be used to estimate the theoretical change in built-up area between 1907 and 1997 from the census population. The two scenarios involve the observations just discussed above. Settlement packing did not remain constant, it significantly increased during the second half of the twentieth century. Instead of using the same α coefficient for all census years, I opted for two different coefficients. For the years 1907 and 1947, a higher coefficient is applied and a lower one for the years 1976 and 1996 respectively. Table 2 lists the results of these two scenarios with the recommended values in bold italics. It suggests that between 1907 and 1996, some 49.06 sq km were solely lost to the expansion of settlement and the need to accommodate an ever-increasing population.

The Egyptian government has tried to balance this continuous population growth and loss of agricultural land to residential built-up areas by large-scale reclamation schemes. According to CAPMAS (2002, 73), 3.17 million feddans (1.33 million ha) of land were reclaimed over the last 50 years. However, Zalla *et al.* (2002, vi) report a somewhat lower figure of 2.7 million of which only 1.5 million feddans are currently under cultivation. Some areas of Egypt offer more opportunities for reclamation than others. The Fayyum depression being surrounded by desert and having ample water supplies appeared initially destined to contribute a major share of new land. But reclamation has been hampered by salinisation and poor drain-

age.[31] New land constitutes only 3.2 % of the total arable land (343,000 feddans) in the Fayyum. Between 1952 and 1997, 18,800 feddans (7896 ha = 7.9 sq km) had been reclaimed in the Fayyum, of which only 10,932 feddans (4591 ha = 4.6 sq km) are under cultivation.[32] It is obvious from the calculations above that the reclamation efforts between 1952 and 1997 fell far short of balancing the growth in built-up area. This is despite settlement expansions being constrained by various factors not discussed so far. If settlement build-up had grown at a rate proportional to the growth in population, the shortfall between reclaimed land and built-up area would have been even larger.

3.5. Constraining settlement expansion: an egyptian response

Over the last four decades of the twentieth century AD, when population growth reached new heights in Egypt, new built-up areas did not expand in line with its population. There are a number of reasons for this, many of which are related to government policies and state regulation. Despite the right intentions of safeguarding Egypt's future and of providing sustainable housing, these laws have contributed to a large-scale distortion of the Egyptian housing market. With Egypt's agricultural land and productivity limited, nothing was more urgent than to protect that agricultural base from turning into housing developments. A law was passed that protects agricultural land from being developed for housing. The net result was two-fold. Firstly, apartment blocks grew upwards with ever more new levels being added to existing blocks. Secondly, illegal settlement took place and is still taking place on land that is owned by the state and not suitable for habitation.[33]

To illustrate the extent of this process, Ibrahim and Ibrahim (2003:218) estimate that 80 % of the population in Greater Cairo lives in housing that was illegally built. In the early 1990's, the government attempted to remove several such settlements, but without much success. With a view to urban migration affecting the city more than any other urban centres in Egypt, Greater Cairo may be claimed as an exceptional case. But it is more a phenomenon of rural to urban migration that is also affecting smaller urban centres.[34] The town of Beni Suef in Middle Egypt tells a similar story to that of Greater Cairo, although on a smaller scale. In 1996, El-Nahhas (1997, Appendix) counted eight illegal settlement areas within the town itself, bringing the total number for the whole governorate to 52. Hard facts on the subject for the Fayyum governorate are difficult to obtain, but it is very likely that the Fayyum is suffering a similar fate. The fear for those living in illegal or semi-illegal settlements is not that they might be evicted, but that they will continue living in adverse conditions. In practice, essential infrastructure, such as water, sewage drainage, electricity, roads and health care cannot be brought officially to those living in these new, but illegal settlements.

A second major roadblock to new housing has been Egypt's Tenants Laws that favour people that rent flats, leaving rents too low for landlords to consider renting them out in the first place or too low for those who seek investment through letting newly built homes. In the 1980s and 90s, this situation resulted in 2 million flats being left vacant. It was only in 1995 that a new law aimed at liberalising the housing market came into force. It allows property owners to freely dictate rent, as well as the length of letting contracts.[35]

Both factors – a ban on development and frozen rent agreements, in addition to the dramatic population growth, drove up prices for new housing development, led to a severe shortage of suitable homes, and the formation of slums in urban areas. To its credit, the Egyptian government has been trying to counter these trends with mixed results. It has invested in the construction of satellite towns in desert areas. Since 1977, some 17 new urban cities have been planned and partially built in the desert margins to relieve the narrow crowded Nile valley. The new *Plan for Development and Construction* aims to increase this figure to 44 new urban communities, offering homes to 12 million people by 2017.[36] Concerns have, however, already been raised over the existing desert satellite towns and their failure to attract people to live there permanently. By 1992, only some 160,000 people were living in flats built in satellite towns.[37]

The Fayyum governorate is no exception here. On the contrary, despite massive population growth and ample desert margins, the Fayyum has never been included in plans for developing satellite towns. The reasons here are twofold. Satellite towns have mainly been designed as twin towns on opposite desert-facing sides of existing urban centres and in close proximity

31. For a general overview of the regional distribution of old irrigated land and land reclaimed between 1952 and 1996, see Meyer 2001, 335, 336: Figure 2.

32. Zalla *et al.* 2002, 22, 51.

33. Other official responses included the implementation of health, population and family planning policies that initially lacked perspective and clear direction. The impact of such policies on slowing down population growth in Egypt is debateable: Ibrahim and Ibrahim 1998, 22-24, 30.

34. McCormick and Wahba 2005, 43-46.

35. Ibrahim and Ibrahim 2003, 220.

36. Ali 2003, 67.

37. Ibrahim and Ibrahim 2003, 244.

to them. In theory, this should foster the acceptance of the new town and greatly speed up the migration processes from the old to the new towns. However, the topology in the Fayyum is different from that of the Nile Valley. All major urban towns in the Fayyum are embedded within agricultural land and located relatively far from desert margins. The Fayyum is also thriving or suffering from its tradition as an agricultural centre. Instead of attracting non-agricultural industry, the region has been pushed further along the road to increased agricultural production and specialisation. Egypt nitrated it into a plan of reclaiming agricultural land. When population grew in the main urban centres of the Fayyum, there was no other way than to expand towns vertically rather than horizontally as elsewhere.

This pattern becomes clear when individual settlements and their built-up areas are mapped out, and not just viewed as basic built-up agglomerates (Fig. 5). One can clearly see how between 1907 and 1997 settlement density increased throughout the Fayyum. There is no trend for settlements along the desert fringes to expand disproportionately. Hence, largely agricultural land, not desert land, was lost to population growth and new settlement. As urbanisation sped up in the second half of the twentieth century, Medinet Fayyum began to visually dominate the settlement network followed by the old and new *markaz* centres Sinnûris, Ibshawây and Tâmiyah. Another important trend is the expansion of new settlement from the core of the Fayyum region – Medinet Fayyum. Settlement in 1907 did not reach as far north and northeast as settlement in 1997 did. The Fayyum gradually filled up with new settlements, starting around and in the vicinity of Medinet Fayyum.

4. Ancient settlement packing: a conclusion

The theory of settlement packing may also be applicable to the ancient world, but since we almost always lack detailed knowledge of the population size of settlements, one quickly arrives at an impasse. What I suggest here therefore is a very hypothetical application, using the population estimates made in this paper (Appendix A – Table 4). This should provide us with an indication of changes in the built-up areas of the Fayyum.

Appendix A - Table 4 summarised the population estimates and built-up area in the Fayyum between 2000 BC and 2000 AD. Here I assume that the lower Tobler coefficient for pre-1997 settlements might be suitable. The early Ptolemaic population would have

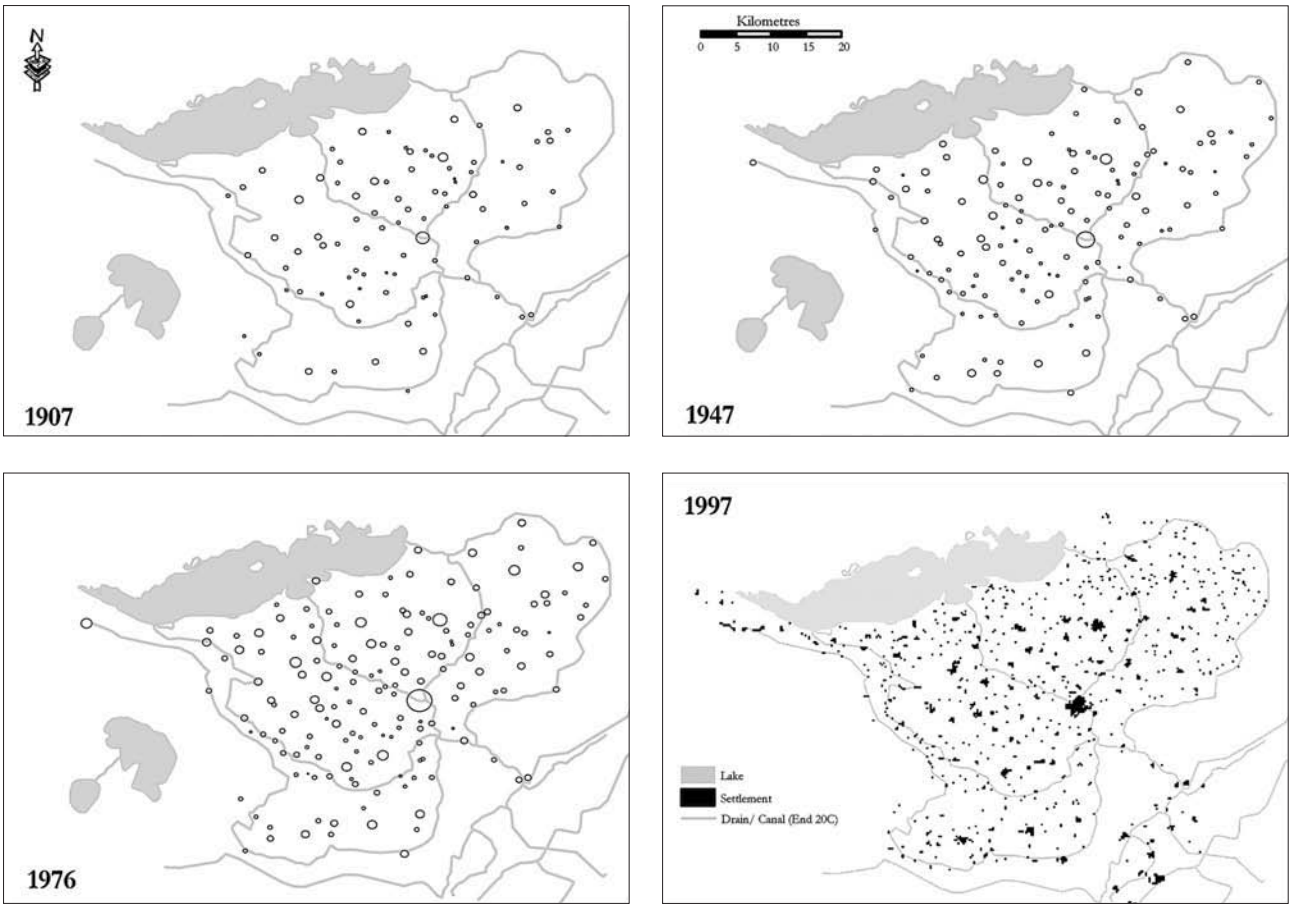

Figure 5. Map of estimated built-up area of Fayyumic settlements: 1907-1976. 1997: as derived from SPOT.

occupied about 4 sq km. Built-up area peaked in the Roman period. Roman settlement in the second and third centuries AD may have occupied as much as 9 sq km, with a primary built-up area of about 1.1 sq km for the metropolis Krokodilon Polis or, as it was then also known, Arsinoe. With a twofold increase in built-up area, land use changes between the Ptolemaic and Roman period were among the most severe in the history of the Fayyum.

An overall increase in built-up area from 4 to 9 sq km seems very little compared to the overall size of the Fayyum depression of about 2,000 sq km. But the discussion above has made it clear that agricultural land lost to an increase in built-up area is very difficult to recover through whatever means. The main method used in modern Egypt is to reclaim land from desert areas. This has proven to be costly, labour-intensive and risky, despite technological innovation. Modern Egypt is doing all it can to avoid the loss of agricultural land to new built-up areas by directing new settlement to the desert margins. Did ancient population growth, and with it the expected growth in built-up area, exert a similar pressure on resources and response? Over the centuries, physical and agricultural processes changed the face of the Fayyum. They also change the nature of the question just raised. Are we comparing like for like?

During the early pharaonic periods, the Fayyum depression was partly lake, partly swamp, with a very small amount of agricultural land in places at a higher altitude. Through the annual Nile flood, fertile alluvial soils were deposited at the bottom of the lake and on what little agricultural land was then cultivated. Cultivable land probably stretched across 100 sq km at most around 4000 BC. It is only when in-flow into the depression was regulated during the Middle Kingdom that the area of cultivable land may have increased fourfold to 450 sq km. The early Ptolemies did even better. They managed to increase the cultivable land from 400 to 1,300 sq km.[38] Compared to the meagre 7.9 sq km that were reclaimed between 1952 and 1997, when the Fayyum's population growth outpaced that of any other period (see above), this was no small feat. But it was a much easier task than 2,000 years later. Under the Ptolemies and Romans, expanding agricultural land through reclamation was a matter of draining the lake. With relative ease large stretches of fertile land could be gained from reducing the size of the lake and drying up the swamp. This made it easier for ancient peoples to balance the likely loss of agricultural land to built-up areas. In modern Fayyum new land for cultivation needs to be reclaimed from the desert. Once the desert reclaims land, it will hardly let go of it. Reclamation takes time and resources which, on balance, might better be invested into preventing population pressure from growing beyond carrying capacity, both in terms of habitation and sustenance. In conclusion, the issue of the growth in built-up area endangering Egypt's agricultural base is a modern concern that has two main causes: exponential population growth and the limit of cultivable land being reached. Neither of these two causes prevailed in the centuries preceding the late twentieth century AD.

38. Butzer 1967, 82, Table 4.

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Appendix. Table 4. Population estimates for the Fayyum region: 2000 BC to 2000 AD.

Year ('-' =BC, '+'=AD)	Number of Site	Fraction of Population living at Fayyum City = α	Fayyum City Population	Total Population	Average settlement size	Estimated Built-up Area - Fayyum City	Estimated Built-up Area - Total Population
-2160	2	0,8262	2.440	2.950	513	0,23	0,27
-2040	22	0,2198	3.040	13.810	513	0,28	1,06
-1785	2	0,8262	2.440	2.950	513	0,23	0,27
-1560	18	0,2456	2.840	11.560	513	0,26	0,91
-1070	3	0,6605	1.990	3.020	513	0,19	0,28
-664	6	0,4504	2.100	4.670	513	0,20	0,41
-400	7	0,4137	2.170	5.250	513	0,21	0,45
-332	6	0,4504	2.100	4.670	513	0,20	0,41
-300	111	0,0899	5.580	62.010	513	0,48	3,98
-200	107	0,0918	6.590	71.850	616	0,55	4,53
-100	77	0,1101	6.940	63.090	739	0,58	4,04
0	115	0,0882	9.770	110.830	886	0,78	6,63
100	130	0,0824	12.330	149.550	1.064	0,96	8,63
200	115	0,0882	14.070	159.600	1.277	1,08	9,13
300	72	0,1142	9.350	81.850	1.021	0,75	5,08
400	40	0,1580	7.100	44.940	970	0,59	2,99
500	74	0,1125	8.530	75.810	922	0,69	4,74
600	115	0,0882	9.150	103.710	829	0,74	6,25
700	91	0,1004	7.490	74.680	747	0,62	4,68
800	4	0,5635	3.020	5.360	780	0,28	0,46
1243	100	0,0953	8.940	93.890	858	0,72	5,73
1517	50	0,1397	6.210	44.430	780	0,52	2,96
1882	75	0,0900	20.584	228.709	2.775	1,51	12,54
1889	81	0,0943	33.068	350.528	3.919	2,29	18,25
1907	104	0,1311	57.884	441.601	3.690	-	-
1917	112	0,1335	67.212	503.618	3.896	-	-
1947	143	0,1759	117.841	670.099	3.862	-	-
1976	161	0,2411	275.278	141.879	5.383	-	-
1996	164	0,2245	446.773	989.774	9.409	-	-

Sources

Number of Sites: estimated by author as an average from various papyrological and archaeological sources, such as FP 2002, Hassan and Tassie 2006, Cahen 1997. Settlement size and population figures: 2160 BC to 1517 AD: estimated by author. From 1882 AD: CAPMAS, various years. Built-up area: estimated by author, using (Tobler's n.d., coefficients: a = 0.000241, b = 0.88).

Note

Between 2160 BC and 800 AD, figures are given for a period, not a particular point in time. For example, population figures for '200' refer to any point in time after that previously listed, here between 100 and 200 AD, or the second century AD.

10. FUENTES, CARTOGRAFÍA, TELEDETECCIÓN Y SIG: CLAVES PARA RECONSTRUIR EL PAISAJE DEL NOMO OXIRRINQUITA

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1. Introducción

El estudio del paisaje oxirrinquita en la antigüedad pasa inevitablemente por asumir un proceso de conocimiento y reflexión sobre el funcionamiento y gestión de la inundación del Nilo. La razón es comprensible si reconocemos que Egipto ha dependido desde siempre y en todos los aspectos de la crecida estacional y cíclica del Nilo. Sus efectos, más allá de los naturales, provocaron un impacto cultural, visual, social, económico y religioso en todo el país y crearon un hecho diferencial único entre las culturas mediterráneas. El control y gestión de las aguas fueron desde los inicios predinásticos hasta nuestros días esenciales para garantizar el alimento y el orden social.

Por tanto, comprender cómo evolucionaron los procedimientos, técnicas y métodos de gestionar y controlar la inundación, sobretodo a lo largo de un siglo XIX que significó para este país la modernización en la forma de explotar la irrigación de sus tierras, ha de ser un proceso previo a cualquier aplicación de otras técnicas de análisis del paisaje.

Esta premisa, sobre la que se ha construido nuestro proyecto,[1] está fundamentada en la tradición iniciada, entre otros, por la Escuela de Besançon en los años setenta del pasado siglo, por lo cual es necesario un proceso de comprensión y análisis sobre cuáles han sido las grandes transformaciones antrópicas del paisaje natural.[2] Estos procesos, relacionados con las formas de organización y explotación del territorio, dejan sus cicatrices o marcas a través de caminos, parcelas, diques o canales de irrigación o drenaje, y condicionan la organización y estructura del paisaje antropizado, tanto presente como futuro. Son formas del paisaje que, una vez creadas, devienen en "morfógenas" y su orientación tiende a propagarse preeminentemente entre las sucesivas formas construidas en el tiempo.[3] Es la aproximación morfológica la que nos permitirá su reconocimiento y contextualización. Pero este acercamiento ha de ser "historizado" para no caer en un mero ejercicio de detección y modulado de las trazas.[4]

Por esa razón, el siglo XIX resulta para nosotros significativo, debido a los grandes cambios y proyectos materializados primero a través de los ingenieros franceses dirigidos por Mehemet Alí y después bajo el protectorado británico. Todos ellos colaboraron a la gran transformación y modernización de la gestión del agua del Nilo, ya fuera por la inundación estacional o por la irrigación perenne. El siglo XX, con la construcción de la presa de Asuán a mediados de los años sesenta, significó el cambio final y la ruptura con una forma natural, social y cultural de entender y visualizar el Nilo.

Esta ruptura tiene su ejemplo más espectacular en El Cairo decimonónico. Cada año, en agosto, tras el anuncio de la crecida anual señalada por el nilómetro de la isla de Rodha, se celebraba la inundación procediendo a la ruptura del dique que contenía las aguas de unos de los canales que atravesaban la ciudad: el *Kalhig Masri*.[5] Las aguas de la crecida penetraban en la ciudad y convertían algunas de sus calles y plazas en canales y lagunas. Así los dibujantes y grabadores franceses que acompañaron la expedición Napoleónica en Egipto, influenciados muy seguramente por el

FIGURA 1. El Cairo. Vista de la plaza llamada Birket-el-Fyl, tomada durante la inundación. *Description de l'Égypte*, vol. 7: *État Moderne I*, 80, Plancha 39, El Cairo.

1. Este trabajo se incluye en el ámbito del proyecto "La organización del espacio en el Egipto Greco-Romano", con el soporte del Plan I+D+I (HAR2008 -01623) y con las ayudas complementarias HAR2010-10368-E, ambas concedidas por el Ministerio de Ciencia e Innovación.

2. Dentro del proceso de investigación de los sistemas de centuriación en Francia e Italia, que se inició en esas décadas.

3. Leveau 2000, 559-560.

4. Es necesario recordar la revisión y crisis sufrida por el abuso en la detección de centuriaciones relacionadas con la falta de contrastación con la documentación histórica. Orejas, Ruiz del Árbol y López 2002, 290.

5. Linant de Bellefonds 1872, 39; Norden 1755, 44.

género pictórico de las *vedute* de Canaletto, Guardi o Carlevarijs, ilustran una ciudad de El Cairo bajo los efectos de una inundación adaptada por completo al entorno urbano, que confundiríamos, de nos ser por la presencia de minaretes o palmeras, con los canales de Venecia. (Fig. 1)

Sin embargo, los cambios aplicados sobre el régimen de inundación del Nilo durante el siglo XIX y, en especial, el siglo XX alteraron drásticamente este fenómeno y lo borraron no sólo del paisaje sino muy seguramente también de la memoria popular.

A partir de este aprendizaje sobre el carácter de la inundación y la gestión del agua del Nilo, hemos trabajado con un mapa arqueológico del área del proyecto en el cual hemos registrado los yacimientos arqueológicos y las trazas correspondientes a la gestión hidráulica (canales, diques, etc.). Estas últimas se han recuperado aplicando técnicas de cartointerpretación, fotointerpretación y teledetección, utilizando primero la cartografía actual e histórica, y después las imágenes de satélite de media y alta resolución disponibles.

Sobre esas trazas y en función de los textos que nos hablan de los grandes proyectos de irrigación, podemos reconstruir el paisaje previo al siglo XIX. Reconociendo los grandes proyectos del siglo XIX que reforman o modifican de base las formas del paisaje, podremos identificar aquellas preexistentes. Sobre esta base y mediante la lectura de las fuentes antiguas hemos tratado de interpretar y reconstruir el paisaje en la antigüedad, pendiente aún la validación sobre el terreno y la comprobación de datos a través de técnicas geomorfológicas y paleoambientales.

2. Del siglo XVIII al XX: transformación y permanencia de la gestión de la irrigación en el Egipto Medio

2.1. Las fuentes

El estudio regresivo del sistema de irrigación en Egipto se ha realizado en base a una lectura exhaustiva de una serie de publicaciones elaboradas en los siglos XVIII, XIX y en los inicios del siglo XX. Es muy importante destacar que algunas de las obras decimonónicas fueron redactadas por autores que estuvieron directamente implicados en el estudio, análisis, transformación, gestión y mejora del sistema de irrigación ya fuera por inundación o por aportación perenne de agua.

Particularmente, las fuentes estudiadas correspondientes al siglo XIX han sido, en primer lugar, la serie de publicaciones sobre Egipto editada entre 1809 y 1829 bajo el nombre de *Description de l'Égypte, ou Recueil des observations et des recherches qui ont été faites en Égypte pendant l'expédition de l'armée française*. Esta gran obra ofrecía una visión enciclopedista y científica del antiguo y moderno Egipto. Fue el trabajo colectivo de un elenco de científicos, investigadores, artistas y técnicos, los *savants*, que acompañaron a la expedición de Bonaparte entre 1798 y 1801.

La segunda fuente, también de gran importancia, proviene de Linant de Bellefonds, ministro de Trabajos Públicos y miembro del consejo privado de Mehemet Alí.[6] Su libro, publicado en 1872, es memoria de sus experiencias, que se remontan a 1817. El texto, de carácter anecdótico en algunos momentos, entra en profundidad en otros presentando informes, presupuestos y aportando una información imprescindible sobre el sistema de irrigación previo a las grandes transformaciones realizadas durante el siglo XIX, de las cuales él es testimonio directo y parte implicada.

J. Barois, secretario principal del Ministerio de Trabajos Públicos en 1887, nos da una información esencial sobre cómo se organizaba hidráulicamente la irrigación del valle medio del Nilo, casi catorce años después de la construcción del canal de Ibrahimiyya.[7] Dicho canal proporcionaba irrigación perenne a la mitad oriental del valle medio y, por tanto, había transformado por completo el sistema de canales de distribución y drenaje del agua. Posteriormente, una reedición de su obra en 1904 completa y actualiza los datos aportados sobre la inundación por cuencas.[8]

Por último, Sir William Willcocks publica el libro *Egyptian Irrigation*, tan sólo dos años más tarde que Barois, y lo reedita en 1913 junto con James Ireland Craig.[9] Dicha reedición resulta de gran interés, dado que detalla los cambios y proyectos realizados entre el final del siglo XIX y los inicios del siglo pasado. Willcocks trabajó desde 1883 en el Ministerio de Trabajos Públicos, desde donde llevó a cabo, entre otros proyectos, la supervisión de la construcción de las presas de Asuán y Assiut. Su obra, dividida en dos volúmenes, es un compendio exhaustivo de los elementos que definían tanto las características geográficas, geológicas y naturales del Nilo como el sistema de irrigación. Además definen, describen y clasifican cómo eran y se construyeron las presas, canales, diques, reguladores y todos los elementos necesarios para la gestión de la ingeniería hidráulica en Egipto.

2.2. La visión de la inundación en el siglo XVIII

La lectura de algunos textos anteriores a la expedición de Bonaparte en 1799 sólo nos da indicios

6. Linant de Bellefonds 1872.
7. Barois 1887.
8. Barois 1904.
9. Willcocks y Craig 1913.

de cómo se producía la inundación del Nilo y de la espectacularidad de la transformación estacional del país. Hemos de tener en cuenta que estas impresiones, redactadas en algún caso bajo el título de viajes o memorias, representan el espíritu iniciático propio del llamado Grand Tour, un fenómeno circunscrito a Italia. Así, algunas de estas publicaciones están redactadas en forma de jornadas o recorridos donde se mezclan aspectos geográficos, etnográficos, naturalistas, arqueológicos o, simplemente, anecdóticos. De este modo, la agricultura o la inundación se describen de una forma general, sin entrar en un gran detalle, por tanto, carecen de un carácter monográfico. Son pocos los casos en los que se hace una descripción minuciosa de la mecánica de la gestión de la inundación.

En esa línea resultan interesantes, por ejemplo, impresiones como la de Benoït de Maillet, cónsul general en Egipto entre 1692 y 1708. Su visión, la de un viajero, nos habla de la inundación desde el aspecto fenomenológico:

> La vue de l'Égypte dans les tems de l'inondation est sans contredit un spectacle des plus charmants du monde. C'est alors que du haut des montagnes on découvre une vaste mer, d'où s'elévent des villes & des bourgades sans nombre, qui n'ont de communication entr'elles que par des chaussées élevées à ce dessein. Les eaux quelquefois sont si abondantes, qu'elles inondent les chaussées même. Alors la communication se fait en bateaux, & ce n'est pas un médiocre agrément de voir tout le pais couvert d'un nombre infini de ces maisons flottantes.[10]

Este texto, publicado en 1735, presenta un panorama en esencia muy parecido al que Heródoto o Diodoro habían descrito dos mil años antes.[11] Resulta evidente que la inundación provocaba el mismo asombro a pesar del paso de los siglos. Poco más nos dice De Maillet, salvo la importancia de los canales como parte esencial del proceso de inundación:

> C'est par là que l'Égypte profite les accroissements du Nil; c'est par là que ses eaux sont répandues dans tout cette contrée, & y portent la fertilité.[12]

Louis Frederic Nörden, capitán de navío danés, quien exploró Egipto y Sudán entre 1737 y 1738, tiene una visión más concreta de la inundación del Nilo y de su gestión y aprovechamiento:

> Ces moyens consistent en des Digues & en des *Calichs*, ou canaux, que l'on coupe, on creuse, dans les endroits, ou le bord de le Nil est bas. On les conduit jusqu'a les montagnes, au travers des provinces entières; de sorte que, quand le Nil croît, ses eaux entrent dans les *Calichs* qui les introduisent au dedans du pays, à proportion de la hauteur du Fleuve.
>
> Quand il est cru a son point, & qu'il répandu ses eaux sur la surface de la terre; c'est alors qu'on pense à les retenir durant quelque temps, afin que les terres ayent le loisir de s'abbreuver suffisamment. Pour cet effet, on practique des digues, appellées *Gisser*, qui empêchent que l'eau ne s'écoule, & l'arrêtent, autant que le tems qu'on le juge à propos. Enfin quand la terre est assez arrosée, on coupe le *Gisser*, pour faciliter l'ecoulament des eaux […].[13]

Este autor danés nos permite imaginar cómo funcionaba la inundación en el valle medio del Nilo. En el momento de la crecida, el exceso de aguas del Nilo era dirigido a través de canales, que, una vez desbordados, inundaban las tierras interiores. Los diques contenían las aguas manteniéndolas en reserva durante el tiempo necesario para que sus aportes favorecieran la fertilidad de la cosecha.[14]

Jean Baptiste d'Anville, el gran geógrafo del siglo XVIII, presenta en 1766 una visión de Egipto que será refutada posteriormente por los *savants* de la expedición de Bonaparte. Según el autor francés, el valle medio del Nilo, tendría tres grandes cursos hidrográficos: el Nilo, el Bahr Yussef y el Bahr Bathen. Este último, al que erróneamente identificaba con el lago Moeris citado por las fuentes, circulaba paralelo entre el Bahr Yussef y el Nilo. El Bathen, que derivaba del Nilo en algún punto entre Minia y Samalut, continuaba hasta llegar a la altura de Beni Suef. Entre el Nilo y el Bahr Yussef, una serie de canales cruzarían transversalmente el valle.[15] D'Anville presupone, basándose en las fuentes antiguas, que quizás el Bathen no fuera un fenómeno natural y que hubieran existido una serie de diques para contener sus aguas. Sin embargo D'Anville no describe el fenómeno de la inundación y parece que cuando observa el Bahr Bathen no acaba de comprenderlo en su dimensión estacional. Su preocupación por la identificación y reconstrucción del territorio de Egipto en la antigüedad, a partir de

10. De Maillet 1740, 70. En ésta y siguientes citas se ha respetado el francés original antiguo.

11. "Y por cierto que, cuando el Nilo inunda el país, sólo las ciudades se ven emerger del agua, poco más o menos de un modo similar a como lo hacen las islas del mar Egeo, pues el resto de Egipto se convierte en un mar y sólo las ciudades emergen. Pues bien, cuando esto ocurre, ya no se desplazan con sus embarcaciones siguiendo los cursos de los ríos, sino por la mismísima llanura", Hdt. 2.97; "[…] crece tanto cada día que, al final, inunda casi todo Egipto. Y, del mismo modo, volviendo atrás en sentido contrario, baja durante igual tiempo cada día poco a poco hasta que llega a la posición anterior. Al ser el territorio llano y estar situadas las ciudades y las aldeas e incluso las granjas sobre montículos hechos a mano, el panorama resulta semejante a las islas Cícladas", Diod. I.36.8.

12. De Maillet 1740, 71.

13. Norden 1755, 61-62.

14. Esta descripción de Nordën coincide con la de Richard Pococke, miembro de la Royal Society que viaja a Egipto entre 1737 y 1741. Léase Pococke 1772, 124.

15. D'Anville 1766, 154-156.

las fuentes clásicas, le impidió contemplar el Bathen desde una perspectiva de fenómeno natural y analizar su gestión antrópica, como así había insinuado Nörden.

Finalmente, en 1789, Claude-Étienne de Savary describe brevemente el efecto de la crecida y nos habla de los canales como distribuidores del agua de la inundación, y de los diques que permitían la contención de las aguas.[16]

Por tanto, a lo largo del siglo XVIII, los diversos autores que hablan de la inundación del Nilo no desarrollan exhaustivamente la mecánica que relaciona canales y diques. Sí se conocía que aquellos distribuían en el valle el agua de la inundación, mientras que los diques servían de contención y medio de comunicación entre ciudades y poblaciones. Como justificación a los cambios y transformaciones que se realizaron a lo largo del siguiente siglo, algunos de ellos hablan ya de la dejadez en el mantenimiento de canales y diques, y el grave peligro que esto significaba para el futuro del país.[17]

2.3. La gestión de la inundación en los inicios del siglo XIX

Diques e inundación por cuencas

Coinciden los autores decimonónicos en que el control de la inundación mediante diques y canales ya se había introducido en los periodos más antiguos de Egipto.[18] Pero de estas estructuras hidráulicas, según Barois, nada quedaba ya, pues la negligencia y abandono habían borrado cualquier traza de su existencia. Linant de Bellefonds, por el contrario, sostiene que aún se apreciaban elementos antiguos de ingeniería hidráulica en el paisaje. Éste era el caso del dique de Kocheicha, situado a 6 km al sur de la actual localidad Maidum, o de las estructuras en piedra situadas a lado y lado del Nilo, entre las cataratas de Asuán y Ouadée Halfa, en la Nubia. La experiencia viajera de Linant, que durante años exploró el país antes de acceder a los cargos de funcionario de la administración egipcia, así nos lo confirmaría.

Cuál era la situación previa de la gestión hidrográfica de Egipto en los inicios del siglo XIX es algo que Linant de Bellefonds, Barois y Willcocks desvelan de forma vaga y sin concreción. Teniendo en cuenta que el siglo XVIII tampoco había aportado datos exhaustivos, en algún caso hasta confusos, sólo la *Description* de los *savants* de la expedición de Bonaparte proporciona datos suficientes para reconstruirlo.

El equipo de científicos que acompañó a la gran empresa napoleónica hasta Egipto describía el funcionamiento del sistema de la siguiente manera:

> Ces canaux sont dirigés dans le haut Égypte, plus ou moins obliquement, vers les deux chaînes de montagnes qui bordent la vallée: parvenus à leur pied, ils se prolongent parallèlement au désert; mais des digues transversales en interrompent le cours, de sorte que leurs eaux, arrêtés par ces digues s'élèvent en amont des barrages dont ont vient de parler, et plus, par conséquent, l'espace qu'elles submergent est étendu.
>
> Quand cette submersion a atteint sa plus grande hauteur, on coupe la digue qui soutenoit les eaux; elles s'écoulent alors au-delà de cette digue, en suivant le même canal, qui se prolonge lui-même sur la limite du désert, jusq'à un second barrage qui, arrêtant de nouveau les eaux, les oblige de se gonfler, et de se répandre, sur une partie de l'espace renfermé entre deux digues transversales consécutives.
>
> On coupe la seconde digue comme on avait coupé la première; les eaux descendent de la même manière contre una troisième barrage; qui produit à son tour la submersion d'une certaine étendue du terrain; et ainsi de suite.[19]

Es decir, que el sistema de irrigación consistía en una sucesión de cubetas naturales, delimitadas por diques, anegadas mediante canales durante la inundación. Así se aprovechaba la pendiente que sigue el valle del Nilo hasta su desembocadura para facilitar la distribución homogénea del agua cargada de limos. Los diques, construidos con tierra reforzada, además de contenedores de las aguas formaban la red de comunicación pedestre en los momentos de la inundación.[20] El término utilizado por ingleses y franceses para estas cubetas era *bassin irrigation* o *bassins d'inoundation*, y nosotros hemos adoptado el de *cuencas de inundación*.

A inicios del siglo XIX la mecánica de este sistema consistía en que las cuencas se inundaban sucesivamente, así cuando una de ellas se completaba y se

16. Savary 1787, 198-199.

17. "[…] mais le cours du tems & les divers désolations dont le royaume a été affligé, ont tout fait tomber dans une telle décadence, que, si une extrême nécessité n'obligeoit les Arabes à travailler, dans moins d'un siècle, l'Egypte se trouveroit réduite a un aussi triste état que la petite Barbarie, au voisinage des Cataractes, où on ne laboure, & ne cultive guère, que l'espace de vingt à trente pas de terrain, au bord du Fleuve", Norden 1755, 62. Años más tarde, Martin (1813, 199) utiliza palabras parecidas para expresar el estado de abandono de la provincia de Beni Suef: "Cette condition ne peut être remplie que par les soins constans d'un gouvernement sage et éclairé; et c'est un avantage que les Égyptiens ne connoissent pas depuis bien des siècles. Ces terres de l'ouest si favorisées de la nature, et sur lesquelles devroient toujours reposer les espérances du reste de l'Égypte, sont les plus malheureuses; elles manquent totalement d'eau dans les crues foibles, et ne peuvent en recevoir qu'en très petite quantité dans les crues les plus fortes : l'exhaussement des canaux, causé par l'abandon dans lequel on les a laissés si long-temps."

18. Por ejemplo, Linant de Bellefonds 1873, 5; Willcocks y Craig 1913, 299; Barois 1887, 8-9.

19. Girard 1823, 496-497.

20. Girard 1823, 497; Girard 1813, 352-353.

habían retenido las aguas el tiempo suficiente para la deposición de limos, entonces se procedía a la ruptura del dique. Las aguas se dejaban pasar a través del canal que había inundado la primera para anegar las tierras en la siguiente hasta ser contenidas nuevamente por otro dique transversal.

Estos diques, sobretodo los más antiguos, presentan una forma longitudinal sinuosa, debido a que la ruptura provocada en los puntos de circulación obligaba a que la reparación de los muros se hiciera reculando o avanzando con respecto a su posición anterior. De esta manera, los diques perdían con el curso del tiempo su forma rectilínea.[21]

El control de las aguas no se hacía tan sólo mediante la ruptura del dique, ya que en algunos se habían construido en ladrillo puentes con arcos de tres metros de longitud, ocupando cada uno de los pilares un regulador. La función de estos últimos sería la de permitir la circulación de las aguas una vez hubieran sido contenidas el tiempo suficiente en la cuenca precedente.[22]

La misma obra, al describir la hidrografía de la provincia de Beni Suef, enumera tres tipos de diques: grandes, medianos y pequeños. Los grandes atravesarían el valle de extremo a extremo siendo el más destacado, de entre todos, el antes mencionado de Oukchechy o Kocheicha, y el resto de diques serían:

> […] Behabchyn, Safanyeh, Saftrachin, el-Noueyreh, Choubak, Ehoueh, Badahal ou el Chantour, Samalout, Menbaâl et Bardanoah.[23]

Esta enumeración tiene un gran valor y utilidad, dado que es la primera vez que una fuente nos menciona una lista de diques previa a las reformas decimonónicas. Su comparación con otras listas correspondientes a las cuencas en funcionamiento en el siglo XIX, nos ha servido para datar como modernos algunos de ellos. La misma clasificación distingue los diques medianos como aquellos que tendrían su origen en el Nilo o en los mismos diques grandes para acabar en poblaciones construidas sobre montículos.

Los canales de inundación

Una parte de la inundación en el valle medio correspondía al Bahr Yussef. Este canal natural sigue un curso muy tortuoso, con una anchura entre los 50 y los 60 metros y una profundidad máxima de 6 a 8 metros. Sus aguas llegan hasta el Fayum, sirviendo a su vez de *fedder*[24] para la inundación de cuencas y como aliviadero del drenaje de las mismas en el momento de descenso de las aguas.[25]

Pero este curso natural no era el único que intervenía en la crecida de las aguas. El Bahr Bathen, que había llamado la atención de D'Anville años antes, es objeto de estudio por parte de los científicos de la expedición francesa. El término árabe *bathen* era un nombre genérico que se aplicaba a:

> […] presque tous les canaux qui parcourent l'intérieur des terres dans direction du sud au nord.[26]

Pero, además, este término derivaba de *batn*, es decir, centro o vientre, aplicado por ejemplo al lugar donde los canales de Damietta y Rosetta se separaban: *Batn el-Baqarah* o 'Vientre de la Vaca'.[27]

Para referirse a los grandes canales entonces se utilizaba la expresión *fyad bathen*. El mayor de estos, según la *Description*, sería el que habría provocado la confusión con el lago Moeris de Granger, Sicard y D'Anville.[28] Este, situado entre las localidades de Cheykh-Zayat y Beni Soueyf, tenía, según Martin, entre 23 y 24 kilómetros de longitud, un máximo de 36 metros de anchura y poco más de un metro y medio de profundidad. Sus aguas quedarían retenidas por el dique de Saftrachine.[29] El mismo autor, miembro de la expedición científica de Bonaparte, añade que el valle medio estaba cruzado por grandes canales paralelos al Nilo que facilitaban la inundación de las tierras una vez iniciada la crecida estacional.

Así, por ejemplo, otro *fyad bathen* del valle medio nos es descrito de la siguiente manera:

> […] dont l'origine sur le Nil est entre le village de Nazlet-Abou-Esné et celui de Qalousaneh. Il passe au pied du village du Matâtyeh, ou il se divide en deux branches, dont l'une a l'est devient petit Bathen, et se perd, à deux lieus de là, dans les terres d'Abou Girgeh; l'autre, a l'ouest communique pendant l'inondation avec le Bahr Yussef, au village d'El-Houeh: mais il n'a plus de trois lieues de longueur.[30]

Este *fyad bathen* hemos podido identificarlo con una de las trazas recuperadas a través del estudio de la cartografía y la teledetección. Dicho canal sigue un trazado parecido al descrito por los franceses. (Fig. 2)

21. Barois 1904, 265-266.
22. Willcocks y Craig 1913, 564-583.
23. Martin 1813, 198-199.
24. Generalmente, son los canales que transportan el agua de la inundación cargada de limos y la distribuyen entre las cuencas de inundación.
25. Linant de Bellefonds 1873, 14.
26. Martin 1813, 200.
27. Martin 1813, 200.
28. Principalmente de P. Sicard, en quien se inspiraron Granger y D'Anville. Este último nos dice que fue el propio Sicard quien le enseñó el Bathen (léase D'Anville 1766, 154).
29. Martin 1813, 201.
30. Martin 1813, 201.

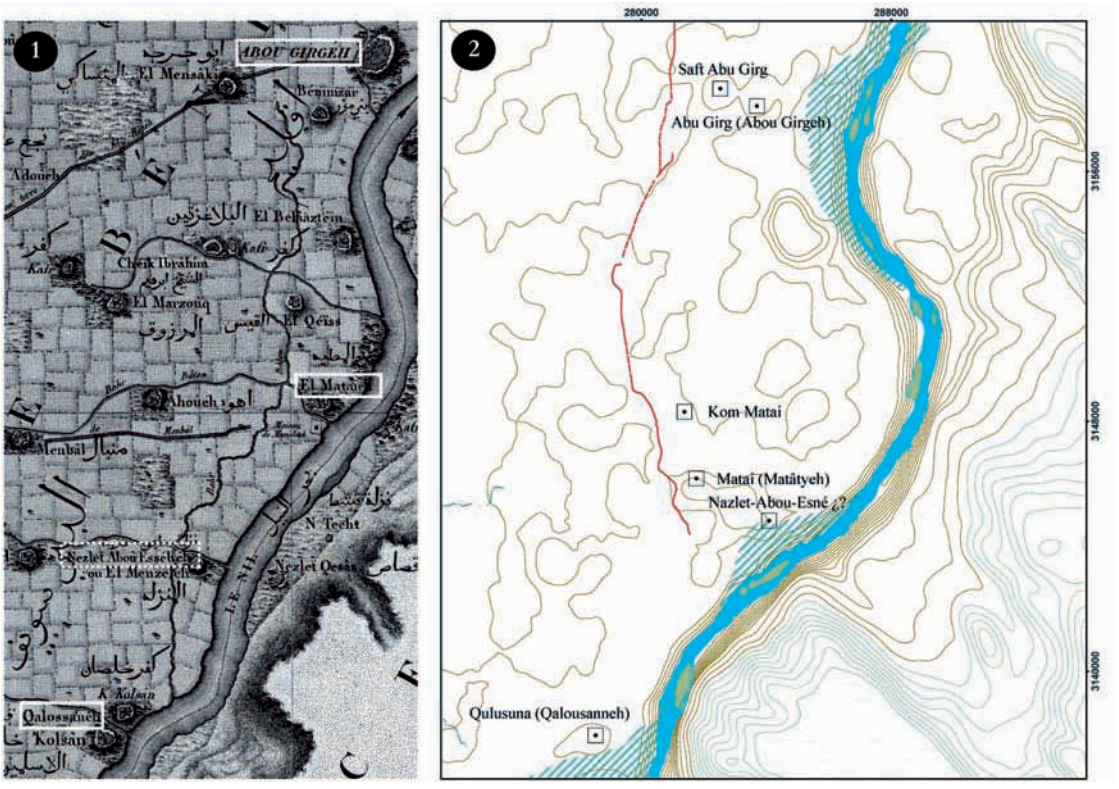

Figura 2. 1) *Description de l'Égypte*, *Atlas géographique*, Plancha 14, 1826. 2) Trazas localizadas en las imágenes Corona y cartografía analizada. Localidades citadas en la *Description de l'Égypte*, vol. 6: *État Moderne*, 206.

El análisis e interpretación de dicho canal se hace en el artículo de Subías, Fiz y Cuesta de esta misma publicación. Sin embargo, no hemos encontrado trazas de lo que podría haber sido la bifurcación, citada por Martin en el fragmento anterior, que se dirigía hacia la población de el-Houeh.

Pero los propios *savants* no se ponen de acuerdo del todo al utilizar este mismo término. Así Jomard nos dice que:

> On dit un bâtin et plusieurs bátin [el-bâtin, el-baouâten]; ce mot Arabe, qui signifie intérieur, est parfaitement bien appliqué aux bas-fonds dont je parle, puisqu'ils forment la partie la plus basse et la plus intérieure du pays: ils conservent de l'eau presque toute l'année, et ils offrent, par endroits, l'aspect d'un canal continu.[31]

Por tanto, no serían canales naturales sino lugares situados a baja cota que, tras producirse la inundación, retendrían el agua a lo largo del año dando la sensación de ser canales de agua. El principal de ellos, según Jomard, tenía en febrero de 1801 entre 50 metros y 100 metros de anchura.

La explicación que dan los *savants* de la expedición a este fenómeno era la particular disposición del valle medio que presenta dos planicies inclinadas, una desde el Nilo, la otra desde el Bahr Yussef, que forman en el encuentro entre ambas una cubeta o bajo fondo que permitía la conservación de las aguas durante largo tiempo, razón por la cual recibía el nombre de Bahr Bathen, es decir, 'río interior'.[32] En algunos casos, estos bajos fondos, debido a los desbordamientos del Nilo, acabarían convirtiéndose en canales naturales. *Bahr bathen* era un término genérico, sin embargo, si era necesario distinguir un gran canal, entonces se aplicaba el término *fyad bathen.*

En otro volumen correspondiente a las antigüedades de Egipto, la *Description* desarrolla nuevamente el fenómeno del Bahr Bathen.[33] Según el texto, éste se extendía de forma irregular desde, aproximadamente, las ruinas de *Hermopolis* hasta más al sur de Minia, y se llamava Tera't[34] el Ghouetat y Tera't el-Sebakh. A partir de esta localidad tomaba el nombre de el-Dafa. Tanto Linant de Bellefonds como una de las planchas dedicadas a la cartografía en la *Description* dibujan este canal con gran detalle. (Fig. 3) Teniendo en cuenta

31. Jomard 1809, 105, nota 1.

32. Martin 1813, 201.

33. "Ce bas fond existe d'une manière continue, mais très irrégulièrement depuis les ruines d'Hermopolis, où il prend le nom de *Tera't el Govetah* y *Tera't el Sebakh*, jusque bien au-dessus du Minieh, où on le nomme el-Dafà […] Sa larguer est très grande et sans limites distinctes. Pendant la plus grand partie de l'anne il est à sec; dans les hautes eaux, il devient sensible: mais il a plusieurs branches et non un lit unique et tracé […]". Jomard 1818, 260.

34. 'Canal' en árabe.

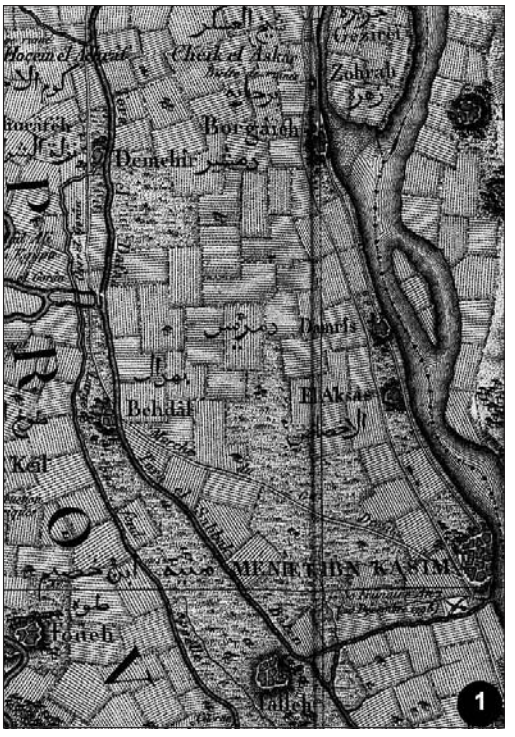

Figura 3. 1) *Description de l'Égypte*, *Atlas géographique*, 1826, Plancha 14.
2) Linant de Bellefonds, *Carte Hydrographique de la Moyenne Égypte,* 1873.
3) Imagen Corona DS1105-2235DF034.

que en el valle medio del Nilo la primera gran canalización es el Ibrahimiyya y que Linant de Bellefonds no menciona en sus memorias ninguna gran canalización construida en esta área en el siglo XIX, debiéramos de pensar que uno de los canales *fyad bathen* preexistentes ya atravesaba esta zona.

Otra de las planchas dedicada a la hidrografía del valle medio, nos presenta un plano que rotula, entre *Hermopolis* y Minia, este mismo *bathen.* Los autores elaboraron toda una serie de secciones de varios tramos del valle en las que se incluían el Nilo, el Bahr Yussef y el Bahr Bathen.[35] Por desgracia, el trabajo sólo se concentró en el área entre Samalut y Minia, fuera por tanto de nuestra área de trabajo.

Casi sesenta años más tarde, Linant de Bellefonds nos proporciona otra visión de cómo funcionaba la inundación del Nilo antes de las reformas decimonónicas:

> Lorsque les eaux coulaient librement dans les plaines, celles-ci se trouvaient ravinées partout par les eaux des crues, et plusieurs de ces ravines conservaient pendant les étiages une certain quantité d'eau courante; aujourd'hui même il existe encore beaucoup de ces ravines ou cours d'eau naturels dans toute l'Égypte.
>
> En descendant du sud vers le nord, on rencontrait de ces cours d'eau considérables pendant les crues, et à peu près dans le même état qu'ils étaient avant que des travaux fussent venus régulariser les débordements du fleuve; mais aujourd'hui ils sont en grand partie maîtrises et utilisés pour les arrosages.[36]

Es decir, la inundación consistía en dejar que el agua desbordada del Nilo se encauzara de forma natural a través de torrentes, arroyos o ramblas naturales y desde ellos se inundaba el valle. Algunos cauces mantenían, en algunos casos, parte del agua a lo largo del año, pero los otros permanecían secos. Linant de Bellefonds, por tanto, insiste en el carácter natural de dichos canales como una consecuencia de la contención y regulación de las aguas mediante diques. Así, una vez practicada la abertura o tomando como origen los reguladores construidos, las aguas se canalizaban estacionalmente de forma natural:

> Plusieurs autres ravines ou cours d'eau naturels existent encore dans les plaines de la Haute-Égypte et surtout dans la Moyenne, mais ils sont de bien moindre importance que les deux précédents. Souvent ils prennent leur origine en aval d'un des nombreux déversoirs pratiqués dans les digues des bassins d'inondation; les eaux, qui échappent par ces déversoirs ravinent la plaine et forment alors des bas fonds que l'on nomme Bathen, ce qui veut dire lieu bas.[37]

Linant utiliza también el término *bathen* haciendo esta vez referencia no a los canales, los *fyad bathen* de la *Description*, sino a los bajos fondos, definidos por Jomard, donde se acumulaban las aguas. El agua procedente de una de las cuencas de inundación quedaba canalizada y distribuida a través de torrenteras naturales formándose lagunas naturales en los lugares de menor cota. Sin embargo, podríamos pensar que tales torrenteras o arroyos formaban parte de un sistema de canales de origen antrópico, cuya falta de mantenimiento, manifestada por diversos autores en el siglo XVIII, hubiera de alguna manera convertido en naturales.

Estas torrenteras darían entonces explicación a los numerosos entrantes que desde el Nilo penetran en el terreno tomando la inclinación natural este-oeste de la orografía del valle y que Linant rotula en el plano de 1855.

Pero estos cursos naturales no parecen ser los únicos, según Linant existían canales, llamados *nili*, que sólo se utilizaban durante las crecidas del Nilo. Estaban excavados a cuatro metros del nivel de circulación y con una profundidad que disminuía hasta llegar a las tierras que deseaban inundar, donde el canal se perdía. Algunos atravesaban provincias y distribuían sus aguas a través de derivaciones que servían para las inundaciones.[38] Estos canales los diferenciaba Linant de los llamados *sefi,* que suministraban la irrigación perenne y que él atribuía directamente al gobierno de Mehemet Alí, pues no existían referencias de lo contrario. Pero Linant con esto nos indica que los *nili* sí eran canales anteriores al gobierno de Mehemet Alí. Tal y como los describe Linant, deberían corresponder a los *fyad bathen* o a los *bahr bathen* de la *Description*, salvo que parece que los *nili* son canales excavados frente a los *fyad bathen*, en principio de carácter natural.

2.4. Las reformas de Mehemet Alí en el valle medio

De los textos del siglo XVIII se desprenden motivos para transformar y modernizar la gestión de la inundación en Egipto. Los canales que hasta entonces estaban en funcionamiento sólo permitían la distribución del agua de la inundación, pero el resto del año permanecían secos. Únicamente las tierras alimentadas con el agua conservada en los *bathen* o las aguas elevadas mediante *shaduf* o *saquia* en zonas próximas al Nilo o al Bahr Yussef permitían cultivos a lo largo del año. Por tanto, cultivos como el algodón o la caña de azúcar, propios del verano, servían para fomentar una economía de escala y en expansión.

Sabemos que entre 1783 y 1796 se produjeron años de baja inundación, escasa producción de grano y

35. Martin 1822, 14, Plancha 6.
36. Linant de Bellefonds 1873, 3.
37. Linant de Bellefonds 1873, 4. Los canales precedentes son Sohagieh y Bar Yussef.
38. Linant de Bellefonds 1873, 19-20.

epidemias, resultando de todo ello una tierra devastada ante un 75 % de tierras no irrigadas. El país se vio abocado a una terrible hambruna y entró en un periodo de revueltas y sedición. En 1798, Bonaparte desembarca en Egipto y, casi sin oposición, toma El Cairo.[39] El país que encuentra Mehemet Alí en 1805, tras el breve paso de Bonaparte, requería de medidas drásticas que dieran solución a una situación insostenible.

Fundamentalmente, los trabajos de transformación estarían orientados a independizar la economía del país de la abundancia de agua en la crecida y, por tanto, de aquellos años de baja inundación y sequía, la *sharakia.* El nuevo sistema permitiría tener a gran escala tres formas de cultivo: de verano (algodón y caña de azúcar), cultivos propios de la crecida (maíz y sorgo) y los de invierno (cereales, forrajes, etc.). No hay que olvidar que Mehemet Alí pretendía, además, con la introducción a escala del cultivo del algodón, la construcción de fábricas para su hilatura y tejido.[40] De esta manera, el país no sólo solucionaba el problema de la gestión del agua sino que iniciaría un proceso de industrialización en la misma línea que habían seguido los países europeos en el siglo XVIII.

Pero otros motivos eran los relacionados con la estabilidad y el orden social del país, a su vez dependientes de la inundación. Nos dice Linant que, en el momento de la llegada del cuerpo expedicionario de Bonaparte, los jefes mamelucos controlaban cada una de las provincias.[41] En cada una de ellas, cada pueblo administraba y gestionaba sus propios canales y diques sin preocuparse de si eran beneficiosos o perjudiciales para el resto. Se producían enfrentamientos armados entre distritos motivados por los intentos de conducir las aguas hacia las tierras de cada localidad. Estamos, por tanto, ante un estado que necesitaba centralizar la gestión del agua, creando para ello infraestructuras y órganos de gestión y control estatales. La invasión francesa, el desmantelamiento de la influencia mameluca en la política de Egipto y la llegada al poder de Egipto de Mehemet Alí son los factores que estimularon el cambio.

En este sentido nos resultan también interesantes las observaciones tanto de De Maillet como de los *savants* franceses de la *Description.*[42] Ambos coinciden en los enfrentamientos entre las comunidades locales por el acceso a unas aguas ricas en limos y su distribución lo más equilibrada posible.[43] Un descuido en el tiempo destinado a la deposición en una cuenca de inundación provocaría que la siguiente resultara perjudicada por la caída en la calidad de las aguas y, por tanto, en el beneficio de la cosecha. Esta situación, según la *Description*, habría generado situaciones de conflicto incluso entre localidades separadas solamente por un dique.[44] Con todas las salvedades que impone el tiempo transcurrido, este motivo explicaría porque la legislación en la antigüedad era muy severa respecto a este tema y se castigaba duramente, ya fuera a través de la legislación del Digesto o del Código de Justiniano, a un individuo o a un colectivo si provocaban la ruptura de un dique o la desviación de las aguas antes de tiempo.[45] La inquietud y la ansiedad, sobretodo en momentos en los que se sabía a través de los nilómetros que la inundación sería escasa, provocarían acciones dirigidas a la ruptura de diques contenedores de las aguas destinadas a otra comunidad. Situación de conflicto que alimentaría la lista de motivos para justificar el cambio en el modo de gestionar las cuencas de inundación y la introducción de la irrigación perenne.

El nuevo gobierno de Mehemet Alí emprendió una serie de trabajos de mejora a partir de 1816.[46] Sabemos que fue en el delta donde se introdujo primero la irrigación perenne, encajando el Nilo entre diques longitudinales y reformando los canales que alimentaban las cuencas, excavándolos entre un metro y metro y medio por debajo del nivel más bajo de las aguas. La finalidad de esta última operación era la de proporcionar agua a lo largo del año construyendo, además, ingenios de gestión para permitir la continuidad del suministro.[47] Sin embargo, estos trabajos quedaron circunscritos al Bajo Egipto.

39. Hassan 1998, 39

40. Linant de Bellefonds 1873, 363-364.

41. Linant de Bellefonds 1873, 1-2.

42. "Alors pour l'observation de la loi, on veille les armes à la main, de province en province, de village en village. De là naissent des disputes, des guerres même, qui deviennent générales, où il se livre quelquefois des combats, pour prevenir le tems de l'ouverture d'un canal, ou pour l'empêcher." De Maillet, 72.

43. "On voit que l'étendue des terres inondées depend de deux circuntances; d'abord la hauteur de la inoundation; ensuite de la durée du temps pendant lequel on laisse les eaux s'accumuler contre les digues qui les soutiennent: mais comme le terrain situé inmediatament au-dessus reste au sec jusqu'à ce qu'on y laisse entrer les eaux en ouvrant ces digues, on conçoit que les villages inférieures peuvent perdre, par les retards qu'on apporterait à cette ouverture, tous les avantages dont les villages superiors jouieroient seuls en laissant l'inondation tendue sur leur territoire […]." Girard 1823, 498.

44. "[…] engendre souvent des querelles sanglantes dans le même canton; et, le défaut de police prolongeant les haines qui en résultent, il se trouve que des villages voisins, sont depuis un temps immémorial, ennemis irréconciliables", Girard 1823, 498.

Además Le Père (1809, 134, nota 1) destaca que la legislación beneficiaba a los poblados más alejados de la toma de agua general, permitiéndoles que abrieran sus canales particulares. En cambio, en el sistema de diques el proceso era inverso: las cuencas situadas más al sur, y, por tanto, más cercanas al proceso de inundación, eran las primeras en abrir sus diques.

45. *Dig.* XLVII, 11, 10; *Cod. Just.*, IX, 38.

46. Linant de Bellefonds 1873, 13; Willcocks y Craig 1913, 368.

47. Barois 1904, 141.

Pero el nuevo sistema tuvo sus carencias. La reforma de los canales provocó que los limos no se distribuyeran correctamente y quedasen depositados en los canales. Esto último obligó a la realización de continuos trabajos de limpieza para evitar la colmatación de los mismos.[48] Willcocks lamentaba que la reforma no hubiera afectado al mantenimiento de los diques del anterior sistema por cuencas, pues así se había perdido la oportunidad de beneficiar las tierras del Bajo Egipto con las ventajas de los dos sistemas de irrigación.

No tenemos datos concretos entre 1820 y 1874 sobre cuáles fueron las labores de mejora de las cuencas de inundación en el Alto y Medio Egipto, teniendo en cuenta, además, que hasta 1830 no existe una dirección centralizada y planificada de los trabajos de construcción de canales o diques. A partir de 1836, año de creación del Ministerio de Trabajos Públicos, el ingeniero jefe en el Alto Egipto, el mismo Linant, reunía a los ingenieros de las provincias para definir y planificar los trabajos de adecuación. Estas reuniones fueron registradas en actas, remitidas al consejo del bey y, posteriormente, enviadas para su ejecución a las provincias.[49]

Para completar este vacío de información resulta importante conocer como describen el funcionamiento de las cuencas de inundación las fuentes posteriores a la segunda mitad del siglo XIX. Comparándolas con la *Description* y viendo qué es lo que ha cambiado, entenderemos que se habían producido grandes cambios.

2.5. La gestión de las cuencas de inundación en la segunda mitad del siglo XIX

La mejora del sistema

Una pregunta interesante que surge cuando leemos los textos posteriores a 1850, es con respecto a las modificaciones realizadas durante Mehemet Alí en la gestión y el control de la inundación en el valle medio. De esta lectura hemos de suponer que en algún momento, durante su gobierno, fue transformada la mecánica de inundación por cuencas. Pero ni Barois, ni Linant, ni tan siquiera Willcocks son claros en decirnos cuáles habían sido los cambios con respecto al sistema encontrado por los *savants*.

¿Cómo conciben los tres autores una cuenca de inundación? Para éstos la cuenca era un área delimitada por una serie de diques, situados en paralelo y transversalmente al Nilo. Mediante canales *fedder* que atravesaban la cuenca se distribuía el agua de la inundación. De esta manera se facilitaba la deposición más o menos regular de los limos necesarios para la fertilidad de la cosecha estacional. Tanto Linant de Belefond como Barois o Wilcoocks nos describen con precisión cómo funcionaba la mecánica de la inundación por cuencas.[50] De los tres, la mejor explicación es quizás la de Willcocks, quien esquematiza perfectamente el problema tomando por base una serie de cuencas, separadas entre sí por diques transversales.[51] (Fig. 4) Todas estarían conectadas por un canal *fedder* que tomaría agua directamente del Nilo y la llevaría, siguiendo las cotas menores del valle, hasta finalizar en la cuenca situada más al norte.

Según el mismo autor, cuando comenzaba el periodo de inundación, el agua en ascenso alcanzaba la cabecera del canal *fedder* y alimentaba el canal. El caudal atravesaba sucesivamente las cuencas a través de obras de mampostería, reguladores o *déversoirs*, realizadas en los diques transversales, dosificando así la inundación. Se procuraba que fuera la última cuenca del sistema, la situada más al norte, la que primero se inundara. Progresivamente y de norte a sur, se cerraban las compuertas y se inundaban el resto de cuencas. Si la crecida no generaba excedente como para alimentar las cuencas cercanas a la cabecera del *fedder*, se procuraba que la deficiencia fuera cubierta por canales secundarios de vaciado del sistema de cuencas inmediatamente anterior.

Pasado el periodo necesario para que los limos se depositaran eficazmente, comenzaba el proceso inverso por el cual se abrían las compuertas de los diques, se vaciaba la cuenca y sus aguas eran descargadas en la siguiente. La última descargaba directamente en el Nilo o en el Bahr Yussef mediante canales de drenaje.

Barois menciona que no existían suficientes aberturas en los diques transversales y, por tanto, no era posible asegurar una correcta inundación y distribución de los limos como tampoco un rápido drenaje de las aguas. El sistema que se utilizaba era el de fracturar el dique en determinados puntos, lo cual obligaba a su reparación anual. Esta situación ya se nos presenta en la *Description*, por lo que hemos de suponer que no fue la construcción de los reguladores, necesarios para el correcto funcionamiento del sistema, uno de los trabajos primordiales planificados en la primera mitad del siglo.

Si comparamos esta mecánica con la explicada en la obra colectiva de la *Description,* apreciamos una clara diferencia. Recordemos que para los *savants* la inundación se gestionaba de sur a norte, desde la cuenca situada a mayor cota y por la apertura sucesiva de diques, una vez las aguas se habían retenido el tiempo

48. Barois 1904, 141-142.
49. Linant de Bellefonds 1873, 39.
50. Linant de Bellefonds 1873, 13-19; Willcocks y Craig 1913, 303-311; Barois 1887, 22-26.
51. Willcocks nos habla del sistema anterior a 1888 (fecha de la primera edición de su obra), pero coincide con Barois y Linant.

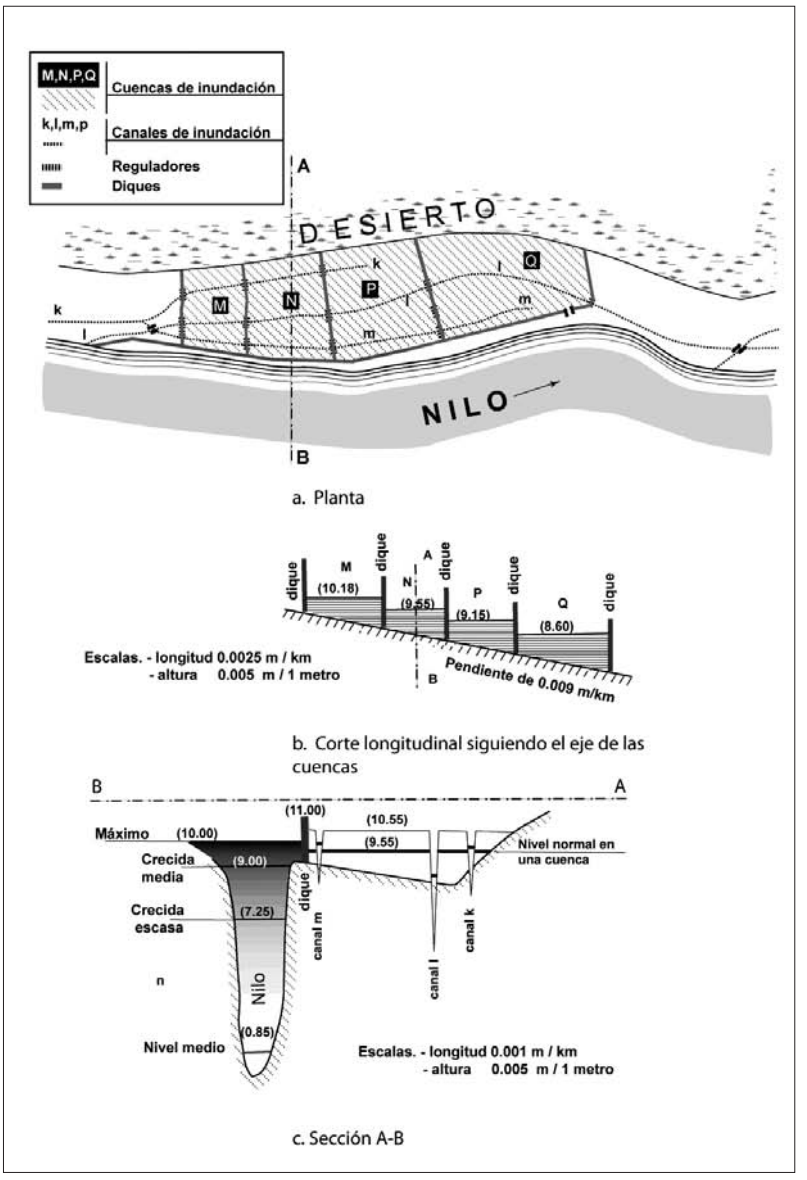

Figura 4. Planta, corte y sección: ejemplo del sistema de cuencas de inundación. Fuente: Barois 1904, 76 figuras 7, 8 y 9.

suficiente. En cambio, ahora encontramos un sistema construido en baterías de cuencas de inundación, de tal manera que las aguas inundan primero la situada más al norte, remontando secuencialmente hacia el sur y siguiendo, por lo tanto, un proceso inverso al descrito por los científicos franceses.

La diferencia se podría deber a que el sistema fue mal comprendido por los científicos franceses o que, realmente, a partir de 1834, una de las principales tareas llevadas a cabo por Mehemet Alí, y bajo sus órdenes la de Linant, fue la alteración del sistema de tratamiento de la inundación del Nilo. No podemos saber si el sistema es mejorado o simplemente se recuperó un método que había sido abandonado a lo largo del siglo xviii; recordemos cómo las fuentes de este siglo nos hablaban ya del deterioro producido durante el periodo mameluco.

La introducción de la irrigación perenne en el valle medio del Nilo

En 1873, se inauguraba el canal de Ibrahimiyya dando inicio a la irrigación perenne en el valle medio e introduciendo el cultivo de la caña de azúcar en las provincias de Assiut, Minia y Beni Suef.[52] Dicha construcción, de 268 km de longitud, tiene su cabecera a la altura de Assiut y sigue las cotas altas cercanas al Nilo, del cual toma sus aguas. Este canal, paralelo al río, se construyó aprovechando, en alguno de sus tramos, antiguos canales, de la misma manera que muchos canales *sefi* construidos en tiempos de Mehemet Alí habían aprovechado tramos de los antiguos canales *nili*.[53] Su caudal aporta agua durante los periodos estivales sumándose a la del Bahr Yussef. Este fue modificado en su cabecera para recibir su caudal del Ibrahimiyya.

52. Barois 1887, 28.
53. Barois 1887, 40.

Durante la inundación, el Bahr se utilizaba para alimentar las cuencas que se extendían desde los diques situados en Derout hasta el dique de Kocheicha, al norte de la provincia de Beni Suef. En la segunda mitad del siglo XIX era el mismo Bahr Yussef el que ejercía de *feeder* de una serie de dieciséis cuencas que se extendían a lo largo de 200 km.

Las cuencas inundadas por el Bahr Yussef y las tierras irrigadas por el Ibrahimiyya estaban separadas por un gran dique longitudinal, llamado *mohit*, que se extendía desde Derout[54] hasta la finalización del canal.[55] Este último dato resulta de gran interés, pues nos da detalle de un paisaje adecuado a los dos sistemas de gestión del agua y cultivo diferentes, separados entre sí por una línea trazada a escuadra.

2.6. Los últimos proyectos y el inicio del siglo XX

Sabemos que el sistema de cuencas de inundación, a partir de las reformas citadas de Mehemet Alí, es reparado y mejorado a lo largo de varios proyectos. Así, entre 1889 y 1891, se mejoran las correspondientes a las provincias de Kena y Sohag, y en 1902, con la construcción de la presa de Assiut, se benefició la inundación de las provincias de Minia y Beni Suef.[56]

En 1897, la irrigación perenne estaba aplicada a toda la provincia del Fayum, mientras que ésta sólo afectaba a una estrecha franja situada al norte de la provincia de Assiut y al sur de las de Minia y Beni Suef. Mientras, al norte de estas dos últimas la irrigación perenne se utilizaba en todo el valle.[57]

Un elemento que nos resulta de interés es la reforma que sufren las tierras situadas en la ribera izquierda del Bahr Yussef, en la provincia de Minia, entre 1899 y 1902. Willcocks[58] nos dice que se construyeron diques, reguladores y canales de drenaje, lo que transformó unas tierras de baja calidad en terrenos de primera categoría. Recordemos cómo a partir del siglo XVIII se inicia un proceso de acumulación de arenas eólicas que da lugar a la formación de dunas en el margen occidental del valle. Podría parecer entonces que no existía este sistema de irrigación en el lado occidental del Bahr Yussef, pero es Barois quien nos corrige esta suposición cuando, al enumerar las cuencas existentes, añade que también funcionaban en el margen izquierdo pero que éstas eran de menor importancia.[59] Además, Linant, en la publicación del plano de 1854, dibuja un sistema de diques y reguladores (*deversoirs)* en el margen izquierdo del Bahr Yussef. Por tanto, hemos de pensar que el proyecto de 1899 fue de mejora y ampliación de un modelo precedente que ya funcionaba.

Los trabajos de mejoras del sistema de inundación por cuencas se debieron, principalmente, a las perdidas producidas por los periodos de sequía y baja inundación, conocidos como *sharakia*, que los proyectos anteriores no habían solucionado. En concreto fue la sequía de 1888 la que llevó al gobierno Egipcio a publicar una nota por la cual se autorizaba la realización de toda una serie de trabajos para mejorar el sistema de inundación por cuencas, diseñados por el coronel J. C. Ross entre 1886 y 1887.[60] Además se producía otra situación: desde la construcción del canal de Ibrahimiyya, algunas de las cuencas situadas entre el tramo irrigado por éste y el desierto dependientes de Bahr Yussef (Assiut, Minia y Beni Suef)[61] nunca fueron alimentadas por suficiente *red water* (agua con alto contenido en limos) y además quedaban inundadas por pocos días por un agua con escasos contenidos en limos (llamada *white water*), lo que provocaba un grave deterioro de los suelos.[62] El cambio a la irrigación perenne en el lado occidental del Bahr Yussef fue acompañado por el mantenimiento de las cuencas existentes y por la plantación de tamariscos, palmeras datileras, regalicia y zarzos.[63]

En 1897, en Minia, se mantenía ya un sistema mixto de inundación y irrigación perenne tras la remodelación del coronel Ross. La construcción de un regulador en Minia y otro en "Benhessa", junto con un *feeder* desde el norte de Minia con salida directa en el Nilo, había doblado y triplicado el valor de las tierras. La reforma del lado occidental del Bahr Yussef tenía también como objetivo el evitar el avance progresivo de las arenas del desierto.[64] Una situación parecida se daba en Beni Suef, donde se hacía más palpable la transformación hacia una irrigación perenne. Las reformas afectaron asimismo al Ibrahimiyya permitiendo que proporcionara durante la inundación agua cargada de limos a las cuencas a través de ocho entrantes construidos en el canal. A su vez, éstas descargaban sus excedentes en el Ibrahimiyya.

Ese mismo año, habían comenzado también los trabajos de conversión del sistema de cuencas del Alto Egipto hacia la irrigación perenne. Así sabemos por

54. Barois 1887, 41.
55. Barois 1904, 94.
56. Willcocks y Craig 1913, 302.
57. Willcocks y Craig 1913, 388.
58. Willcocks y Craig 1913, 302.
59. Barois 1887, 42.
60. Willcocks y Craig 1913, 311-312.
61. Willcocks y Craig 1913, 328.
62. Willcocks y Craig 1913, 308.
63. Willcocks y Craig 1913, 348.
64. Willcocks y Craig 1913, 339.

Willcocks qué cuencas estaban en funcionamiento y en qué año se produjo su conversión:

Cuenca	*Año de inicio de la conversión*	*Año de inclusión en el Círculo*[65] *IV*
Deri	1903	1905
Mankatin	1903	1905
Membal	1903	1905
Bardanohi	1903	1905
Garnusi	1903	1905
Salakusi	1903	1905
Kom el Sayeda	1904	1906
Hosha marko	1905	1906
Hosha Absug	1905	1906
Hosha Talt.	1905	1906

Con estas transformaciones se había conseguido, finalmente, que fueran posible a gran escala los cultivos de verano, invierno y los del periodo de inundación.[66]

En 1904, Barois reedita su obra y nos dice que ambos sistemas conviven separadamente pero con excepciones a esa regla. Por un lado, aquellas tierras que, situadas en tierras bajas de una cuenca de inundación, pueden aprovechar el nivel freático mediante la extracción por bomba de agua, *sakia* o *shaduf*.[67] De esta manera, se podrían realizar cultivos de irrigación antes de producirse la inundación. Dicho sistema recibía el nombre de *qedi*. No sería errado pensar que tal vez se tratara de aquellas tierras llamadas *bathen*. Los canales utilizados para la inundación, los *nili* mencionados por Linant, que, por tanto, sólo entraban en uso con la crecida, servían a su vez para conducir el agua procedente de la extracción mediante bombas o norias situadas en las cercanías del Nilo y del Bahr Yussef.[68]

En este momento, las culturas que se realizaban eran: de invierno, llamadas *chetoui* y formada por cereales, forraje y leguminosas; de verano, llamadas *sefi* y representadas por el algodón y la caña de azúcar, y, por último, las propias de inundación, formadas por el maíz o el sorgo y llamadas *nili* en el Bajo Egipto y *nabari* en el Alto. Resulta interesante que los nombres aplicados por Linant a los diferentes tipos de canal se extendieran al nombre dado a los cultivos de irrigación e inundación.[69]

En 1911, las cuencas de inundación habían sido compartimentadas mediante diques secundarios dedicándolas al cultivo de la caña de azúcar, algodón, o mijo. Dichas tierras eran irrigadas por bombas de agua o mediante norias situadas en las mismas cuencas. Este bombeo se realizaba a través de compañías privadas o eran los mismos *fellahin* quienes obtenían el agua mediante *shaduf* o *sakia*. Entre 1897 y 1912, el número de *sakia* había pasado de 17340 a 40600.[70]

Willcocks indica que el modelo ideal de cuenca sería aquella que dispondría de una irrigación perenne procedente del subsuelo, que le permitiría el cultivo de caña de azúcar durante un año o dos, para luego someterlo a un proceso de inundación durante un año.[71]

Otro objetivo de las reformas fue resolver dos problemas acuciantes: la aportación de aguas ricas en limos y el incremento en la cantidad de agua, con el fin de aumentar el número de días de permanencia en cada cuenca y la superficie inundada. El éxito es evidente cuando se constata que entre 1877 y 1907, ambos años de baja inundación, se pasó de 45.339 a 8.765 acres sin irrigar en la provincia de Minia.

Finalmente, en 1894, una comisión técnica dependiente del Ministerio de Trabajos Públicos elaboró un informe para determinar cuál de los lugares propuestos desde El Cairo al Wadi Halfa por los ingenieros gubernamentales (entre ellos, el propio Willcocks) sería el elegido para la construcción de un gran embalse.[72] Esta comisión concluyó unánimemente que Asuán era la única ubicación posible para un embalse que almacenara la suficiente cantidad de agua procedente de la inundación y que pudiera suministrar el suficiente caudal a lo largo del verano al valle del Nilo.[73] Una vez aprobado el proyecto, los trabajos se inician en 1898 y la presa se completa a finales de 1902. En 1946, se alcanza el máximo nivel del embalse, lo que puso de manifiesto que era necesario un proyecto de mayor envergadura. Este proyecto no se planifica hasta 1954, en el ámbito del cambio nacionalista egipcio representado en la figura de Nasser. Las obras no se inician hasta 1960, la primera presa proyectada se finaliza en 1964 y el proyecto concluye en 1976, cuando el embalse alcanza el límite de su capacidad y aporta a

65. Egipto divide las áreas sujetas a irrigación perenne en *círculos*. Así las provincias de Minia y Beni Suef forman parte del Cuarto Círculo.

66. Willcocks y Craig 1913, 390.

67. Barois 1904, 51-52.

68. Barois 1904, 97-99.

69. Barois 1904, 52.

70. Willcocks y Craig 1913, 344.

71. Willcocks y Craig 1913, 347.

72. Willcocks y Craig 1913, 681.

73. *Egypt. Technical Commission on Reservoirs* 1894, xi.

todo Egipto la irrigación perenne. Entendemos que en 1964 el sistema de inundación por cuencas aún funcionaba y que, con posterioridad a esta fecha, los diques dejaran de tener utilidad y la inundación que había caracterizado al paisaje egipcio hasta entonces comenzará a ser sólo un recuerdo.

3. Metodología

Los apartados anteriores evidencian que el proceso de transformación y cambio del valle medio fue complejo. Las grandes infraestructuras hidráulicas, los canales de irrigación y de drenaje construidos durante el siglo XIX alteraron, mimetizaron y ocultaron los sistemas precedentes a la expedición de 1799. Conocemos pues el funcionamiento de las cuencas de inundación estructuradas por diques, las diversas definiciones aplicadas sobre el término *bathen*, la diferencia entre un canal *sefi* y otro *nili* y sabemos que la transformación del valle se produjo en varias etapas a lo largo de más cien años, dejando cada cambio su impronta sobre el terreno. Aprehendidas estas premisas, hemos aplicado métodos y técnicas, que describimos a continuación, a través de los cuales hemos reconstruido de una forma general los diversos paisajes del siglo XIX del valle medio y hemos realizado también un primer acercamiento al entorno que caracteriza el yacimiento de Oxirrinco. Estos métodos y técnicas han servido a su vez para la propuesta de reconstrucción del paisaje oxirrinquita explicada en esta misma publicación (Subías, Fiz y Cuesta).

3.1. Fuentes de datos

Cartografía

Nuestro trabajo, siguiendo las premisas y componentes de un estudio arqueomorfológico del paisaje en el valle medio, ha necesitado, en primer lugar, del análisis y síntesis regresivos de la cartografía actual e histórica del territorio objeto del estudio.[74]

Siguiendo este criterio, se han compilado las cartas topográficas actuales de la provincia de Minia y Beni Suef (escala 1:50K) elaboradas por la Egyptian Survey Authority.

En cuanto a lo que se refiere a una cartografía elaborada con anterioridad a la construcción de la presa de Asuán, hemos digitalizado y georeferenciado planos topográficos (1:50K, 1:100K, 1:200K) levantados entre los años 1906 y 1939 por el Survey Department of Egypt, momento en el cual el país estaba bajo protectorado británico. La precisión y detalle de estos mapas ha sido esencial para la detección de estructuras usadas para la gestión hidrográfica del país.

En los dos casos, el uso de estas fuentes ha facilitado la localización de topónimos de poblaciones citadas en los documentos elaborados en el siglo XIX, a pesar de la variación que éstos han sufrido a lo largo de los últimos doscientos años. Todos los elementos reconocidos sobre este soporte han sido vaciados sobre el SIG creando las correspondientes capas vectoriales: ciudades, toponimia actual, infraestructuras hidráulicas, cursos del Nilo y del Bahr Yussef, etc.

La cartografía usada del siglo XIX se ha basado principalmente en la *Carte Hydrographique de la Moyenne Égypte*, de Linant de Bellefonds, elaborada en 1855 y reelaborada en 1883. Este plano nos ha sido de gran utilidad en la reconstrucción del valle medio a lo largo del siglo XIX, debido no sólo a la calidad con la cual fue elaborado para un área de grandes dimensiones sino porque también recoge topónimos y detalles de gran utilidad, como son la situación y estructura de los diques y reguladores, así como la ubicación de varios proyectos de construcción previstos en 1855.

Un problema para el que no hemos encontrado una solución ha sido el manejo de los 51 planos a una escala 1:100K que acompañan a la *Description de l'Égypte*. Los problemas y errores en la ubicación de las poblaciones y en la situación y trazado de diques y canales (puestos en evidencia por Gomaà) fueron motivo suficiente para no utilizarlos como fuente de trabajo principal ni tampoco como cartografía de soporte a la investigación. Sólo hemos utilizado puntualmente alguna de los planchas de la obra para ilustrar, como hemos visto, la discusión sobre los *bathen.*

Imágenes de satélite y DEM

La teledetección ha sido la segunda forma de aproximación a través de la información espacial que ésta proporciona y sobre la cual no ha sido aplicado el filtraje conceptual realizado por el cartógrafo.

Su aplicación en arqueología la podríamos remontar a las fotografías aéreas de Stonehenge tomadas por P. H. Sharpe sobre las planicies de Salisbury en 1906. Años después, la diversidad internacional de los escenarios bélicos, la gran amplitud de los frentes de combate y la necesidad de conocer la logística militar e industrial del bando contrario fueron motivos suficientes durante la Segunda Guerra Mundial para la elaboración de grandes coberturas de fotografías aéreas. En su interpretación participaron arqueólogos encuadrados en los servicios secretos que, al finalizar el conflicto, aprovecharon medios y conocimientos para publicar sus observaciones a lo largo de los años cincuenta del pasado siglo.

La Guerra Fría y la Carrera Espacial permitieron la puesta en órbita de satélites capaces de generar coberturas globales del planeta, coincidiendo con las

74. Entendiendo por *arqueomorfología* (Palet 1997, 28): "[…] la restitución, definición y lectura arqueológica de las diversas trazas que forman la morfología histórica del territorio, en tanto que estas trazas son huellas de la actividad humana sobre el paisaje".

primeras publicaciones sobre el tratamiento multiespectral de las imágenes que fue aplicado en arqueología en los inicios de los años setenta. Actualmente, la resolución espacial de las imágenes de satélite en los inicios de la segunda década del tercer milenio junto con la capacidad multiespectral es la última gran técnica de la cual la arqueología se ha beneficiado para localizar estructuras de menor escala.[75]

A lo largo de estos años, las publicaciones sobre teledetección aplicada al paisaje Egipcio se han centrado sobretodo en las áreas del delta, el valle medio del Nilo y la península del Sinaí,[76] y en la reconstrucción del curso del Nilo en Karnak y Menfis,[77] en la formación de la isla de Edfu durante el Imperio Nuevo[78] y en la detección de un canal Canópico.[79]

Para nuestro proyecto hemos realizado un trabajo exhaustivo de búsqueda y selección de las imágenes procedentes de diversos satélites, procurando que éstas se hicieran teniendo en cuenta diferentes momentos del año. Esto último se hizo con la intención de potenciar la detección de aquellas trazas susceptibles de aparecer en momentos estacionales concretos.

Las imágenes fueron obtenidas en su mayoría del servidor disponible en internet del USGS *Earth Explorer*. Más concretamente, aquellas escenas captadas por los sensores Landsat y Corona.[80] En cambio, las imágenes Aster 1B fueron adquiridas a la empresa ERSDAC (Japón). Se georeferenciaron las Corona ortorectificando el conjunto y usando la proyección WGS 84 UTM-36N.

Las imágenes Corona, desclasificadas en 1995 por la administración Clinton, corresponden a una de las primeras series de imágenes procedentes de un satélite con cobertura global obtenidas durante la Guerra Fría, en el periodo entre 1960 y 1975. Concretamente, la serie KH 4B es la que mejores resultados proporciona, debido a su mejor calidad y a que fueron tomadas con resoluciones en torno a los 2 m/píxel. Su cobertura global, sobretodo en áreas asiáticas y africanas, la convierten en un referente absolutamente necesario en cualquier estudio del paisaje.[81]

En el caso que nos ocupa, su gran interés radica en ser una extraordinaria fuente de información del valle medio del Nilo entre 1960 y 1976, periodo en el cual vimos que se construyó la presa de Asuán. Las imágenes muestran aún elementos y trazas correspondientes al sistema de inundación por cuencas, donde el paisaje captado aún no presentaba las alteraciones correspondientes al desarrollo urbano y territorial de los años ochenta y noventa del pasado siglo. Su uso, combinado con imágenes más modernas procedentes de otros sensores, nos ha permitido observar las grandes transformaciones producidas en los últimos treinta años. Esta primera impresión pondría a la arqueología egipcia bajo los mismos problemas que caracterizaron los procesos de cambio y crecimiento urbano en la Europa de los sesenta y setenta.

Sin embargo, para un estudio más detallado del entorno más cercano a la ciudad de Oxirrinco fue necesaria la adquisición de escenas Quickbird (5-02-2009) y Worldview 2[82] (23-06-2010) con resoluciones de 0.6 y 0.5 m/píxel respectivamente. Para esta última se han utilizado sus características multiespectrales de WV2 (8 bandas), aplicando diversos tipos de análisis, que desarrollaremos en los apartados siguientes. También hemos utilizado estas imágenes para georeferenciar las imágenes Corona tomadas en el área de Oxirrinco.

Además, el análisis de la topografía del valle medio del Nilo así como determinadas operaciones, como pueda ser la ortorectificación de imágenes, requieren de modelos digitales de elevación (DEM). En estos casos fue necesario recurrir a los servidores públicos con coberturas globales, como CGIAR-CSI,[83] que proporciona un DEM a 90 m/pixel (STRM-90), o a la reciente elaboración del producto Aster GDEM de la ERSDAC, con resoluciones de 30 m/pixel.

Problemas con GDEM

El uso de Aster GDEM nos permitió detectar una serie de anomalías que no son visibles sobre imágenes de alta resolución o en Google Earth. Inicialmente, interpretamos tales anomalías como antiguos diques o grandes depósitos de agua. Sin embargo, la página web de la ERSDAC GDEM contiene una reciente revisión, por la cual se informa de las anomalías en el producto, similares a las que nosotros habíamos detectado, y se insiste en el carácter "experimental", cosa que nos obligó, por tanto, a abandonar tal hipótesis.

75. Parcak 2009, 13-39.

76. Parcak 2007; Mumford y Parcak 2002.

77. Hillier, Bunbury y Graham 2007; Bunbury, Graham y Hunter 2008; Lutley y Bunbury 2008.

78. Bunbury, Graham y Hunter 2009.

79. Stanley y Jorstad 2006.

80. También se han vaciado imágenes Hiperion, EO 1 ALI y SIR-C, que por sus características multiespectrales y radar han sido previstos futuros análisis.

81. Parcak 2009, 52-57.

82. Comercializadas por la empresa Digital Globe.

83. CGIAR es el Grupo Consultivo para la Investigación Agrícola Internacional. Su servidor en internet (http://srtm.csi.cgiar.org) proporciona un DEM obtenido a partir del Shuttle Radar Topographic Mission, gestionado por la NASA.

Generando un DEM propio

Estos problemas nos forzaron a buscar otras soluciones. Una de ellas fue la creación de nuestro propio DEM a partir de las bandas Aster 3N y 3B. Estas dos bandas, captadas al tiempo pero con un desfase estereoscópico, permiten, a partir de técnicas de fotogrametría, la creación de imágenes estéreo y la extracción de un DEM con una resolución de 15 m/píxel. Otros proyectos han utilizado las bandas 3N y 3B para generar un DEM del área próxima a la ciudad de Zagora, situada en el sur de Marruecos.[84]

Otra fuente utilizada para la creación de DEM fue a partir de las imágenes procedentes del sensor Corona, ya que éste realiza de forma simultánea la toma de dos imágenes estereoscópicas.[85] Otros proyectos han aplicado esta técnica para generar modelos digitales de elevación de alta resolución.[86]

Base de datos y SIG

Hemos creado una base de datos en la cual se han incluido los yacimientos compilados en el trabajo de Farouk Gomaà, Renate Müller-Wollermann y Wolfgang Schenkel.[87] Esta base de datos fue integrada en ArcGis 9.3 junto con la cartografía de base y las imágenes de satélite. La superposición de toda esta información permitió la creación de capas correspondientes a trazas de canales o diques encontrados en la observación y análisis tanto de la cartografía como de las imágenes.

3.2. Técnicas de análisis espectral

Gracias al uso del *software* ERDAS Imagine 2010, ha sido posible la aplicación de diversas técnicas de análisis espectral sobre el conjunto de imágenes seleccionadas. Las diferentes resoluciones espaciales proporcionadas por cada tipo de sensor nos han permitido la realización de diversas aproximaciones en función de la escala de trabajo que estuviéramos adoptando.

Combinación de bandas

Las imágenes multiespectrales se componen de bandas que captan diversas franjas del espectro electromagnético. Cada una de estas bandas actúa de manera diferente sobre elementos naturales o geológicos. Inicialmente, sólo es posible combinar tres bandas en una única imagen pudiendo resaltar diferencias y contrastes, como por ejemplo los derivados del crecimiento diferencial de la vegetación. Así, por ejemplo, utilizando las imágenes Landsat, es posible combinar las bandas 4-3-2 (IR-R-G) de manera que obtenemos una nueva imagen en la cual la banda IR destaca aquellas trazas sobre las cuales la vegetación crece con mayor o menor fuerza, relativas a una mayor presencia de humedad.[88]

Índices NDVI

Sin embargo, también es posible, a partir de una imagen, el operar con las bandas que la componen, de tal manera que el resultado resalte solamente determinadas características registradas en su espectro. Este es el caso, por ejemplo, del NDVI (Normalized Diferential Vegetation Index), un índice asociado a la salud de la vegetación y, por tanto, a la existencia de muros, fosas o canales bajo sedimento. La presencia de estas estructuras implica una destacada o reducida presencia y descomposición de componentes orgánicos que retienen mayor o menor humedad y, por tanto, señalando su existencia a través de los cambios en la densidad de la vegetación.[89] NDVI es, por tanto, una técnica analítica que compara las bandas IR y R procedentes de las imágenes multiespectrales. Esta técnica la hemos utilizado con imágenes obtenidas de sensores multiespectrales de resolución media y alta: Landsat, Aster, WV2. El problema se produce cuando ésta se aplica sobre áreas en las cuales hay un fuerte grado de desertización o la presencia de dunas. En estos casos, que se manifiestan en nuestra área estudiada, hemos visto que es mejor aplicar otro tipo de análisis, como PCA o Tasseled Cap.

Con el uso de índices NDVI hemos localizado algunos canales colmatados por el desuso o que fueron sustituidos durante el siglo XIX por canales profundos diseñados para la irrigación permanente.[90]

Análisis de Componentes Principales (PCA)

Una forma de eliminar la redundancia presente en el espectro electromagnético captado por una escena de un sensor multiespectral es reduciendo las bandas a una serie de nuevas componentes que recogen gran parte de la información original. Este método, llamado Análisis de Componentes Principales (PCA), permite la identificación tanto de aquellos rasgos registrados en la mayor parte de las bandas como de los que

84. Véase Lee *et al.* 2008.

85. Dashora, Lohani y Malik 2007.

86. Sobre detalles técnicos, léase Galiatsatos, Donoghue y Philip 2008; para aplicaciones en arqueología, Gossens *et al.* 2006 y Casana y Cothren 2008.

87. Gomaà, Müller-Wollermann y Schenkel 1991.

88. Para una mayor información sobre las aplicaciones en arqueología de la combinación de bandas de los sensores Landsat y Aster, véase Mumford y Parcak 2002 y Altaweel 2005.

89. Parcak 2009, 92-94.

90. Sobre aplicaciones del índice NVDI, véase Merola *et al.* 2006; Rowlands y Sarris 2007 y Masini y Lasaponara 2007.

son específicos a algún grupo de ellas. La capacidad de síntesis del ACP la convierte en una técnica muy apropiada para filtrar las imágenes, como paso previo a otros análisis multiestacionales. Es esta capacidad la que nos sirve en la selección de la información más significativa de cada periodo o estación estudiado.[91] Su aplicación en arqueología ha permitido la detección de yacimientos,[92] muros enterrados[93] y anomalías arqueológicas sobre imágenes del sensor Ikonos.

Tasseled Cap (TTC)

Tasseled Cap (TTC) es una transformación aplicada sobre imágenes multiespectrales cuya intencionalidad consiste en la obtención de nuevas bandas a partir de la combinación lineal de las originales realzando aquellos rasgos de interés de cada escena. La diferencia con respecto al ACP està en que TTC ofrece componentes con características físicas concretas. Es decir, independientes del tipo de imagen que se esté analizando.

Kauth y Thomas idearon esta técnica en el marco del proyecto LACIE (Large Area Crop Inventory Experiment), desarrollado por la NASA y el departamento de agricultura estadonidense (USDA) en los años setenta.[94] Se analizaron los componentes fundamentales de variación en una imagen Landsat MSS, describiendo sus características físicas desde el punto de vista del seguimiento de cultivos. Sobre el conjunto de imágenes, los autores del trabajo distinguían tres componentes: uno denominado "brillo" (*brightness*), suma ponderada de las cuatro bandas Landsat originales; el segundo, denominado "verdor" (*greeness*), relacionado con la actividad vegetativa; un tercero conocido como "marchitez" (*yellowness*), que se asignaba a la reducción de vigor vegetal, y un cuarto, *nonsuch*, sin significado aparente. En los años ochenta fue cuando comenzó a tener mayor difusión y fue aplicada a otros sensores, principalmente al sensor Landsat TM y al AVHRR.[95] De esta aplicación resultó la detección de un quinto componente relacionado con la "humedad" (*wetness*).

La técnica fue también aplicada sobre sensores multiespectrales de alta resolución espacial, como Ikonos, y se escogió para su aplicación el territorio de Metaponto.[96]

Fusión de imágenes

Uno de los problemas que nos encontramos al trabajar con imágenes multiespectrales fue que algunas de las bandas que las componen están recogidas con una resolución espacial diferente, lo que dificulta, por tanto, la combinación y tratamiento del conjunto de bandas. Así, por ejemplo, las bandas SWIR y TIR de una escena Aster no podrían ser combinadas con las UNIR, debido a que aquellas tienen resoluciones de 60 y 90 m/píxel frente a los 30 m/píxel de las últimas. En otro caso, si aplicáramos una combinación o un PCA a las bandas multiespectrales de una escena WV2, la resolución resultante sería de 1.8 m/píxel, en lugar de los 0.5 m/pixel de la imagen Panchromatica.

Para resolverlo se han utilizado herramientas de fusión con el fin de combinar sobre una imagen de alta resolución (por ejemplo, WV-2 Panchromatica 0.5 m/píxel) el resto de bandas multiespectrales a una resolución menor (1.8 m/píxel). Una de estas técnicas aplicadas es la Ehlers Fusion, ideada e implementada por Manfred Ehlers, de la Universidad de Osnabrük.[97]

3.3. El paisaje oxirrinquita: escalas de trabajo

Hemos emprendido varias estrategias para abordar el estudio del paisaje de Oxirrinco aplicando varias escalas de trabajo y en función de las fuentes utilizadas.

Entendemos que antes de abordar un estudio arquemorfológico basado en trazas de parcelación, caminos, diques menores y canales es necesaria una regresión que reconstruya el sistema de cuencas de inundación y los cambios provocados por la construcción de los grandes canales de irrigación, como el Ibrahimiyya.

Así, el estudio del sistema de cuencas en el valle medio del Nilo ha requerido, primero, una aproximación a gran escala, utilizando las fuentes escritas y planimétricas del siglo XIX. Con este enfoque, hemos reconstruido las diversas fases y transformaciones que alteraron esta región desde la llegada de la expedición de Bonaparte en 1799 hasta el final del siglo XIX. El área estudiada correspondiente al valle se extiende desde Samalut hasta Magaga, con una superficie total aproximada de 1304 km^2. (Fig. 5.1)

Desde una escala menor y ante la falta de una cartografía histórica de detalle de el-Banhasa y Sandafa el Fahr, las dos poblaciones surgidas en las proximidades de Oxirrinco, hemos realizado directamente aproximaciones al paisaje analizando las imágenes obtenidas por satélite. En esta segunda perspectiva, hemos organizado el estudio en función de tres aproximaciones o ventanas abiertas sobre el área del proyecto. La primera se inicia a un kilómetro al sur de Oxirrinco y cubre un área de 80 km^2 extendiéndose desde del Bahr Yussef hasta las estribaciones de las montañas líbicas. (Fig. 5.2) La segunda, de menor superficie, se extiende

91. Chuvieco 1996.
92. Stafford, Leigh y Asch 1992.
93. Garbuzow 2003.
94. Kauth Tomas 1976.
95. Crist y Cicone 1984 *a* y *b*; Cicone y Metzer 1984.
96. Horne 2003.
97. Ehlers 2008.

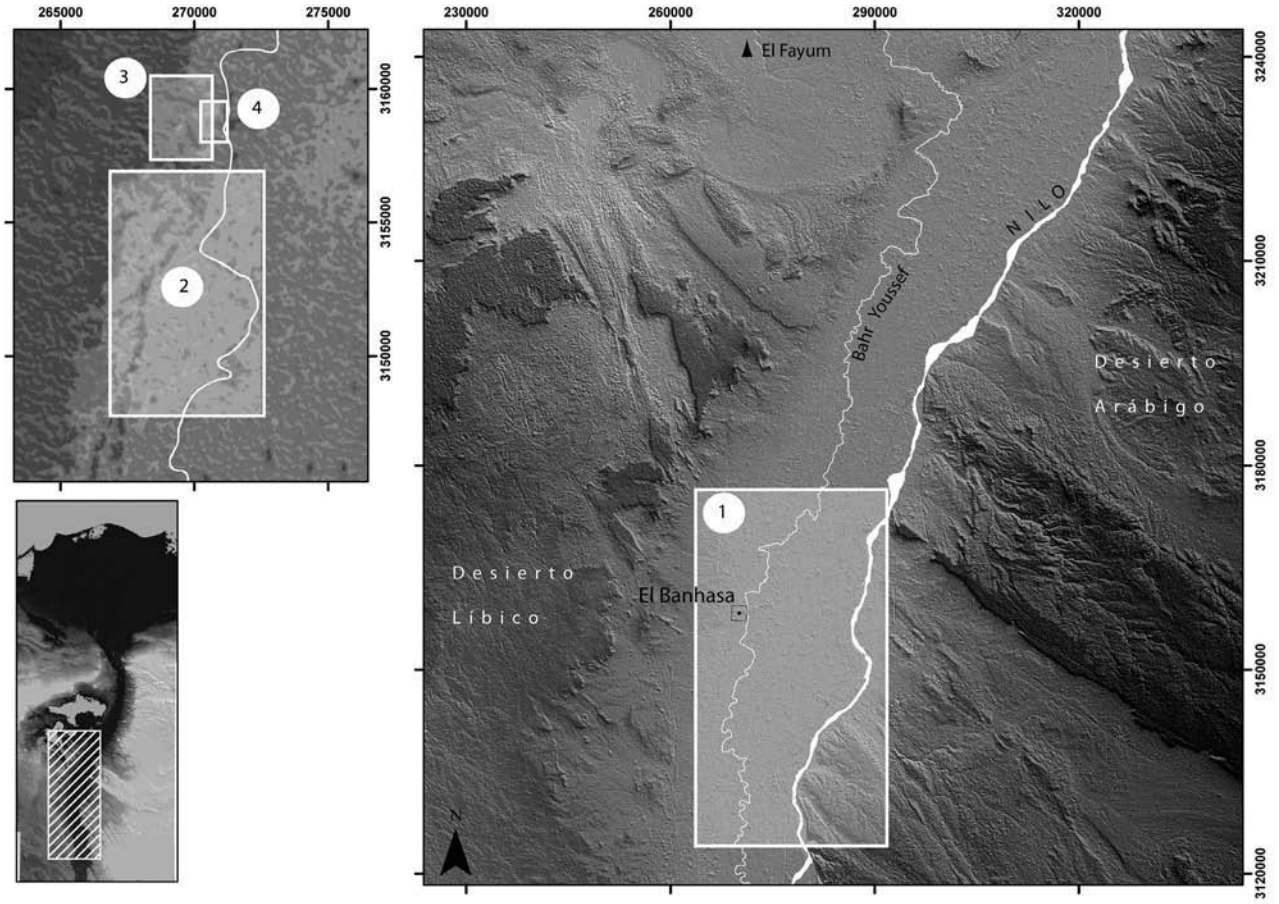

Figura 5. Ventanas sobre las que se ha aplicado un tratamiento de combinación de bandas, TTC y PCA, contrastado con escenas Corona.

en 5,25 km^2 y está situada al oeste del yacimiento, con la intención de analizar el entorno físico inmediato de la ciudad grecorromana. (Fig. 5.3) Por último, la tercera área sujeta a esta aproximación correspondería al propio yacimiento. (Fig. 5.4)

Para las tres hemos aplicado primero técnicas TTC y PCA sobre las imágenes captadas por diversos sensores multiespectrales (Landsat 4-5 TM, MSS), entre 1984 y 1999. El resultado proporcionaba diversas trazas de vías, wadis, canales o elementos no identificados que hemos ido analizando siguiendo un proceso diacrónico, eliminando aquellos que no existían con anterioridad a 1984, fecha en la que se ha dispuesto de información sobre esta zona, accesible en la red. (Fig. 6) Hemos constatado al mismo tiempo el grado de transformación del área rural en torno a la actual localidad de Bahnasa.

A nivel práctico cabe añadir que la aplicación del TTC sobre esta área ha constatado que los mejores resultados se han obtenido en la combinación de los componentes 2-3-4 (verdor, marchitez y humedad) y de los componentes 3-4-6 (marchitez, humedad y el componente 6, sin identificar)

Estas marcas detectadas, síntesis y eliminación de la redundancia inherente entre las diversas bandas de una misma imagen, fueron luego superpuestas sobre las escenas de alta resolución tanto Corona, QuickBird y WV-2. En el último caso, también se aplicaron técnicas de PCA y TTC, con el fin de analizarlas con mayor detalle.

4. Resultados

4.1. Aproximación a gran escala: propuestas para una reconstrucción del paisaje en el valle medio del Nilo a lo largo del siglo XIX

Desde la perspectiva de una escala mayor en el estudio del paisaje y tras el análisis de las fuentes que nos permiten contextualizar los grandes proyectos aplicados en el valle medio del Nilo, hemos seguido un proceso regresivo a la hora de reconstruir los diferentes paisajes a lo largo del siglo XIX.

El valle medio entre 1873 y 1887

Nuestra fecha de partida es 1887, momento en el cual se publica el libro de Barois. Anteriormente, vimos la relación de cuencas de inundación en funcionamiento en ese año.

Habíamos hablado del gran dique longitudinal, *mohit*, que separa las cuencas de inundación de las

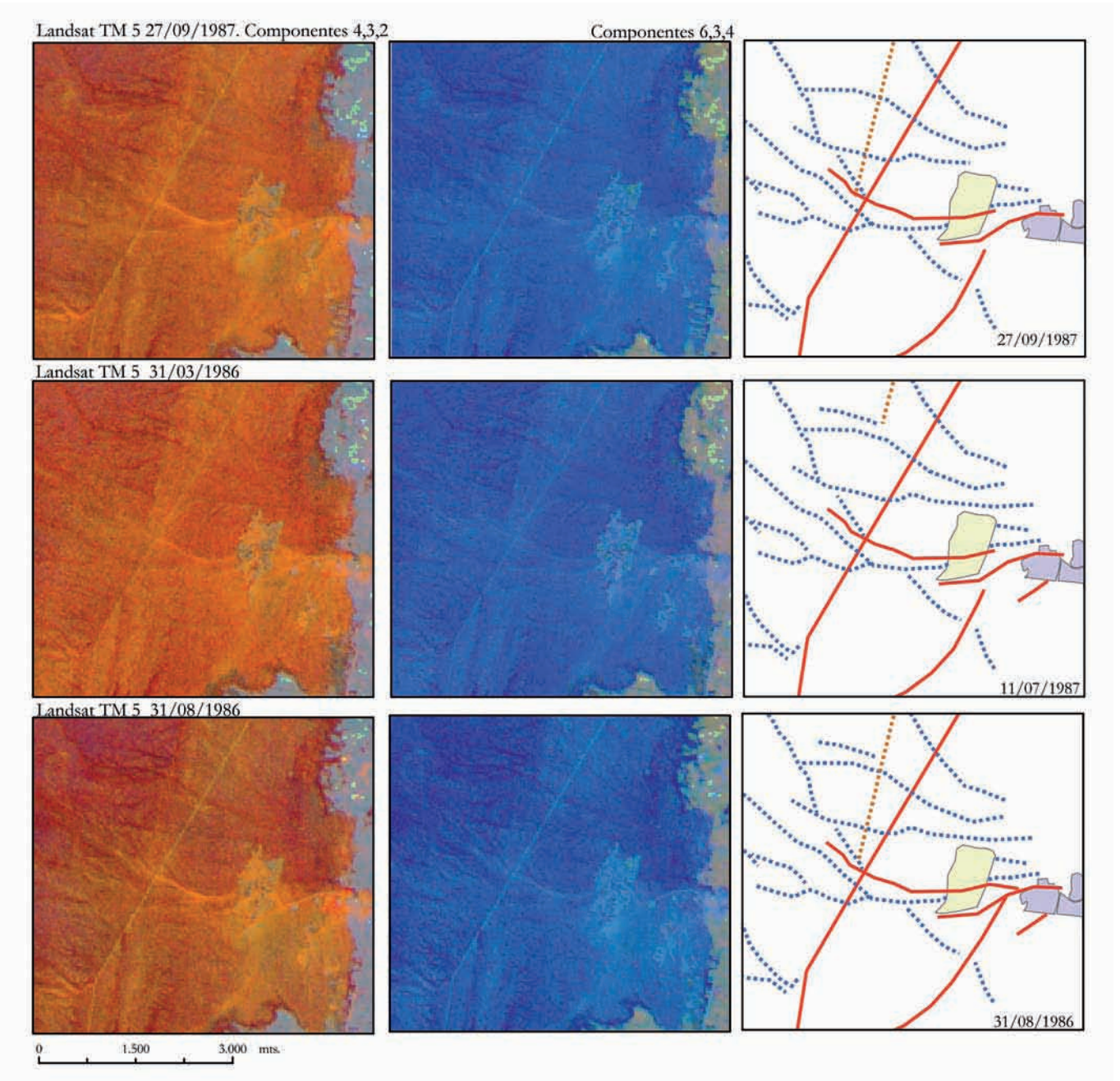

Figura 6. Aplicación de TTC a una serie de escenas entre 1987 y 1984.

tierras irrigadas. Este dique, que se puede identificar en una de las planchas de la publicación de Barois, es actualmente el canal de drenaje Al Muhit / Al Garbhi o, también, si usamos los planos egipcios elaborados bajo protectorado británico en 1908, el canal de Bardahnui.

Esta división antrópica del valle medio señala, como habíamos dicho, dos paisajes completamente diferentes. Esta variación se haría más evidente durante las crecidas, ya que ambos entornos estaban gestionados por sistemas de irrigación y cultivos completamente diferentes. Durante la crecida, se inundaba la mitad occidental del valle, como así daban razón los textos de los viajeros del siglo xviii, de manera que las poblaciones quedaban aisladas, tan sólo comunicadas por diques. Los canales de inundación y drenaje en esta parte del valle crean un conjunto de formas radiales irregulares en torno, generalmente, a los espacios situados a menor cota, donde las aguas de la inundación tienden a acumularse, los *bathen* de Linant. El Bahr Yussef haría de eje del que parten o al que vierten todos ellos.

Sin embargo, una vez traspasado el dique *mohit*, el cambio es radical: el lado oriental presenta un entorno de regadío y campos cultivados organizado en forma de parcelas regulares, delimitadas por canales menores y acequias que siguen la orientación del Ibrahimiyya, del que son dependientes. Este último sistema, teniendo en cuenta los cambios producidos en esta parte del valle en el siglo xix, se estructuraría coincidiendo con la construcción de este canal. (Fig. 7)

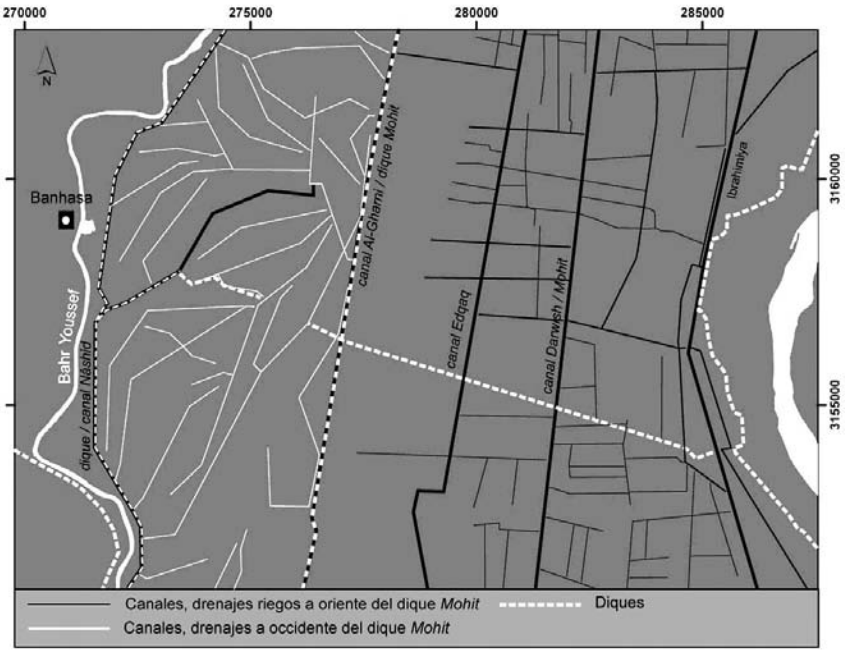

Figura 7. Morfología de los sistemas de irrigación perenne e inundación y drenajes a oriente y occidente, respectivamente, del gran dique *mohit*.

La primera reconstrucción, que hemos fechado en 1887, la hemos realizado a partir de una de las planchas de la publicación de Barois.[98] (Fig. 8) En ésta se aprecia claramente el gran dique *mohit,* que divide las tierras inundadas por el Bahr Yussef de las irrigadas por el Ibrahimiyya e impide que la inundación anegue estas últimas.

Además, Barois proporciona una lista de cuencas en funcionamiento en 1887 para las provincias de Minia y Beni Suef,[99] e indica, además, la superficie de inundación alimentada por el Bahr Yussef:

Cuenca	*Área (ha)*
Dehri-Mankatin	7.686
Burdanaoni	7.875
Garnonsi	12.337
Salagonssi	2.636
Sultani	13.396
Minieh	10.573
Nuera	13.711
Bahabahin	21.514
Kocheicha	33.600

En la reconstrucción de este sistema de cuencas, hemos encontrado dificultades, dado que estas extensiones, tabuladas por Barois, no coinciden con las que saldrían a partir de la cartografía que presenta el mismo autor. Esto nos hizo suponer que tuvo acceso a datos diferentes y que, por tanto, las cuencas representadas en la cartografía corresponden realmente al momento de la publicación del libro en 1887, en el cual el sistema de irrigación perenne ya se había aplicado a prácticamente a la mitad del valle y el dique *mohit* ya había sido construido. Pero los datos publicados por Barois en el texto, por el contrario, habría que fecharlos en algún momento entre 1873 (año de la inauguración del Ibrahimiyya) y 1887.

Esta suposición se debe, por ejemplo, a que Barois habla de 7.686 ha de tierras inundadas en la cuenca Dehri-Mankatin. En primer lugar, en el texto los cálculos se hacen sobre una única cuenca mientras que en la cartografía rotula dos cuencas diferentes. Nosotros, al reconstruir ambas cuencas a partir de la plancha de Barois, vemos que aún sumando las áreas correspondientes, Dehri y Mankatin no superan las 5.000 ha. Nuestra primera explicación fue pensar que las tierras situadas al oeste del Bahr Yussef estaban incluidas en dicho cálculo. La existencia de un conjunto de diques en el margen izquierdo del Bahr, detectados en la cartografía y teledetección, nos podría llevar a esa suposición. Sin embargo, el propio autor nos indica que las cuencas de inundación situadas al oeste del Bahr no tenían una importancia destacable. Además, tanto Barois como Willcocks separan en las estadísticas las cuencas situadas al oeste y al este del canal de Joseph.

Esta discordancia se repite en otros casos, salvo para las cuencas de Membal (no da datos) y Salagonssi. Como el canal del Ibrahimiyya había sido construido casi veinte años antes de la publicación del texto de Barois, pensamos en elaborar una segunda propuesta

98. Barois 1887, Plancha III.
99. Barois 1887, 42.

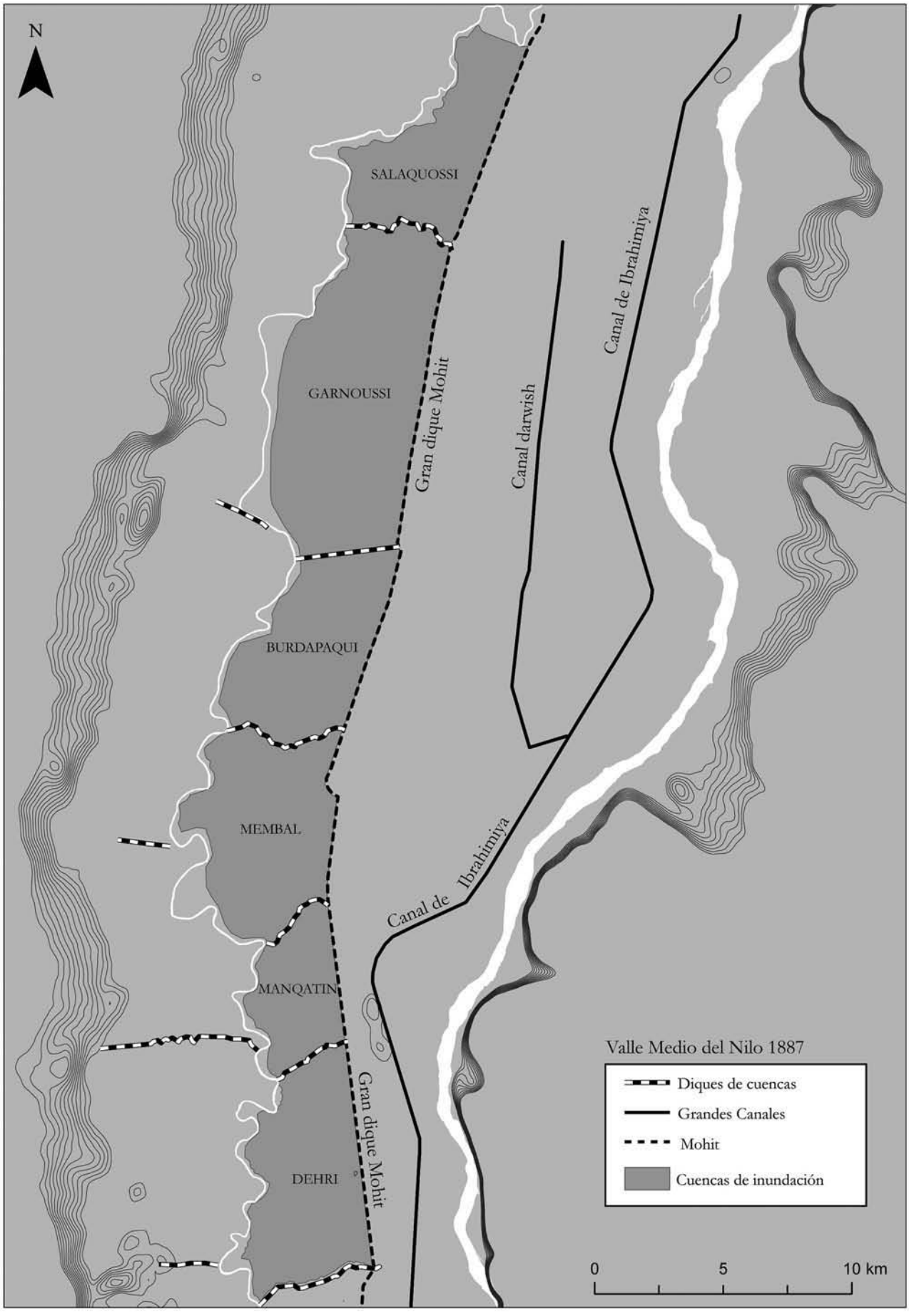

Figura 8. Reconstrucción del valle medio del Nilo (1887).

en la que el límite oriental de las cuencas fuera dicho canal. Sin embargo nuevamente existían claras diferencias entre los datos de Barois y los que nos proporcionaba esta reconstrucción. Solamente la cuenca Dehri-Mankatin quedaba ajustada con una diferencia de 181 ha.

Por tanto, descartando esta solución, se planteó otra propuesta (Fig. 9) en la cual el límite entre la irrigación perenne y la inundación reflejado en los datos de Barois estuviera situado entre el dique *mohit* y el Ibrahimiyya. Este límite correspondería al Darwish, un canal longitudinal al Nilo, derivado del canal Ibrahimiyya. Su cabecera está a la altura de Matai y asciende hasta alcanzar el dique de Garnus. Esta propuesta nos parece la más acertada, dado que la cuantificación de las áreas inundadas por las cuencas proporcionada por Barois se ajusta más a esta disposición. Las diferencias con nuestra propuesta están entre las 13 ha (Bardanhoui) y las 757 ha (Garnansoui). Un dato que nos pareció definitivo en esta elección fue que un plano topográfico de 1908 da a esta derivación dos nombres: canal Darwish, y *Mohit Wastani drain*. La utilización del término *mohit* nos informa que esta derivación fue utilizada en su momento como dique longitudinal de separación entre ambos sistemas de gestión hidráulica para impedir que el agua de la inundación pudiera llegar hasta las tierras sujetas a irrigación perenne. Sin embargo, hay una cuenca, la de Salagonssi, cuyas dimensiones en esta propuesta no coinciden con los cálculos de Barois (la diferencia es de, aproximadamente, 2.000 ha). Pensamos que probablemente la parte más al norte del dique *mohit* ya estaba construida en el momento de la redacción del texto y, por tanto, las dimensiones de la cuenca en ese momento, fechado entre 1873 y 1887, se ajustaban a las que realmente tenía en el plano definitivo de 1887.

Estas discordancias entre los datos tabulados y el plano nos hacen pensar que o bien hubo un error en el cual Barois mezclo datos antiguos o bien tales datos reflejan un proceso de conversión gradual de reconversión y reducción de las cuencas de inundación. Los primeros corresponden a un momento posterior a la inauguración del canal de Ibrahimiyya, sin el gran dique *mohit,* en el que el dique-canal de drenaje *Wastani* sería el límite de contención entre los dos sistemas.

Otro tema a tener en cuenta son los nombres dados a las cuencas de inundación. En el caso de Burdanahoui, el nombre corresponde a una localidad que quedaría fuera de la cuenca propuesta en la cartografía de Barois. Es muy interesante, dado que el nombre conservaría el topónimo que ya se citaba en uno de los diques enumerados por la *Description*, lo cual nos permite fecharlos en un momento anterior a 1800.

Finalmente, ya hemos visto que Barois presenta como una única cuenca a la llamada Dehri-Mankatin. En ese momento concreto debía de estar prevista una división en dos de la cuenca, dado que en la plancha refleja tal división y Willcooks, en la relación vista de cuencas que habían de ser transformadas en irrigación perenne a partir de 1901, muestra a su vez tal división. Es decir, tanto el dique situado a la altura de Samalut, el segundo de la enumeración de Gomaà, Müller-Wollermann y Schenkel, como otro dique situado a la misma altura pero en el margen opuesto del Bahr Yussef se habrían construido con posterioridad a 1887.

El valle medio en 1854

La figura 10 muestra una reconstrucción del valle medio en 1854, año que coincide con la publicación de la *Carte Hydrographique de la Moyenne Égypte*, de Linant de Bellefonds. Esta fuente resulta interesante, entre otros datos, dado que algunos diques del margen izquierdo del Barh Yussef están rotulados como proyectos, lo cual nos permite datarlos como posteriores a 1854.

Un problema podría surgir al interpretar este plano, dado que es una reedición hecha en 1882. Sin embargo, esta reedición se hizo para incorporar únicamente el ferrocarril construido en aquel periodo en el Alto Egipto. Recordemos que en 1883 ya estaban en funcionamiento otras grandes infraestructuras hidráulicas, como el canal de Ibrahimiyya, inaugurado en 1873, o el gran dique *mohit*, y no están reflejados en el plano de Linant de Bellefonds.[100] Por tanto, suponemos que el plano de 1882 copió íntegramente el levantamiento de 1854 añadiendo simplemente el ferrocarril.

Observando el plano de Linant de Bellefonds, podemos decir que, efectivamente, sólo existe una cuenca de inundación en el área de Salamut, delimitada por los diques enumerados como 2 y 3 por Gomaà, Müller-Wollermann y Schenkel. Sin embargo, el primero, que separaría las cuencas de Manketin y Dehri en el plano de Barois, ya hemos dicho que seguramente fue construido entre 1873 y 1886. Asimismo, también habíamos dicho que el otro dique del margen occidental del Bahr Yussef, no citado por Gomaà, Müller-Wollermann y Schenkel, se habría construido en ese periodo. De todos modos, en la observación que se puede hacer en imágenes actuales de ambos sorprende que aún presenten las irregularidades en el trazado provocadas por las rupturas y reparaciones del dique. Más aún si entendemos que la modernización del sistema estaba encaminada a dotarlos de reguladores que evitaran la necesidad de romper los diques en los momentos de exceso de caudal.

100. La publicación incluye esta nota "Revue et completée en 1882 pour les chemins de fer", Linant de Bellefonds 1882. Además, el propio Linant, en sus memorias y en el apartado dedicado a la cartografía publicada, nos dice: "[…] mais, jusqu'à ce jour c'est encore la mienne que l'on connaît, celle sur laquelle toutes les autres, depuis 1848, on été copiées." Linant de Bellefonds 1872, 495.

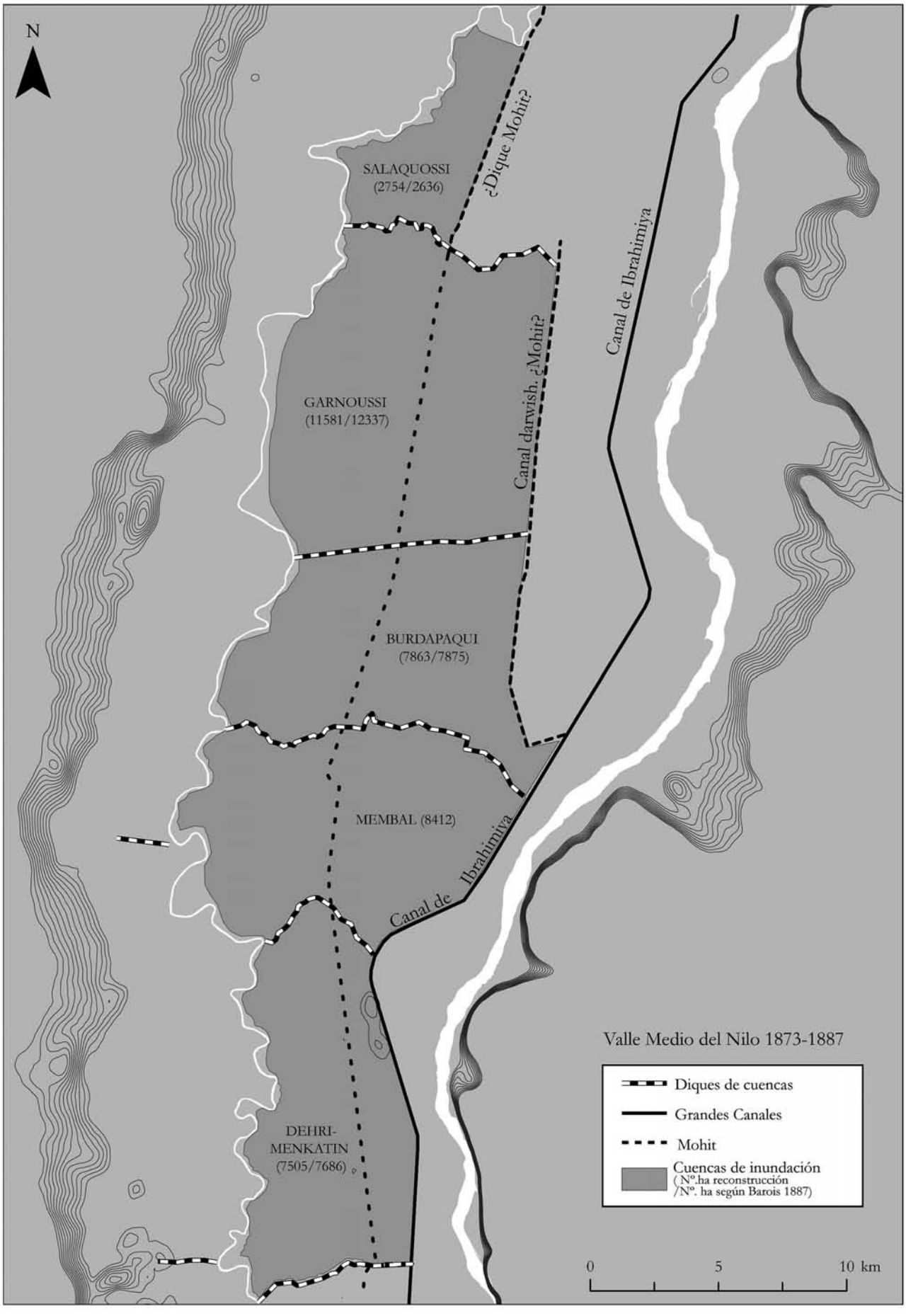

Figura 9. Reconstrucción del valle medio del Nilo (1873).

Por otro lado, las cuencas de Membal y Garnoussi se mantendrían siguiendo las delimitaciones de los diques de Gomaà, Müller-Wollermann y Schenkel. No ocurriría lo mismo con la cuenca de Bardanhoui, la cual, según Linant de Bellefonds, parece a su vez subdividida en tres por dos diques más.

Comparando el plano de Linant de Bellefonds con la plancha de la *Description,* vemos una diferencia singular. Linant de Bellefonds dibuja entrantes del Nilo que podríamos identificar con canales *nili* o *fyad bathen*, pero no dibuja casi canales en el interior. En cambio, la plancha de la *Description* muestra un terreno atravesado desde el Nilo hasta el Bahr Yussef por un número considerable de *fyad bathen*. Esta falta de información en Linant de Bellefonds sorprende por cuanto el Bahr Bathen mencionado y dibujado por los *savants* sí que es registrado por Linant de Bellefonds más al sur, desde Minia hasta Samalut, y nuevamente más al norte a partir de Fahnt. Este vacío podría deberse a que se realizaron grandes cambios en esta zona o bien al carácter estacional de los *fyad bathen,* en muchos casos secos hasta que se producía la inundación. Esto último habría ocultado su existencia a Linant de Bellefonds, quien sólo pudo registrar los canales entrantes desde el Nilo y el Bahr Yussef.

Creemos que las trazas que hemos detectado podrían formar parte de los canales de inundación y drenaje. Los diques formarían una secuencia de cuencas atravesadas por estos canales desde Samalut, favoreciendo la inundación y drenando nuevamente en el Bahr a la altura de Beni-Khalaf.

Otro tema a tener en cuenta son las supuestas reformas del lado occidental del Bahr realizadas entre 1899 y 1901. Como habíamos comentado, Barois no daba importancia a las cuencas existentes con anterioridad, pero Linant de Bellefonds define un sistema de cuencas, con diques dotados de reguladores en 1855. Es verdad que algunos aparecen con el rotulo *projecté* pero en general podemos decir que en el lado occidental del Bahr se gestionaba la inundación.

El valle medio en 1800

Más interesante resulta la reconstrucción del sistema de cuencas en 1800. A falta de una revisión de la documentación relativa al periodo mameluco hemos encontrado en la *Description de l'Égypte* elementos suficientes para proponer cuál era la organización hidráulica del valle medio. Desgraciadamente, la recomposición de los datos no se ha hecho directamente de la cartografía de la *Description*, imposible de utilizar como ya se dijo por los errores y equivocaciones en la ubicación y representación de diques y canales.[101] Además, la enumeración de los diques en el texto no sigue una ordenación geográfica que permita una identificación directa. Sin embargo, la combinación del plano de Linant de Bellefonds de 1855, con una mejor precisión, junto con la lista de diques enumerada por los autores de la *Description* nos ha ayudado en la tarea de reconstruir el paisaje en 1800.[102] Es cierto que existen variaciones fonéticas en los topónimos empleados en una u otra fuente y, por tanto, la ubicación de alguno de los diques puede ser discutible, sin embargo no hemos encontrado en la cartografía de Linant de Bellefonds otros que pudieran ajustarse mejor. Podemos afirmar que la lista de grandes diques son los existentes en 1800 y que podrían haber estructurado el sistema de cuencas de inundación en el valle medio. La premisa de los *savants* es muy clara, un gran dique es aquel que atraviesa transversalmente el valle medio desde el Nilo hasta el Bahr Yussef. Linant de Bellefonds rotula, en el plano de 1854, diques que cumplen tal premisa pero que no fueron enumerados en la *Description*. Por tanto, incluiríamos estos diques dentro del programa de remodelaciones de Mehemet Bey en el valle medio entre 1820 y 1855.

Cotejando ambas fuentes, hemos encontrado las siguientes equivalencias de topónimos:

Description de l'Égypte	*Linant de Bellefonds*	*Actual*
Behabchyn	Babechine	Haud Bahbasin
Safanyeh	Saffannie	Safaniya
Saftrachin	Safi Rachine	Saft Rachine
el-Noueyreh	¿Nonewere?	¿Haud an-Nuwaira? ¿Nuera?
Choubak	Chobak	¿?
Ehoueh	Elloué	¿Helwa?
Badahal, Chantour	Bedal, Chantour	Badah, Ash-Shantour
Samalout	Samalout	Samalut
Menbaâl	Minbal	Minbal
Bardanouâh	Bardanou	Bardanuha

A partir de las trazas detectadas y de los estudios previos de Gomaà, Müller-Wollermann y Schenkel, hemos seguido una ordenación de sur a norte para tratar de situar los once diques de la *Description.*

Hemos identificado, en primer lugar, el llamado dique de Samalut en la enumeración de los *savants.* (Fig. 11.1) Actualmente, existe un dique situado a la altura

101. Gomaà, Müller-Wollermann y Schenkel 1991.
102. Véase nota 19.

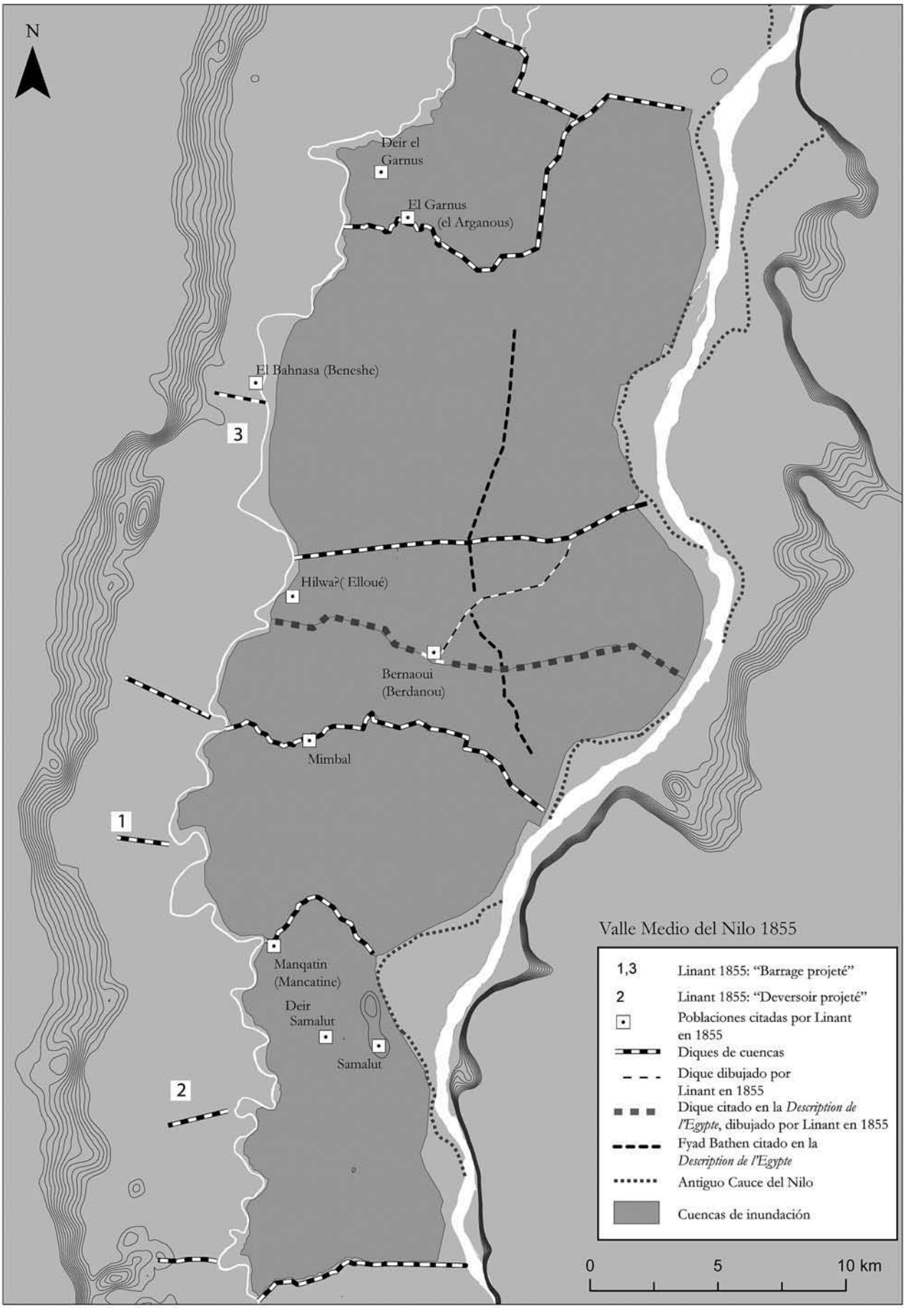

Figura 10. El valle medio del Nilo en 1855.

de Samalut, el dique 2 de Gomaà, Müller-Wollermann y Schenkel, claramente reconocible al oeste del canal de drenaje de *Muhit-Al-Garbi* y con continuidad en el margen izquierdo del Bahr Yussef. Este dique no es representado por Linant de Bellefonds. Recordemos también que Barois en 1887 hablaba en el texto de la cuenca unificada de Dehir-Manquetin y que en el plano que acompaña su publicación rotula por separado las cuencas de Dehir y Manquetin. Ya vimos que nuestra hipótesis era suponer que este dique se construye poco antes de 1887. Al sur de Manqatin y al oeste de Samalut se encuentra la vieja población de Dehir Samalut, que daría nombre a la cuenca situada más al sur tras la división en dos de la cuenca de Dehir-Manquetin. Un poco más al norte, representado por Linant de Bellefonds y a poca distancia de la población de Manqatin, encontramos otro dique que identificamos con el Samalut de la *Description*. Este dique sería el tercero de la enumeración de Gomaà, Müller-Wollermann y Schenkel.

Los diques segundo y tercero son los más fáciles de asignar ya que corresponden bien sea a cuencas de inundación en funcionamiento en la enumeración de Barois o a topónimos actualmente existentes: Bardanoah o Berdanou, según Linant de Bellefonds (actualmente Bardanuha), y Menbaâl, hoy en día la población de Minbâl. Son los diques 4 y 4a de Gomaà, Müller-Wollermann y Schenkel. En el plano, Linant de Bellefonds dibuja dos diques próximos a estas localidades. (Fig. 11.2, 11.3)

El cuarto dique de la *Description* es nombrado como de Ehoueh. (Fig. 11.4) Creemos que se corresponde con la población rotulada por Linant de Bellefonds como Elloue, que actualmente podrían ser las de Hilwa o Helwa. Linant ilustra también a poca distancia de esta localidad un gran dique transversal. Sería el dique 5 de Gomaà, Müller-Wollermann y Schenkel.

A continuación, las trazas detectadas se corresponden con dos diques situados entre el Garnus y Tambidi. Son los diques seis y siete de la enumeración de Gomaà, Müller-Wollermann y Schenkel para los que no hemos encontrado topónimos que nos permitan asignarlos a alguno de los enumerados en la *Description*. En cambio, en el plano de Linant de Bellefonds estos dos diques se dibujan claramente junto con un importante sistema de reguladores.

Safanyeh es otro dique nombrado por los *savants.* (Fig.11.5) Linant de Bellefonds dibuja un dique cerca de una localidad etiquetada como Safanieh y que actualmente se corresponde con la población de Safaniya. Este dique, el octavo de Gomaà, Müller-Wollermann y Schenkel, conserva aún su trazado desde el Nilo hasta el Bahr Yussef.

Posteriormente, son tres los diques que Linant de Bellefonds dibuja en el plano, pero no se corresponden con ninguno de los citados por la expedición francesa y, por tanto, son posteriores a 1800. El primero conserva una parte importante de su trazado al sur de la población actual de Muzura, el segundo estaría situado a la altura de El Fashn y el tercero, que no hemos podido identificar, lo encontraríamos en Ifaqhs. Son los diques noveno, décimo y undécimo de Gomaà, Müller-Wollermann y Schenkel.

Siguiendo hacia el norte, los diques sexto, séptimo y octavo presentan problemas para poderlos identificar. Cuando Linant de Bellefonds hizo el levantamiento, seguramente tuvo serios problemas para seguir el trazado de los diques, ya que presentan trazados irregulares y, en algunos casos se entrecruzan. Aún así, hemos podido identificarlos en el plano de Linant de Bellefonds.

Así, el sexto dique citado por la *Description* tendría dos posibles nombres de referencia: Chantour y Badahal. En el plano de Linant de Bellefonds, el primer topónimo tiene la misma fonética y actualmente corresponde a una población llamada Ash Shantour. En el segundo topónimo tenemos una mayor variación, ya que Linant de Bellefonds lo rotula como Bedal y lo podemos identificar con la actual población de Badah. (Fig. 11.6) Es el dique 12 de Gomaà, Müller-Wollermann y Schenkel.

El séptimo dique, llamado Saftrachine o Saft Rachine, conserva casi el mismo topónimo actualmente. (Fig. 11.7) Es el decimotercero dique de Gomaà, Müller-Wollermann y Schenkel.

Un poco más al norte, encontramos el octavo dique, Choubak, correspondiente a una población rotulada como Chobuk por Linant de Bellefonds. Gomaà, Müller-Wollermann y Schenkel no lo incluyen en su lista. (Fig. 11.8)

El noveno dique es el que pudiera provocar mayores problemas, debido a su variación fonética. (Fig. 11.9) La *Description* lo llama el Noueyreh, Linant de Bellefonds rotula una población con el nombre de Nonewere, situada entre las poblaciones de Dindil (actual Dandil), Bouche Cora (Bush), Ennasi el Medina (Ihanasya el Medina) y Beni Souef. La lista de cuencas de inundación en funcionamiento en 1887 que vimos anteriormente nombra una llamada Nuera, que se corresponde en la planta de Barois con la tercera comenzando por el norte. El seguimiento de este tercer dique de Noueyreh a través de la teledetección nos ha dado un dato que pudiera situar su antigüedad con anterioridad a 1800. Al sudoeste de Ihanasya el Medina, en el extremo occidental del dique, se sitúa el *tell* de Heracleópolis Magna. Es sugerente la idea que esta ciudad dispusiera de un gran dique de contención de aguas que sirviera a su vez como su principal sistema de comunicación pedestre durante las inundaciones. En la enumeración de Gomaà, Müller-Wollermann y Schenkel es el dique 14.

A continuación, encontramos el dique de Behabchyn o Babebchine. (Fig. 11.10) La confirmación de su ubicación procede del nombre que Barois da a la cuenca de inundación situada inmediatamente al sur

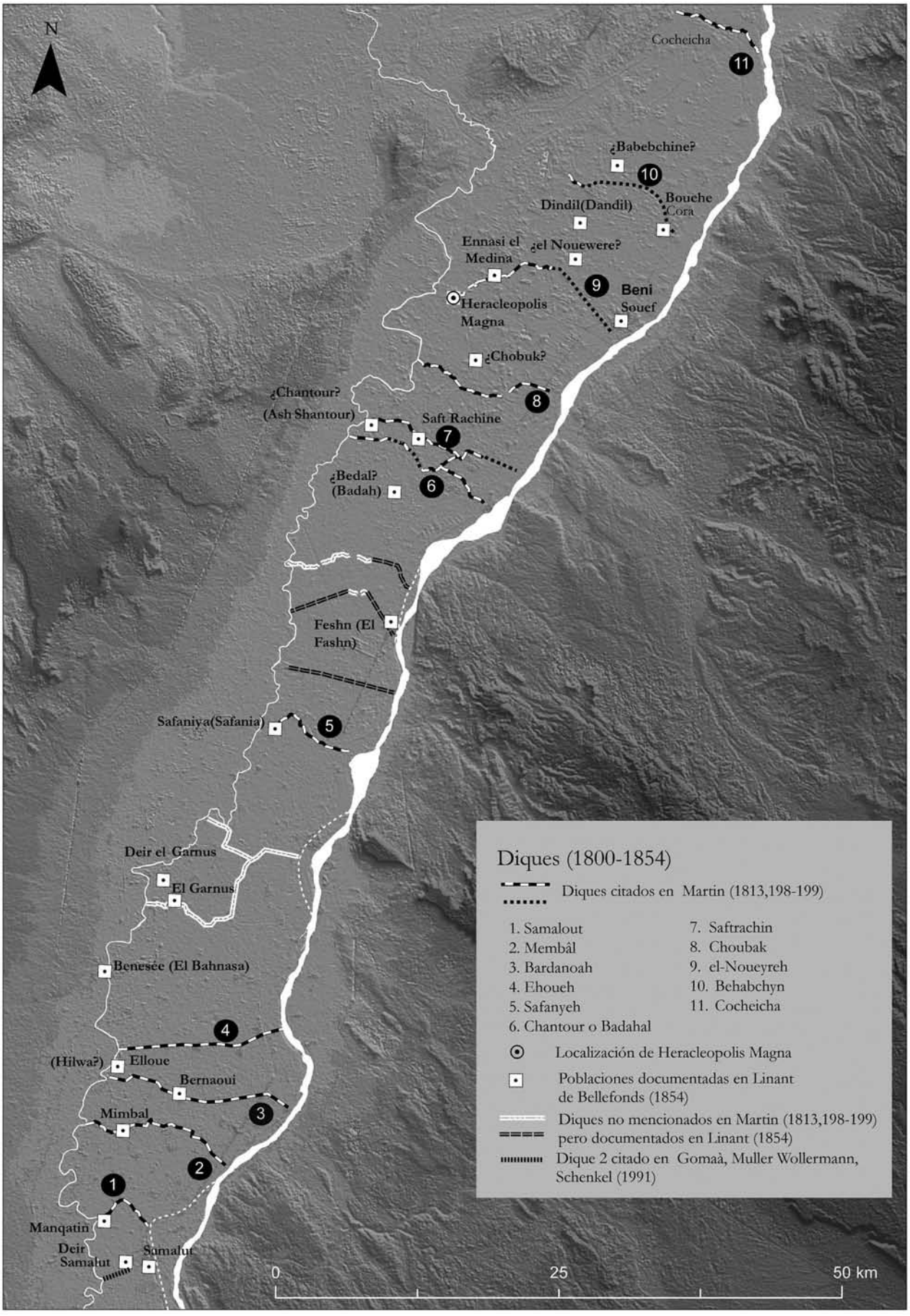

Figura 11. Hipótesis de localización de los once grandes diques citados en la *Description de l'Égypte*.

de la de Cocheicha: Bahahshin[103] o Bahahehin.[104] Actualmente se corresponde con el topónimo de Haud Bahbasin (dique 16 de Gomaà, Müller-Wollermann y Schenkel).

Por último, tenemos el dique de Cocheicha o de Oukchechy, el cual no presenta discusión alguna ya que es el citado por todas las fuentes y considerado como antiguo por éstas[105]. (Fig. 11.11) Linant de Bellefonds lo sitúa en su cartografía y lo etiqueta como Cocheicha. Estaría situado, aproximadamente, a 6 km al sur de la localidad de Maidum,[106] iniciándose desde el Nilo entre las actuales localidades de Al Maslub y Bani Ghunaym, hasta alcanzar el desierto a la altura de Kom Abou Radi. Sería el dique 18 de Gomaà, Müller-Wollermann y Schenkel.

La *Description* no incluye en esta lista el dique 17 de Gomaà, Müller-Wollermann y Schenkel, que haría de separación entre el Fayum y el valle del Nilo. Sí que está incluido en la cartografía de *La Description*, la cual se refiere a él como "digue en pierre".[107] Willcocks habla de este dique como "a very ancient bank" y nos indica que fue reforzado en 1835 con mampostería.[108] Sin embargo, el autor inglés parece confundirse, pues Linant de Bellefonds distingue entre el gran dique en piedra cercano a Lahoun y el dique de Cocheicha.

Observando nuestra propuesta, vemos como existe un vacío importante. Los científicos de la *Description* no mencionan en la lista el dique del Garnus. Sorprende que, cumpliendo el requisito de extenderse del Nilo al Bahr Yussef, el dique del Garnus (correspondiente a los diques 6 y 7 de la lista de Gomaà, Müller-Wollermann y Schenkel) no estuviera citado por la *Description* y sí esté representado en el plano de Linant de Bellefonds. Siguiendo el criterio de los *savants,* tendríamos que suponer que fueron construidos entre 1820 y 1855, al menos uno de ellos. Este razonamiento no coincidiría con la aportación de Wolfang Schenkel, por la cual identificaba este dique a través de un texto de época romana. Dada la configuración de los diques 6 y 7, que se unen en un punto que coincide con la actual localidad de Tambidi, podríamos pensar en un error de apreciación por parte de los *savants*, quienes, recordemos, clasificaban como medianos aquellos diques que, teniendo su origen en el Nilo, conectaban con otro gran dique o con una población situada en un montículo. Por tanto, y teniendo en cuenta la hipótesis de Schenkel, pudieron haber tomado como tres diques medianos el conjunto de los dos diques.

Pero, por otro lado, Butzer menciona que los diques construidos con anterioridad al siglo XIX habrían servido para convertir las llanuras aluviales en cuencas de inundación naturales, las cuales serían de una longitud mayor que la subdivisión de cuencas decimonónica.[109] Esta opinión de Butzer resulta de especial importancia, dada la gran superficie que ocuparían las dos cuencas continuas delimitadas por los diques de Elloue, Safaniya y Badahal, en el caso de ser acertada nuestra hipótesis. Por otro lado, suponiendo que realmente éstas fueran las cuencas en funcionamiento, los problemas derivados del mayor tiempo de espera en el llenado de las cuencas hacen suponer que el sistema fue modificado para compartimentarlas con otros diques.

En este sentido es interesante la apreciación de Barois, quien nos dice que siempre la última cuenca de una cadena es la que presenta mayor longitud y anchura.[110] La razón era que, si se producía una crecida desmesurada no calculada o se cometían errores en las maniobras de vaciado, la solución era provocar rupturas sucesivas en la cadena de diques, aliviando de esta manera el excedente. La última cuenca soportaba el sobre exceso hídrico al ser mayor su superficie. Por otro lado, una cuenca de menor extensión permite que los diques sufran menos las tensiones y cargas del agua almacenada, y también permite solventar los fuertes desniveles, lo cual favorece de esta manera una fácil y económica distribución del agua. En esta lógica, las cuencas menores de Bardanoah, Menbâal y Ehoueh junto con la mayor, delimitada por Safaniya y seguramente la de Chantour, formarían una cadena de cuencas alimentadas por el Bahr Yussef, el Nilo y los diversos *fyad bathen*.

Resulta interesante el carácter intermedio entre estas dos grandes cuencas, que separa el dique de Safaniya. Realizando cálculos aproximados, vemos que las distancias entre los diques de Elloue y Safaniya y de éste con el de Chantour están aproximadamente entre los 26-27 km y los 27-30 km, respectivamente. Estos datos podrían dar indicios de que estamos ante una estructuración racional del espacio anterior a la reorganización del siglo XIX. Este diseño previo tendría el dique Safaniya como un elemento importante en la definición de espacios, al ser casi equidistante entre los diques de Elloue y Chantour.

103. Barois 1887, Plancha III.

104. Barois 1887, 42.

105. Barois 1904, 267; Linant de Bellefonds 1873, 5 y 345.

106. "L'une des plus considérables, qui porte le nom d'Oukchechy, est située à environ deux myriamètres au nord de Beny-Soueyf: elle commence d'un côté vers le Nil, au sud des villages de Zâouy et de Masloub, passe au nord des villages de Qemen el-A'rous et de Begyg, et va s'appuyer au désert, touchant presque les villages d'Ouboueyt et de Koum-Abourâdy." Martin 1813, 198.

107. Jacotin 1826, 54, Plancha 19.

108. Willcocks y Craig 1904, 442.

109. Butzer 1976, 12.

110. Barois 1904, 60.

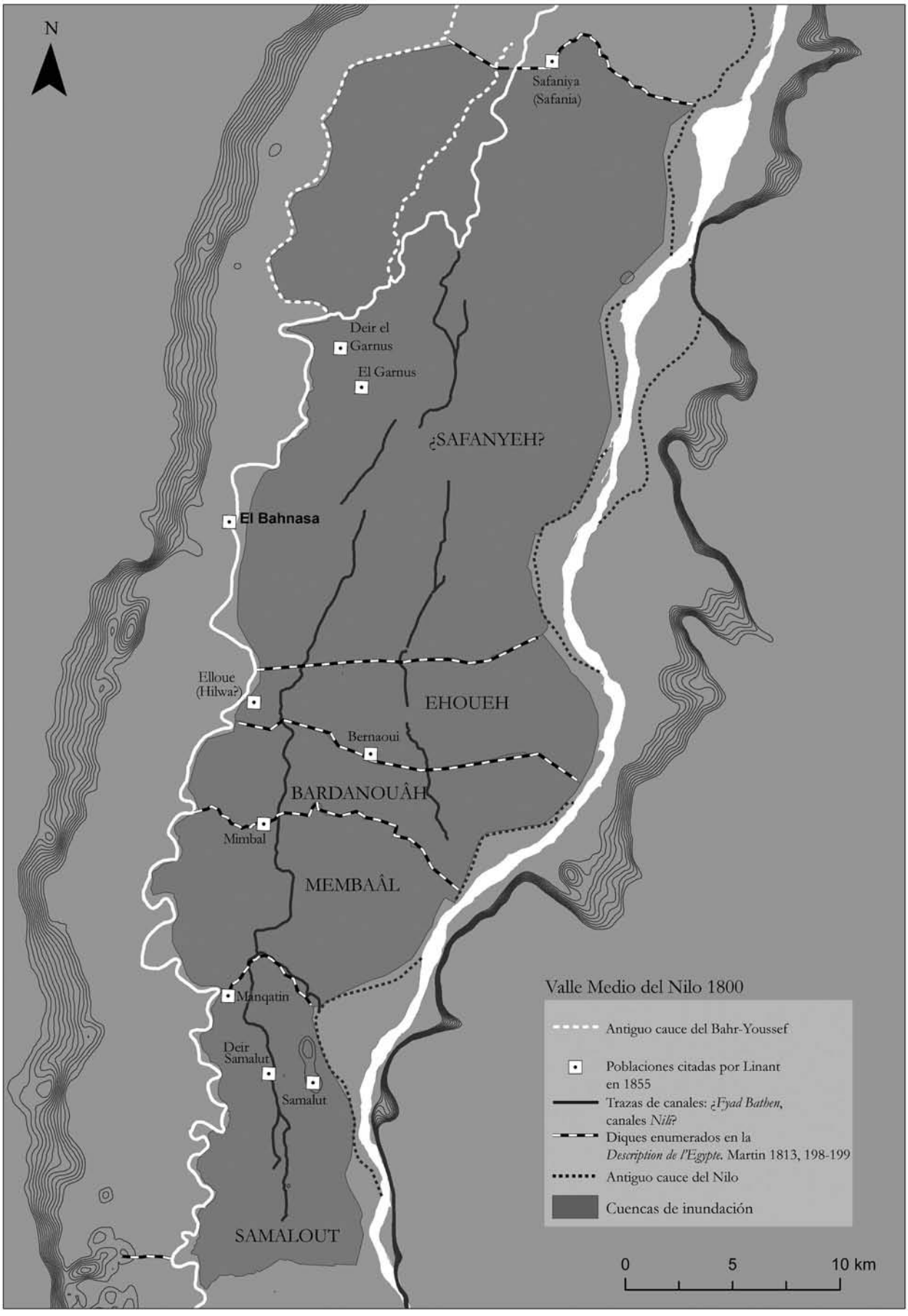

Figura 12. Reconstrucción del valle medio del Nilo (1800).

Tras este análisis, coincidimos con Schenkel en atribuir una antigüedad anterior a 1800 al dique de Safaniya (dique séptimo de nuestra numeración), al que identifica con el *Seper-merou* del papiro ramésida de Wilbour.[111]

A partir de estos datos, hemos construido un último plano en el cual se refleja la organización por cuencas de inundación del valle medio del Nilo en 1800. (Fig. 12) De la disposición de dichas cuencas destaca por su tamaño una, que hemos llamado *Safanieh*, al ser este el dique más antiguo y al existir una tendencia a utilizar como nombre de una cuenca el propio del dique norte de cierre.

Sobre esta planta hemos incorporado las trazas de canales identificados mediante cartointerpretación y teledetección. Ya vimos anteriormente como una de ellas se adaptaba a uno de los *fyad bathen* de la *Description*, entendiendo que la otra traza lo sería también. El más occidental permitiría distribuir las aguas de la inundación en las cuencas de *Samalout*, *Membaâl*, *Bardanoah*, *Ehoueh* y *Safanieh*, y desbordaría, finalmente, en el Bahr Yussef; mientras que la segunda, descrita por los *savants*, permitiría la distribución directa de las aguas del Nilo en crecida en las cuencas de *Bardanoah, Ehoueh* y *Safanieh*, y descargaría sus aguas en este durante el descenso de las aguas.

Por último, sobre el plano hemos indicado el antiguo trazado del Bahr Yussef, el cual los *savants* confundieron creyendo que era el cauce real del canal.

4.2. Aproximación a menor escala al paisaje oxirrinquita: un estudio de teledetección

4.2.1. El área extraurbana situada al sur de Oxirrinco

Un meandro del Bahr Yussef, canales de inundación y humedales

El elemento geográfico que caracteriza esta primera aproximación se inicia a una distancia de unos 4,5 kilómetros al sur de Oxirrinco, entre las localidades de Dayr as-Sanquiriyyha y Hilwah, donde el Bahr Yussef forma un gran meandro. (Fig. 13 y 15) La composición de bandas con imágenes Landsat, el análisis NDVI y las imágenes Corona revelan que el lado occidental de dicho meandro se encuentra atravesado por una serie de canales, seguramente semejantes a los canales *nili* descritos por Linant. Actualmente, algunos están colmatados, al abandonarse la funcionalidad original de canalizar y distribuir la inundación en la zona durante la crecida. Otros han sido canalizados respondiendo al cambio producido en los años sesenta del siglo pasado con la construcción de la presa de Asuán.

Al este del meandro, la topografía señala una ligera elevación longitudinal correspondiente a un gran banco de arena o duna, el cual varía entre los 300 metros y los 500 metros de anchura, siguiendo una dirección NE-SW. (Fig. 16.10) Estas dunas, según Butzer, son depósitos eólicos, restringidos a la franja occidental del valle, que se extienden longitudinalmente y de forma irregular a lo largo de 128 kilómetros entre Gebel Deshasha (Biba) y el monasterio de Deir al-Miharraq (Qusiya).[112] Butzer, en el mismo trabajo, analizó también la secuencia geológica del valle medio e identificó, entre otros, dos estratos de arena eólica depositados sobre los niveles grecorromanos.[113] El superior, al que llamó *Upper Younger Dunes,* comenzaría a depositarse en el inicio del siglo XVIII de nuestra era por encima de niveles de aluvión datados entre los siglos XV y el XVII. El segundo, el *Lower Younger Dunes*, se formaría entre el 300 y el 1450 con una interrupción, datada entre el 800 y el 1200, provocada por la acumulación de aluviones, producto de los altos niveles de inundación que el Nilo alcanzó durante ese periodo.

Además, el dique lateral que acompaña al Bahr Yussef toma al norte del meandro una orientación E-W. (Fig. 16.7) Cuando el Bahr completa el meandro y recupera su orientación N-S, este dique ya no lo acompaña sino que se prolonga siguiendo la dirección W-E hasta que alcanza este conjunto de dunas longitudinal. De esta manera, este dique completaría el cierre de una cuenca de inundación. A esta misma altura, en la confluencia del Bahr Yussef con uno de los canales de inundación, se encuentra el regulador de El-Miheigra. (Fig. 16.8) Una vez retenidas las aguas de la inundación el tiempo suficiente, entonces la apertura del regulador drenaría el agua directamente en el Bahr Yussef. Es significativo que, a partir de este punto, no hay grandes diques de acompañamiento en el tramo que bordea las localidades de Sandafa el Fahr y Bahnasa.

Este conjunto de datos nos permite pensar que existió una cuenca de inundación que relaciona el meandro del Bahr Yussef, los posibles canales *nili* y la citada elevación occidental, cubriendo una superficie de 15,9 km^2.

Esta cuenca de inundación no se corresponde con ninguna de las principales que nombran tanto Barois como Willcocks. Sin embargo, como ya se dijo, ambos autores hablan de forma general sobre el sistema de cuencas de inundación correspondientes al lado occidental del Bahr Yussef sin asignarles nombre alguno.

Un poco más a occidente, entre esta elevación longitudinal y las estribaciones de las montañas líbicas, encontramos una serie de depresiones, con cotas mínimas similares a las de esta cuenca de inundación. Estas depresiones, al analizar las imágenes Corona y Aster, así como la cartografía actual, revelan un área con una vegetación propia de humedales. (Fig. 14 y 16)

111. Schenkel 1994, 29.
112. Butzer 1959, 75-76.
113. Butzer 1959, 78-79.

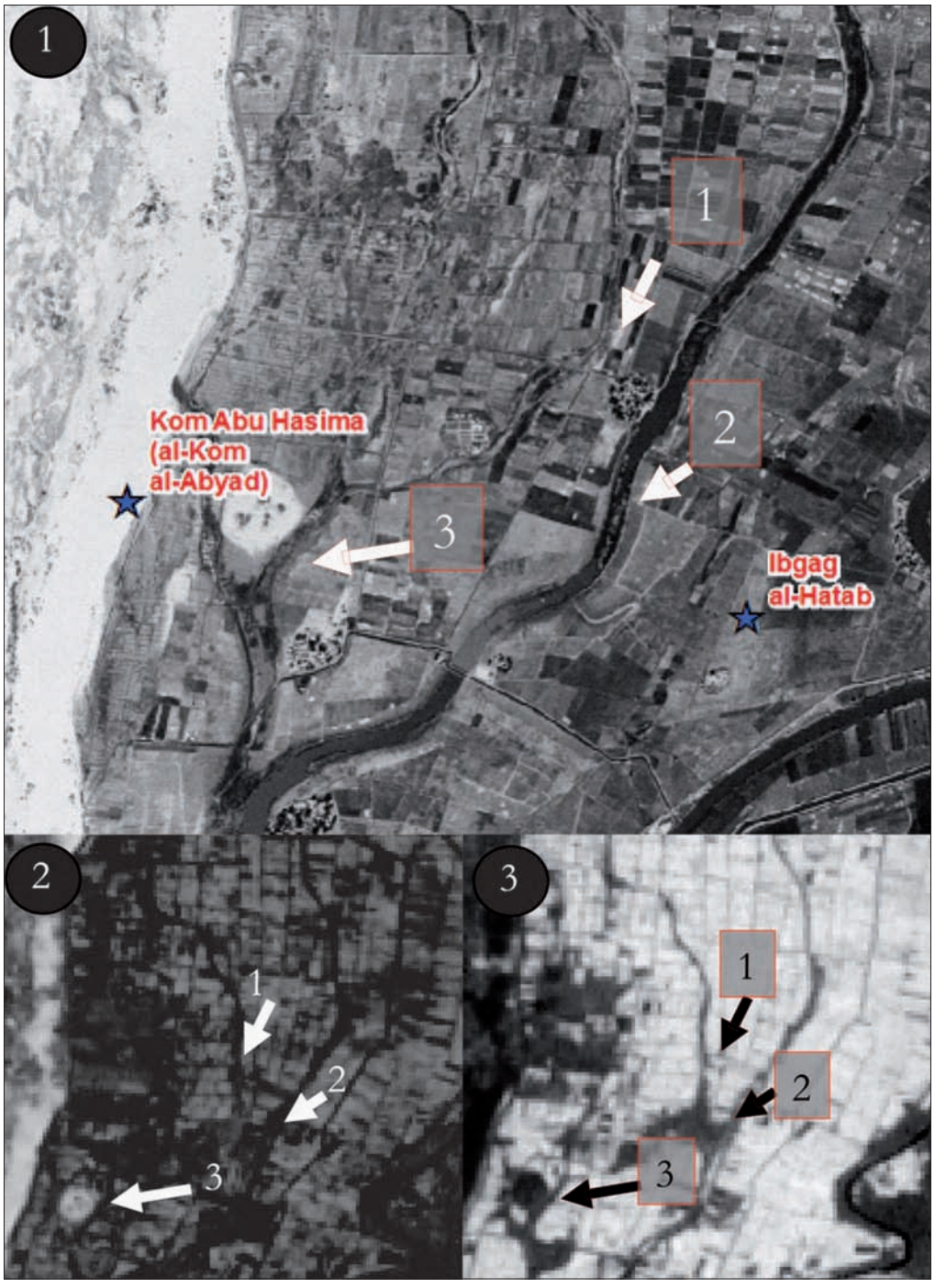

Figura 13. Detalle de la zona del meandro en el cual se indican con los números 1, 2, 3 zonas concretas de los posibles canales *nili* de inundación. 1) Escena Corona. 2) Composición bandas 432. 3) Índice NDVI.

Observando detenidamente el conjunto de imágenes, vemos cómo una serie de canales atraviesan transversalmente la elevación longitudinal dando origen a una red que abastecería de agua a la serie de depresiones. (Fig. 16.6) La forma de estos canales parece indicar que no son canales *nili*, sino que responden a canales excavados en profundidad. Por tanto, no podemos afirmar que se utilizara como área de inundación y que su funcionalidad se adaptaría más a la adecuación de estas tierras para el cultivo, como así se aprecia en las imágenes más recientes. La aportación de aguas con limos permitiría la dignificación de estos terrenos.

Más al norte, entre Bahnasa y la cuenca de inundación del meandro del Bahr Yussef, es posible apreciar en algunas imágenes Corona una traza longitudinal caracterizada por una coloración más blanquecina que la diferencia del entorno. (Fig. 16.5 y 17.6) Pensamos, por la anchura, que podría corresponderse con un posible paleocurso del Bahr Yussef. Además, la forma particular de las parcelas en esta área delimita el cauce que hubiera seguido dicho posible paleocanal. (Fig. 17.7) Hay que señalar, además, la anchura de ese paleocurso, muy similar al Bahr Yussef.

Situada más al oeste de este detalle, vemos como arranca al norte del mismo una traza en forma de

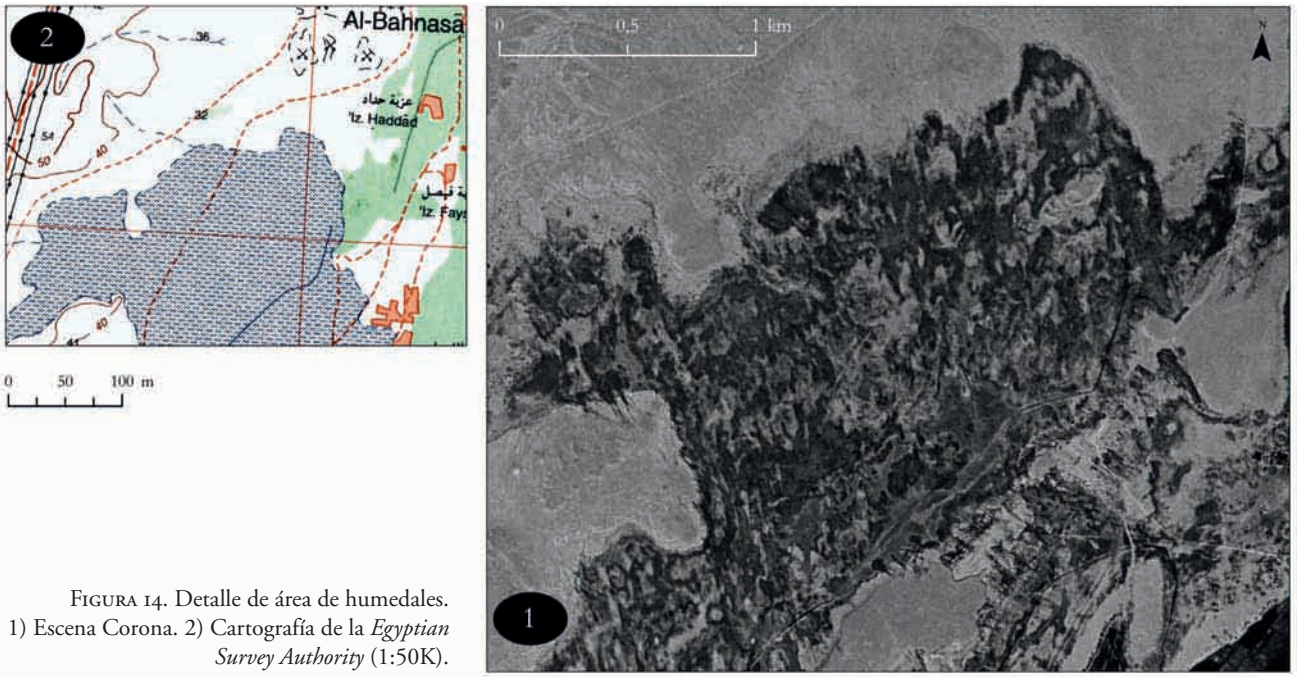

Figura 14. Detalle de área de humedales. 1) Escena Corona. 2) Cartografía de la *Egyptian Survey Authority* (1:50K).

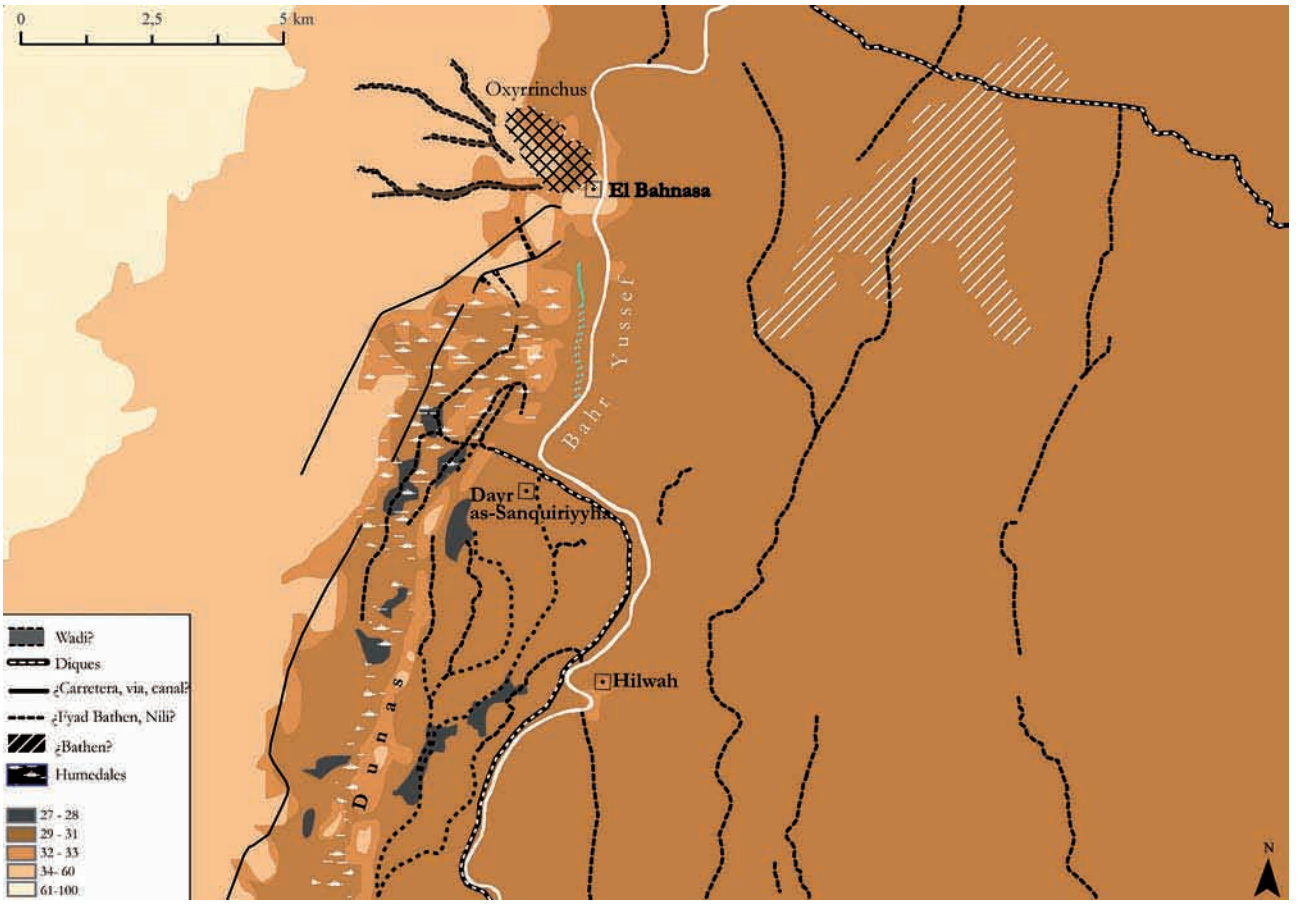

Figura 15. Área de estudio en torno al meandro del Bahr Yussef situado al sur de Oxirrinco.

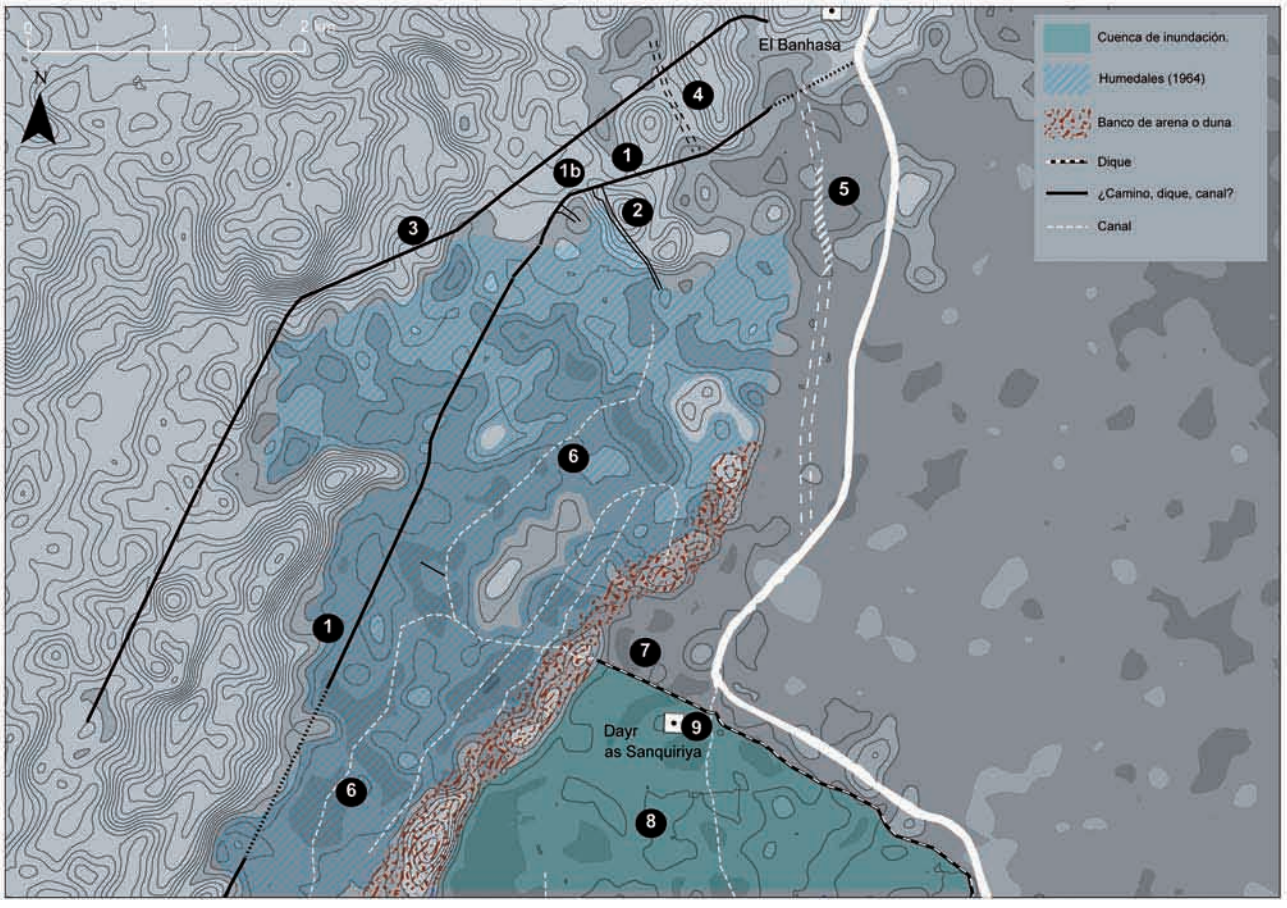

Figura 16. Detalle del área situada al sur de Oxirrinco.

incisión, que podría corresponder a un canal. (Fig. 16.4) Pero la imagen no es suficientemente nítida en esta zona y las escenas más modernas de Quickbird y WV2 no aportan más información, a causa de la profunda transformación sufrida en esa zona.

Este conjunto de humedales se planificó con la intención, quizás, de aliviar los excedentes de la inundación. De esta manera, suministrarían aportes a las zonas deprimidas limítrofes con el desierto. Además, la presencia de trazas del paleocanal, el regulador de El-Miheigra y la falta de grandes diques de acompañamiento en el espacio que abarca desde el dique de cierre de la cuenca del meandro hasta más al norte Bahnasa y Sandafa reforzaría la idea de que la reforma de esa cuenca estuvo destinada también a evitar la inundación.

No nos es posible datar cuando se construyó esta cuenca, dado que no disponemos de una información textual y cartográfica tan concreta ni de un estudio de campo. Podríamos pensar que ésta se incluiría en el conjunto de reformas realizadas en la segunda mitad del siglo xix y encaminadas a mejorar el sistema de cuencas de inundación existente en el margen izquierdo del Bahr Yussef, en funcionamiento cuando Linant de Bellefonds publica el plano de 1855, salvo una presa que éste etiqueta como proyectada. Si tomamos como base el estudio de Butzer, que databa la formación del conjunto de dunas longitudinales a partir de 1700, debemos pensar que la construcción de esta cuenca no fue anterior a esta fecha.

Otras marcas del paisaje

Como dijimos anteriormente, las trazas detectadas en las escenas Landsat fueron superpuestas sobre escenas de alta resolución Quickbird, Corona y WV2.

Inicialmente, hemos detectado una estructura cuya función no hemos podido identificar, pero que podría corresponderse con un posible dique, una conducción, canalización o vía. (Fig. 16.1 y 17.1) Ésta es longitudinal, con una orientación SW-NE. Pensamos que no estaba en uso cuando se tomó la escena Corona, ya que se ven una serie de rupturas o discontinuidades en alguno de sus trazos. Sin embargo, superpuestas a la topografía también podrían deberse a las irregularidades del terreno.

En la figura 17.4, podemos ver un detalle de una escena WV2 tomada en el año 2010. Se aprecian los restos de esta misma estructura, ahora muy deteriorada y desmontada, debido a la reciente construcción de una autopista, a poca distancia del lugar. Parece compuesta por un talud, sobre el que se encuentra una calzada de circulación delimitada por dos posibles muros. Su anchura en la Corona sería de aproximadamente 3 metros.

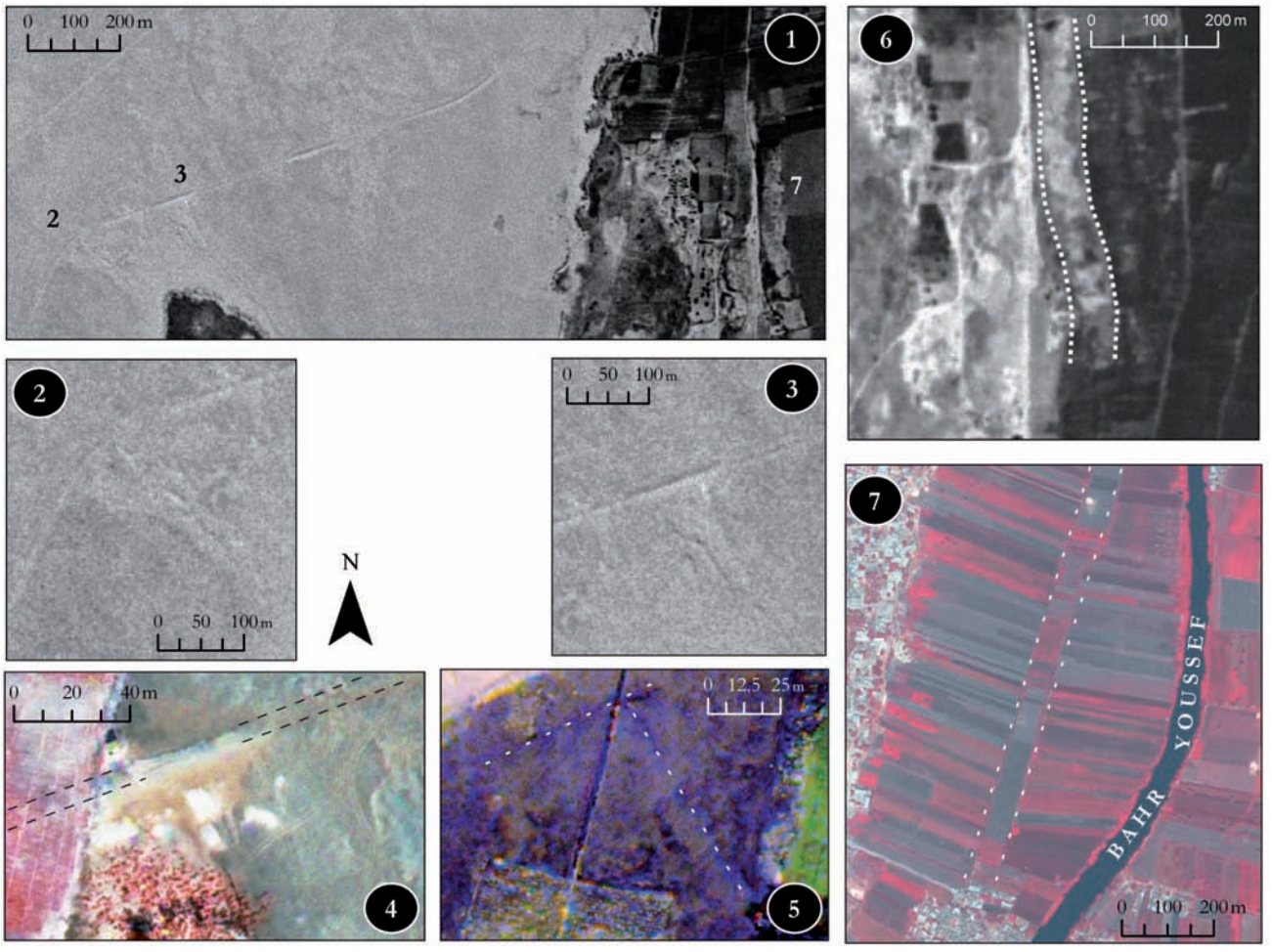

Figura 17. 1) Vista general, trazas en imagen Corona. 2) y 3) Detalles de traza longitudinal en imagen Corona. 4) Detalle de traza longitudinal en imagen Worldview 2. 5) Detalle de marcas con igual orientación en imagen TTC Worldview 2 Bandas 221. 6) Posible paleocanal del Bahr Yussef en imagen Corona. 7) Posible paleocanal fosilizado entre la parcelación de los campos en imagen Worldview 2.

También se aprecian dos alineaciones transversales a la mencionada estructura. (Fig. 16.2, 17.3 y 17.4) Cada una de ellas se compone a su vez de dos posibles muros con una anchura aproximada de 10 metros. Ambos tienen una orientación SE-NW y se ensanchan en forma de embudo al contactar con la estructura longitudinal.

El análisis TTC también revela muy veladamente un conjunto de formas lineales (Fig. 17.5) con una orientación parecida a la de esta estructura longitudinal. Esta orientación difiere con respecto a las parcelas de los campos de cultivos actuales.

Más al norte, encontramos otra traza de una posible carretera documentada en la cartografía de 1908, que comunica Bahnasa con otra carretera transversal que borea el valle del Nilo por su lado occidental y que está situada más al oeste. (Fig. 17.3)

4.2.2. El área situada al oeste de Oxirrinco

Asimismo, para la segunda área de estudio se han aplicado las técnicas de análisis TTC y PCA. Ambas han puesto en evidencia el sistema de wadis y la red de caminos que confluyen sobre Oxirrinco. Los wadis destacan sobretodo por el componente 4 del análisis TTC, cuya tonalidad puede deberse a una mayor presencia de humedad.

La confluencia de los wadis en Oxirrinco podría ser un buen motivo para abrir estudios sobre una posible ocupación durante el periodo predinástico. Estos trabajos pasarían por el análisis geomorfológico y la prospección pedestre de esta zona, siguiendo como criterio los trabajos realizados en Nag-el-Qarmila en el Alto Egipto (Gatto *et al.* 2009). Estos autores opinan que la estructura de los wadis fue utilizada para las prácticas de irrigación durante dicho periodo. En esa época, la inundación del Nilo alcanzaría la altura de los wadis, que, tras la retirada de aguas, se utilizarían como albercas o reservas de agua para la práctica de la irrigación durante el resto del año.

En esta zona observamos primero dos marcas del paisaje. La primera se correspondería a un wadi en los análisis Landsat. (Fig. 18.1) Éste seguiría una trayectoria E-W y continuaría más allá de la cantera moderna hasta llegar a las inmediaciones de Bahnasa. La segunda (Fig. 18.2) corresponde a un camino que

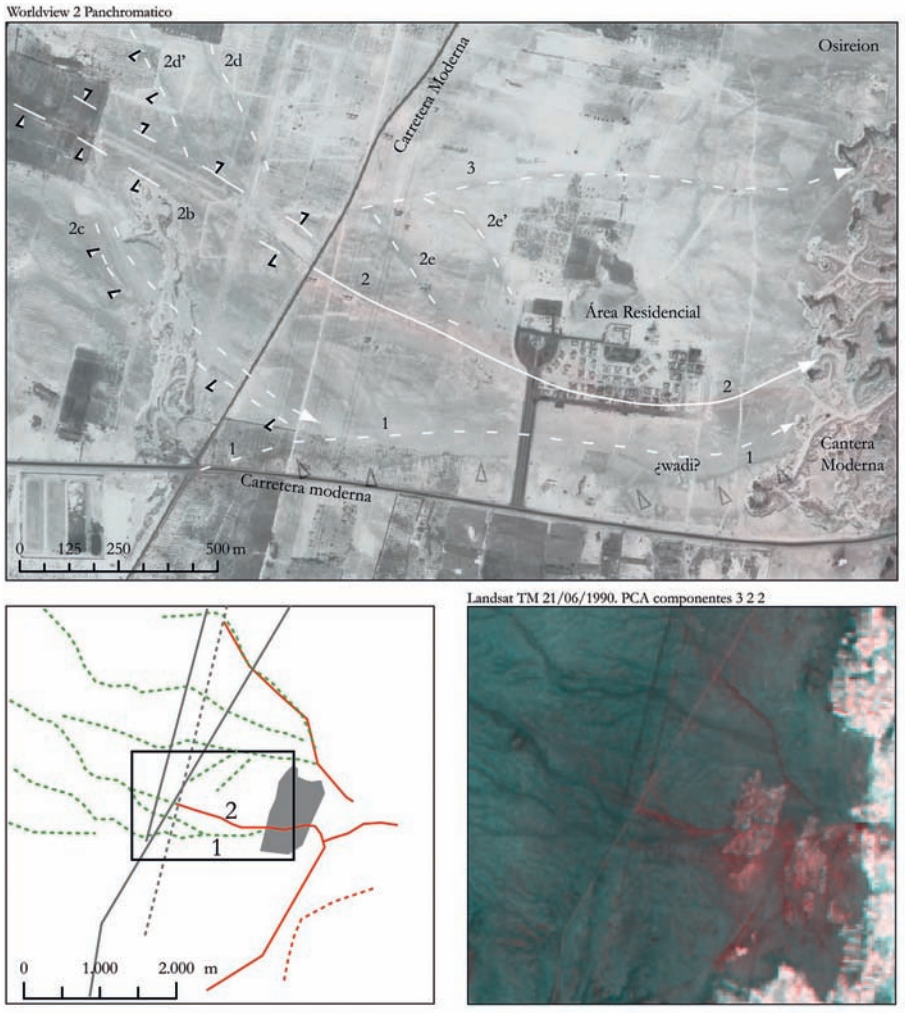

FIGURA 18. Detalle de las trazas detectadas a oriente del yacimiento de Oxirrinco.

comunicaba en los años ochenta del pasado siglo la cantera con una carretera transversal que bordea esta parte del valle, y que fue abandonada con la construcción de una nueva carretera procedente de Bahnasa. Pensamos que este antiguo camino aprovecharía en origen un wadi que continua una vez pasada la carretera transversal, ya que aún pueden verse sus trazas, enmascaradas por un campo de cultivo. (Fig. 18.2b) Apreciamos también dos señales longitudinales con una orientación de 60º con respecto al wadi procedentes de los campos de cultivo situados un poco más al norte. (Fig. 18.2d y 2d') Otras marcas longitudinales pueden verse un poco más al este. (Fig. 18.2e y 2e') Las cuatro están articuladas por una quinta, perpendicular y con una orientación SW-NE que se dirige hacia el yacimiento de Oxirrinco.

Un poco más al norte encontramos otro posible wadi orientado hacia el yacimiento. (Fig. 19) Los análisis TTC de las imágenes Landsat muestran que, desde la carretera transversal, fue utilizado como camino manteniendo en la actualidad dicho uso. El mismo TTC, aplicado esta vez a la imagen WV2, muestra en la combinación de las bandas 4/3/2 la amplitud del wadi observable por tonalidades más claras y que parece dividirse en dos trayectorias, una que se dirige en línea recta hacia la zona norte del yacimiento y una segunda que realiza un brusco giro en bayoneta tomando una orientación NW-SE en dirección a Bahnasa. (Fig. 19.1a y 1b) Este análisis queda confirmado cotejando los datos visualizados mediante TTC con las imágenes Corona. (Fig. 20)

Por último, estos wadis confluyen hacia el yacimiento de Oxirrinco. Observamos cierta relación entre la orientación de los wadis al alcanzar el límite urbano de Oxirrinco y ciertas afloraciones longitudinales cuya coloración es más oscura que la predominante del terreno. (Fig. 21) Estas afloraciones, generalmente alineadas en dirección SW-NE y que parecen moduladas, están situadas al NW del área arqueológica de Oxirrinco, y no siguen la orientación de las ínsulas urbanas que se insinúan en las diversas imágenes analizadas.

4.2.3. El contexto urbano: algunas trazas a destacar

La combinación de bandas 832 y la aplicación de las funciones TTC y PCA sobre la imagen multiespectral WorldView en el área arqueológica de Oxirrinco nos ha proporcionado dos evidencias destacables, entre otras, localizadas en otros puntos del yacimiento.

La primera se ha localizado en las inmediaciones del teatro. (Fig. 22) Ésta se caracteriza por una traza cuadrangular, orientada hacia el norte. La combinación de las bandas 832 manifiesta una mayor tonalidad en el color rojo, indicador de una mayor salud en la vegetación y, por tanto, de la presencia de una zona con altos contenidos en humedad. La aplicación de análisis TTC repite en el componente humedad una diferencia que moldea nuevamente dicha forma cuadrangular.

La segunda evidencia corresponde a una alineación con una anchura y longitud aproximada de 16 y 258 metros respectivamente. (Fig. 23) Ésta revelaría la posible existencia de una canalización que se introduciría en la zona urbana. Su orientación sería igual a la de la trama urbana de la ciudad grecorromana. La tonalidad de la combinación 832 de la imagen así como la componente 3 del PCA indican que podría existir una fosa o canal, colmatado, que contendría una mayor cantidad de humus que su entorno inmediato y favorecería de esta manera el crecimiento de la vegetación.

Para la interpretación de las dos marcas analizadas remitimos al lector al artículo de Eva Subías de esta misma publicación.

6. Conclusiones

El análisis regresivo de las fuentes y la cartografía nos ha permitido restituir qué diques estaban en funcionamiento durante la presencia del cuerpo expedicionario francés en 1799. Nuestro estudio también nos ha clarificado como se encauzaba y distribuía la inundación mediante los *fyad bathen* o los *nili*, antes de que fueran canalizados o añadidos a tramos de otros nuevos, como se hizo durante la construcción del Ibrahimiyya. Hemos visto como estos todavía pueden encontrarse en los planos cartográficos y en las imágenes de satélite, a pesar de los años transcurridos desde la construcción de la presa de Asuán.

Viendo la magnitud de las transformaciones producidas a lo largo del siglo XIX (irrigación perenne, partición de cuencas existentes, cambio en el sistema de inundación, canales de irrigación y drenaje), podríamos aventurar que la reconstrucción realizada de las cuencas de inundación en 1800 sería una aproximación al sistema existente en el periodo grecorromano. Estas cuencas serían alimentadas durante la inunda-

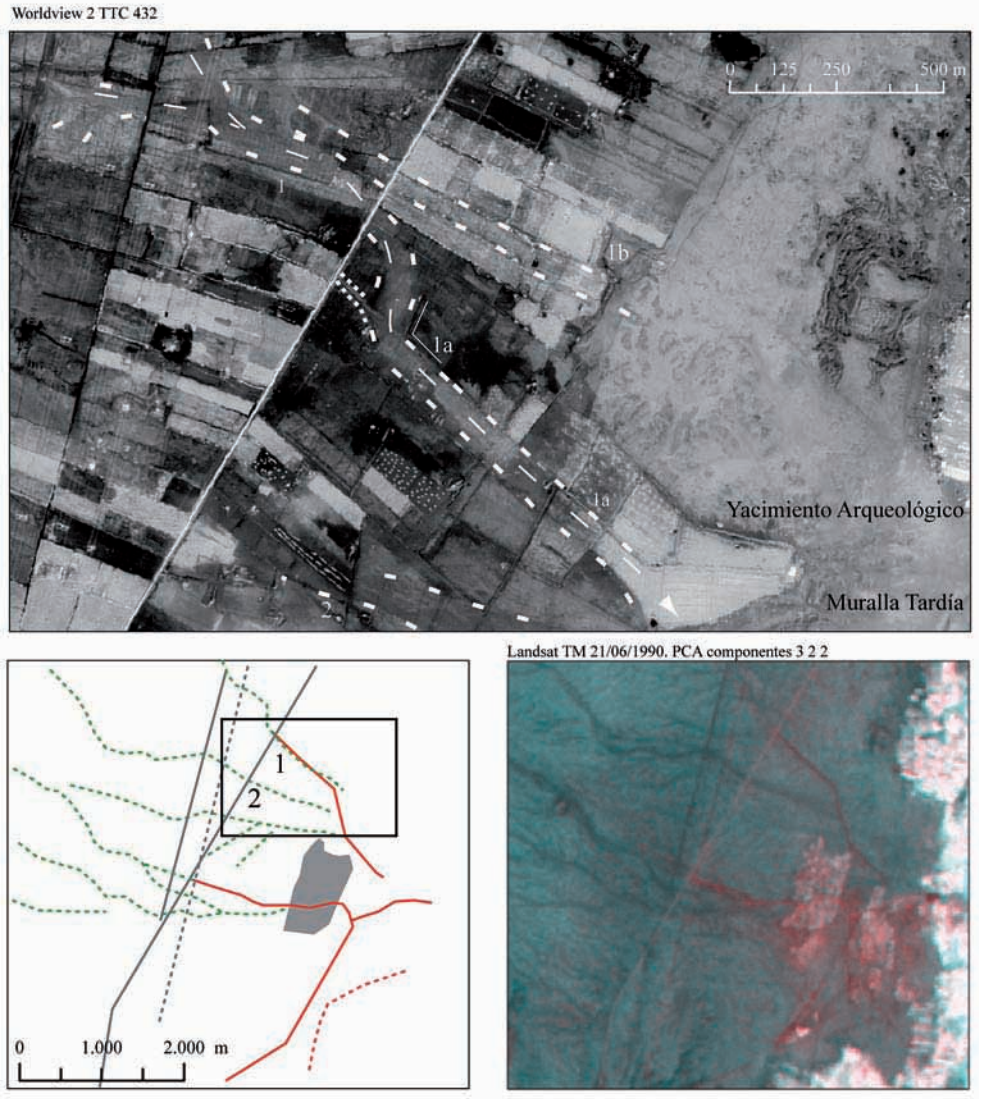

FIGURA 19. Detalle de las trazas detectadas a oriente del yacimiento de Oxirrinco.

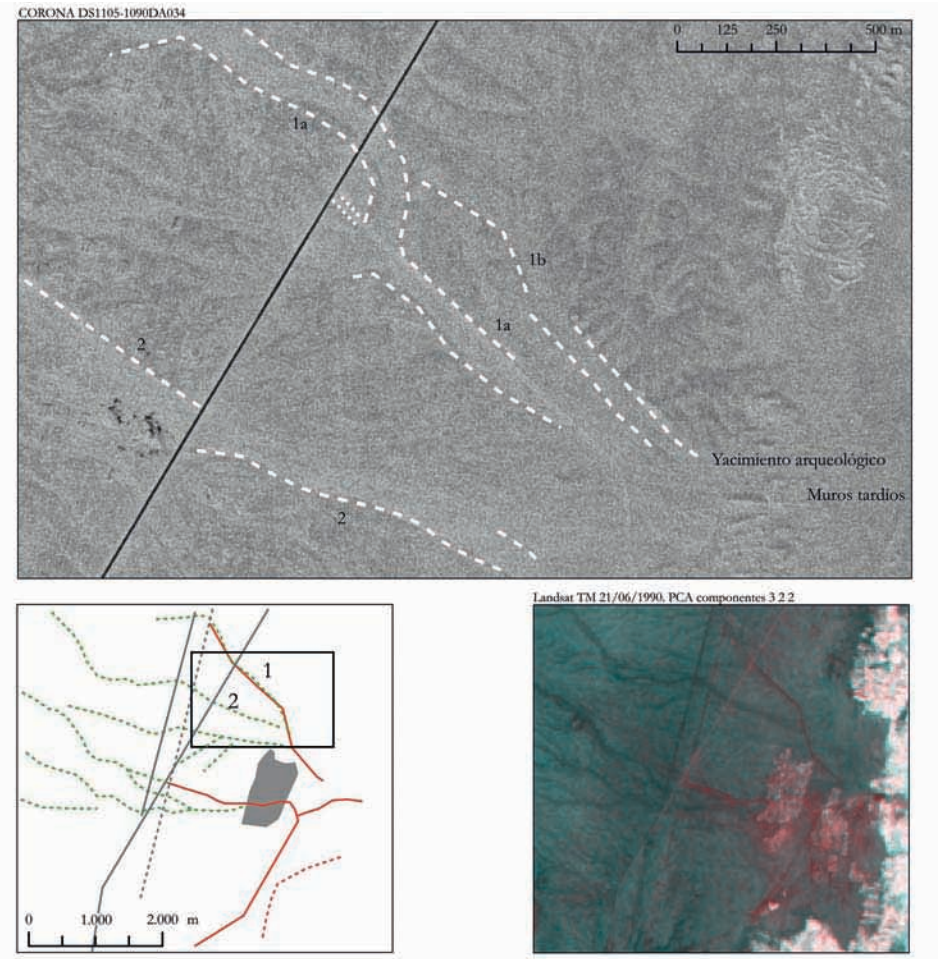

Figura 20. Detalle de las trazas detectadas a oriente del yacimiento de Oxirrinco.

ción por la red de trazas de Bahr Bathen o bajos fondos que hemos detectado. Queda por determinar si estos canales o ríos interiores son de origen natural o antrópico, aunque Jomard en su momento afirmó que no había localizado restos de infraestructuras hidráulicas.[114]

Sin embargo, hemos de considerar también la posibilidad de encontrarnos con un contexto similar al que han identificado Lutley y Bunbury más al norte.[115] Según el estudio realizado por este equipo, en realidad, estos canales serían resultado de la migración del Nilo en toda la amplitud del valle. Unas variaciones que han sido calculadas para el área de Menfis y que alcanzarían los 9 km cada mil años. Estos paleocanales o cauces abandonados, al producirse la inundación estacional, recuperarían su caudal y alimentarían de forma natural las cuencas de inundación construidas. En el área que nos ocupa debiéramos añadir la variabilidad en el cauce del Bahr Yussef

En beneficio de esta última posibilidad recordemos que las dos planicies inclinadas desde el Bahr Yussef y el Nilo formarían cubetas o bajo fondos, los *bathen* descritos por Linant de Bellefonds. Esta disposición favorecería la tendencia migratoria de ambos cursos y la formación de estos cauces abandonados o paleocanales. Futuras aproximaciones geomorfológicas permitirán resolver estas cuestiones y establecer cronologías que nos permitan un mayor detalle en la reconstrucción de este paisaje.

Pero no olvidemos que entre ambos momentos nos encontramos con la invasión musulmana y el gobierno mameluco. Un periodo demasiado amplio para no pensar en cambios y modificaciones del sistema precedente. Hemos de entender que, si las fuentes de los siglos xviii y xix nos hablan del deterioro y abandono en las infraestructuras, es que éstas como mínimo se mantuvieron hasta ese momento.

La restitución del sistema de cuencas en el año 1800 nos permite definir dos grandes cuencas de gran tamaño continuas entre sí y separadas por el dique de Safaniya, identificado por Schenkel como el *Seper-merou* del papiro ramésida de Wilbour. Estamos posiblemen-

114. "Il est donc manifeste qu'il n'y a jamais eu là de canal ni de lac creusé par les anciens, ni aucun travail de cette espèce; il ne s'y voit d'autre ouvrage que celui même qu'opèrent les eaux de l'inondation: au reste, on ne connoit, dans tout ce cours d'eaux, aucune trace d'écluses, ou autres constructions pareilles." Jomard 1809, 105, nota 1.

115. Lutley y Bunbury 2008.

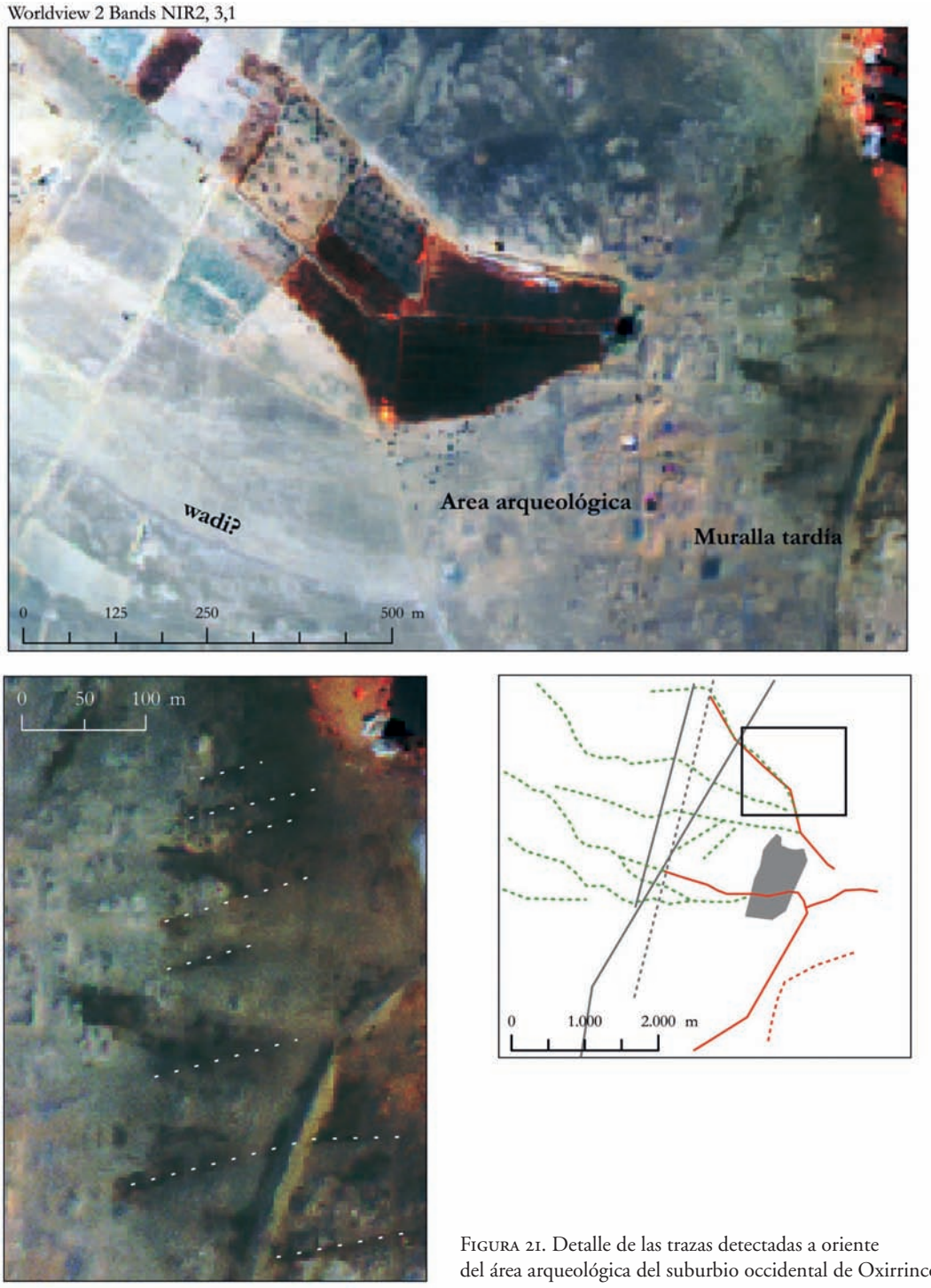

Figura 21. Detalle de las trazas detectadas a oriente del área arqueológica del suburbio occidental de Oxirrinco.

te ante un sistema de cuencas de grandes dimensiones, quizás nuevamente compartimentadas por diques menores. Ambas cuencas estarían delimitadas por los diques de cierre situados al norte y al sur (Ehoueh y Chantour), construidos a distancias casi equidistantes con el dique de Safaniya.

Nuestro análisis, efectuado desde una escala mayor, nos ha permitido determinar que la continuidad e intensidad en los estudios arqueomorfológicos dedicados a restablecer los sistemas parcelarios anteriores a la llegada de la expedición francesa han de centrarse principalmente en el lado occidental del valle medio, a partir, sobretodo, del dique *mohit*, elevado tras la construcción del canal de Ibrahimiyya. Esto no excluye el lado oriental, pero es evidente que las principales modificaciones y alteraciones se efectuaron allí y, por tanto, la introducción de la caña de azúcar y el algodón, cultivos que acompañaron a la introducción de la irrigación perenne, alteraron seguramente los sistemas de parcelación preexistentes.

Por otro lado, la aproximación mediante teledetección en torno a Oxirrinco nos ha permitido recons-

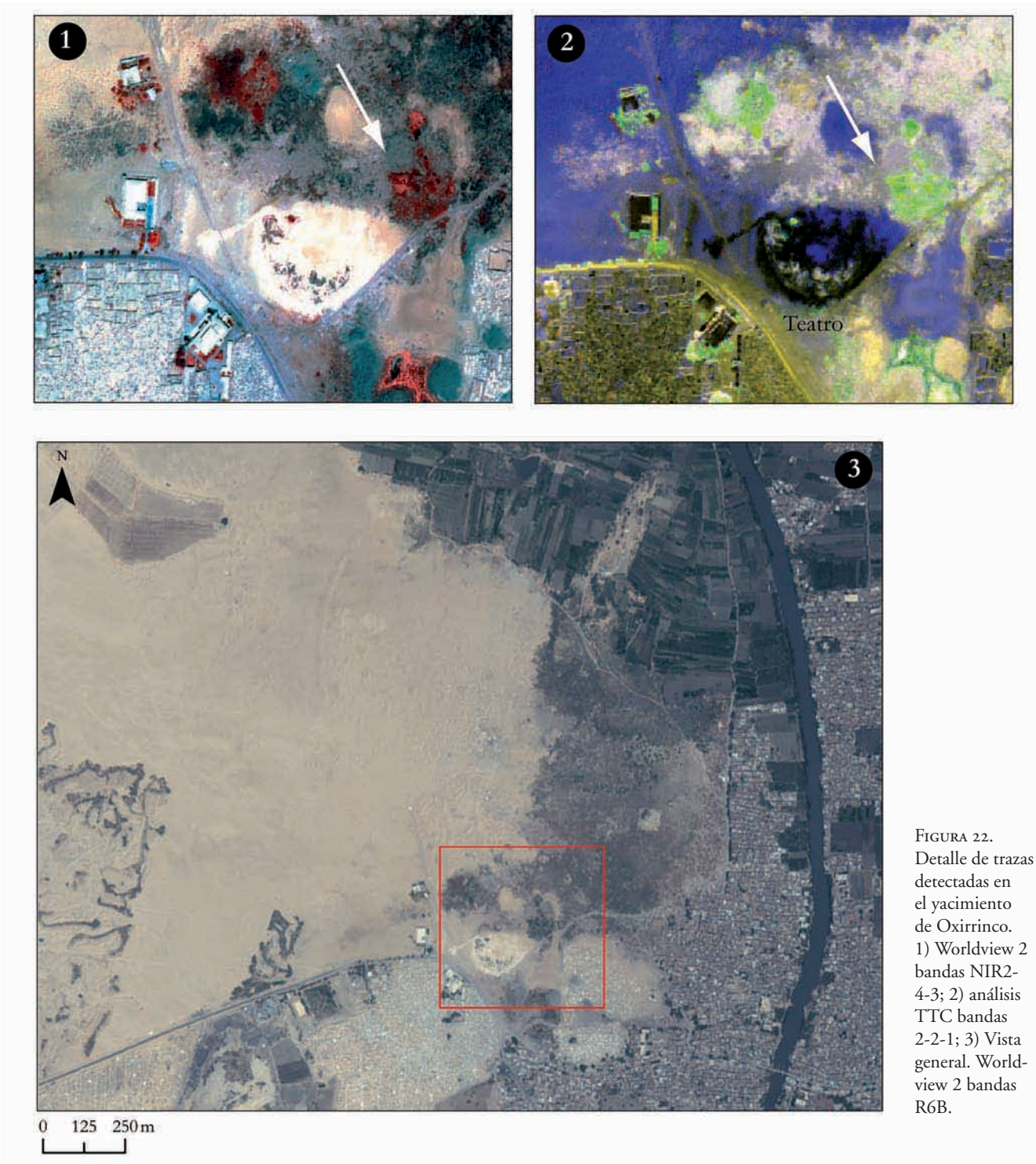

Figura 22. Detalle de trazas detectadas en el yacimiento de Oxirrinco. 1) Worldview 2 bandas NIR2-4-3; 2) análisis TTC bandas 2-2-1; 3) Vista general. Worldview 2 bandas R6B.

truir el sistema de wadis sobre el que se estructuró la población grecorromana y hemos evidenciado la presencia de un posible paleocanal desplazado al oeste del Bahr Yussef.

Las trazas de canales *nili* situados en el margen oriental del Bahr, así como puntos de baja cota y los diques de cierre, nos muestran como al sur de Bahnasa se construyó, seguramente a mediados del siglo XIX, una cuenca de inundación que dignificó una zona afectada por las arenas y dunas de origen eólico acumuladas desde el siglo XVIII.

Por último, los análisis TTC y PCA nos han aportado información sobre elementos y estructuras de uso hidráulico en el área arqueológica de Oxirrinco.

La teledetección no deja de ser una técnica por la cual se toma distancia aprovechando la amplitud en la cobertura espacial de los sensores utilizados. Pero esa misma distancia no puede ser el único método escogido. Este estudio, realizado a varias escalas de trabajo, no estará completo hasta no haber revisado sobre el terreno las trazas localizadas, acompañadas de prospecciones pedestres en el territorio. Estas acciones han

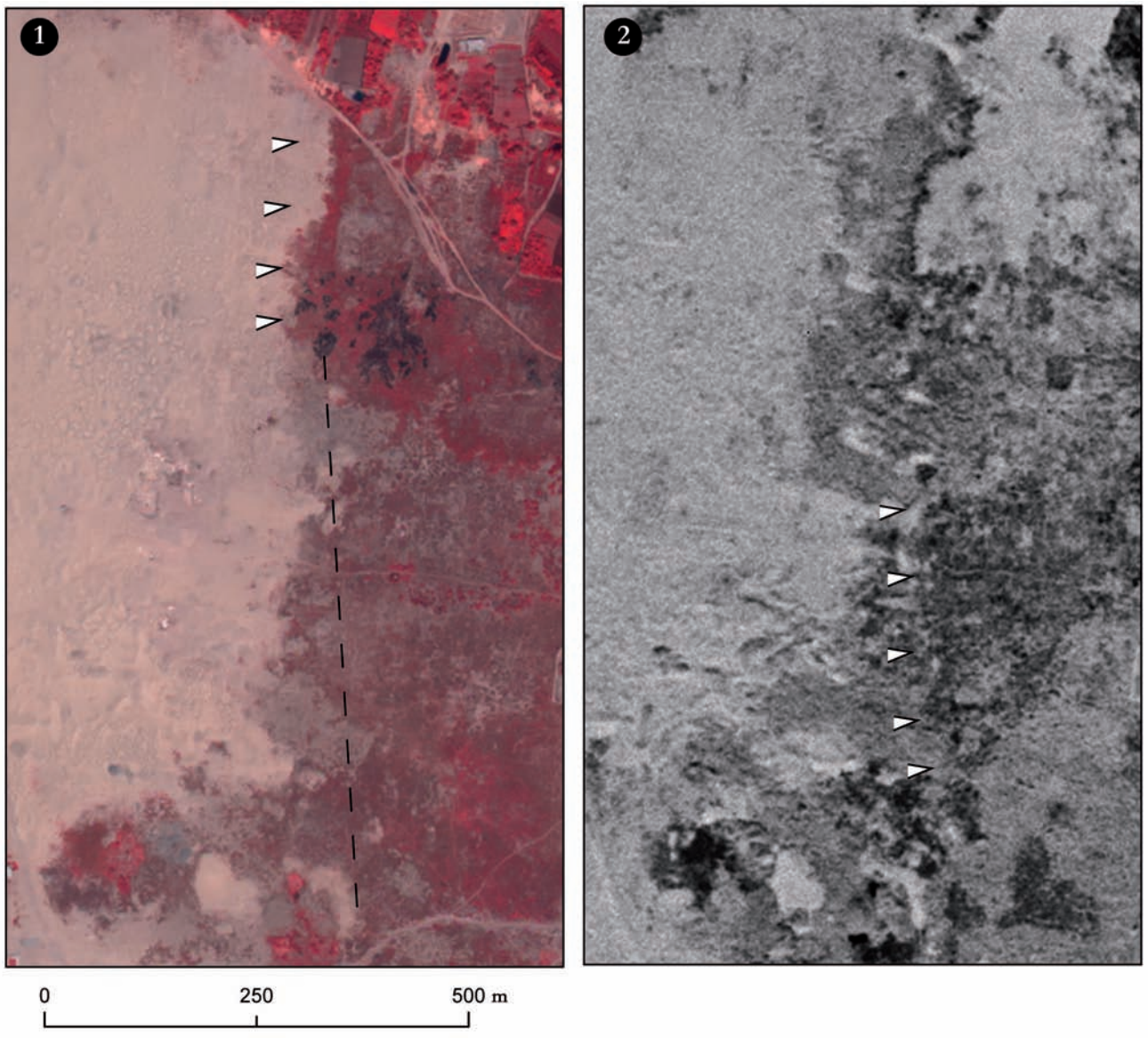

Figura 23. Detalle de trazas detectadas en el yacimiento de Oxirrinco. 1) Worldview 2 Bandas NIR2-4-3; 2) Corona DS1105-1090DA035 (09-11-1968).

de ir complementadas con aproximaciones geomorfológicas y paleoambientales que completen la visión del paisaje oxirrinquita.

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11. ELEMENTOS DEL PAISAJE DEL NOMO OXIRRINQUITA

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La ciudad de Oxirrinco y su entorno forman parte de un sistema ecológico-geográfico amplio que podemos describir como el Egipto Medio. Este concepto no pertenece a la antigüedad, durante la cual predominó la distinción entre Alto y Bajo Egipto, sin embargo la reforma provincial de Diocleciano introdujo la *provincia* de Arcadia, que recoge de forma más acertada la unidad geográfica de la zona. En efecto, el Egipto Medio posee características distintivas respecto al Alto y el Bajo Egipto que resultan del sistema hidrológico y de comunicaciones que lo estructuran.

El paisaje que pretendemos explorar[1] corresponde genéricamente a la época grecorromana, aunque lo dilatado de esta franja cronológica, que se inicia a finales del siglo IV aC y se prolonga hasta el siglo VII dC, debería, en buena lógica, mostrar situaciones diferentes con relación por lo menos a tres fases históricas: la ptolemaica, la altoimperial y la del Bajo Imperio, pues a cada una de ellas le corresponde un concepto administrativo y fiscal diferenciado.

En diversas ocasiones se ha subrayado que en el Egipto antiguo existía una relación estrecha entre la división territorial y el sistema impositivo.[2] El nomo podría ejercer de unidad recaudadora y concentrar la gestión en la metrópolis, mientras que las toparquías constituirían el primer nivel de concentración de los productos tributarios para gestionar su transporte a los grandes puertos de embarque.

El análisis del paisaje del Egipto Medio sugiere que dicha estructura administrativa está así mismo estrechamente relacionada con el sistema hidráulico y de comunicaciones establecido o reforzado desde la época ptolemaica. En particular, nuestra hipótesis de trabajo es que la red de canales/diques ya entonces dividía el territorio en zonas de irrigación por inmersión, al tiempo que proporcionaba un medio de transporte para evacuar las cosechas. Todo ello según unas superficies agrarias dimensionadas en proporción a los núcleos de habitación y según una estructura del paisaje construida de forma meditada gracias a una experiencia milenaria.

Los historiadores de los sistemas de irrigación en Egipto han propuesto visiones distintas del proceso de adquisición de dicha experiencia hidrológica. En particular, el sistema de cubetas de inundación genera algunas dudas. El riego y el abono por inmersión y decantación son una obviedad en un sistema fluvial regular y estacional como el del Nilo y ciertamente caracteriza la actividad del agricultor a la escala doméstica, sin embargo, el problema es la escala de dichas cubetas y trabajos comunitarios en cada época.

En época contemporánea la inmersión de tierras se realizaba a gran escala como resultado de grandes proyectos destinados a maximizar el aprovechamiento de la inundación. En particular, el último gran ajuste es debido a Mehmet Alí, virrey de Egipto (Mahmud Bey), que movilizó un equipo encabezado por el ingeniero belga Linant de Bellefonds, designado ministro de obras públicas. La estrategia de maximización se concretó, en principio, hacia 1820, en excavar canales profundos capaces de proporcionar agua incluso antes de la inundación. Previamente los canales debían ser poco hondos, destinados tan sólo a distribuir la crecida hacia tierras más altas, y pensados también para mantener cierto nivel de agua hasta el final de la temporada de la crecida. La irrigación perenne se instaurará definitivamente en el valle en 1873 con la obertura del canal de Ibrahimiyya, que atraviesa el Egipto Medio.[3] Entre las dos escalas, la de una gestión local y la de una gestión estatal moderna, el sistema de "inundación por cubetas" tuvo que ir experimentando reajustes.

Para seguir ese proceso cabe consultar la obra de Linant de Bellefonds, que levantó una cartografía con trazas del sistema de irrigación imperante antes de la modernización del riego mediante grandes canales. Sin embargo, su trabajo de "geografía histórica" no va acompañado de una memoria precisa que complemente los mapas. El primer mapa, de principios de siglo,[4] propone la situación anterior y presenta trazas de canales fósiles y de diques antiguos, y el segundo, de 1854, anota las grandes obras de infraestructura –diques–

1. Esta comunicación ha sido realizada en el marco de la proyecto de I+D del Ministerio de Ciencia e Innovación HAR2008-01623 "La ciudad egipcia en época clásica: la organización del espacio en el Egipto helenizado" y de las ayudas aportadas por el Institut Català d'Arqueologia Clàssica en concepto de soporte a la investigación financiada por el Ministerio.

2. Bonneau 1987, 192.

3. Habib Ayeb 1990.

4. "*Carte hidrographique de l'Égypte Moyenne*, d'après les ordres de son altesse Mehemet Ali viceroi d'Égypte", de Linant de Bellefonds fechado en 1882 y archivado en la BNF Cartes et Plans GEC-38, pero, según Linant de Bellefonds (1872, 20), la cartografía fue aprobada por Mehmet Alí en 1833.

que convenía reparar.[5] El sistema decimonónico contaba con un buen número de diques transversales, 11, según Martin,[6] dentro de los límites de la provincia de Beni Suef. Ignacio Fiz, en un trabajo aparte, ha seguido con detenimiento la estrategia de transformación de las cubetas de inundación en el siglo XIX.

F. Gomaà, R. Müller-Wollermann y W. Schenkel, en el año 1991, y W. Schenkel en un artículo específico para la gestión hidráulica, propusieron una lectura del territorio del Egipto Medio.[7] En su obra, que constituye un referente indispensable, se relacionaban los diques y los topónimos de raíz faraónica con el fin de estudiar el paisaje más remoto. Su trabajo recoge un gran número de diques, dos de los cuales estarían documentados en el Papiro Wilbour: el dique de *Pi-ohe* y el de *Spermeru*. Otros diques, considerados anteriores a la época moderna, fueron considerados posibles persistencias de la época faraónica. Según los autores citados, a finales del siglo XIX, desaparecían las últimas trazas de los diques del sistema de inundación por cubetas. Su estudio apunta a la posibilidad de que todos los diques provengan de la época faraónica, pues siguen un ritmo que podría ajustar-se a una antigua medida lineal egipcia (*jtr.w)*.[8] La ausencia de diques en la cartografía anterior, de los siglos XVII y XVIII sería imputable al escaso interés y profesionalidad de los técnicos.

El hecho es que, si admitimos que los 11 grandes diques señalados por Martin son anteriores a la época moderna, aún cabe desandar el camino de la transformación del territorio en otras épocas. El sistema hidráulico de la antigüedad podría haber experimentado reajustes e innovaciones durante diversos períodos, empezando por el ptolemaico, conocido por su interés en la productividad agrícola, pero también podrían provenir de otro período de la historia egipcia con un fuerte control estatal: el otomano. Una serie de registros otomanos dan cuenta de los diques que estaban en proceso de degradación desde el período mameluco con el objeto de someterlos a reparaciones. Pero cuáles eran esos diques y sus dimensiones es justamente la cuestión pendiente de dilucidar. De hecho, G. Alleaume alerta contra el peligro de proyectar erróneamente hacia la antigüedad el sistema de irrigación por cubetas y el sistema de contener entre diques las riberas de los cursos de agua. Los mismos registros confirman que no había grandes canales atravesando en ese momento el Egipto Medio.[9] La historiadora opina que la pendiente transversal era la preferida en época antigua para la irrigación y, según ella, se puede observar una regularidad de la circulación de las aguas en dirección este-oeste.[10]

Nuestro trabajo, a la vista de la problemática evocada, ha consistido en volver a recuperar la información disponible a partir de la cartografía y la geografía histórica y, apoyándonos en los trabajos de Gomaà, Müller-Wollermann y Schenkel (1991), profundizar en el análisis de las trazas de diques y canales para proponer un sistema general de funcionamiento que se ajuste al paisaje del período grecorromano. La cronología de los diques, imposible de verificar de forma categórica, la intentamos verificar a la luz de la existencia de referencias donde los papirólogos encuentran relación entre una localidad y una infraestructura de este tipo. También introducimos reflexiones puntuales de tipo geomorfológico espoleadas por las enseñanzas sobre el sistema hidráulico proporcionadas por D. Bonneau a través de sus publicaciones.

1. El problema de los canales

Exceptuando el Nilo, el Bahr Yussef es el principal curso de agua de origen natural que estructura el valle del Egipto Medio. Esta realidad, que nos parece obvia, no debía serlo tanto en épocas remotas, pues la cartografía histórica presenta dificultades para denominarlo y para describirlo. En efecto, el brazo del Nilo o canal de Joseph, aparece citado a veces como Moeris o, incluso, con otro nombre, como veremos más adelante.[11] Entendemos que la confusión se justifica porque en la zona había otros cursos de agua que competían con el Bahr en capacidad de irrigación y porque se establecían conexiones entre ellos. Así, la cartografía de los siglos XVII y el XVIII muestra en repetidas ocasiones, para esta zona del Egipto Medio, dos o tres grandes cursos entrelazados que dan lugar a grandes islas de tierra aluvial. En la isla más septentrional, que corresponde al límite entre el nomo oxirrinquita, el heracleopolita y el memphita, el cartógrafo Duval sitúa *Nilopolis*, conocida por la fuentes,[12] y otros dos núcleos: *Dilotes* (Delas, en la provincia de Beni Suef)

5. *Carte hydrographique de la moyenne Égypte* réimpression dans: *Atlas des grands travaux publics étudiés et exécutés sous l'époque de Mohammed Ali el- Kébir. Le Caire sous Mohammad Ali* [Le Caire ed. 1949, nota 33]. Linant de Bellefonds, fechado en 1854.

6. Martin 1813.

7. Gomaà, Müller-Wollermann y Schenkel 1991. También Müller-Wollermann 1993 y Schenkel 1994.

8. Gomaà, Müller-Wollermann y Schenkel 1991, 3.3.8.

9. Michel 1995, 165. Véase también Michel 2005.

10. Alleaume 1992, 304.

11. Cabe incluso citar una afirmación según la cual el Bahr Yussef se originaría al sur de Assiut con el nombre de canal de Ibrahimieh, según Bruhnes (1899, 250). En la antigüedad el brazo natural del Nilo arrancaría al sur de Minia (Derout) mientras que el canal de Ibrahimiyya empieza a la altura de Assiut.

12. Ptolomeo *IV, v, 26*, que sitúa la ciudad en una isla, lo que ciertamente influiría en el cartógrafo para introducir el topónimo. Según Amélineau (1890, 136), *Nilopolis* es Dilotes.

y *Alvi*.[13] Otra isla, más pequeña, aparece entre el nomo oxirrinquita y el hermopolita y contiene la referencia a *Hipponom* (que correspondería a el Hibeh), a oriente del Nilo.[14] (Fig. 1) También Deslile dibuja una gran isla entre el Fayum y *Memphis*, pero su cartografía es más detallada y pone en evidencia que estaba trazando un canal que da un rodeo saliendo del Nilo a la altura de Maimon para volver a él a la altura de Kasr el-Arab.[15]

En otros mapas del siglo XVIII, vemos una configuración distinta de los cursos fluviales al sur del Fayum con la inclusión de una gran vía de agua, entre el Nilo y el Bahr Yussef. Vaugondy, interpretando a Sicard, lo bautiza como Moeris,[16] pero D'Anville pone en evidencia un curso muy importante llamado L. Bathen, que arranca a la altura de Gebel el-Teir, situado al este del Nilo, en frente de la actual Samalut, y enlaza con el Nilo por un canal menor en las proximidades de Zohra.[17] (Fig. 2) Este origen no se corresponde al del Bahr Yussef, de modo que el trazo grueso parece estar indicando un canal intermedio importante que se prolongara hasta la entrada del Fayum, en realidad, cerca de Ahnas. Un canal con estas características no se suele tener en consideración como medio de irrigación

Figura 1. Detalle del mapa de Duval, del siglo XVII, con indicación de la forma general del valle medio.

13. *Atlas Vetus sive tabularum et Mapparum ex veteri geographia collectio*, *Aegyptus Antiqua*, de P. Duval (1619-1683), publicado en 1719, pero el mapa se fecha entre los años 1630-1683, según la noticia del archivo cartográfico de la BNF GE- CC- 1371 (17). Agradecemos a la Bibliothèque Nationale de France la posibilidad de consultar y tomar una fotografía doméstica del atlas.

14. *Atlas Vetus sive tabularum et Mapparum ex veteri geographia collectio*, *Aegyptus Antiqua*, de P. Duval (1619-1683), publicado en 1719, pero el mapa se fecha entre los años 1630-1683, según la noticia del archivo cartográfico de la BNF GE- CC- 1371 (17).

15. *Carte d'Égypte*, de G. Delisle (1675-1726), fechado en 1698 y conservado en el archivo cartográfico de la BNF GE- G- 6013.

16. *Carte de l'Égypte ancienne et moderne dressée sur celle du père Sicard*, de G. Robert de Vaugondy (1688-1766). Fechado en 1753 y conservado en la BNF GE DD-2987 (7802). Consultable en: *Poste d'accès aux ressources éléctroniques* IFN- 7759158.

17. *Carte d'Égypte*, de J.-B.Bourgignon d'Anville (1697-1782), conservada en la BNF GE- D- 9216, colección D'Anville (CLXII). El mapa aparece fechado en 1727. Otros mapas de la serie se pueden consultar en línea en http://www.davidrumsey.com/.

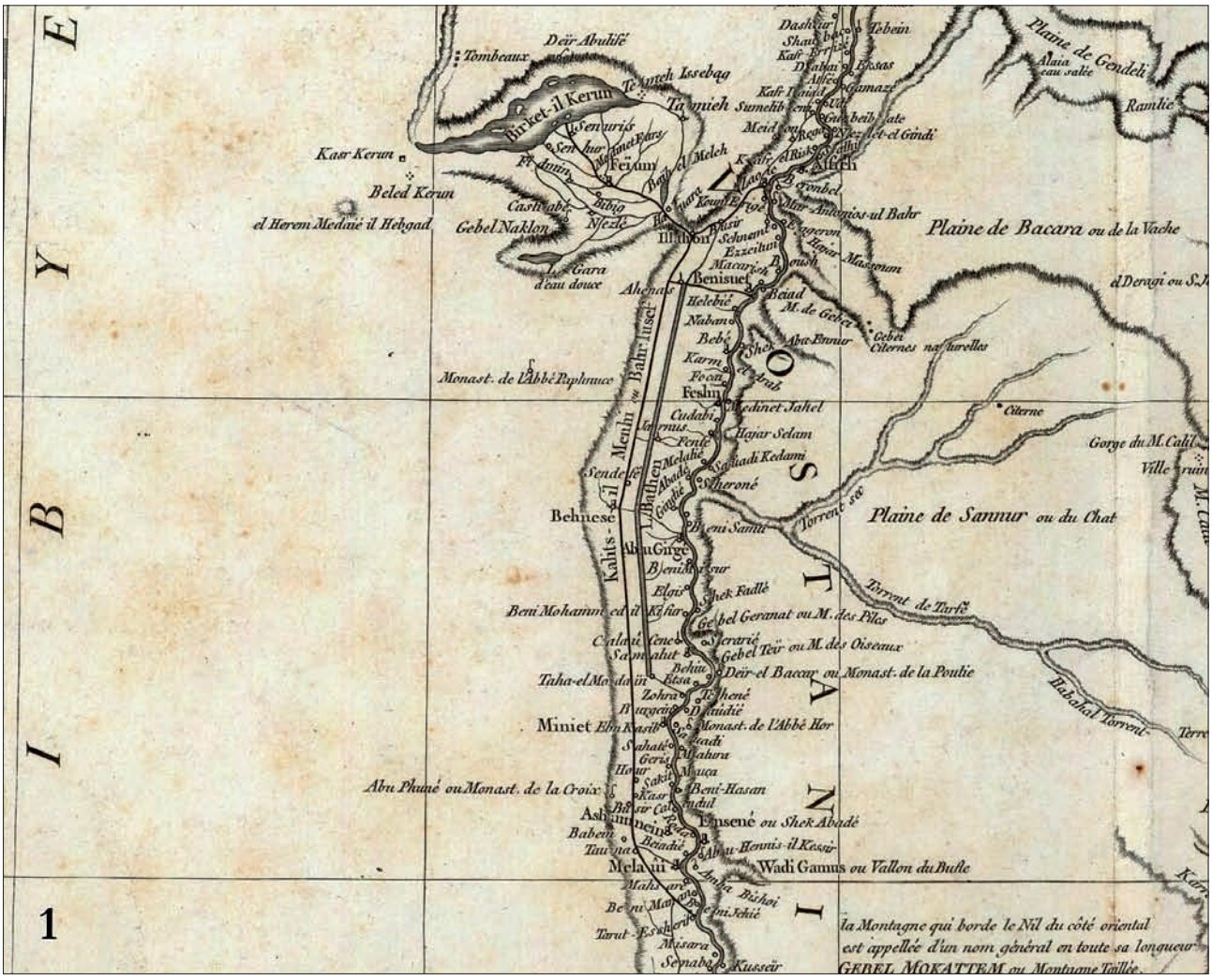

Figura 2. Detalle de los mapas de Sicard y D'Anville que pone en evidencia la percepción de la importancia de los distintos cursos de agua: 1) mapa cartográfico de D'Anville, 1727; 2) interpretación de Sicard a partir del cartográfico de Vaugondy, 1753.

antes de la construcción del canal de Ibrahimiyya en 1873, sin embargo la cartografía obliga a retrotraer las grandes canalizaciones cuando menos a mitad del siglo XVIII. La representación exagerada de dicho canal no implica necesariamente que el caudal fuera grande sino más bien que el agua se desbordaría dando lugar a un lago alargado en la depresión central del valle. Con estos ejemplos cartográficos, queremos señalar la probabilidad que el Egipto Medio estuviera tradicionalmente surcado por canales de cierta importancia para regar la zona "entre ríos", de los que ha quedado escasa constancia escrita, y que dichos canales eran cambiantes.

La importancia otorgada a dicho Bathen queda demostrada, pues el Bahr Yussef aparece como un hilo de agua lindando con el desierto. Entre el Bahr y el Bathen, otras líneas transversales dividen la tierra. Se trata de cursos de agua que unían las dos corrientes, pues gráficamente son como el propio Bahr Yussef. En el mapa de Sicard, en concreto, hallamos estos trazos de comunicación a la altura de Beni Hassan, otro a la altura de Sandafa, otro al sur de Garnous y otros más al norte.[18] Es probable que dichos cursos fueran acompañados de diques de contención y constituyeran cubetas de inundación. No en balde la zona media del Nilo era conocida por Al-Idrisi como el "golfo del Nilo".[19]

El aspecto de los dos mapas citados previamente, presenta un punto en común: tres cursos de agua corren paralelos en el Egipto Medio. En el primer mapa, el canal más grueso es el intermedio, que se origina cerca de Samalut, en el segundo también es el canal central, pero se origina cerca de Minia y, por lo tanto, corresponde sin ninguna duda al Bahr Yussef, aunque aparezca citado como Moeris. Finalmente, un tercer mapa denomina el canal más occidental como *Taneos Fossa* mientras que el curso central recibe el nombre de *Moeridis Lacus* y arranca del Nilo a la altura de Heracleópolis delimitando la "isla" del nomo. En todos ellos, lo significativo es la importancia del canal que corría históricamente en paralelo entre el Bahr Yussef y el Nilo. Por otra parte, la cartografía de Linant de Bellefonds, incluía una gran canalización occidental como proyecto de drenaje y, presumiblemente, regularizaba y unía algunos cursos precedentes, como por ejemplo el *Lycus Canalis,* que aparece más al sur.[20] (Fig. 3) Ello nos hace pensar que también en dirección al norte pudo existir una serie de canalizaciones que recogían a las faldas de la cadena líbica una zona de humedales. Ninguno de estos canales existe con el mismo trayecto en la actualidad o cuando menos no existen con la continuidad y ubicación expresada por los mapas del siglo XVIII. La pregunta es: ¿de cuándo datan esos canales y qué origen tienen?

1.1. Canales al oeste del Bahr Yussef

En ocasiones se ha mencionado la existencia de un antiguo curso del Bahr Yussef y que éste habría experimentado un movimiento hacia el este.[21] Para abordar este problema es necesario conocer la dinámica geomorfológica del valle del Nilo y entender las fluctuaciones de los cursos de agua en este sistema fluvial en época histórica.[22] Es preciso también tener presente que los trabajos de irrigación mediante canalizaciones debieron empezar muy pronto en la historia de Egipto y que el paisaje del valle ha sido a lo largo de su historia muy variable.[23] El valle en el Egipto Medio se ensancha desde Assiut, donde el río encuentra espacio para divagar y la posibilidad de dar lugar a canales secundarios. Es aquí donde nacería el Bahr Yussef actual, algo más al norte de Assiut, según documentos medievales, aunque el brazo podía haber seguido un curso diferente al principio.[24] En efecto, el lecho mayor del Nilo habría permitido grandes fluctuaciones. Respecto a la posibilidad de que hubiera existido un curso natural a occidente del Bahr Yussef cabe decir que en las fotografías aéreas se sigue con gran claridad una franja de humedad adhiriendo a las estribaciones del desierto desde Qena hasta la entrada del Fayum (a la altura de Ehnasia el Medina), consecuencia del perfil del valle medio, con zonas más bajas en los márgenes del lecho mayor debido a la acumulación de los limos de la inundación en los bordes de los cursos de agua.[25]

Junto a esa franja de humedad en el borde occidental del nomo oxirrinquita, se localizan diversos segmentos de canal fosilizados que desembocan en el curso actual del Bahr Yussef. No hay continuidad entre esas trazas, pero se relacionan con meandros del brazo fluvial y serpentean como el propio río, de modo que muestran las variaciones experimentadas. Por ejemplo,

18. *Carte de l'Égypte ancienne, divisée en ses 58 nomes ou gouvernements*, de C. Sicard (1677-1726). Fechado en 1722 y conservado en la BNF GE DD- 2987 (7804,1-2 B). Consultable en línea en *Poste d'accès aux ressources électroniques* IFN- 7759288. *Taneos* se refiere, seguramente, a una denominación equivalente a Egipto, a partir de la capital Tanis, a juzgar por las precisiones de Cagnola (1829, 27).

19. Fehérvári 2006, 6.

20. El mapa citado en la nota anterior, reporta, más al sur, el nombre de *Lycus canalis* a occidente del Nilo y prácticamente enlaza con el *Taneos Fossa*. Dicho plano sugiere que el *Taneos Fossa* tiene el mismo origen que el anterior, a saber, un canal de drenaje a los pies del desierto.

21. Butzer 1959, 78.

22. La importancia de estas variaciones para analizar los patrones de asentamiento ha sido puesta en evidencia por Butzer (1960).

23. Véase el interesante trabajo de geografía histórica de Loiseau 1999 y también Bunbury, Hillier y Graham 2007.

24. Butzer 1959, 78. También apunta a que el "brazo de Sohag" pudiera tener su origen en el período medieval.

25. Hurst 1954, 30 y 39-48.

Figura 3. Detalle de la cartografía de Linant de Bellefonds documentando un proyecto de canal de drenaje.

entre Muzura i Gafadun o más al sur, a la altura de Sinara, donde lo que aparece es un caudal fino que rodea la población y que sigue igualmente su curso hacia el sur. La traza prácticamente desaparece a la altura de Safaniya, pero reaparece a la altura de Abu Bisht para dirigirse nuevamente hacia el Bahr Yussef en un meandro. En esa zona no existe paleocanal, como si el brazo del Nilo siempre hubiera estado ubicado en el emplazamiento actual del Bahr Yussef durante un trecho de unos 8 km, a la altura de Oxirrinco.[26] (Fig. 4) Al sur de Oxirrinco, después de otro gran meandro emerge otra traza del canal fósil hasta la localidad de Abu Hisheima y sigue hacia el sur un trecho. Más allá, perdemos el rastro, enmascarado tal vez por un canal moderno o tal vez por aportaciones eólicas que han cubierto los sedimentos antiguos, pues K. Butzer apuntaba en 1959 la existencia de dunas de arena que habrían invadido el valle en época post-clásica.[27] (Fig. 5)

La idea del paleocanal o canal seco tiene su propio término en griego: *Koilas-Koiloma*.[28] Constituían depresiones que en la inundación se colmaban, conservaban más tiempo el agua y daban lugar a lagunas. Da la impresión que algunos tramos del canal fosilizado fueron usados hasta épocas recientes, pues figuran en la cartografía de principios del siglo xx.[29] Lo importante, sin embargo, es saber si en esos segmentos, que se separan hasta 8 km del Bahr actual, el agua circulaba en época faraónica y grecorromana, como así lo sugiere la nitidez con la que todavía son visibles las trazas y la coherencia que presentaban, como mostraremos a partir de la interpretación de las imágenes.[30] De confirmarse la vigencia de esos cursos en época histórica, podríamos afirmar dos cosas: 1) que un canal occidental o algunos segmentos del paleocanal coexistieron con los otros dos grandes cursos: el Nilo y el brazo denominado Bahr Yussef; 2) que el paisaje del Egipto Medio no se basaba en cursos de agua más o menos paralelos sino que los canales se entrecruzaban cerrando unidades agrarias prácticamente dentro de "islas", que pudieron tener alguna importancia como criterio de demarcación.

Queda por apuntar los nombres de este curso de agua o, cuando menos, de alguno de sus segmentos. Es probable que en primera instancia el problemático

26. Ver Subías en este mismo volumen.
27. Butzer 1959, 78.
28. Bonneau 1993, 18.
29. *Survey Department (Egypt), Topographie 1:50 000*, El Cairo 1906-1923.
30. P. Oxy LI 3638 línea 12, al norte de Oxirrinco tenía que haber un antiguo canal situado a oeste del canal Tomis y junto a Sinara, según comentario de los editores.

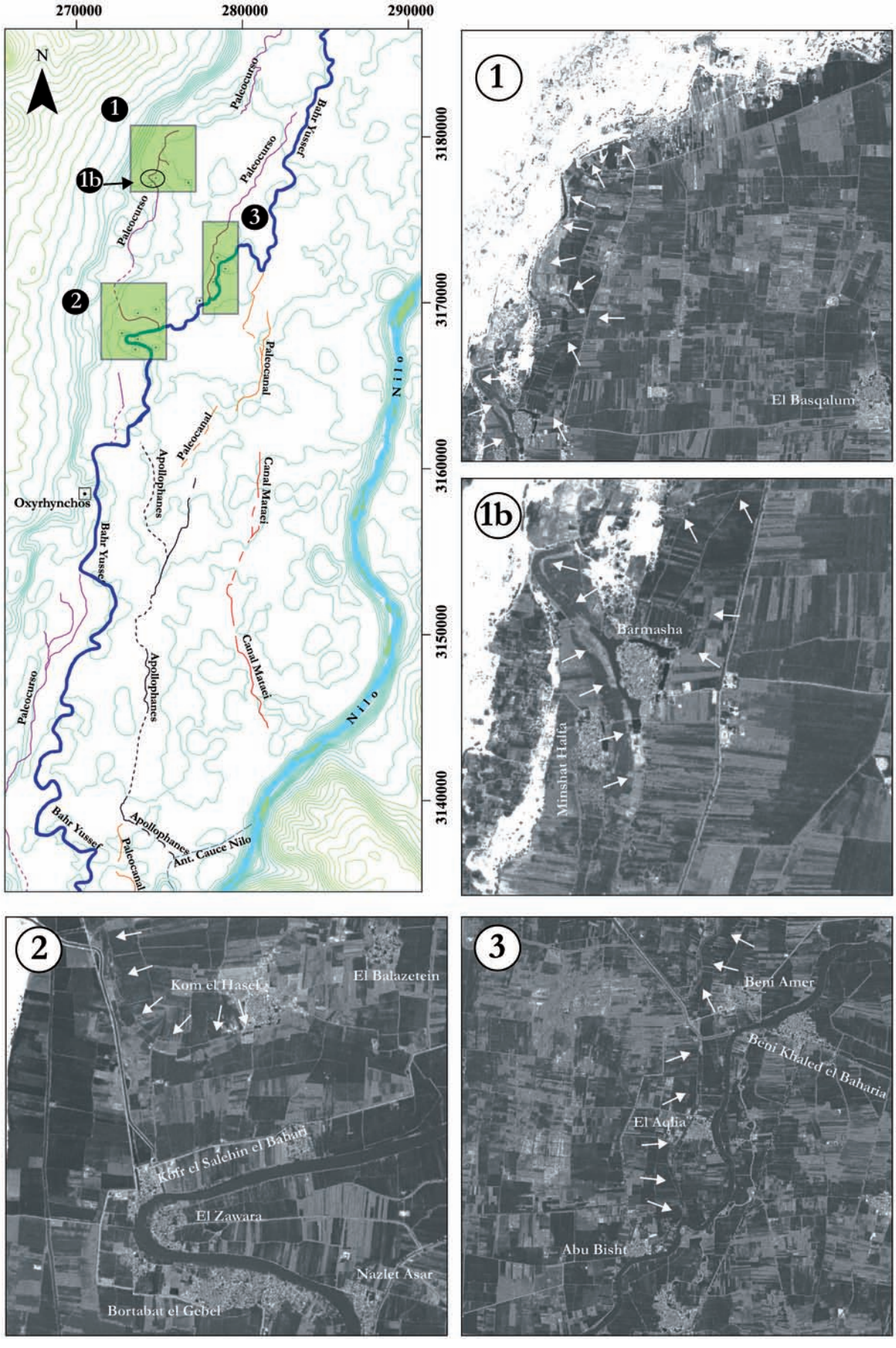

Figura 4. Trazas de paleocanales detectadas al norte de Oxirrinco: situación geográfica y detalles a partir de la imagen Corona DS1111_2167DA042.

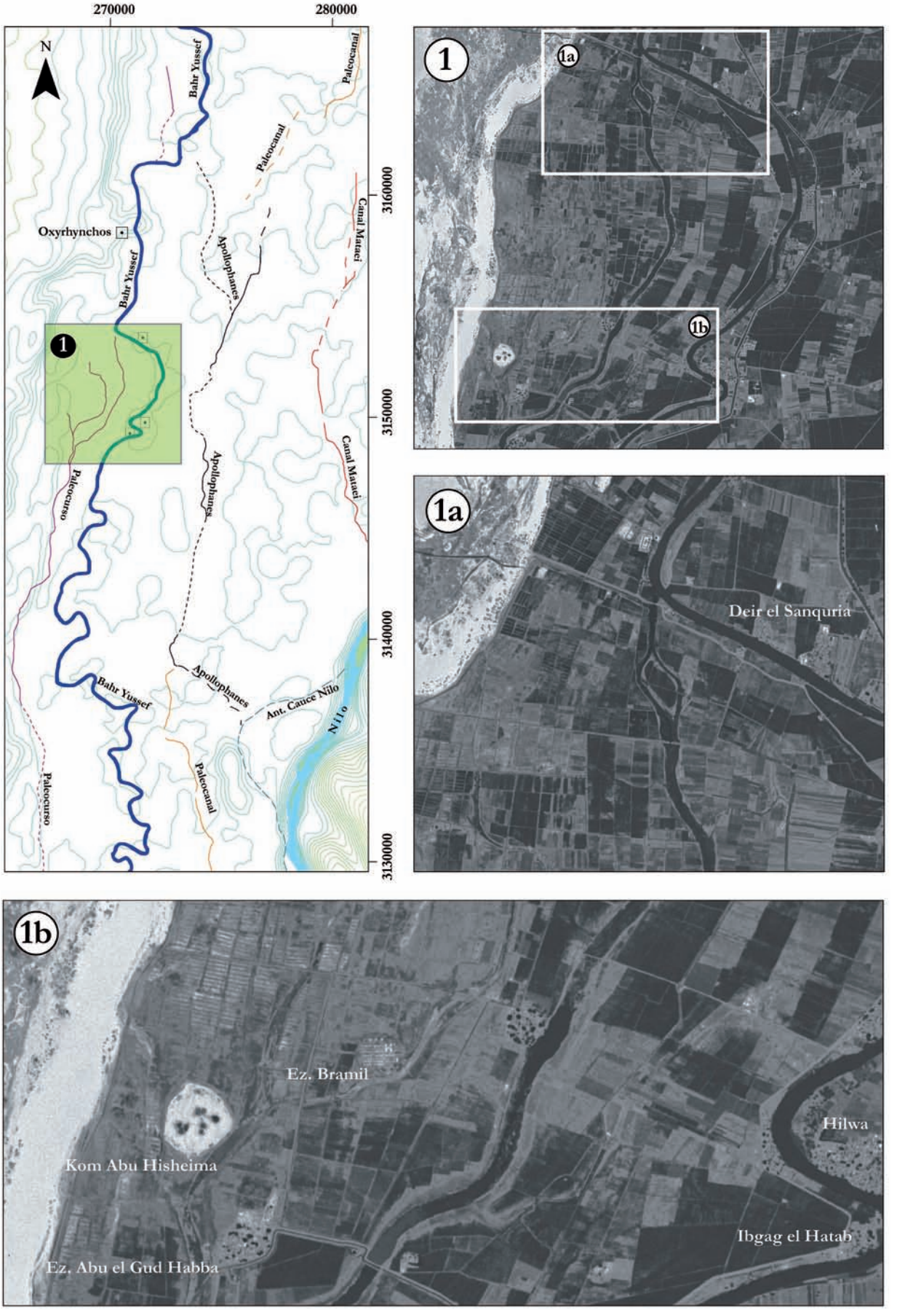

Figura 5. Trazas de paleocanales detectadas al sur de Oxirrinco: situación geográfica; vista general a partir de la imagen Corona DS1111_2167DA043 y detalles en dos emplazamientos distintos.

canal occidental corresponda al llamado *Temy* de época faraónica.[31] Existe, sin embargo, otro nombre muy significativo en el contexto grecorromano y es el de *Oreinou Boreinou*, que indicaría un canal septentrional del desierto o del "límite".[32] Lo interesante es que el papiro que lo cita habla de las tierras de *Pela*, que se encuentra al sur de Oxirrinco, con lo que nos traslada a un segmento distinto del que referíamos como *Temy*, situado cerca de Sinara. Entonces, ¿el *Oreinou Boreinou* sería un canal septentrional respecto a qué núcleo o región? ¿Cabe considerar que es el mismo que el anterior y que estaban unidos? De hecho, existe otro canal llamado de *Mounthoteu*, cuyos ribereños entran en relación con los de *Pela*, *Sinary* e *Ision Tryphonis*, es decir, localidades al norte y al sur de Oxirrinco.[33] Por último, señalar que, a juzgar por los papiros, existían, en el nomo oxirrinquita, otros canales conocidos como el "largo" o el "otro"[34] y como *Themothis*,[35] además del canal de Apollophanes, del que nos ocuparemos más adelante.

También para la toparquía baja existen referencias cruzadas entre núcleos de población y cursos de agua. Así, un papiro proporciona la secuencia de poblaciones en la parte noroccidental del nomo: *Souis*, *Dositheu*, *Sinary*, *Psobthis*, *Takona* (Kom el-Ahmar Mazura), *Tychimphagon*, *Sesphtha*.[36] La posición de *Sesphtha* es particularmente importante, pues es la puerta de evacuación de la cosecha de grano hacia el Nilo, lo que tal vez indique su posición sobre un curso de agua que podría haber conectado nuevamente el Bahr Yussef y el Nilo. Se ha propuesto su ubicación en Sumusta y correspondería al límite septentrional del nomo.[37] *Tholtis* (Tilt wal-Quli'a)[38] también seria clave en la región como lugar de embarque. Finalmente, cabe señalar que, como en el sur, la división del valle podía ser longitudinal y no transversal, de modo que el nomo heracleopolita podía haber separado el oxirrinquita del Nilo en esta región.[39]

1.2. Un canal mayor "entre ríos" y su función como demarcación

El trazado del canal de Apollophanes, situado entre el Bahr actual y el Nilo, es uno de los retos de cualquier estudio sobre el paisaje del Egipto Medio en época ptolemaica o romana.[40] Su existencia está documentada por un papiro y su importancia queda demostrada porque en el siglo III o IV dC se procede a consolidarlo. De dicho canal sabemos que partía del Nilo, que vertía sus aguas en el Bahr Yussef y que constituía, por lo tanto, un atajo para la circulación de personas y mercancías procedentes de la zona central del valle, pues, de no existir el canal, desde una zona intermedia de los nomos oxirrinquita y cynopolita se tendría que remontar por el río para embocar el brazo natural que permitía acceder al Fayum. Pero si una de sus funciones pudo ser la de la circulación, la realidad es que también fue uno de los canales responsables de estructurar el territorio agrícola según lo que sugiere la división administrativa del nomo oxirrinquita. El valle medio del Nilo es particularmente ancho y, aunque irrigado por las dos corrientes naturales, el limo acumulado en las riberas impediría un buen derramamiento del agua durante la crecida. El canal de Apollophanes habría permitido irrigar la zona intermedia del nomo distinguiendo una mitad lindando con el Bahr el Yussef y otra bordeando el Nilo. De hecho, la división administrativa del nomo contempla una toparquía occidental y una toparquía oriental.[41]

En la cartografía de principios del siglo XIX, el canal de Apollophanes u otro canal que reuniera sus características no aparece, mientras que sí lo hacen unas trazas perpendiculares al Nilo que podemos interpretar como grandes diques.[42] El canal podría haber desaparecido como tal en ocasión de la gran remodelación del sistema hidráulico dando lugar a segmentos reutilizados para drenaje. El análisis de las fotografías permite observar una serie de canales razonablemente alineados, que podríamos interpretar como evidencias de un antiguo canal. Los segmentos de canales aparecen a menudo sin coherencia respecto a un origen y un destino del agua, por lo que no tienen una lógica que permita relacionarlos con canales modernos u otras infraestructuras, como por ejemplo pozos.

El origen del canal no es nada claro, pues existen distintas trazas que parten del Nilo en esa zona. Por ejemplo, un primer conjunto de trazas sería visible en la cartografía al sur de Al-Bayahu y otro conjunto, algo más arriba de Samalut, en una zona donde el Nilo se

31. Que correspondería al antiguo curso del Bahr Yussef, según Goyon (2008).

32. P. Coll. Youtie II 68, citado por Rowlandson 1996, 12 n. 22 y Rowlandson 2007, 210 n. 2. El concepto de *desierto* se infiere por el término *oriou*, que significa 'límite'. Existe un canal *oriné* en el Fayum, según Bonneau (1993, 17).

33. P. Oxy XLIX 3462. Tiene que estar relacionado de alguna manera con *Paimis, Sinary, Ision Tryphonis.*

34. P. Coll. Youtie VI 988, recogido por Rowlandson 2007, 210 n. 2.

35. P. Oxy XLVI 3268. Cercano a *Phoboou*, entre *Ophis* y *Pankerke*, toparquía oriental, 5º pagus. Ver Benaissa 2009, 359.

36. P. Oxy 47, 3333. Ver Rowlandson 1996, 14-15.

37. Rowlandson 1996, 15 y Gonis 2000.

38. Benaissa 2009, 284.

39. Rowlandson 1996, 15.

40. Rowlandson 2007, 210, nota 2. SB XIV 12108 = ZPE 24, 1977, 133-7. Equivale a P. Mich.in.412, r. Ver Youtie 1977.

41. Ver el esquema propuesto por Rowlandson 1996, mapa 3.

42. *Carte ancienne et comparée de l'Égypte*, del coronel P. Jacotin y de M. Jomard, a partir del mapa levantado por la expedición francesa (*Ongizzi sculpsit*; fini par Blondeau). Fechado hacia el 1800 y conservado en BNF GE- C- 8968.

ensanchaba hacia occidente en un gran meandro. Nos inclinamos por esta opción por la conjunción de diversos factores: el empuje natural del agua en la curva del río y el hecho que la extensión del valle a irrigar es superior en este punto. A partir de este origen, junto a la serie de trazas seleccionadas, podríamos encontrar otra que corre en paralelo a occidente de nuestra propuesta hasta Hilwa, pero no puede corresponder con los topónimos griegos que se relacionan en las tareas de conservación del canal. Además, en el origen, esta serie está relacionada con un dique, por lo que pensamos que las escorrentías observadas son fruto del drenaje moderno y no corresponden a un sistema de aportación nacido en el Nilo. (Fig. 6)

En cuanto al tramo final del trazado del canal de Apollophanes, que corresponde con la localidad de Saqula, las trazas se interrumpen antes de alcanzar el Bahr Yussef. Posiblemente, la existencia de una depresión donde se concentraría más tiempo el agua de la inundación ha favorecido la desaparición de trazas. (Fig. 7)

El curso del canal de Apollophanes se conoce aproximadamente por los nombres de las poblaciones antiguas que contribuyeron a su mantenimiento, lo que permite suponer que el canal lindaba con ellas a lo largo de 250 *schoenes*. Algunos de estos topónimos han sido identificados con poblaciones actuales por diversos autores, otros quedan pendientes de ubicar. En nuestra reflexión, que se combina con el análisis de las fotografías de satélite y la interpretación de trazas del paisaje, proponemos una lectura de esas equivalencias, que, es preciso subrayar, no se fundamenta en datos objetivos. Nuestro criterio ha sido el de la lógica de la enumeración en el P. Michigan 412, que podría haber alternado las dos orillas del canal de Apollophanes para enumerar de sur a norte las poblaciones concernidas.[43] Para ubicar esas poblaciones antiguas hemos tenido en consideración las poblaciones actuales que presentan trazas de un asentamiento antiguo. Esas trazas se caracterizan por la forma de *tell* circular, para proteger el hábitat de la inundación, y constituyen el casco antiguo de la población contemporánea. (Fig. 8) Las equivalencias que proponemos serían: *Atychis* (cerca de Samalut),[44] *Senyris* (Manqatin?),[45] *Sinkepha* (Kom al-Ahmar?),[46] *Sadalou* (Minbal),[47] *Mermertha* (Dafash?),[48] *Monimou* (Gawada?),[49] *Kerkemunis* (Siyalah?),[50] *Mouchinachap* (Dinaza?),[51] *Kerkethyris* (Bani Ali?),[52] *Pela* (Billa el-Mustagadda),[53] *Seryphis* (Ashrubah),[54] *Lenon* (Utu al-Waqf?),[55] *Paimis* (as-Salisah?)[56] i *Senekelu* (Saqula).[57] Con esta distribución tendríamos en la zona intermedia del curso del canal asentamientos distribuidos por ambas riberas. Además, todas estas poblaciones se reparten entre la toparquía alta y la occidental (a partir de *Mouchinachap*) y ninguno aparece relacionado con la toparquía oriental, de modo que el límite administrativo se encuentra a oriente de los núcleos citados. Otro canal se interpone entre estos pueblos y el Nilo: un canal cuyo trazado nos es desconocido pero que podría ser incluso más relevante desde el punto de vista topográfico que el canal de Apollophanes, pues nuestra idea es que este canal pudo servir de límite entre ambas toparquías.

43. Youtie 1977. La enumeración no sigue un orden lineal sino que va en función de su pertenencia a la toparquía alta u occidental. Dentro de la lista de nombres de la toparquía occidental entendemos que participan pueblos en las dos orillas del canal.

44. El núcleo mayor de la zona seria Samalut, pero esta población corresponde a *Samalo* y Deir Samalut a *Mnachis*, según Gomaà, Müller-Wollermann y Schenkel (1991). La población de *Athychis* estaría cerca de *Mermetha*, según (Pruneti 1981, 37). Proponemos una ubicación en Masaret Samalut, que figura como población separada de Samalut en la cartografía del Survey Department Egypt, citado en la nota 29.

45. Según Gomaà, Müller-Wollermann y Schenkel (1991, 188), los hallazgos arqueológicos que corresponderían a *Senyris* se encuentran en al-Kom al-Ahmar/Manqatin, 5 km al NO de la población actual. Nosotros preferimos atribuir *Senyris* a Manqatin y los restos de Kom al-Ahmar a *Sinkepha*, para preservar la lógica de la enumeración de sur a norte.

46. Rowlandson (1996, 12) recoge la referencia según la cual esta población estaría a oeste del río. La autora interpreta el río como el Tomis o Bahr Yussef, pero nosotros entendemos que podría tratarse del Nilo o del canal de Apollophanes. En este sentido, Synkepha se adaptaría mejor a la población actual de al-Qutushah.

47. Según Rowlandson (1996, 12), se ubicaría en la moderna Minbal.

48. Según Pruneti (1981, 37 n. 1), estaría cerca de Atychis, en la toparquía baja, lo que no desentona con nuestra propuesta.

49. Un núcleo más importante en la zona sería *Ibion* en Ibwan az-Zabadi, según Gomaà, Müller-Wollermann y Schenkel (1991). *Ibion* no participa en los trabajos del canal de Apollophanes.

50. En el mapa del Survey Department citado en nota 29, aparece el topónimo Kom Wali.

51. Krüger (1990, 52) sitúa esta población en la toparquía oriental, erróneamente, según Pruneti (1981, 12 n. 23), pero a nuestro entender constituye un indicio de su posición a oriente del canal.

52. Más importante sería Bardanuha, aunque, según Rowlandson (1996, mapa 2), ésta correspondería a *Pheretnouis*. También Gomaà, Müller-Wollermann y Schenkel 1991, 101.

53. Según Pruneti 1981, mapa 2.

54. Según Pruneti 1981, mapa 2 y Gomaà, Müller-Wollermann y Schenkel 1991, 102.

55. Más importante sería Sholqam, pero, según Pruneti (1981, mapa 2) correspondería a *Senokomis*, también Gomaà, Müller-Wollermann y Schenkel 1991, 102.

56. Según Gomaà, Müller-Wollermann y Schenkel (1991, 87), correspondería a Bani wal-Lams, sin embargo su posición es puesta en duda por Rowlandson (2007, 208, nota 1).

57. Correspondencia también controvertida, según Benaissa (2009, 264).

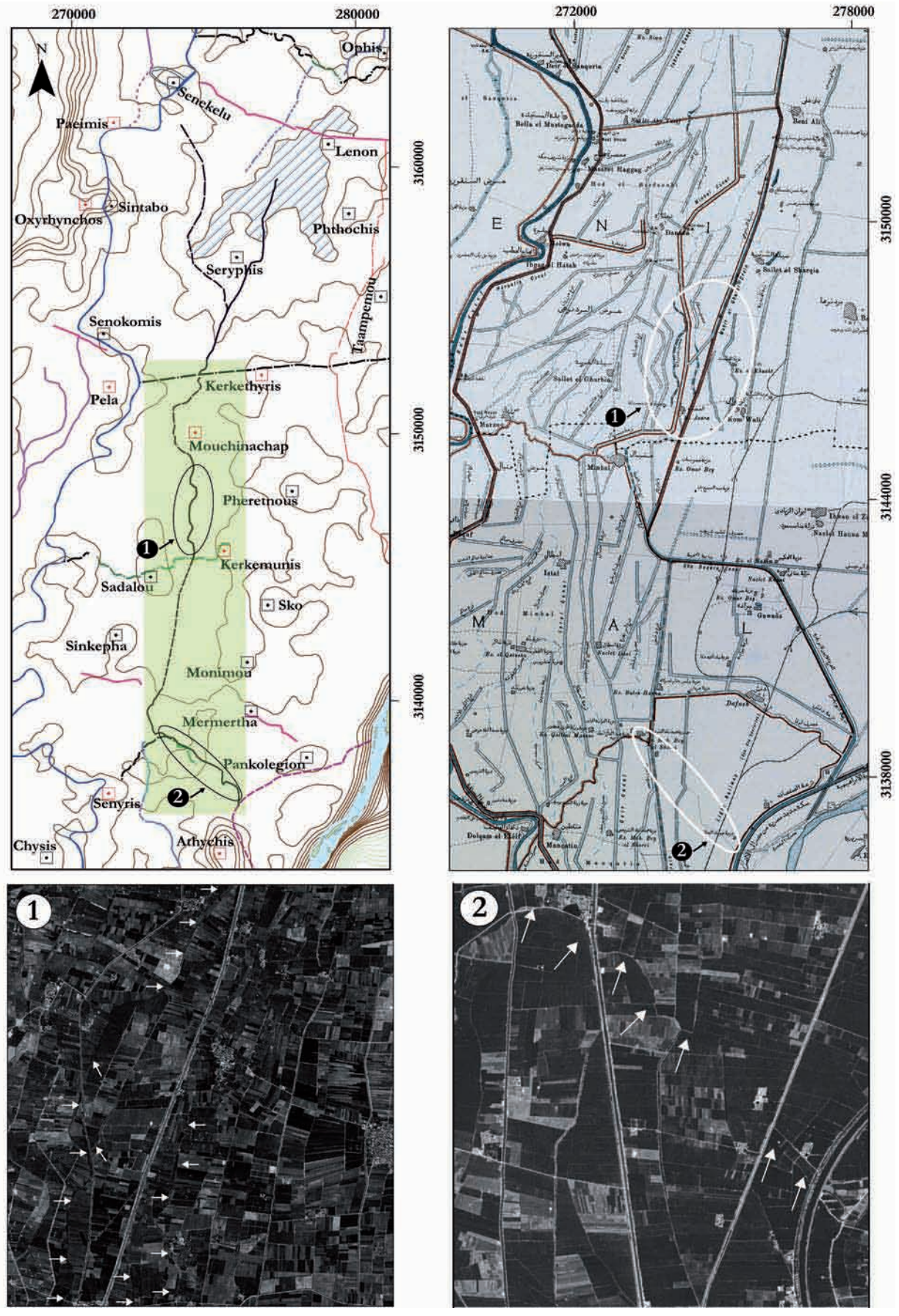

Figura 6. Trazas que permiten pensar en la localización del canal de Apollophanes en el tramo meridional: situación del supuesto canal de Apollophanes y de los yacimientos grecorromanos; trazas reflejadas en un cartográfico de 1908 y detalles a partir de las imágenes Corona DS1111_2167DA043 y DS1111_2167DA044.

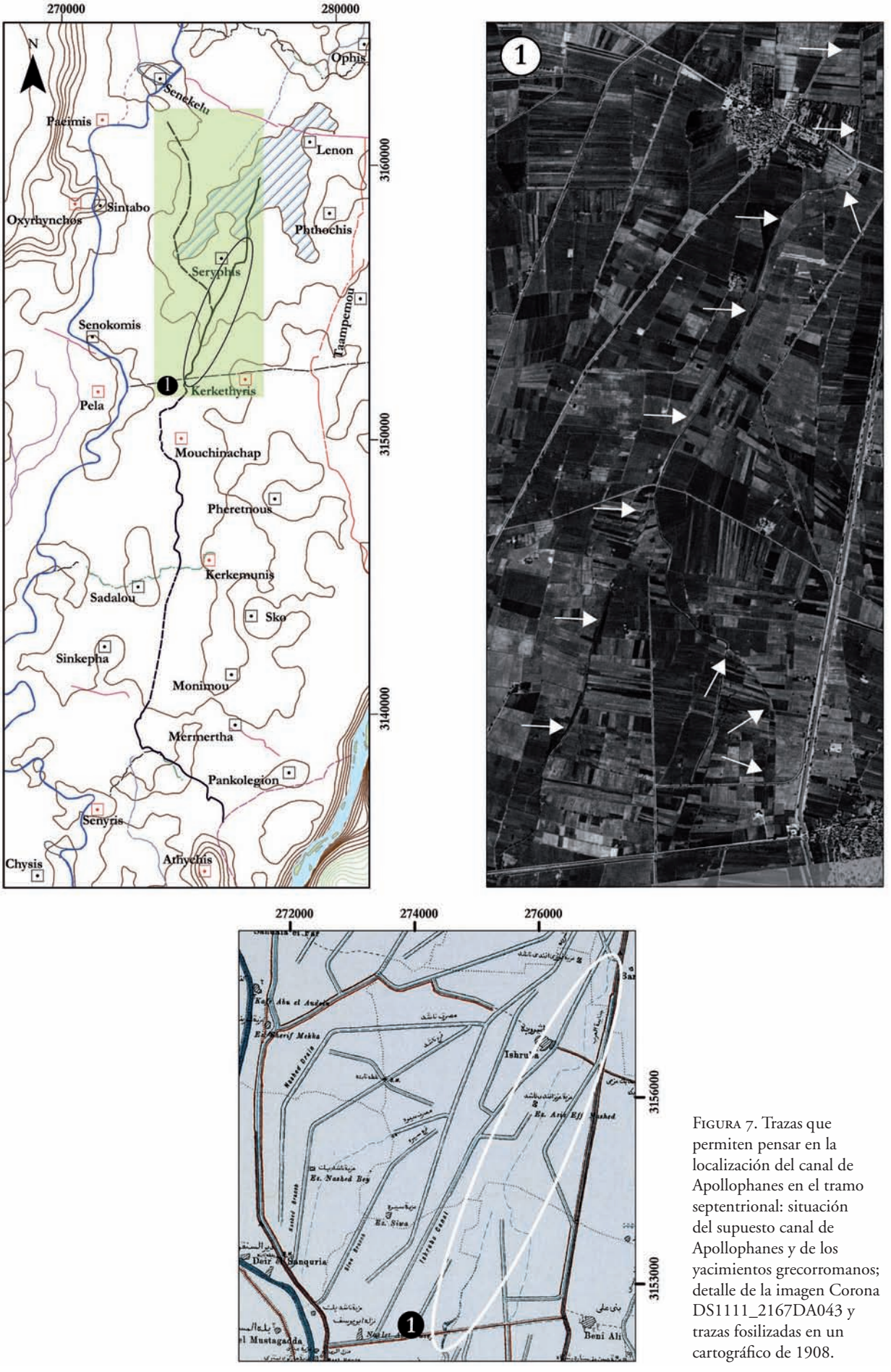

FIGURA 7. Trazas que permiten pensar en la localización del canal de Apollophanes en el tramo septentrional: situación del supuesto canal de Apollophanes y de los yacimientos grecorromanos; detalle de la imagen Corona DS1111_2167DA043 y trazas fosilizadas en un cartográfico de 1908.

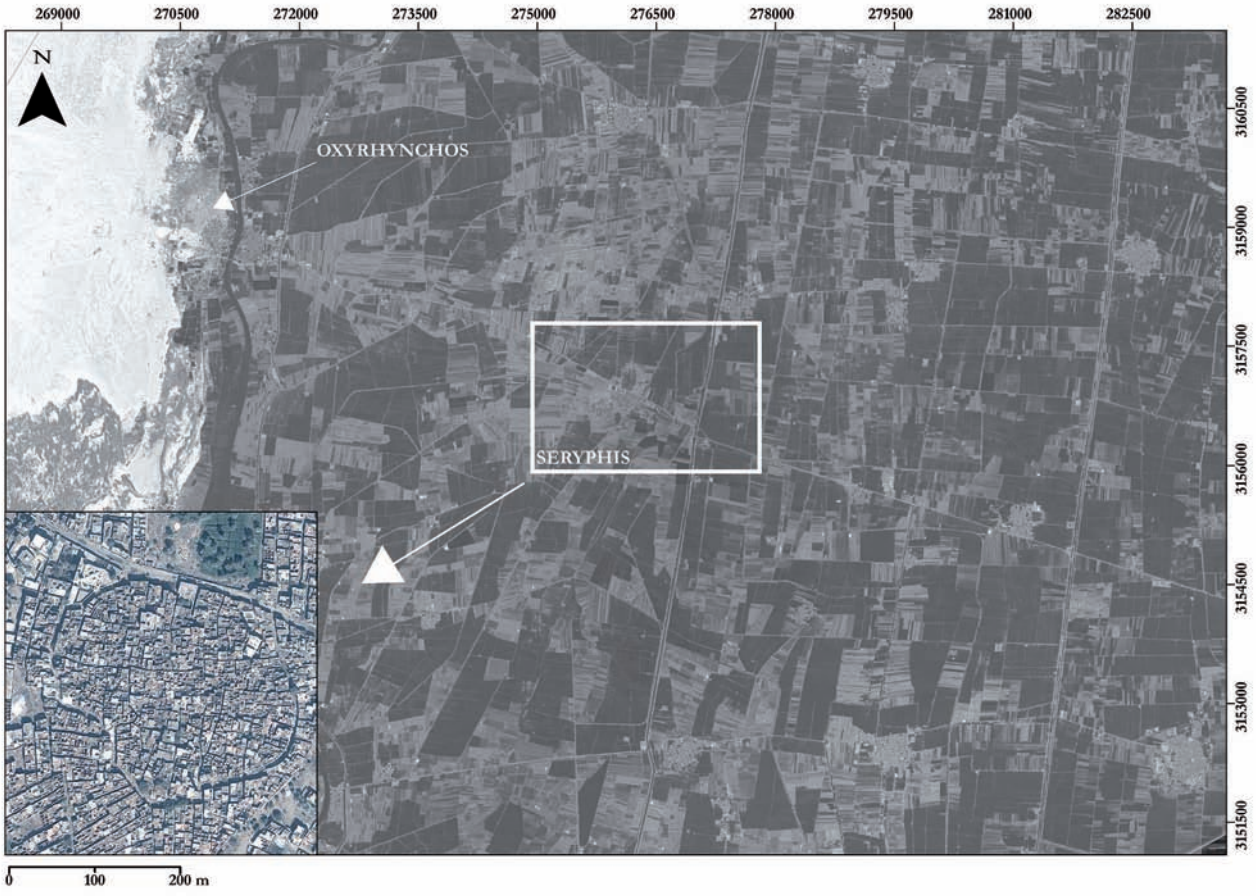

Figura 8. Imagen de satélite de Asrhuba, antigua *Seryphis*, con su núcleo tradicional en *tell*: vista general a partir de la imagen Corona DS1111_2167DA043 y detalle de Asrhuba a partir de la imagen Quickbird 2N361.

La zona "entre ríos" compartida por la toparquía occidental y la oriental, que es la más ancha del nomo, estaba surcada por dos canales intermedios (Apollophanes y otro entre éste y el Nilo, cuyo nombre desconocemos) y puede que eso llevara a dividir en tres unidades administrativas verticales la zona mediana de la toparquía. El inconveniente más grave para esta construcción es la identificación de *Seryphis* con Ashruba, que parece bastante bien afianzada.[58] Otra forma de aproximarse a los datos es evaluar la intensidad de las relaciones entre núcleos,[59] así, por ejemplo, encontraremos que *Monimou* y *Sko* guardan una relación relativamente estrecha, mientras que geográficamente y por posición administrativa no sería tan evidente si *Sko* correspondiera a Al Qays, como a veces se ha querido ver, aunque pudiera haber una confusión con *Kynopolis*.[60] La intensidad de sus relaciones vendría dada, en nuestra visión del territorio, por compartir acceso al otro canal de "entre ríos" que examinaremos en el apartado 1.3, por lo que proponemos para *Sko* una ubicación en el emplazamiento de Nazlet Hanna Masud e Ibwan Zabadi. La zona al este del canal quedaría adscrita al nomo kynopolita. Así, el nomo oxirrinquita apenas tendría acceso directo al Nilo: sólo tal vez en la franja de Abu Girg, por donde la documentación permite afirmar que pasaría un canal y un dique.[61] Cabe señalar que los puertos más importantes sobre el Nilo pertenecen a los nomos vecinos: heracleopolita al norte y kynopolita al sur (*Terithys*). Pero el nomo dispondría, según Rowlandson, de dos puertos en la toparquía oriental en *Satyros* y *Akanthon/Lile*, ambos desconocidos.[62] Habría un puerto en *Neson*, presuntamente sobre el Nilo, desde donde se embarcaría el cereal de *Spania* (Safaniya), pero otro, *Neson*, que significa tierra de depósito fluvial, existiría frente a Oxirrinco.[63] Cuesta imaginar que el grano de *Spania* tuviera que ir hasta el Nilo y no pudiera circular por el Bahr Yussef.

58. Gomaà, Müller-Wollermann y Schenkel 1991, 84.
59. Ruffini 2004.
60. Rowlandson 1996, 15.
61. Benaissa 2009, 205. P. Oxy 1208.
62. Rowlandson 1996, 11-13.
63. Benaissa 2009, 135

1.3. Otros canales y lagunas en la toparquía oriental

La cartografía de principios del siglo XIX,[64] anotando numerosas trazas de canales fósiles y los elementos mayores del sistema de drenaje, pone en evidencia un hecho muy claro: la diferencia entre la parte occidental y oriental del nomo. La parte occidental presenta un sistema de canales de drenaje, con una pronunciada orientación SO-NE, que confluyen hacia una zona central ligeramente deprimida respecto a su entorno inmediato. Esta zona de confluencia está situada alrededor de la localidad actual de Utu el-Waqf. Casi ninguno de estos hilos de agua se relaciona con los grandes canales artificiales, por lo que cabe imaginar que responden a otra lógica de irrigación-drenaje. Así, es presumible que, en época antigua, entre *Lenon-Seryphis-Ptochis* (Abtuga) hubiera una zona particularmente húmeda. Sabemos que el léxico griego del agua en Egipto es rico y variado y que contiene la idea de lago temporal, *limné*, que aparece una veintena de veces en los papiros.[65] Curiosamente, dicha zona es la que está a una cota más baja, según las curvas de nivel de la cartografía moderna, y también es interesante destacar que, en el sistema de irrigación de la época moderna, las derivaciones para irrigar el oriente de esta zona que correspondía a la toparquía occidental confluían hacia esa zona como si después de irrigar se hubieran querido depositar en una laguna contenida en parte por un dique entre *Pankerke* y *Senekeleu*. (Fig. 7) También es interesante pensar que esta configuración del paisaje pudo continuar dominando hasta el siglo XVIII dando lugar al canal-laguna (*Moeridis Lacus*) de la cartografía.

En cambio, la parte oriental presenta pocas trazas de drenaje y en la actualidad está dominada por la presencia de los grandes canales modernos y el sistema ferroviario. En la antigüedad, las riberas del Nilo serían tierras peor irrigadas que otras más alejadas, a causa de la acumulación de lodos de la inundación, que supondrían un obstáculo para que el agua de la inundación fluyera libremente. Por otra parte, dicha franja, cercana al Nilo, muestra signos evidentes de los movimientos de su curso, especialmente en las zonas de meandros, con la formación de auténticas islas. Como en el caso del Bahr Yussef, los meandros dan lugar a derivaciones que se aprovechan para iniciar nuevos cursos o canales y que localizamos como trazas fosilizadas.

En uno de estos puntos, a la altura de Nazlat Abu Shihatah y Matai, encontramos trazas de paleocanales fragmentarias, pero que sugieren por su alineación que podrían haber tenido continuidad en épocas anteriores. Sin embargo, la embocadura del canal no aparece reflejada por ninguna traza, seguramente porque el meandro que hace el Nilo en este punto se ha desplazado sustancialmente desde entonces. (Fig. 9a y Fig. 9b) Nuestra propuesta es considerar que existió un canal a oriente de Apollophanes, que se puede reseguir con cierta claridad hasta la altura de un dique transversal. Las trazas de canales siguen hacia el norte cuando menos hasta la zona de Tambidi. Sabemos además que en esta localidad existía un "puente" o un dique que hacía esa función.[66] (Fig. 10)

Cuál podría ser su nombre, es difícil decirlo. Recordemos tan sólo que hemos recogido la existencia de un canal *Temothis* que relacionaba poblaciones como *Ophis* y *Pankerke*, que se encuentran en esta toparquía. Por otra parte, resulta tentador pensar que este canal pudo servir como elemento de demarcación con la porción de suelo perteneciente al nomo kynopolita, con poblaciones como *Kynopolis* (al-Qais) en la zona meridional o como *Terythis* (Dahrut) en la zona nororiental.[67]

Como en el caso del canal occidental del desierto, creemos que es posible que alguno de los canales modernos haya suplantado en parte antiguos cursos fluviales, como así ha quedado documentado en otras ocasiones.[68] Distinguimos, por tanto, paleocursos y canales para subrayar que las obras de ingeniería en la antigüedad debieron apoyarse sobre una red hídrica compleja y segmentada, fruto de las divagaciones naturales del río. Pero incluso con esta distinción estaremos lejos de poder describir el aspecto del territorio, pues las formas de almacenamiento y captación del agua fueron muy variadas.

1.4. El diazoma y la estrategia de almacenamiento fluvial

Observando las trazas de canales fósiles hemos detectado formas del paisaje particulares coincidiendo con algunos meandros del Bahr Yussef. Se trata de meandros que gozan de la posibilidad de quedar aislados del curso mayor. (Fig. 11) En concreto en el meandro de Saqula (*Senekelu*) y en el meandro de Burtubat. En Saqula, en la actualidad, el río fluye sin ningún giro abrupto, pero unas trazas antiguas muestran un gran meandro en la ribera occidental. En el meandro de Burtubat, el Bahr hace una curva muy pronunciada a occidente y vuelve de forma abrupta hacia la dirección que llevaba previamente. Las imágenes muestran que el meandro podía ser atajado por un paleocanal prácticamente recto. Son situaciones inversas en cuanto a visibilidad actual y que, sin embargo, corresponden a la misma idea: una isla artificial aso-

64. Citado en la nota 29.

65. Bonneau 1993, 53-54.

66. *Chomata* en *Taampeti*: P. Oxy. 2034, 2205, 305. Benaissa 2009, 313. Para la correspondencia entre puente y dique, véase Bonneau 1993, 50-51.

67. Benaissa 2009, 334.

68. En particular, Barois (1887, 39) cita el caso del canal Sahelieh (el canal que se inicia al norte de Matai).

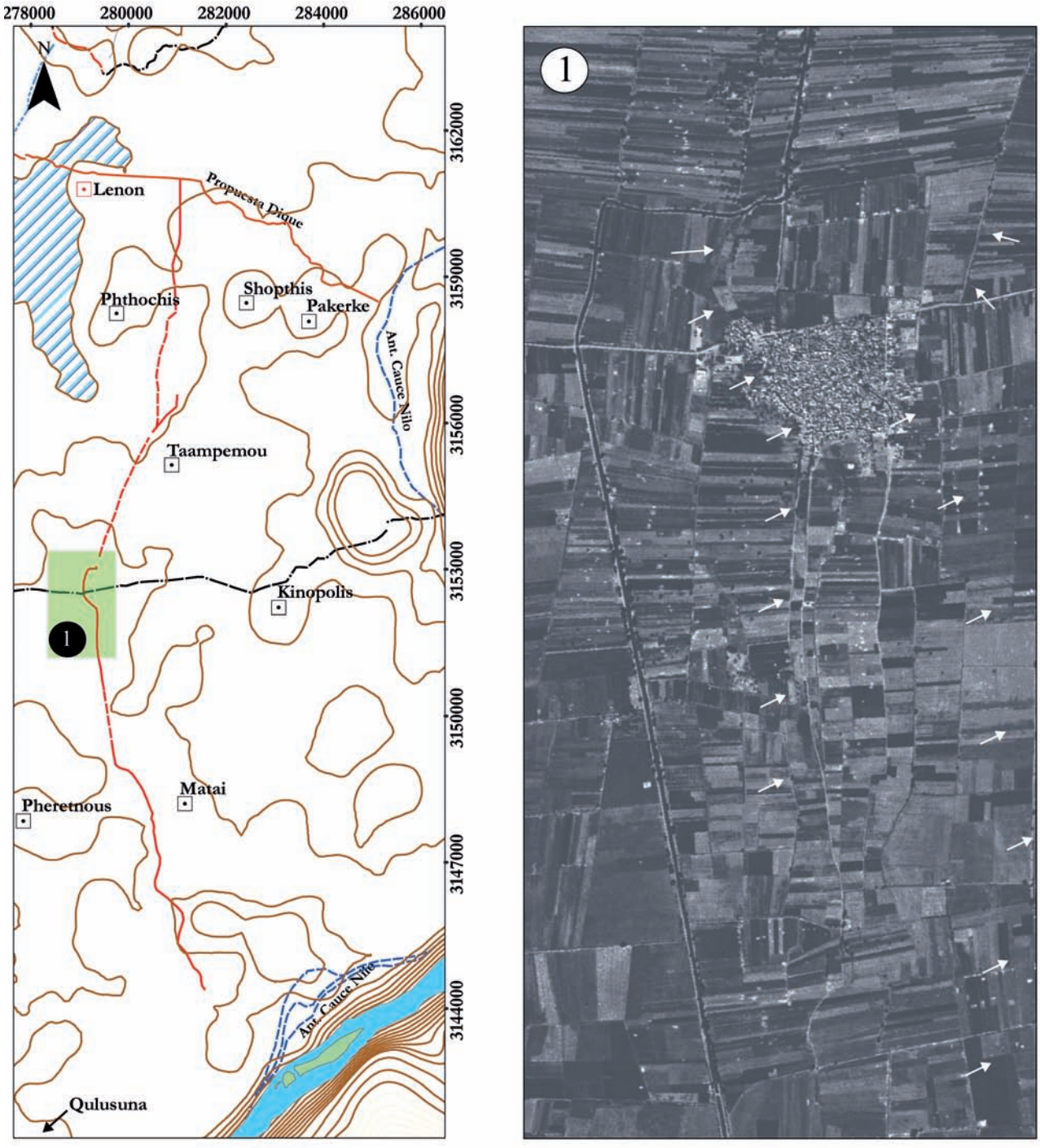

Figura 9a. Trazas y posible recorrido del canal de Matai o Themothis: emplazamiento del supuesto canal de Matai y de los yacimientos grecorromanos; detalle del trazado a partir de las trazas localizadas en la imagen Corona DS1111_2167DA043.

ciada a un meandro y en ambos casos, además, la zona da origen a otro paleocanal que irriga la zona fronteriza con el desierto, comentado en el apartado 1.2.

Danielle Bonneau describió una forma del paisaje presente en los papiros y llamada *diazoma*[69] que no sabía muy bien a qué atribuir, aunque comporta la noción de curva y permitía estacionar por un tiempo las embarcaciones de cereales a la manera de un almacén flotante. El *diazoma* podía ir asociado a un sistema de oberturas que pondrían en relación el tramo de almacenamiento con el curso principal. La autora cita un ejemplo papirológico asociado a *Paemis* (cercana a *Senekelu*).[70] Creemos que las formas que hemos detectado por medio de las imágenes aéreas y las trazas

69. Bonneau 1993, 79.
70. P. Oxy XLIX, 3462 fechado en el siglo I aC.

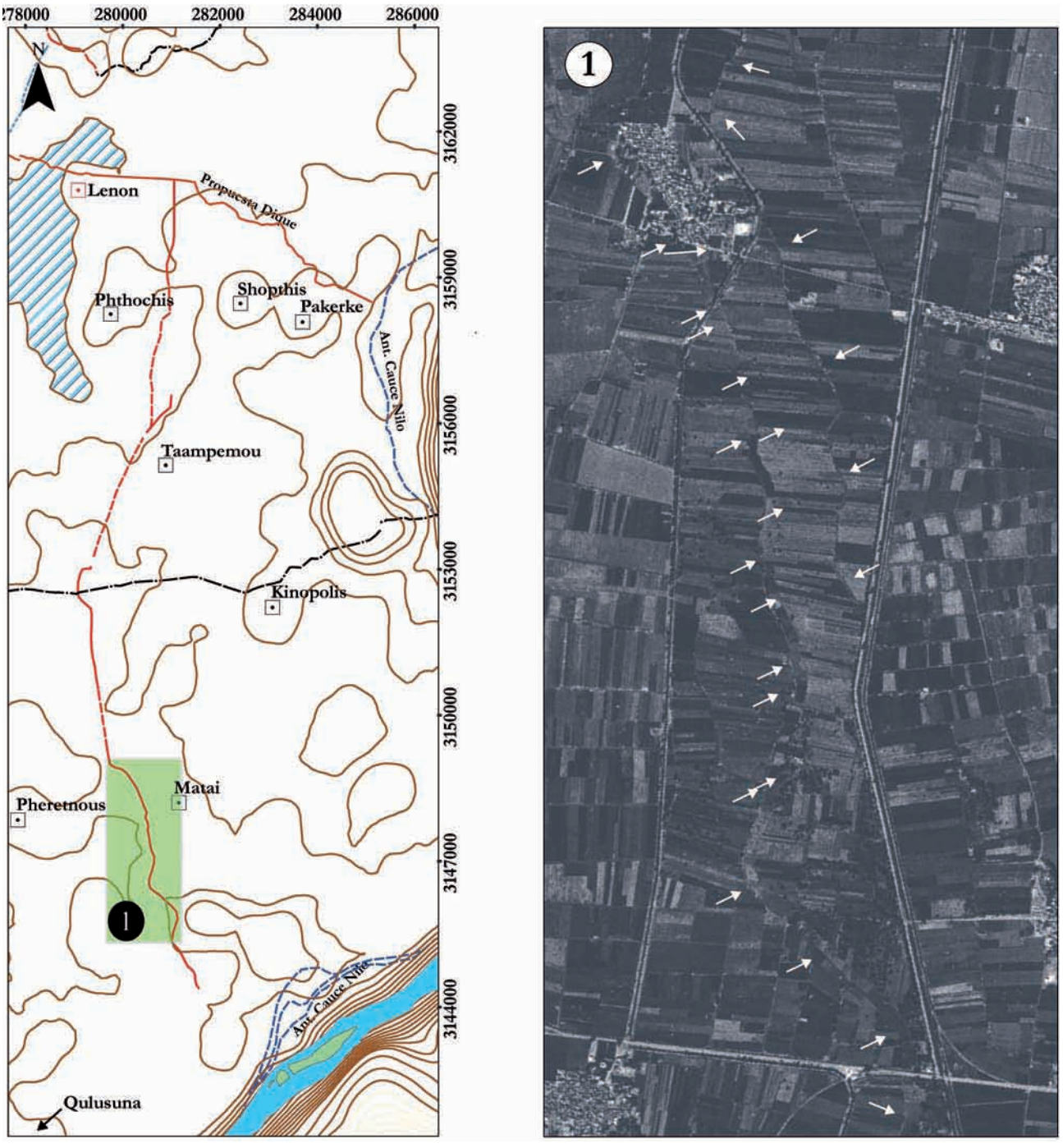

Figura 9b. Trazas y posible recorrido del canal de Matai o Themothis: emplazamiento del supuesto canal de Matai y de los yacimientos grecorromanos; detalle del trazado a partir de las trazas localizadas en la imagen Corona DS1111_2167DA044.

fósiles podrían responder bien a esta función y a este término.

2. El problema de los diques

Evocábamos en la introducción de este artículo la dificultad de identificar los diques y canales del período antiguo. Las grandes infraestructuras del siglo xviii apenas si son reconocibles en la actualidad y la mayoría de ellas debieron anular o sobreponerse a sistemas más antiguos. En cualquier caso, la documentación papirológica permite saber que la práctica era habitual y es razonable suponer que, a una escala adecuada, el sistema de irrigación por inundación contaba con diques de cierta entidad.

El nombre griego habitual seria *choma* o *perichoma*, pero el término *gephyra* podía resultar hasta cierto punto equivalente, pues en el momento de la inundación el dique podía ser el elemento de unión entre

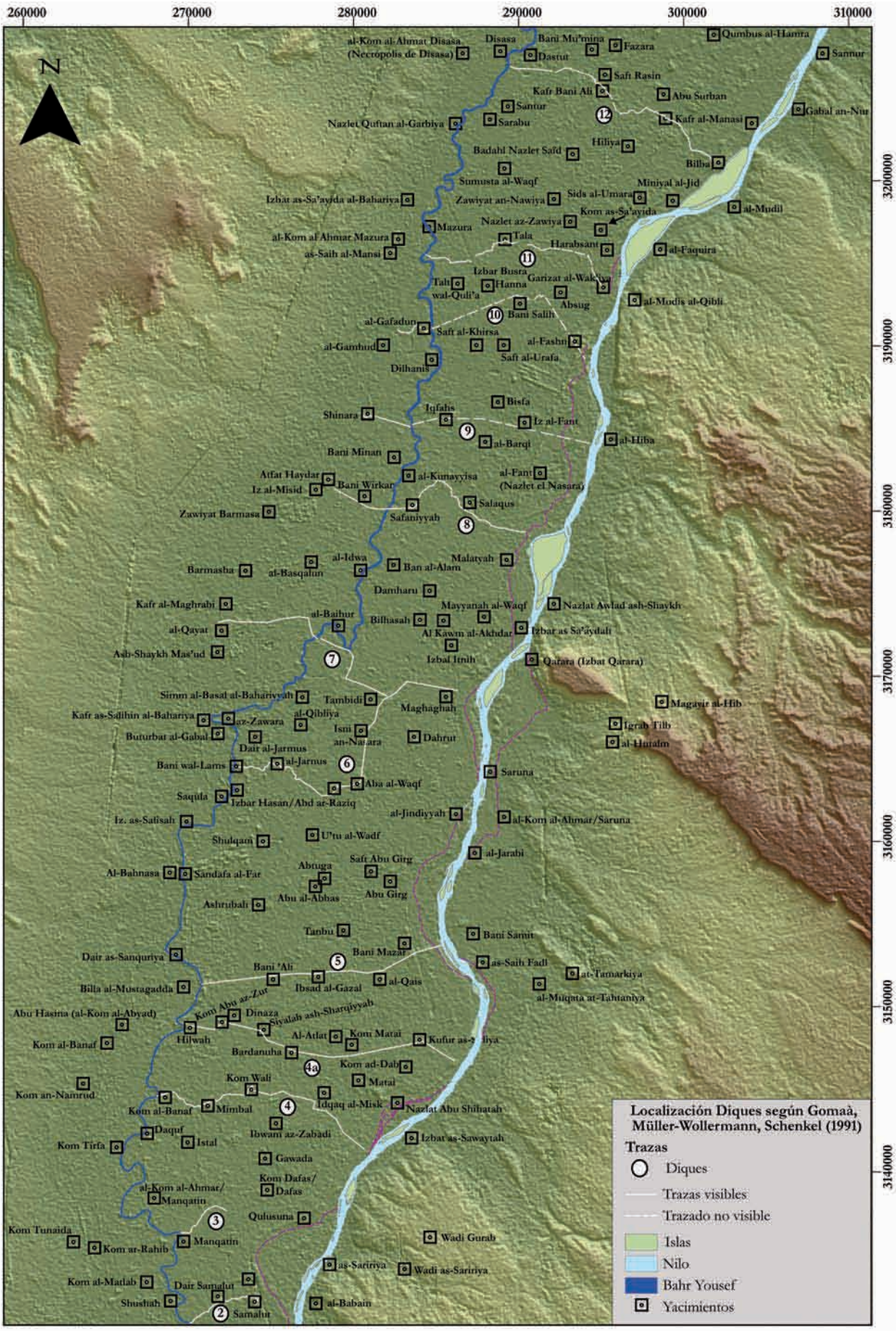

Figura 10. Localización de los diques según Gomaà, Müller-Wollermann, Schenkel (1991).

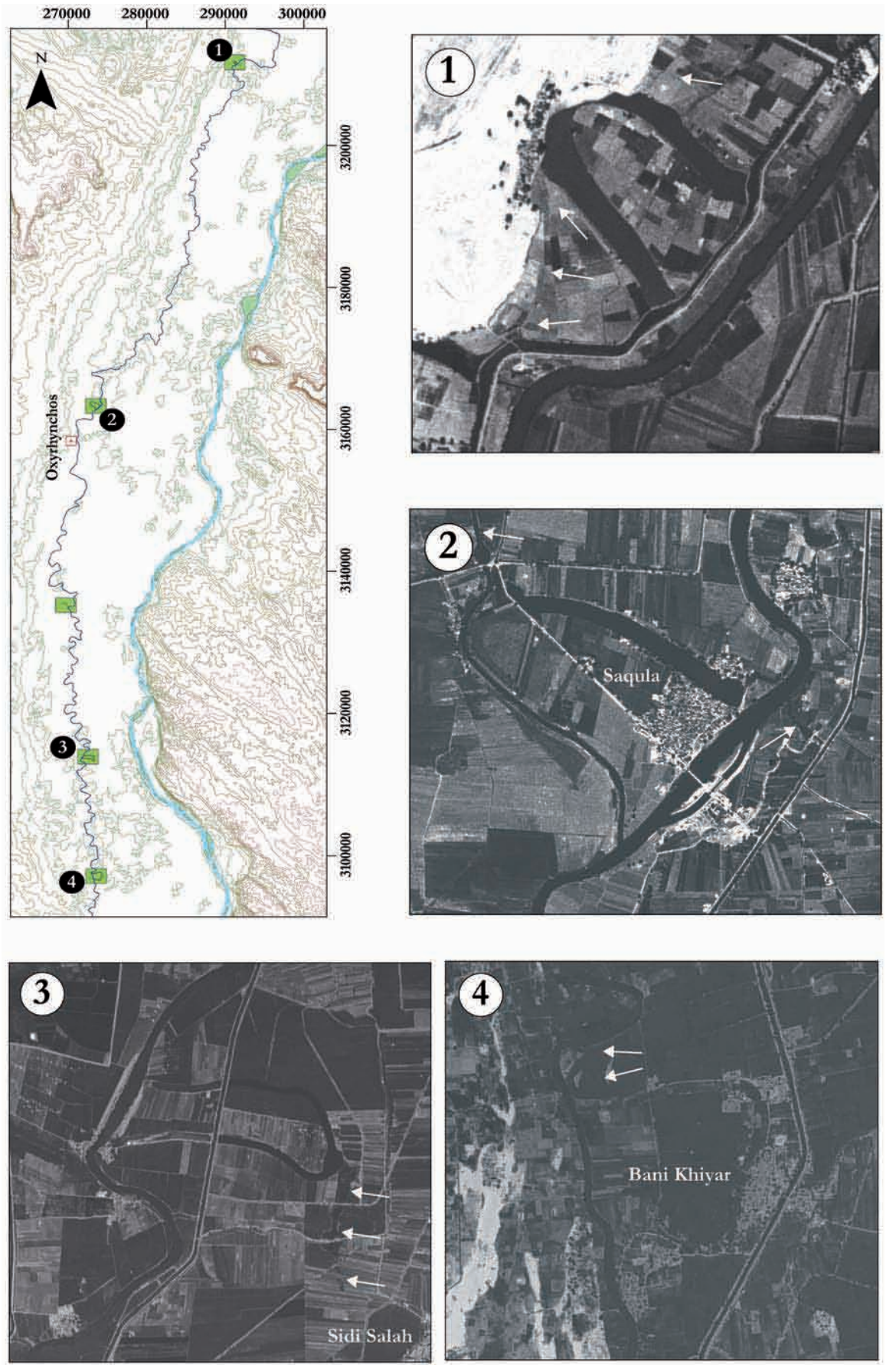

Figura ii. Localización de los meandros del Bahr Yussef acondicionados de forma artificial (*diazoma*): situación geográfica y detalle de cuatro meandros distintos a partir de las imágenes Corona DS1105_2235DA033, DS1105_1090DA034, DS1111_2167DA045 y DS1111_2167DA046.

diversas poblaciones.[71] Así sabemos que Tambidi contaba con un puente o dique. También hay que rastrear las apariciones de *pleurismos*, pues podían delimitar un embalse y son frecuentes en el oxirrinquita.[72] El gran *perichoma* del nomo oxirrinquita se encontraría cerca de *Peenô*,[73] en la toparquía mediana y en una zona concernida con declaraciones de tierra mal inundada. Los datos papirológicos merecerían un estudio en profundidad para relacionar topónimos e infraestructuras, lo que sobrepasa nuestro objetivo para este artículo, pero parece evidente que, como apuntaban Gomaà, Müller-Wollermann, Schenkel (1991), determinadas infraestructuras presentes en época moderna tuvieron su origen en época antigua. De esos diques nos interesa repasar, y tal vez completar, aquellos que pertenecen al nomo oxirrinquita[74] y lo haremos siguiendo la numeración de Gomaà, Müller-Wollermann, Schenkel (1991), que empieza por el sur respetando la lógica espacial dictada por la corriente del Nilo. (Fig. 10)

Dique 2, "de Shusha (*Chusis*)". La traza es todavía visible y nos parece que se puede seguir hasta Samalut. En cuanto a su cronología, hay que decir que no figura en los mapas de Linant de Bellefonds, ni en el de estado de situación ni en el de proyectos, mientras que sí figura un dique más al sur, en Tahawe. La traza observable por teledetección es, por lo tanto, más valiosa, si cabe, pues es sin duda anterior al período contemporáneo. Si el canal de Apollophanes surgía del Nilo al norte de Samalut, tal como pensamos, el dique no sólo no interrumpía su curso sino que podía retener el agua de la inundación dentro de los límites del nomo y servir de alguna forma de linde, por lo que nos parece verosímil que en época antigua se hubiera previsto una forma de contención-camino en este punto tan estrecho del valle, como sí señala la *Description de l'Égypte*. Por otra parte, a la altura de Shusha, pero a occidente del Bahr Yussef, aparece un dique transversal (Dique 2a), que cierra el margen del río hasta las estribaciones del desierto. Además, al norte de Shusha, en el meandro de Kom al-Matlab empieza una traza de canal fósil visible en las fotografías por satélite. Ambas trazas aparecen en el mapa de proyectos de Linant de Bellefonds, por lo que creemos que se deben atribuir al siglo XIX, aunque cabría la posibilidad que se tratara de una restauración.

Dique 3, "de Manqatin". La traza se percibe con cierta consistencia entre Manqatin y Qulusuna. En el mapa de estado de Linant de Bellefonds, que recoge su existencia, aparece un puente para salvar un canal nacido del Nilo. Siendo el empuje del agua hacia el norte, en el meandro del Nilo el agua penetraría fácilmente en el valle y de ahí que se aprovechara la posición para facilitar la entrada de agua. El dique figura también en la *Description de l'Égypte* junto con un trazo norte-sur que separa la cuenca occidental de la oriental entre el dique 2 y el dique 3 y que debe corresponder a un canal tal vez asociado a un dique. Hemos propuesto la existencia de un canal antiguo en este punto.

Dique 4, "de Minbal". Este dique uniría Minbal con Matai. El mapa de estado de Linant de Bellefonds indica que este dique continuaría después de Matai hacia el sur para obtener un dique de contención del propio Nilo. El Nilo, en este punto, vuelve a hacer un meandro y da lugar a nuevas entradas de agua que coinciden por posición con el origen del canal oriental o de *Themotis*, que hemos propuesto previamente. El dique 4, con estas características, cerraría el paso de otro canal nacido más al sur (el canal de Apollophanes, según nuestra propuesta), salvo que se hubiera previsto algún tipo de puente.

Dique 4 *a*), "de Bardanuha". El mapa de estado de Linant de Bellefonds indica un trazado entre Bardanuha y Kom Wallé que no se sabe a qué respondería. Según Gomaà, Müller-Wollermann, Schenkel (1991), se trataría de una traza antigua que no se considera necesario reformar. En nuestra visión del territorio podemos considerar que era parte de un dique que enlazaría hacia occidente con el dique 4 y que seguiría hasta el Nilo, pues hemos hallado trazas que desde Bardanuha siguen hasta Kufur as-Suliya rodeando por el sur el viejo Matai (Kom Matai).

Dique 5, "de Billa al-Mustagadda". La descripción de Gomaà, Müller-Wollermann, Schenkel (1991) comporta un tramo de Beni Mazar hasta al-Qais y después en línea recta hasta el Bahr Yussef. En realidad, el plano de estado de Linant de Bellefonds marca un trazo de dique entre al-Qais y Beni Ali y enlaza nuevamente con un dique longitudinal de contención del Nilo, mientras que el mapa de proyecto enlaza sólo Mussara con Quisse. Las trazas que se observan en las fotografías por satélite dan lugar a una línea muy recta, poco verosímil para la situación antigua. Como en el caso anterior, podemos imaginar que, de existir en época antigua, se localizaría fundamentalmente en la mitad occidental del valle "entre ríos".

Dique 5 *b*), "de Saqula". No aparece en la descripción de Gomaà, Müller-Wollermann, Schenkel (1991), pero se identifica por teledetección. Da lugar a un camino de circulación sinuoso que, por otra parte, presenta alguna laguna de rotura (*ekregma)* entre Saqula y Utu el Waqft. En nuestra propuesta, sirve

71. Bonneau 1993, 50.
72. Bonneau 1993, 45.
73. Bonneau 1993, 46 n. 361. P. Oxy 1188, 24. Para la localidad, cf. Pruneti 1981, 141.
74. La extensión del nomo no se conoce con exactitud pero se sitúa aproximadamente entre Shusha y El-Feschn. Cf. Krüger 1990, 36.
75. Ruffini 2004, 984.
76. Ver figura 1, que contempla también la verosimilitud de los diques 2 y 3.

para contener la acumulación de aguas procedentes del Bahr Yussef, que se depositan en una zona baja al sur de este dique. Además, sirve para contener también y dirigir las aguas del canal de Apollophanes a su vuelta hacia el Bahr Yussef. Finalmente, puede servir de camino entre el Nilo y el Bahr en la parte central del nomo, pues llegaría hasta Abu Girg.

Dique 6, "de Garnus". Según Gomaà, Müller-Wollermann, Schenkel (1991), conduce hasta Tambidi girando hacia el norte en Aba al-Waqf. Se uniría con el Nilo hacia as-Sarh Ziyad (Darut Bilhasa). Las trazas coinciden con los dos mapas de Linant de Bellefonds. El mapa de estado recoge una entrada de agua procedente del Nilo que daría lugar a un nuevo canal de inundación al norte de Sarh Ziyad. La circulación transversal en el nomo es particularmente intensa desde o hasta *Tampeti* (Tambidi), a juzgar por las combinatorias de nombres de localidades.[75] Ciertamente se encuentra en el centro geográfico del nomo, pero también al lado de un dique o puente que facilitaría comunicaciones terrestres.

Dique 7, "de Beni Khalid". Consiste en un tramo recto y corto desde Tambidi hacia occidente. Figura en ambos mapas de Linant de Bellefonds, pero el final no está claro. Las trazas que nosotros observamos apuntan a Beni Khalid.

Dique 8, "de Safaniya". Dique que se extiende desde Safaniya hasta Salaqusi, viniendo de Malatya. Tendría continuidad al otro lado del Bahr Yussef. De hecho, según Gomaà, Müller-Wollermann, Schenkel (1991), podría ser heredero del dique relacionado con la antigua *Spr-merw*. Al norte de este dique, del lado oriental, tendrían inicio nuevas entradas de agua desde el Nilo.

Dique 9, "de Iqfah". El inicio del dique es incierto. Se prolonga a la izquierda del Bahr, a la altura de Synara.

Dique 10, "de Gafadun". Arranca desde al-Fasn con correspondencia en las dos orillas del Bahr Yussef.

Dique 11, "de Sumista". Al norte de este dique el Bahr Yussef presenta una fuerte divergencia en otro canal que da lugar a una "isla" al sur de Ehnasia. Podría ser un límite adecuado para el nomo.

Otros diques más al norte pertenecerían al nomo herakleopolita y no los tendremos aquí en consideración. De lo expuesto hay que resaltar que, en una publicación sucesiva, Gomaà, Müller-Wollermann y Schenkel (1991) tan sólo recogen dos diques como seguros en época antigua, en la parte septentrional del nomo: el de Safaniya y el de Beni Khalid.[76] Dos diques que se prolongan a occidente del Bahr Yussef pautando el valle, que queda recogido entre el Bahr y los márgenes del desierto. Dicha pauta se puede reseguir en otros diques no mencionados, pero insinuados igualmente en el mapa de estado Linant de Bellefonds.

La ausencia en la cartografía más antigua de los grandes diques enumerados nos previene contra una transposición directa hacia la antigüedad de una planificación tan sistemática. Además, consideramos prioritario en el sistema antiguo el riego mediante canales cortos y cubetas, alguno de los cuales se puede reconstruir por la ilación de algunas trazas (el canal de Apollophanes y el canal oriental que nace cerca de Matai). Dichos canales son contradictorios con diques transversales, que cortaran radicalmente el espacio entre el Nilo y el Bahr Yussef con la intención de sumergir completamente las tierras.

Sin embargo, las fuentes han dejado constancia de canales y diques, dos de los cuales asociados a topónimos localizados: *Taampeti* (Tambidi) y *Pakerke* (Abu Girg). El primero parece haber tenido continuidad hasta las formas del paisaje del siglo XIX, recogidas por la cartografía de Linant de Bellefonds. En cambio, del segundo no queda ninguna traza en la cartografía mientras que la teledetección nos muestra evidentes trazas de un dique. (Fig. 12) Ambos situados y enmarcando, aparentemente, la zona media del nomo, después divida entre oriental y occidental.

3. Paisaje y división administrativa

Hemos visto al hablar de los canales "entre ríos" que la división por toparquías podría tener su lógica en dichas infraestructuras, pues marcaba el acceso de los pueblos al agua de la inundación. Puede que la distribución por *pagi* fuera también significativa, pero no se conoce la adscripción de todos los pueblos. Se piensa que la distribución por *pagi* adquirió un carácter estrictamente cardinal, de sur a norte.[77] Sin embargo, pensamos que, como en el caso de las toparquías, la zona intermedia pudo seguir un criterio diferente. Sabemos que *Kerkemunis* y *Mermertha* estaban en el primer *pagus*, *Sadalou* y *Synkepha* en el segundo, *Mouchinachap*, *Senekelu* y *Ptochis* (de la toparquía oriental) estarían en el quinto *pagus*.[78] El caso de *Lenon* es más complejo, pues podría estar en el primero o en el cuarto *pagus,* según la documentación papirológica, lo mismo que *Seryphis* podría estar en el tercero o en el sexto.[79] La aparición de *Seryphis* en el sexto *pagus* junto con *Pakerke* (Abu Girg) no se puede entender según una lógica de distribución de sur a norte, al igual que la aparición de *Lenon* en el cuarto pago junto con *Ophis* (Aba al-Waqf). Por otra parte *Lenon*, en la reparación del canal Apollophanes, aparece justo al norte de *Seryphis*, de manera que no pueden estar muy alejados. Tal vez podríamos imaginar, para supe-

77. Pruneti 1989 y 2001.

78. Ptochis correspondería a Abtuga, según Gomaà, Müller-Wollermann y Schenkel 1991, 102.

79. Pruneti 2001, notas 11, 26, y 36.

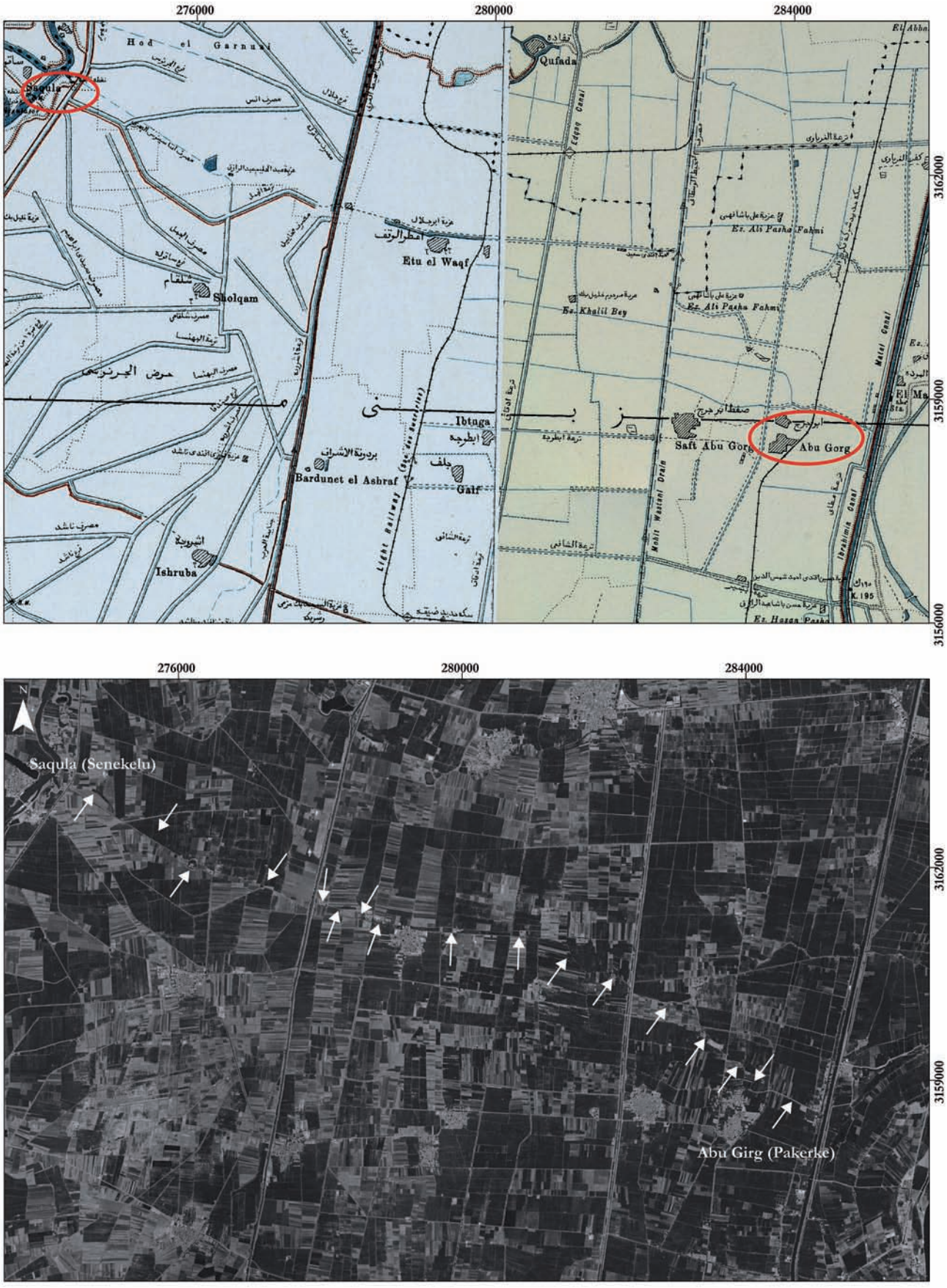

Figura 12. Ejemplo de identificación de los diques: la zona de Abu Girg (*Pakerke*) a partir de la cartografía de 1908 y de la imagen de satélite Corona DS1111_2167DA043.

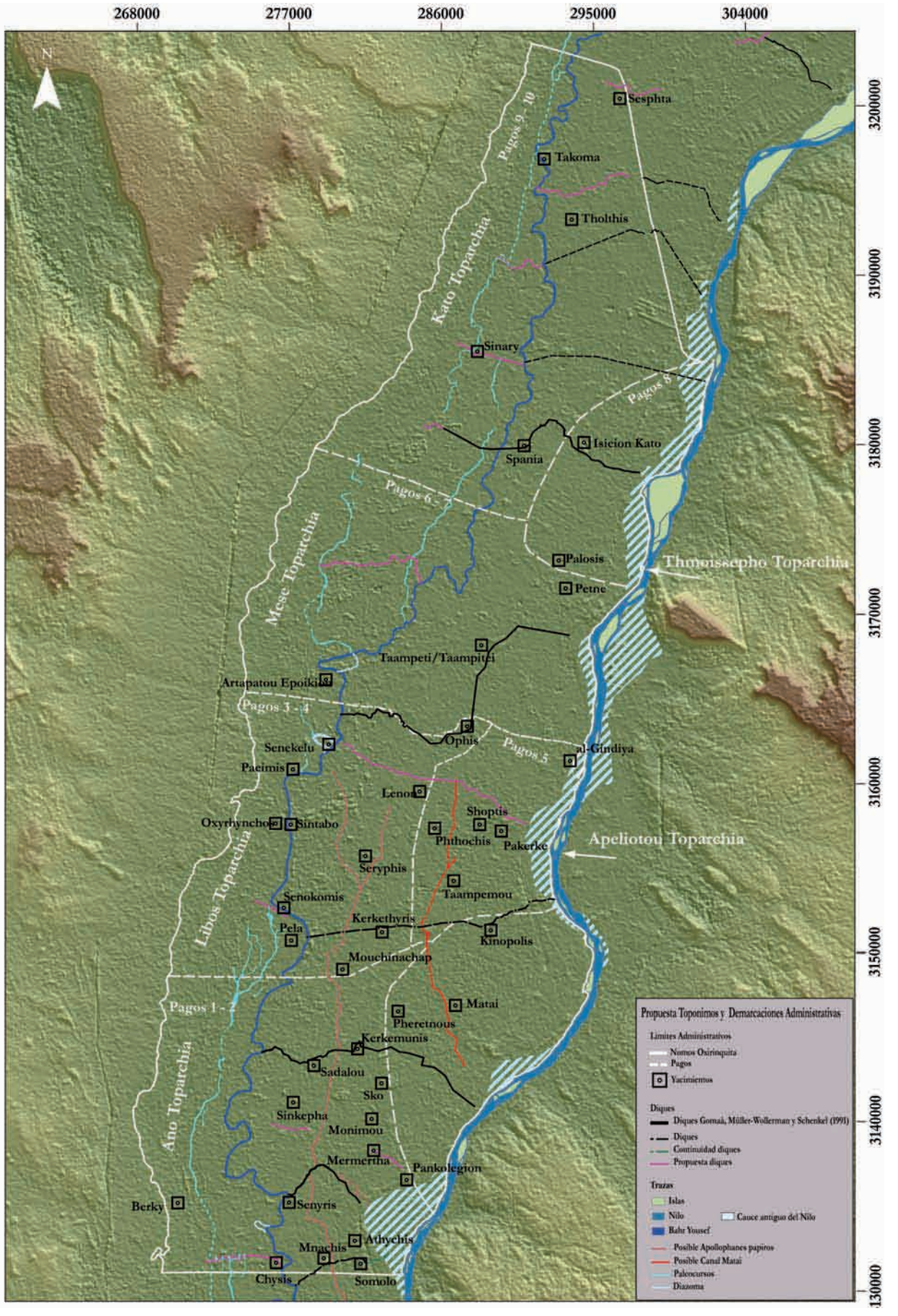

Figura 13. Esquema donde se sintetizan las trazas de diques y de canales antiguos, junto con la propuesta de topónimos y demarcaciones administrativas.

rar la incongruencia administrativa, que existiera un nexo geográfico determinante, como por ejemplo que los dos núcleos se hallaran en la misma ribera de un curso de agua. En definitiva, los *pagi* podrían no responder a una lógica cardinal, sino de cubetas o zonas de inundación. Serían el resultado de la fragmentación del paisaje mediante diques y canales (Fig. 13).

Creemos que los canales antiguos estructuraban el valle de las toparquías alta, oriental y occidental, como también estructuraban el paisaje en la franja occidental de todo el nomo. Y para hacerlo, tal vez se acompañaran de diques que serían tanto de contención como de circulación, por una zona que en el período de la crecida quedaría completamente anegada. La combinación de canales y algún elemento de contención sería suficiente para estructurar el paisaje y la distribución territorial-administrativa dentro del nomo. Las ideas que acabamos de esbozar constituyen el primer paso para una serie de investigaciones que cruzarán aspectos geomorfológicos, textuales y, en el mejor de los casos, también arqueológicos.

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12. THE DEVELOPMENT OF THE CAPITAL ZONE WITHIN THE NILE FLOODPLAIN

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1. Introduction

The location of ancient Egyptian cities is a matter of some debate; many are known from the literature but only some of these are located in the archaeological record. In our work we have used geological techniques to shed light on the locations of ancient cities in the Capital Zone of Egypt. The ancient capitals of Egypt fall within an area that extends from Abu Rawash in the north down to Lisht and the area of the entrance to the Faiyum. Work by Hillier *et al*. (2007), Bunbury *et al*. (2008) and the Survey of Memphis (Jeffreys and others in *JEA* reports 1985 to present) have shown that at least part of this mobility of city sites can be linked to the mobility of the Nile which, in its role as transport artery and water supply, was an important, if often uncontrollable, aspect of the landscape.

2. Climate and landscape change in Egypt

Landscape change in Egypt is a continuous process that is mainly a product of a meandering river, the Nile from which the fertile land of the Nile was deposited during the annual floods. Overlying this continuum of change are the changes that resulted from global warming at the end of the last ice age around 12,500 years ago and subsequent cooling from around 8000 years ago. As the planet warmed, the ice caps melted producing up to 120 m of sea-level change (Fairbanks, 1989) and weather patterns in North Africa shifted (Kropelin *et al*. 2008 and Kuper and Kropelin 2006).

2.1. Long-term climate change

In addition to the continuous processes of migration and aggradation, global temperature change caused a rise in sea level due to melting of the ice caps around 12,500 years ago. Global sea-level rise was recorded by Fairbanks (1989) from corals on Barbados and sea level rise in the Mediterranean was likely to be linked to this global rise that started around 12,500 years ago and slowed around 6,000 years ago. Sea level rise would drive the coastline inland in a way recorded by Stanley and Warne (1993), creating coastal marshes and brackish swamps in the delta. Additionally, the point at which the delta formed distributaries, currently just north of Cairo, may be expected to have been pushed inland some distance. After sea-level rise slowed, the delta moved seawards and the delta-head (the point where distributaries first form) could also have migrated seawards. Unfortunately, this type of recovery of the delta produces a lot of sedimentation, meaning that early city sites would have been covered by sediment (perhaps 5 m or more) (Pennington Cambridge University Unpublished Dissertation 2011). These factors mean that we are much more aware of ancient sites in Upper Egypt (south of Cairo) than in Lower Egypt (north of Cairo).

After the end of the ice age, global warming brought warm weather, light winds and summer rains to north Africa and ushered in the Saharan Neolithic. However, from around 7000 years ago until the industrial revolution there was then a broad cooling of the climate and a gradual change from tropical savanna in northern Africa to drying trade winds and no rainfall, which led to desertification in the Saharan region. Kupar and Kropelin (2006) showed from carbon-dating of sites in the Sahara that the peoples of the region were forced into *refugia*; the oases, areas around wells, higher plateaux (Gilf Kebir) (Kuper and Kropelin 2006) and Gebel Uweinat (Bagnold 1935), as well as the Nile valley itself. As the grasslands returned to desert, sand was released from the Saharan area and blew into the Nile Valley (Hassan 1996), affecting the north before the south (Bunbury 2010). In the area of the Capital Zone, sand flux was evident from the end of the reign of Sneferu (Alexanian *et al.* 2010) and at Giza (Bunbury *et al.* 2009). The influx of sand modified the geography of the sides of the Nile Canyon and pushed settlements away from the marginal terraces of the Nile Valley into the floodplain, in particular the river levees (Jeffreys and Tavares 1994 and Earl Cambridge University Unpublished dissertation 2011). Formerly deep wadis were infilled and the topography became more subdued. Marginal lakes, affected by drying as well as sand infill, probably changed from permanent lakes to ephemeral lakes/marshes (Earl Cambridge University Unpublished dissertation 2011).

2.2. The *continuum* of Nile migration and settlement location

Meandering rivers like the Nile develop sinuosity in which the bends migrate outwards and downstream. In the Nile Valley islands are commonly formed near to the bends and subsequently become attached to the bank on the inside of the bend during the process of river migration. Although in many cases oxbow lakes

are common features of meandering rivers, on the Nile they are very rarely formed since sinuosity is limited by the cliffs that rise on either side of the Nile floodplain (Dufton and Branton 2009). These cliffs that bound the desert are the product of an earlier stage of the Nile development that incised a deep canyon, now filled with sediment. During the era of the Nile Flood (pre-1960s), migration of the Nile increased in rate during high seasons until the river burst its banks during the flood, but was negligible when the river was low. Mean rates calculated over hundreds of years for this type of lateral migration are around 2 m/y.

The annual flood of the Nile also laid down sediment in thin layers across the floodplain and mean rates of aggradation by this method have been estimated at around 1 mm/y (see for example Borchardt 1907 and Jeffreys and Tavares 1994), a value considerably smaller than the lateral migration of the channel. During the flood, settlements were restricted to mounds that rose above the floor of the Nile Valley. These may have been river levees that rise around 2 m above the floodplain, terraces relict from an earlier phase of the Nile or the tops of recently formed islands. Strabo (17, 1:4) describes these settlements as looking like islands in the floodplain (c 40 BCE) when the water was high. Continuous occupation meant aggradation of anthropogenic material forming a kom that could exceed the aggradation of the floodplain and thus maintain the settlement above the water during the flood season.

2.2.1. Assessment of the effects of Nile migration – techniques

Methods for assessing the effects of Nile migration on a given city-site have been developed by Jeffreys 1985, Bunbury *et al.* (2008), Lutley and Bunbury (2008), and Hillier *et al.* (2007). Broadly, their approaches require the integration of map and satellite data with the results of field-walking, geophysical investigation, selective augering and archaeological material. Historic maps of Egypt that show river migration and reference to monuments and other landmarks demonstrate that since the time of Napoleon's *Description de l'Égypte* (1798 published between 1809 and 1822) there has been considerable migration of the Nile channel. These historic maps allow us a glimpse of the past 300 years of Nile migration and a steer as to how the ancient geometry of the landscape should be interpreted in past millennia. Fortunately, freely-available satellite imagery is also an extremely powerful tool in interpreting the landscape from a time before scale maps were constructed.

Satellite imagery was used by Lutley and Bunbury (2008) at Giza to show that ancient levees, tracks and settlements have very conservative geography, partly arising from the excellent surveying skills of the Egyptians who were forced to lay out their boundaries after every flood. Thus koms (settlement mounds) can be identified on satellite images from their discontinuous and narrow road networks, while more recent settlements, unrestricted by the flood, have a more recti-

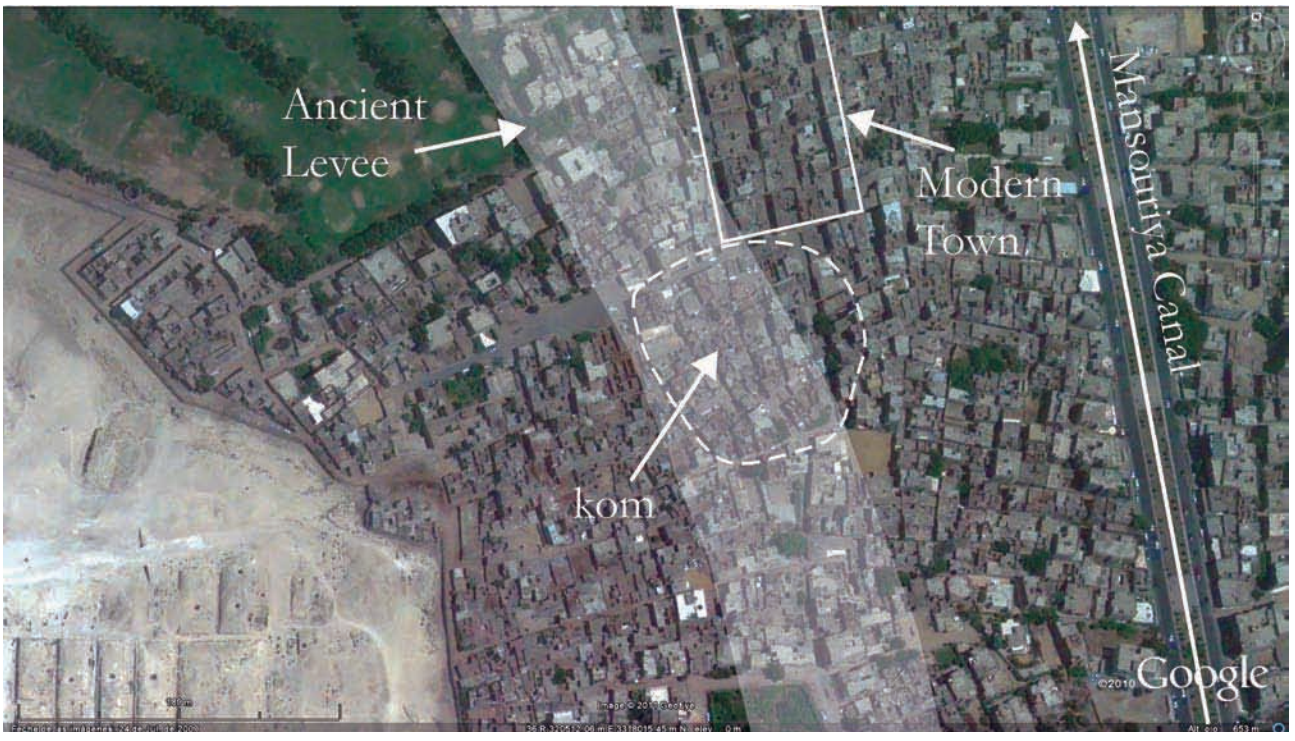

Figure 1. Image showing a village near Giza with an organic pattern of the early settlement (shown with a dashed line) juxtaposed with a more regular street plan (shown with a solid line). The inferred position of the ancient levee is also shown with the path of the modern canal.

linear layout (Fig. 1). Hod (field-group) boundaries, re-planned after every flood by the village dalal (local surveyor) are also conservative and often preserve earlier toponyms, for example *Gezireh* that refers to a former island. The locations of canals are also generally along high-points in the landscape and hence located along former river levees. The work of Hiller *et al*. (2007) demonstrated how former levees could be identified from topographic swells on satellite images.

A preliminary interpretation of landscape change, made from maps and satellites, produces a geometry for landscape change but can only provide an estimate of the time frame in which changes have taken place. By use of geophysical methods such as Electric Resistance Tomography, where electrodes are used to measure the resistance of points in a section below the ground, a sense of the structure below the ground can be added to the model. To add date constraints to a model for Nile migration, monuments of known foundation date place limits on the time at which the land was in existence. In addition to this, dates obtained from texts, where these are available, can give an indication of the date at which a settlement was on a riverbank. In the past there was some circumspection in interpreting texts in this way, but recent work by Bunbury and Jeffreys (2011) suggests that they can be interpreted more literally than previously thought. Thus at Memphis, for example, the Stela of Piye (Piankhi) suggests that there is a harbour at Memphis and a waterfront, statements that are supported by observations of the Survey of Memphis (Jeffreys 2010).

To place limits on the time at which an area was last water and the type of water-body, augering is extremely effective. This technique uses an auger, either hand-operated (for use in small spaces and archaeologically sensitive areas) or a mechanised auger (suitable for use in open ground where it provides a large core rapidly). Typical rates of hand augering are around 10 m per day with a maximum depth in Egyptian sediments of around 10 m, subject to the sediment content. Mechanised augering can make more rapid progress and has a maximum depth of around 40 m. In both cases augering of coarse sands below the water table presents practical difficulties, which may be overcome by the use of borehole casing (tubes). Sieving and careful study of the sediment and the fragments trapped within it (see Bunbury *et al.* 2008) can reveal the types of activities conducted in the area, the type of water-body that it was deposited in, whether still water, marsh or river and, in many cases, the date of the activity in the area. Since past settlements were frequently on islands or river levees, augering of the ancient sediments adjacent to these sites can reveal much about the neighbouring settlement.

The sediments collected from augering generally fall into 'packages' that were deposited within a short time-frame (usually a few weeks or less). Between these packages there may be long gaps, depending on the environment in which it was deposited. For example, floodplain deposits may contain thin clay-rich layers deposited during an annual flood and measuring only a few millimetres. Between one flood deposit and the next there may be a gap of one or many years, depending on how often that part of the floodplain received the flood waters. The thickness and the grain-size of the package is indicative of the environment in which it was deposited, so that fast-flowing river water will deposit thick (up to two-metre) layers of sand, while shallow, slow-moving water will deposit only thin layers of fine-grained (clay-rich) sediments. At the base of these packages there is often a gravelly deposit (lag) and, near to settlements both ancient and modern, the lag contains local and generally contemporary detritus. A date constraint can thus be placed on the sedimentary package from the contents of the lag. A modern lag will be rich in plastic bags, modern ceramics and building materials with no doubt a few re-deposited ancient sherds in the mix. Ancient lags have yielded bones, teeth, pottery, seal impression, beads and stone chippings in abundance, as well as environmental indicators such as desert-rounded sand grains and rhizocretions (mineral crusts that form around plant roots under drying conditions).

In summary, we can use maps and satellite images to compile a geometry for past Nile movements to which time constraints can be added from textual and archaeological investigation coupled with augering. These sources of information combine to provide a historical geography of the area.

3. Case studies of Nile migration

Two areas in Egypt (both capital cities in their time) have been intensively studied in the context of their ancient landscapes: Karnak and Memphis. Through these two studies, we have an understanding of how landscape changes occur and hence can take a view of how other sites have developed without the need for such an intensive scientific campaign.

3.1. The example of Karnak

Jean Jacquet (1983) first noted during his excavations at North Karnak in the Treasury of Tuthmosis III that the ground fell away to the north and he proposed that the area was a former river-bank. The presence of the now land-locked 'tribune' of Psamtek I (see figure 2), sometimes also described as a quay, gave some support to this argument. The difficulty however was that the structure is now some 800 m from the Nile. Other authors had commented on the way in which there are two axes to the Temples of Karnak, an early east-west one and a later north-south one. Other tribunes were also connected with the temple on the west and south sides, all of them land-locked. Bunbury *et al.* (2008) conducted a survey of sediments

and around thirty-five boreholes in conjunction with excavators around the temple. They concluded that the earliest foundations of the temple during the late 11th, early 12th Dynasty were on an island in the then Nile channel. Temple foundations at Opet and at Mut were on an echelon part of an island or river-bar structure at this time. Al-Zaniya Island (2 km north of Karnak and now no longer an island) demonstrates that islands of this type become bonded to a riverbank within a century or so and the results from Karnak suggest that this was the case here also. From the New Kingdom, the Karnak-island was largely joined to the riverbank and the temple complex became westward facing.

Akenaten's temple to the east of the Karnak temple (subsequently demolished for theological reasons) was laid out on the new ground produced as the channel filled in. Meanwhile to the west, until Ptolemaic times, the temples continued to expand following the arc of the river bank to which ramps to the north of the main tribune gave access and along which a river wall, excavated by Mansour Boraik and for which the sediments are described by Ghilardi (2009), was constructed. With time, river sands were deposited along this pre-Ptolemaic water-front and the temple was left further from the shore. Once again new land was created and Ptolemaic baths that were constructed crossing the old river wall have recently been excavated.

3.2. The example of Memphis

The Survey of Memphis has explored the landscape around the site of Memphis since 1985 and augered more than 100 boreholes in the floodplain surrounding the site. The results show that the site was active over a very long period of time. Recent work by Ying Qin (Cambridge University unpublished dissertation 2010) shows that there was a very early island there (at a level of ~9 m asl) possibly dating to pre-dynastic times. The bone, cereal and red sherd-rich terrestrial sediments that she augered remain to be studied in detail, but they were also described at similar levels from other parts of the site by Joseph Hekekyan (see Jeffreys 2010 for details). Borehole surveys between Saqqara and Mit Rahina suggest the presence of an earlier channel in this location that migrated eastwards from Early Dynastic times towards the Mit Rahina area. Three main islands of Memphis appear in the topography and the description of the siege of Memphis by Inaros and the Athenians described by Thucydides suggests that these remained emergent as parts of the city during floods of the period. (Fig. 3) Analysis of the floodplain shows that the western branch of the Nile migrated eastwards until the city of Memphis had branches of the Nile on either side. The course of the western branch further south is subject to speculation, but it is possible that it was an extension of the Bahr Yusuf that has now declined leaving only an area of low ground and the canal, the Bahr Libeini that is associated with it.

Hekeyan excavated a Roman wall on the eastern side of the eastern mound of Memphis that he interpreted as a waterfront wall and this is also be expected to be the location of a Nilometer known to have existed at the site. Since Roman times, the eastern branch of the Nile has migrated eastwards as far as the edge of the desert via Bedrashein. Of the two original inferred branches of the Nile, only this eastern branch remains.

4. The context of texts

A number of texts refer to the site of Memphis and its topography. Among these are the Tale of Sinuhe, The Prophecy of Amenemhat and the Stela of Piye. The texts, originally written in Ancient Egyptian Scripts, were studied by Bunbury and Jeffreys (2011), who concluded that in the Middle Kingdom, when the tale of Sinuhe was thought to have been written, there were two branches of the Nile that went to either side of the main site, giving it strategic importance. Recent work by Ben Pennington (Cambridge University unpublished dissertation 2011) shows that, as the delta matures, there are fewer cross (east-west) channels between the branches of the distributary network, meaning that the 'head' or apex of the delta, where the distributary system begins, becomes a strategic point. It seems that Memphis was the most northerly point that all branches of the Nile could be controlled. In his work on the sources for the Survey of Memphis (2010), Jeffreys collected and examined a number of texts concerning Memphis dating from the time of Herodotus (c. 440 BCE) and later. There is evidence in the works of Herodotus that there was manipulation of the river around Memphis in order to protect the town from flooding even when the Nile was high. Later Thucydides (c.430 BCE quoted in Jeffreys 2010) states that the Megabyzus in the Siege of Memphis cut off the waters in order to maroon the fleet of Memphis and thus carried the day.

We know that the work of maintaining the hydraulic system was an annual duty from the texts recovered from Oxyrhynchos (Parsons 2007) that describe the *corvée* system of labour that required every resident of the countryside to move five *naubia* (5×3×3×3 cubits) of earth annually in the process of dredging canals and creating or restoring embankments. More recently Twain's (1883, 624) accounts of another large river, the Mississippi, suggest that, if a ditch were dug in anticipation of the annual rise of the river, the river could be diverted into a new course and texts alluding to the control of the waterways around Memphis may be referring to this type of activity. Perhaps the smaller, less tempestuous western branch of the Nile was a more satisfactory subject for this type of manipulation. However, it remains to be debated when

Figure 2. Google Earth image of the Karnak Temple Complex showing the places mentioned in the text. 1. Quay of Psamtik I, 2. Treasury of Tuthmosis III, 3. Tribune at west entrance to temple, 4. Possible tribune to south of temple, 5. Temple of Opet, 6. Temple of Mut, 7. Ramps at entrance to temple. 8. Ptolemaic Baths, 9. Temple of Akenaten.

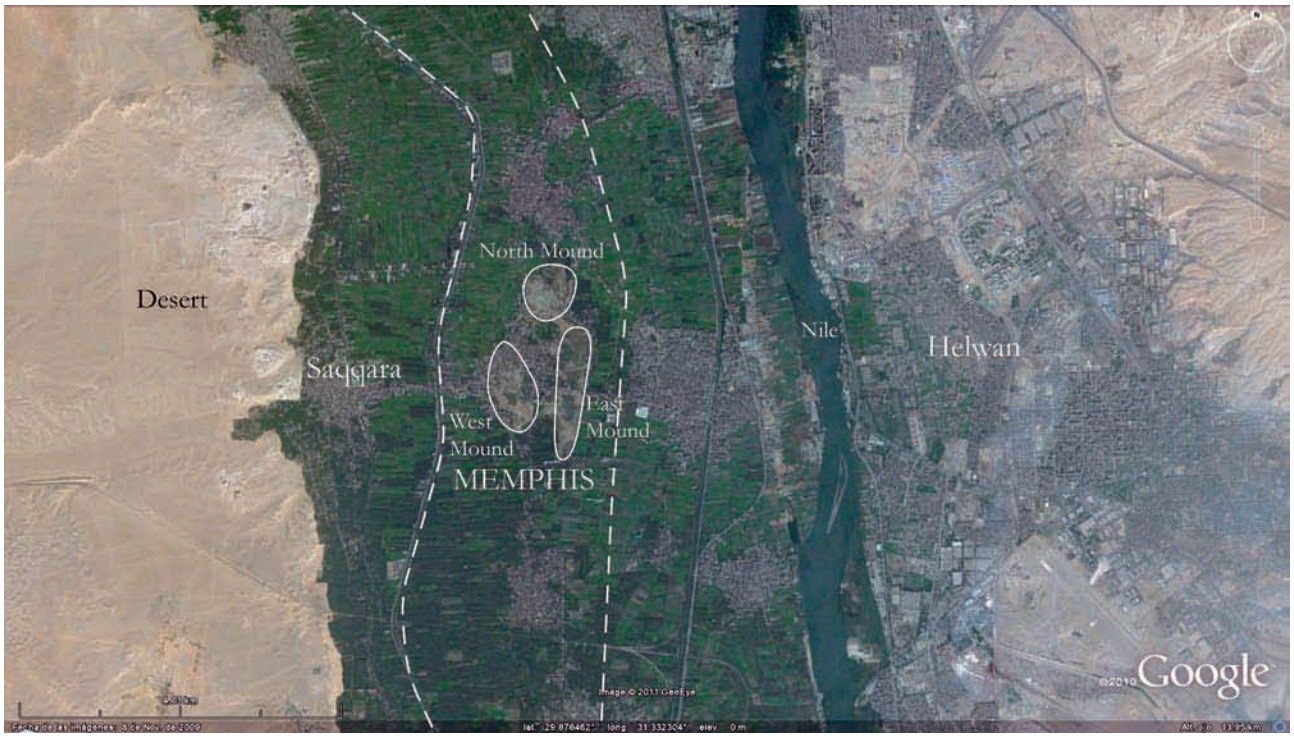

Figure 3. Google Earth image of the Nile floodplain around Memphis. Solid lines indicate areas of high ground within the Memphis settlement and dotted lines the inferred courses of rivers extant during the development of the site.

the Egyptians moved from responding to the imposed movements of the Nile to manipulating the river to conform to their requirements.

5. Nature versus nurture

5.1. Oxyrhynchos – active river management

Work by Ignacio Fiz (this volume) suggests that there was a diversion of the Bahr Yusuf such that it came close to the desert edge. The hydrology of Oxyrhynchos would therefore appear to be a managed one with a diversion from the Bahr Yusuf that flowed along the desert edge at the location that is now Behnasa and formed the eastern boundary of the town. The curvature of the channel at this location suggests that it may have migrated a small distance (<100 m) east since the city was constructed. Supplementary channels supplied a tank at the upstream end of the town, a possible location for the fish for which the town was known, and there may also have been a downstream embankment that provided further marshy land from which fish and fowl could be harvested. Under the relatively drying conditions that began at c. 700 BCE in this area, with little rainfall to augment the flood waters and around 2 m/yr of evaporation, it is unlikely that water-bodies of this type could remain wet throughout the whole year, although they could be expected to persist for at least part of the annual cycle (Earl University of Cambridge Unpublished Dissertation 2011).

5.2. Hermopolis – Antinoopolis – response followed by management

In the case of Hermopolis and Antinoopolis, closely related cities, it may be observed from the work of Myrto Malouta (also this volume) that both cities seemed to have an affiliation with the river. Hermopolis was said to have been founded on an island in the Nile during the Middle Kingdom (c 2000 BCE to c 1800 BCE), while Antinoopolis was said to have been founded around 130 CE on the river at the point where Antinous was drowned. Considering usual rates for migration and assuming that both these statements are correct we can address the issue of whether the two cities were founded on separate branches of the river or whether a single channel migrated between them. Taking a general mean for movement of the river, we find that Hermopolis (~6 km west of Antinoopolis) is probably at a former location of the main Nile channel. After the foundation of Hermopolis, (ancient Khmun) we infer that the river migrated away from the town until it reached the desert edge and Antinoopolis was founded. Interestingly the river has not migrated away from this point since that time and thus we must conclude that human intervention has prevented it from doing so. There is an increase in the sinuosity of the river around Antinoopolis that seems to be a result of controlling the location of the river in this way.

6. Conclusions

The Nile is mobile. It takes the form of a meandering river of low sinuosity that is constrained to flow within a canyon, itself a former incarnation of the Nile as we know it. Typical mean rates of horizontal Nile migration are around 2 m/yr, with the minor channel (the Bahr Yusuf) expected to have lower migration rates. In some cases human intervention is seen to have prevented further migration and the restriction is visible in an increase of sinuosity around the point of control. In the cases examined here, evidence for this type of control is associated with large Roman settlements. The direction of migration can be deduced from the field boundary patterns of the Nile Valley, which are very conservative in their locations. The relatively high horizontal migration rate contrasts with the more modest rate of vertical aggradation of the floodplain, which is around 1 mm/yr.

Over a longer timescale, Egypt has been subject to the effects of climate change; the desertification of the Saharan region and the initiation of sand flow into the Nile Valley that damped the topography, particularly on its western side from whence blow the prevailing north-westerly trade winds.

Both these factors have a bearing on where settlements were located. In pre-dynastic times, settlements were focused on the wadi mouths and earlier Nile terraces that flanked the valley and were likely to have been the near to marginal lakes rich in fish and fowl. Later, settlements moved away from the wadi mouths, which became unstable and blanketed by sand by the end of the Old Kingdom, and onto the river levees and islands of the Nile Channel. This emphasis on island sites and river levees persisted until the construction of the Aswan High Dam, when unrestricted settlement of the Egyptian floodplain began to occur.

Acknowledgements

I would like to thank Eva Subías and Ignacio Fiz who convened and hosted the meeting that made this paper possible. I would also like to thank my colleagues who have shared much field data and many discussions of the material. In particular, Angus Graham, David Jeffreys and Mark Lehner at Karnak, Memphis and Giza respectively. Thanks are also due to the British Academy for small grant SG-35671 and the Supreme Council of Antiquities in Egypt under whose auspices the work was conducted.

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1. Ptah, a Civilising Hero?

Ptah was one of the main divinities of the diverse Egyptian pantheons. He was the god of craftspersons. There is, however, a work that links Ptah to what today we would call one of the fine arts. In fact, Ptah was a builder, although his best work is not visible at first glance. For example, he founded and built the city of Memphis and played the role of a pillar or telamon standing upright holding a Djed pillar, but above all he built himself. He was his own work, well-posed on the sign of Maat or justice. He holds up the world –that he himself engendered– which is built merely by his presence.

Keywords: Ptah, builder god, architecture, Memphis, Noun, Djed pillar, Maat.

2. Why did Ancient Egyptians Longed For Their Cities? City, Nostalgia and Identity-Fashioning in the New Kingdom

This paper considers the Egyptian city as a cultural object that tells us about the relationship between the Egyptians and their space and environment. There is first an exploration of the official texts, in which the city is both a part and the mirror image of the world as planned by the demiurgic god and implemented by Pharaoh. Then there is the consideration of the literary texts, especially the 'longing for the city' from the New Kingdom, which allows us to glimpse a more subjective reconstruction of the geography of the individuals and the role it plays in identity-fashioning.

Keywords: Egypt, city, environment, nostalgia, identity.

3. Water, Toponymy, and the Image of the City in Graeco-Roman Egypt

The space of the Egyptian city during the Graeco-Roman era is a multilayered and polysemic reality, due to multiple cultural identities and a complex relationship between physical data and symbolic constructions. This paper explores two interrelated fields where these articulations can be analyzed: urban toponymy and water management. The attention is focused on the case of Oxyrhynchus, where names of districts and toponyms such as *Krios Potamos* allow us to draw an image of the differing perceptions of urban space, with an emphasis on: a) dynamic definition of space through communal practices such as ritual, and b) the image of the city as a well-irrigated garden, belonging to both Greek and Egyptian tradition.

Keywords: Egypt, Oxyrhynchus, urban space, toponymy, water supply, garden.

4. Pharaonic Alexandria: Ezekiel's *Exagogé* and political allegory in Hellenistic Judaism

How did Jews feel about life in Hellenistic Alexandria, with its complex cultural demands and intermittent intimations of anti-Semitism? It is hard to tell, given that we have so little that deals directly with this issue. This chapter argues, however, for an indirect approach: texts that rewrite the Biblical narratives of Egypt can serve as (amongst other things) allegories of the contemporary position of Hellenistic Jews. Ezekiel's Exagogé, a now-fragmentary tragedy on the Exodus

story, is one such example. The *Exagogé*, it is argued here, is fundamentally about the problems of defining a distinct Jewish identity in the turbulent, multicultural world of Alexandria.

Keywords: Egypt, Jews, Ezekiel the tragedian, second-temple Judaism, tragedy, Hellenistic literature, identity.

5. Urban Connections: Arsinoe, Antinoopolis and Hermopolis in the Papyri

The site chosen for the foundation of Antinoopolis had once been occupied by a small pharaonic settlement. In AD 130 Hadrian used it to build a completely new city, unencumbered by the history of the area, which it was destined to transform. Antinoopolis was organised as a Greek city and colonised with people mostly from Ptolemais and the privileged class of 6475 Hellenes of Arsinoe. And yet the new foundation lay straight across the Nile from Hermopolis, a major city with a long history and a rich Egyptian tradition, which also, until then, had maintained sole claim to the area and its fertile land and resources. The sudden appearance of the artificial Hadrianic construct is bound to have had a significant impact, both economic and cultural, on Hermopolis. This study, based mostly on papyrological evidence from or about Antinoopolis, aims to detect the levels of cross-fertilisation through the various stages of the symbiotic relationship, forced or organic, that developed between the two neighbouring cities, a process offset by the dwindling ties between Antinoopolis and Arsinoe. It focuses on the process by which the population of Antinoopolis gradually took up residence there, on their activities, and on the changes to the city's administrative position over time, which mirrored the reforms taking place throughout Egypt and the Empire.

Keywords: Egypt, Antinoopolis, Hadrian, Hermopolis, Arsinoe, Nile, foundation, land, papyri, citizenship, residence.

6. The Non-Identical Twins: Mendes and Thmuis in the Hellenistic and Roman Periods

By comparing the available papyrological, literary and archaeological data, this article aims to specify the role played by the cultural variable on the evolution of Mendes and Thmuis (Nile Delta) in the Hellenistic and Roman periods. Inhabited from the 3rd century BCE by a large and prosperous Greek community, these twin cities in fact preserve a strong Egyptian profile, which simultaneously emanates from the representations linked to it and the historical data. With the objective of understanding the impact of their cultural interaction in the town planning of Mendes, my first interest lies in the toponymic representations and the literary *topoi* associated with the capitals of Mendes and later in what the documental data reveal on the subject of the identity of the nome and the transfer of the administrative centre from Mendes to Thmouis.

Keywords: Nile Delta, Mendes, Thmuis, toponymy.

7. Reflections on Urbanism in Graeco-Roman Egypt: a Historical and Regional Perspective

After a brief summary of the degree of our knowledge of urbanism in Graeco-Roman Egypt, some case studies are presented and examined. The analysis is based on settlements located in the region of El-Fayyum and at Dakhla Oasis, which are quite well preserved and partially excavated. These settlements did not have the juridical status of *polis* or *metropolis* and are usually considered as villages. However, their complex plans and the monumentality of their main temples suggest a more appropriate definition would be third rank settlements or towns. It has been observed that there are regional traditions in building materials and techniques and decoration and plans. The urban layouts vary and the Classical model of a chessboard schema was mainly applied to *poleis* and *metropoleis*, in a few cases also to towns. The architecture, public and domestic, shows

a mixture of Egyptian and Classical traditions due to local customs and to the logical necessity of signifying the new lifestyle and institutions.

Keywords: Fayyum, Dakhla oasis, temenos, dromos, Graeco-Roman Egypt, urbanism.

8. Oxyrhynchos: Metropolis and Landscape

Due to archaeological difficulties, very little is known about Graeco-Roman cities in Egypt. In addition, the perception of their ruins is influenced by different pre-conceived opinions related to the urban forms of ancient Egypt and the settlement types, depending on their legal status. Our aim is to discuss the existence of an urban design during the Hellenistic period consisting of a more or less regular and complete planning of structures and services, depending on the status, and also to examine this design in relation to the seasonal nature of flooding. The ruins of Oxyrhynchos analysed in the light of its landscape and based on images from different sources allow us to envisage a complex, sophisticated urban setting, which would explain why the city was one of the most important Hellenistic and Graeco-Roman metropolises in the country.

Keywords: Oxyrhynchos, landscape, dyke, pond, allotment, urban planning, suburb.

Appendix. A Methodological Contribution to the Land Parcelling Study. The Case of Oxyrhynchos

The following paragraphs describe how we have established a proposal for the land parcelling of the Egyptian city of Oxyrhynchos using aerial photography principles. Instead of taking photographs from an aircraft, we used a kite. The images obtained were placed on a topographic base prepared by the team and the result was a mosaic of extremely detailed photographs. This allowed us to easily locate ancient parcellation traces. By discerning the clearer lines of the rest, we were able to see a regular section with measurements based on Alexandrian standards.

Keywords: Oxyrhynchos, urban planning, metrology, aerial photography.

9. Past and Present Population Trends in the Fayyum Region

The Fayyum region today faces problems that stem from the exponential growth of its population since the second half of the twentieth century AD. One official response has been to restrict residential building on agricultural land. This has rarely been enforced, allowing illegal settlements to emerge. This paper seeks to put a figure on the amount of agricultural land that has been lost to or consumed by population growth. The starting point is a reconstruction of the population size and its spatial distribution within the Fayyum region across different centuries. The second part will then explore the relationship between population growth and its impact on land use patterns, in particular the growth in built-up area. Using data from remote-sensing satellite images and Tober's theory of settlement packing, built-up area figures are estimated and compared to actual values. Two contemporary scenarios illustrate that settlement or population packing has not remained constant, significantly increasing during the second half of the twentieth century. The analysis highlights three major trends. First, between 1907 and 1996 some 49.06 sq km were lost to the expansion of settlement and the need to accommodate a growing population. Second, less land was lost than one would expect when assuming a proportional relationship between population growth and land loss. Hence, other factors must have constrained the spatial expansion of the Fayyumic population. Lastly, settlements along the desert fringes did not expand disproportionately. When land was lost to population growth, it was not desert, but arable land.

Keywords: Fayyum, population, demography, settlement.

10. Sources, Cartography, Remote Sensing and GIS: Keys for Reconstructing the Landscape of the Oxyrhynchos Nome

We present the applied methodological approach to the study of the landscape of the Middle Nile Valley. We place special emphasis on analysing the nineteenth-century transformation of the seasonal Nile flood management infrastructure and how the perennial irrigation system was introduced, completely modifying the landscape known before that time. Both systems coexisted until the construction of the Aswan Dam in 1971, the year in which the flood phenomenon as it had been known since the pharaonic period ceased to occur. The applied methodology was mainly based on knowledge of the modern written sources, principally reports and manuals that refer to the flood and its management. In addition, the existing ancient cartography was compiled and digitalised and the traces of irrigation and drainage channels and dykes were extracted following archaeomorphological criteria. Lastly, we applied different satellite image analysis techniques with the aim of completing the information obtained from other techniques. All this information, collected and exploited on a GIS platform, allows us to propose a model for how the Nile flood was managed at the time Bonaparte's expeditionary force landed in Egypt in 1798.

Keywords: Egypt, flood, Nile, remote sensing, GIS, multi-spectral analysis.

11. Features of the Oxyrhynchos Nome Landscape

The studies of the agrarian economy of ancient Egypt are particularly rich thanks to the information contained in the papyri. The historical geography has also aroused interest in terms of the Nile flood and irrigation techniques. Nevertheless, to obtain detailed knowledge of the Egyptian countryside and its transformations, it is necessary to approach the study of each region with systems that allow archaeological data to be integrated with those referring to the present-day physical environment, in order to be able to track down the traces of the ancient landscape and its large infrastructures. This paper presents the results of an initial analysis of the Oxyrhynchos nome using the instruments that allow for the integration of historical cartography, papyrology and remote sensing.

Keywords: Oxyrhynchos, landscape, toponyms, remote sensing, flood, Apollophanes, palaeocanals, diazoma.

12. The Development of the Capital Zone within the Nile Floodplain

Our work uses the geo-archaeological analysis of sites in the northern Capital Zone of Egypt, between Abu Rawash in the north and the entrance to the Fayum in the south, to explore the past landscapes of the area. A mixture of satellite and map studies combined with field-walking and auger and geophysical surveys allows us to reconstruct the landscapes around ancient sites and show how they have changed over time. In collaboration with a number of archaeological missions we have shown that at least part of this mobility of city sites can be linked to the movements of the Nile which, in its role as a transport artery and water supply, was an important, if difficult to control, aspect of the landscape.

Keywords: Geomorphology, Nile, landscape, satellite, archaeological site.