Caprotti F (2006) Malaria and Technological Networks: Medical Geography in the Pontine Marshes, Italy, in the 1930s *The Geographical Journal* 172(2): 145-155

Abstract

This paper examines the struggle against malaria undertaken by the fascist regime in the Pontine Marshes, south of Rome, and relates it to discourses of domination of nature on the one hand, and modernization and civilization through technological networks such as health and medical networks on the other. The marshes' 'first nature' is described first of all, focusing on malaria and the difficulty of making an impact on marsh biology before the fascist enterprise and before the large-scale employment of modern technology for the subjugation, channelling and development of the marshes. Secondly, the paper focuses on the organization of medical antimalaria networks in the marshes during the years immediately preceding and during the fascist period (1922-1943). Thirdly, the 'second nature' produced in the marshes following the land reclamation and antimalaria projects is examined, and an assessment is provide of the fascist antimalaria project in the marshes.

Keywords: Pontine Marshes, medical geography, fascism, nature, Italy

‘Ask for what end the heav’nly bodies shine,

Earth for whose use? Pride answers, ‘`Tis for mine:

For me kind nature wakes her genial pow’r,

Suckles each herb, and spreads out ev’ry flow’r;

Annual for me, the grape, the rose renew

The juice nectareous, and the balmy dew;

For me, the mine a thousand treasures brings;

For me, health gushes from a thousand springs;

Seas roll to waft me, suns to light me rise;

My foot-stool earth, my canopy the skies.’

But errs not nature from this gracious end,

From burning suns when livid deaths descend,

When earthquakes swallow, or when tempests sweep

Towns to one grave, whole nations to the deep?’

(Alexander Pope, *Essay on Man*, 1869: 31-32).

Introduction: nature, malaria and technological networks

The ideological and scientific domination of nature characterized the modern era. Nature was conceptualized as lying outside society and culture broadly conceived (Latour 1993), and was thus laid low from its transcendental religious pedestal and laid open to utilitarian exploitation and demystification (Smith 1984; Harvey 1996).

Geographers have tried to understand the way in which the changing concept of nature in the modern period has influenced and been part of the project of modernity. Studies have explored the juxtaposition of the city-society sphere to the natural realm (Cronon 1991; Davis 1998; Gandy 2002), and have extended as far as considering the relationship between nature and the city in the mediaeval period (Fumagalli 1994). A consideration of urban political ecology in this light has led to an understanding of how nature and social power are interlinked in the city (Katz and Kirby 1991). The way in which modernity channels, harnesses and commodifies nature for the ends of progress, development and "ecological modernization" (Desfor and Keil 2004) have also been the focus of ample attention (Cosgrove 1990; Swyngedouw and Kaika 2000). Kaika and Swyngedouw (2000), for example, analyse the networked essence of technology as it controls the flows of nature in the urban arena (Kaika 2005). National projects of modernity, such as Spain's *regeneracionismo* ('regenerationism') (Swyngedouw 1999), the Linth Valley hydro engineering scheme in Switzerland (Speich 2002), and Italy's Pontine Marshes land reclamation and urbanization project, are examples of the fusion between ideology and hard science in the creation of hybrid landscapes (Swyngedouw 1999).

Water has been one of the main foci of research and attention to date, as it has become increasingly commodified and subject to control, regulation, institutionalization and hydropolitical struggle (Elhance 1999; Gandy 2002; Swyngedouw 2004; Worster 1985). As such, it is an example of the wider commodification of nature in industrial society:

> ‘nature is brought into the social world through the agency of labour in the extraction and transformation of use values, the industrial internalisation of nature’s processes, the instrumental knowledge and action structured by science and technology in the service of accumulation, and through the globalization of production and exchange mediated by the market for commodities. And it is here that we can begin to talk of nature as literally “incorporated”’ (FitzSimmons and Goodman 1998: 202).

On a smaller geographical scale, there have also been analyses on how modern views on nature have influenced science (Haraway 1990, 1991), domestic space (Kaika 2004) and the biological body (Synnott 1993; Featherstone, Hepworth and Turner, eds 1991). This paper attempts to bridge the gap between water and the biological body by examining the malaria pathogen in the Pontine Marshes, focusing on the struggle against nature which Italian fascism undertook in the marshes, thus showcasing its deeply modern understanding of nature, its recourse to technological networks to dominate it and eliminate ‘first nature’ (exemplified by malaria and the mosquito) and its institution of a ‘fascist second nature’ presented as the positive outcome of the fascist project of modernity and modernization.

The fascist regime was in power in Italy between 1922 and 1943. The 1920s and especially the 1930s saw the commencement of various projects aimed at modernising Italy whilst maintaining ‘traditional’ rural values (Payne 1995). These were projects such as the Battle for Wheat (Ibid), land reclamation (Istituto di Studi Romani 1935), and the construction of New Towns (Millon 1978; Ghirardo 1989; Ghirardo and

Forster 1985; Caprotti 2004). Land reclamation in particular was crucial to the fascist project of developing Italian territory and transforming it into a productive and highly organized whole. The reclamation of the Pontine Marshes (see figure 1) was one of Italian fascism's main modernizing projects, and attracted vast national and international media attention (Torri 1935). Until recently the development of the socionatural landscape (Swyngedouw 1999: 449) of the Pontine Marshes has attracted little in terms of historiographical (Sallares 2002) or geographical attention.

This paper examines the struggle against malaria undertaken by the fascist regime in the Pontine Marshes, south of Rome, and relates it to discourses of domination of nature on the one hand, and modernization and civilization through technological networks such as health and medical networks on the other. Although based mainly on archival research, the research presented here also made use of print sources and interviews. Archival documents were sourced from the Central State Archive in Rome (Archivio Centrale di Stato, or ACS). Specifically, documents and reports from Mussolini's personal government archive (Segreteria Particolare del Duce, Carteggio Ordinario 1922-1943, or SPDCO) and the fascist ministry of agriculture and forests (Ministero dell'Agricoltura e delle Foreste, or MAFF) were used. Secondary published sources from 1930s Italy were also utilised. These include newspaper articles and books written on the Pontine Marshes project and land reclamation.

The first section of the paper describes the marshes' 'first nature', focusing on malaria and the difficulty of making an impact on marsh biology before the fascist enterprise. The second section focuses on the organization of medical antimalaria networks in the marshes during the years immediately preceding and during the fascist *ventennio* (two

decades). The third section examines the 'second nature' produced in the marshes following the land reclamation and antimalaria projects, and the fourth section provides an assessment of the fascist antimalaria project in the marshes. The final section provides some conclusions.

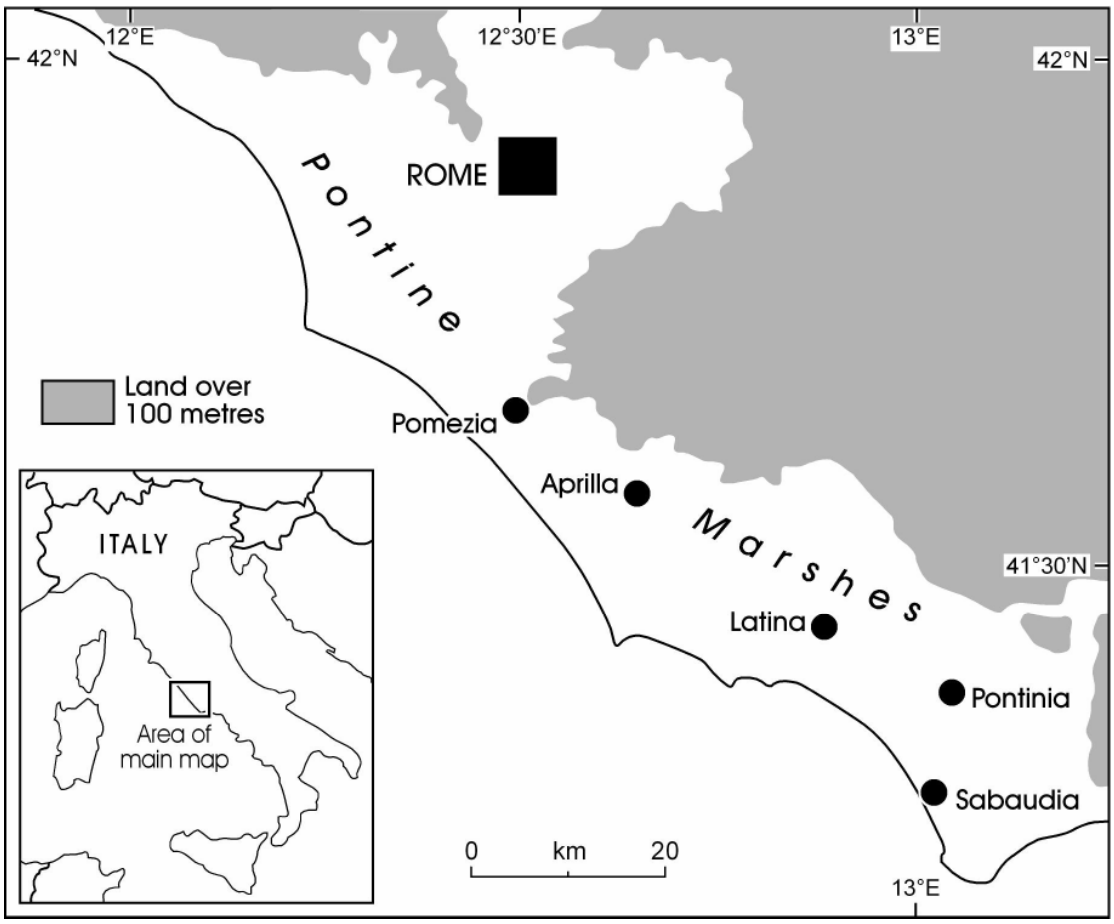

Figure 1: The Pontine Marshes

Roots in Time: Transforming a Millennial Landscape

The Pontine Marshes project, undertaken mainly between 1930 and 1939, was the foremost example of land reclamation in fascist Italy. At the beginning of the 1930s the Pontine Marshes were a low-lying and waterlogged expanse of some 75,000 hectares around thirty miles outside the doors of Rome, fascism's chosen capital. The marshes had defied efforts at reclamation by various powers throughout history, from the Romans (Sallares 2002) and various Popes (Koot 1991), to the post-Unification liberal governments of Italy. The latter passed several laws aimed at the reclamation of the marshes from 1868 to the fascist takeover in 1922 (Ghirardo 1989: 40).

The key physical reason for the marshes' invulnerability to attempts to 'civilise' them was geological: the marshes lie on an area of very flat land gently sloping towards the sea. The marshes, bordered by the Lepini mountains in the east, receive the mountains' runoff and are their eastern watershed. Thus, reclamation and drainage had to be carried out on a massive scale in order to succeed. However, a key biological factor went hand in hand with the unfavourable geological and hydrological regime which made the marshes so resistant to 'civilization' and lethal to would-be colonists. This factor was malaria. The marshes were habitats for the *Anopheles* mosquito, which is a malaria vector, well into the first half of the twentieth century (Celli 1933; Harrison 1978: 24). As early as 70 a.D., Licinius Mucianus, reporting the existence of 24 towns, or *urbes* in the marshes, referred to their existence in such harsh conditions as a *miraculum*, a miracle (Traina 1988: 100). Cicero himself described the marshes as "neither pleasant nor healthy" (Cicero, in

Sallares 2002: 189), and Borca (2000: 74) notes that the Romans viewed marshlands dichotomially as liminal areas, regions of 'otherness' compared to the "spaces shaped by man and culture" (Ibid). At the start of the twentieth century, the situation had not changed by much, except that the area was largely uninhabited. The marshes' only inhabitants were seasonal pastoralists (Anonymous 1934b) in a "vast region where the goddess of Fever […] reigned supreme and which was dominated by squalor and abandon" (Cortesi 1935: 119). When the fascist government came to power in 1922, the situation in the Pontine Marshes was largely unchanged.

This paper understands fascist medical authorities' attempts to eliminate malaria from the Pontine Marshes as a modern project to destroy the marshes' 'first nature' and institute a controlled and ideologically acceptable 'second nature' in its place, through a struggle between society (fascism) and nature (Latour 1993). This view of nature can be seen as essentially instrumental to the fascist regime's wider aims in the marshes (Harvey 1996): the mastery and possession of nature through science, knowledge and technology would achieve general good for all (Ibid: 120). However, this paper does not 'first nature' with ideas of untouched pristine environments. As FitzSimmons and Goodman (1998: 199-200) have noted with respect to Cronon's (1999) analysis of the interactions between nature and society in the making of Chicago, the attempt to excavate the mutual interactions between nature and society can partially reinstate the modern dualism between the two. This paper attempts to avoid this, but focuses on how Italian fascism relied on precisely this distinction in order to justify its medical and political aims in the Pontine Marshes. Knowledge, technology and science were deployed to dominate the natural realm (Oliver 2000). Nature – in this case, malaria – was engaged with through a process of cognition

which stemmed from human consciousness (Burgess 1978; Castree 1995; Stubbs 2001). In other words, nature could only be known through a relationship with it (Smith and O'Keefe 1980). Thus, the natural realm represented by malaria became conceptually separated from society: the latter conceptualized the former as external but lying within its sphere of techno-scientific influence (Latour 1993). In the Pontine Marshes, society interacted with nature in a productive, exploitative and mutually transforming dialectical relationship.

The following focuses on the modern project undertaken by the fascist regime to eliminate the 'negative' nature of the marshes, identified with malaria. The project fused biology, technology and propaganda. Marshland could not be colonised without the removal of a particular biological agent detrimental to human habitation: malaria. Technology was pitted against one of the marshes' negative natural characteristics. The next section briefly recounts efforts to sanitise the Pontine Marshes by removing malaria from the environment. This lays a basis for the following section's analysis of the technological support network put in place by the fascist regime to maintain the environmental status quo desired by the fascists in the Pontine Marshes.

Fascism and the Mosquito

The fascist regime viewed land reclamation as a physical intervention on the landscape which could have an effect not only physically but also on the economy and on the moral and political character of affected people. Land reclamation in the Pontine Marshes progressed according to an integral program aimed at reclaiming

people as well as land (Millon, 1978: 335). As stated above, the marshes were malaria-ridden areas when the reclamation projects commenced. Malaria was seen as the "absolute mistress of this lonely region" (Lepri 1935: 96). In order for reclamation to succeed, malaria had to be eradicated and exterminated. This would enable healthy human habitation (Anonymous 1934a). Malaria is carried by the *Plasmodium falciparum* parasite within the mosquito (Sotiroff-Junker 1978): fascism planned to do away with the mosquito, and as a consequence with the disease. The death toll attributable to the disease in the region was significant: for example, in the town of Sermoneta, on the edge of the marshes, 8% of all deaths in 1925, just before the fascist land reclamation program, were directly attributable to malaria (this figure does not consider the interaction of malaria with other diseases). With a crude death rate of 41 per 1,000 in 1925, this signifies that one out of every 37 deaths was directly attributable to malaria (Sallares 2002: 119). After land reclamation, the crude death rate in the town had been reduced to 20 per 1,000 as a result of the eradication of malaria (Ibid). These figures underline the impact of malaria in the Pontine Marshes before land reclamation in the 1930s, and its importance to the fascist regime.

The governmental institutions charged with reclamation – the ministry of agriculture and the directorate-general for integral land reclamation – embarked on a program aimed at sanitising the Pontine Marshes. The program relied on sanitation and healthcare, as well as on the chemical extermination of malaria-carrying *anopheles* mosquitoes, in order to return the marshes to a "healthy" state. The anti-malaria campaign pursued in the marshes by the fascist regime was part of a wider, technological project aimed at reclaiming the marshes in agricultural, social and political terms.

The first sanitation and anti-malaria efforts in the marshes in the twentieth century were set in motion in 1906 by Dr. Angelo Celli. He was a famous epidemiologist, professor of medicine and a parliamentary deputy (Drake 1990: 259; Alessandrini 1935: 206). Celli had persuaded the then Director General of the Red Cross, Senator Taverna, to found three small health centres in the area: in Casal delle Palme, Foro Appio and Ponte Maggiore. (Ibid: 206). This first attempt at healthcare provision in the marshes was useful but not sufficient. The three doctors assigned to the marshes could not hope to cover such an extensive area, where malaria was endemic. Celli's attempts also encountered problems because of peasant culture, both in the Pontine Marshes and in the nearby Agro Romano (the marshy flatland which borders Rome to the south and south-east). Attempts at providing better education for the peasants, although promising, were continuously threatened (Drake 1990: 260). The involvement of Anna Celli, the epidemiologist's wife, and Sibilla Aleramo, a prominent Italian writer concerned with the conditions of women in particular and the lower classes in general, meant that the anti-malaria campaign changed into a campaign to provide a wider spectrum of education for the peasants of the region (Ibid). Significant difficulties were also encountered in efforts to eradicate the mosquito, identified as the underlying cause of malaria (Ibid: 259-261).

The malaria situation did not change significantly until 1922. During that year a committee was founded and charged with reviewing and implementing measures to alleviate the Pontine Marshes' sanitation problems. The committee commissioned a report from a certain Dr. Pais. His proposals were studied and presented to Mussolini, together with a project for the foundation of an institute concerned with solving the

main underlying cause of the marshes' poor health situation: malaria. The resulting *istituto antimalarico* (anti-malaria institute) for the Pontine Marshes was founded in 1922 under the patronage of the King of Italy. Technical directorship of the institute was held (in succession) by various members of the initial review committee. The institute's first anti-malaria projects resulted in the foundation of two small health centres, at Colonia Elena and in the Quadrato area (where the fascist New Town Littoria was to be built a decade later, in 1932. The Quadrato health centre was moved to the newly-constructed Littoria when land reclamation work started). The construction of other sanitation posts soon followed, and personnel numbers increased. Many recources were provided by land reclamation consortia. Medical facilities were also expanded somewhat to include limited surgical capabilities (Alessandrini 1935).

The sanitation efforts aimed at the eradication of the mosquito brought to bear a range of chemical measures and biological knowledge against the winged insect. Water reservoirs were treated with petrol and Paris Green (*Verde di Parigi* – copper arsenic acetate) for malaria larvae. Insecticides were used to kill mosquitoes in reclamation workers' quarters. Ambulances were introduced in order to transport malaria patients, and others, to hospital. The biological realm was also mobilized against malaria – the gambusia fish (*gambusia holbrooki* Girard), known as the mosquitofish (Margaritora, Ferrara and Vagaggini 2001), was introduced to the area because of its known appetite for *anopheles* mosquito larvae (Alessandrini 1935: 209). Positivist scientific methods were also utilised in order to take the battle to the insect world. Disease statistics were kept, and patient records were introduced. Data on malaria (and other

diseases) outbreaks and location was compiled and forwarded to governmental commissions responsible for internal migration.

Publicity campaigns (mainly poster-based) encouraged workers and the first colonists to protect themselves (Alessandrini 1935: 213). Alessandrini, director of the Pontine Marshes anti-malaria institute from 1927 onwards, stressed the point that sanitation improvements in the Pontine Marshes went hand in hand - *pari passo* – with land reclamation. It was seen as an integral effort, since land reclamation would have been severely hampered without the development of sanitation and anti-malaria measures (Ibid).

The Pontine Marshes were being cleared of a natural element – the mosquito – which was clearly detrimental to society in its role as a malaria vector. The mosquito was taken by the fascists to exemplify the evil character of pre-fascist nature in the marshes. The destruction of the marshes' natural environment was justified through rhetorical recourse to a nature which was identified as feminine and therefore negative if allowed to express itself freely. Malaria (from *mal aria*, literally "bad air") was not desirable in any sort of human environment; it remains one of the biggest killers in the twenty-first century. However, the fascist struggle against it in the Pontine Marshes was an example of the assignation of negative, feminine values (such as sterility, identified then with women) to the natural sphere. The regime embodied a deeply engrained, modern conceptual separation between the natural and the human, the objective and the subjective, male and female. It utilised the dichotomy at will and to its own advantage. In the particular case of malaria in the Pontine Marshes, fascism

believed that feminine nature could only be subdued through destructive authoritarian action, spearheaded by the figure of Mussolini:

> "such a rich and varied animal life was the consequence of nature free in all its manifestations, a triumphant nature: but unfortunately nature's triumph concealed the defeat of man and his activities: he fought for centuries but always lost: nature had too strong an ally in malaria and the vast army of *Anopheles*! But finally there had to be the appearance of He who would tilt the balance of the centennial struggle by submitting nature to man, and [He] came, saw, and won" (Lepri 1935: 99-100).

Because of the fascist regime's open declaration of a struggle against malaria not only in the Pontine Marshes but nationwide, Italy maintained its prominence in malaria research and in the application of new technologies to the attempted eradication of the mosquito from the environment. In fact, by 1929 even prominent malariologist Lewis W. Hackett stated that "It can probably be truly said that no Government in the world is now doing as much anti-larval work in the control of malaria as Italy" (Hackett 1929, in Harrison 1978: 187). The creation of a positive, fascist 'second nature' in the marshes necessitated the destruction and elimination not only of the marshes' original swamp environment, but of one of its biological characteristics so detrimental to human health and national development.

Technological networks and the creation of a 'second nature' in the marshes

Technology, the application of scientific knowledge and the selective usage of scientific discourse enabled the reclamation and biological sanitisation of the Pontine Marshes. The figures speak for themselves. At the end of the major land reclamation works *per se* (not including ongoing work into the late 1930s), 16,165 kilometres of canals had been built or reactivated; 1,360 kilometres of roads had been built; 3,040 colonial houses, or *poderi*, had been constructed; 4,500 artesian and fresian wells had been dug, and 60 billion lire (in 1977 lire equivalent) had been spent on reclaiming the marshes (Sottoriva 1977: 49). By 1935, electrification was completed, with a total power usage of six million Kwh. The struggle against malaria specifically and the marshes' 'first nature' generally was also yielding positive results by the end of the 1930s. These efforts were included under the umbrella term of integral reclamation. Reclaimed land then needed to be sustained, so that it could be colonized through New Towns and fascist-built colonial farmsteads, or *poderi*. The following discusses the technological support network aimed at maintaining and improving the results of the reclamation effort.

Land reclamation ensured that the Pontine Marshes could be turned into land which could be exploited for agriculture. The whole project was aimed at the creation of an idyllic rural area consonant with fascist ideals of productivity and activity within the state's interests. This meant that the landscape constructed in the 1930s was very complex, encompassing fields and farmsteads as well as small agricultural centres (the *borghi*) and New Towns. The landscape of the marshes had been radically changed in under a decade:

> "It is difficult to imagine now what the Pontine Marshes were like before Mussolini's bonifications. Some parts of the marshes were permanently submerged, while other areas dried out in the summer each year. There were flooded forests in winter. In the early modern period, maize was planted in June and harvested in November in some parts of the Pontine Marshes which were submerged under water in winter. It was these seasonal, open marshes which were so lethal as a source of malaria, as Palladius understood […] Only a small fraction of the marshes survived Mussolini's attentions." (Sallares 2002: 168-9).

However, the predominantly rural character of the land did not signify a totalising rurality. The Pontine Marshes' rural areas were organized around New Towns (Millon 1978) and, to a lesser extent, the smaller settlements known as *borghi*. The reclaimed land on which this rural/urban mix was built was, however, an unsustainable construct. The area's hydraulic regime, coupled with climatic, geological and soil characteristics, meant that the area would soon become unmanageable without continuous work aimed at sustaining the initial achievements of land reclamation. From the fascist point of view, this meant that the "proper" fertile characteristic of the marshes had until the fascist era been kept subdued by a disordered nature:

> "In the Pontine region, there has been a struggle lasting thousands of years between man and the adverse forces of nature which opposed a lethal, unordered and difficult hydraulic regime to the region's fertile lands" (Almagia' 1935: 50).

The Pontine Marshes had to be maintained in their reclaimed state by a constant low-intensity struggle against nature after the initial massive resource-intensive reclamation drive at the start of the 1930s. This struggle was mediated through a technological support network. Once the land was reclaimed it had to be sustained. Drainage networks had to be maintained, water extraction plants and pumping stations had to be constructed, and other technological and engineering solutions had to maintain man's advantage over "nature". This is what is meant here by the use of the term "technological support network": a series of systems that were put in place to sustain and continue the production of a constructed "second" nature (Smith 1984).

The main pivots of the technological support network were large pumping and drainage plants called *impianti idrovori* (drainage pumping stations), in Italian literally "water-eating" machinery plants. For example, the Comprensorio della Bonificazione Pontina land reclamation area (which in itself was divided into two smaller administrative reclamation areas) had to be drain1ed continuously. The system which maintained drainage in one of these areas included 14 *impianti idrovori*, with a combined drainage capacity of c.60 cubic metres per minute. Each plant contributed drainage capacities of between one and 35 cubic metres (Prampolini 1935). The Mazzocchio station, constructed near Littoria in 1935, was by far the most imposing such complex. It was capable of draining 9,000 hectares, compared to a maximum of 1,200 Ha for the Caronte and Botte Inferiore plants combined (Prampolini 1935: 153; Anzimonti 1932.). The Mazzocchio plant was the Big Bertha of the land reclamation campaign, aimed at massive drainage until "the last vestige of the Pontine Marshes will have disappeared" (Prampolini 1935: 153). The Mazzocchio

plant is still described in contemporary accounts as a wondrous feat of land reclamation.

The effort to keep the marshes drained and agriculturally productive did not only mean enlisting the help of the latest technology. It also meant pitting "positive" nature against "negative" nature. "Positive" natural characteristics were described as desirable and fascist. "Negative" ones – such as malaria – were assigned detrimental values and were earmarked for destruction. Pennacchi (2001a) presents the example of eucalyptus trees in Italian land reclamation. The trees were not native to Italy, but were imported from Australia. They were planted in the Pontine Marshes (as well as in other reclaimed areas) because of their reputation as avid absorbers of water. In fact, they absorbed so much water that in the marshes, crops could only be planted ten to fifteen metres away from eucalyptus windbreaks. Most of the trees were planted by the national veterans' institution, known as the ONC (*Opera Nazionale Combattenti*). In time, the trees became part of the marshes' post-1930s constructed environment. They were introduced into the area through human action. Ironically, their removal caused problems: today most eucalyptus trees in the Pontine Marshes have been felled. The trees used to provide cover from maritime wind, and as a result of having been cut down, the Pontine Marshes have experienced three to four tornadoes per year as a result of greatly reduced tree cover (Pennacchi 2001b). Although Pennacchi (2001a) doesn't suggest this, the use of the trees by the fascist regime can be seen as a fusion of man and nature, producing a hybridised environment.

Assessing fascism's antimalaria project in the Pontine Marshes

As mentioned above, reclaimed land, agricultural output and a subdued natural environment could not be maintained without the elimination of one of the Pontine Marshes' ancient, "negative" natural characteristics: *anopheles*-borne malaria. Certain segments of the technological support network were aimed at eliminating malaria. In particular, the institutions which had been set up to eradicate malaria as reclamation work progressed were organizationally redefined and incorporated into a limited healthcare network aimed at continued struggle against the disease. The anti-malaria institute for the Pontine Marshes was disbanded on 1 January 1933, when Mussolini placed anti-malaria responsibility with the Red Cross (located in the marshes in the vicinity of the Appian Way). Giulio Alessandrini, the technical director of the defunct institute, was called by the Red Cross to be the manager of the marshes' sanitary and health services. This task was aimed at maintaining the anti-malaria drive in a region which had not been completely freed of the disease and its primary vector.

The struggle against malaria was carried out through the organization of sanitary and health facilities throughout the region. Their aim was to provide wide health coverage (if not capacity) in the marshes. For example, four *Dopolavoro* (after-work) centres were turned into hospitals, in the fascist-planned villages of Borgo Podgora, Borgo San Michele, Borgo Sabotino and Borgo Grappa (although the hospital in Borgo Grappa had been previously completed) (Alessandrini 1935). A surgery in Casal delle Palme was also expanded. The ONC contributed with the construction of a 50-bed pavilion for patients in Colonia Elena, as well as a small hospital and surgery in Borgo Montello. The ONC also gave up part of a rice storage facility in Macchia di

Piano, where a hospital with a capacity of up to 70 beds was constructed in order to replace the smaller health centre in Ponte Maggiore. A health centre was also built in Borgo Pasubio, equipped with two wards, a laundry and a garage (Ibid).

Whether the term "hospital" can really be applied to facilities which had relatively few beds and which did not necessarily offer round-the-clock care can be debated. What is sure is that health service provision was improved in the Pontine Marshes during the 1930s, if only because *any* improvement in healthcare was a great improvement, since the anti-malaria institute was so short-staffed and under-equipped at the start of the 1930s. For example, in February 1932 the marshes' residents could only count on a total of 56 hospital beds, 6 doctors and one obstetrician (not counting assistants) to care for their health needs (Moretti to Ministry of Agriculture and Forests 1932). However, as stated, improvements in health service provision were not necessarily stellar. Alessandrini (1935: 216), for example, wrote with pride of what can only be objectively described as a small, 90-bed hospital inaugurated in Littoria on 1 October 1934.

The main aim of the 1930s anti-malaria program in the Pontine Marshes was to continue the battle against the disease and provide localised health service coverage. Thus, by the mid-1930s, in order to sustain anti-malaria efforts the Red Cross and the ONC had constructed seven health centres with adjoining "hospitals", four health centres without hospitals, and 10 smaller doctors' centres open for part of the day. A children's camp, the "Littoria marine colony" (*colonia marina*), was built on the coast, to provide children with the opportunity of staying away from malaria-ridden marsh areas in the summer months. The colony housed 400 children and opened its

doors on 2 August 1934, with children staying in residence over the summer and autumn until 10 November. In the camp buildings, children were protected from mosquitoes by ten layers of wire mesh on windows; Alessandrini (1935: 220) proudly wrote that none of the children who stayed at the camp contracted malaria. Urban research has pointed towards interpretations of initiatives for youth as examples of a focus on a "return to nature" as opposed to the corrupting influence of the city (Pomfret 2001). This observation could be applied to the *colonia marina* built to segregate children from the influence of malaria as 'negative nature'.

Antimalaria efforts were not a clear success, and the technological support network was clearly lacking in many areas concerned with the struggle against the mosquito-borne disease. The main problem seems to have been constituted by a lack of experienced manpower. Total medical employee numbers in the marshes were rather low. The Agro could count on 11 doctors directing the health centres, as well as eight assistant doctors, two specialized antimalaria doctors, one midwife, 48 nurses, a "disinfestation militia" numbering 26, and 22 general assistants (Alessandrini 1935). Furthermore, the medical personnel's ministry to the scattered colonists was hampered by transport, which was sufficient but limited. Alessandrini (1935: 223) lists eleven cars, eight ambulances, three trucks, 12 horse-drawn carriages and 61 bicycles, as well as 16 drivers and four horse-drawn carriage drivers.

Given the resource and manpower limits of the anti-malaria network in the marshes, the results were quite impressive. The malaria incidence rate, which was higher than 80% before 1924, decreased to a minimum of 2.09% in 1933, although it was higher in the following two years (Alessandrini 1935: 224). Doctors also apparently managed

to carry out around 200,000 visits in 1933 (Ibid). With a total of 21 doctors, this is around 9,524 visits per doctor per annum (around 26 visits per doctor per day). However, the 1939 *Physical and Economic Atlas of Italy* shows that in 1932 the Pontine Marshes were still the area with the second-highest malaria mortality rate in Italy, with 25 to 50 malaria-related deaths for every 100,000 inhabitants (Dainelli 1939). A note written on 2 October 1936 for Mussolini's personal archives shows that malaria was not eliminated from the marshes. The note stated that in the area where the New Town of Aprilia was being built, "malaria rages continuously" (Segreteria Particolare del Capo del Governo 1936). This would signify 0.25 to 0.5 malaria-related deaths per 1,000 inhabitants. This figure can be compared with British antimalaria efforts, carried out over more than 25 years in Malaya and Singapore until the Japanese invasion of December 1941, and which resulted in a reduction of the death rate from 300 for every 1,000 estate workers, to 4.9 per 1,000 in the general population, over the period from 1911 to around 1939 (Watson 1942: 163-5). The death rate from malaria was therefore lower in the Pontine Marshes, after little more than a decade, than in the geographically larger Malaya after a quarter of a century of work. Sir Malcolm Watson, responsible for the antimalaria campaign in Singapore from 1911 to 1928, compared British achievements in Malaya to the Pontine Marshes, in a 1942 paper published in *The Geographical Journal*:

> "For over two thousand years malaria defied all man's efforts to reclaim and cultivate the Pontine Marshes. But within the past decade, Mussolini, by destroying the anopheles, has colonized this area; perhaps this will be his greatest, or only, abiding claim to fame. I remind you though that

> twenty-five years earlier we had in Malaya managed to accomplish bigger things in bigger swamps" (Ibid: 1942: 168).

Wartime hostility is evident in the statement, as is colonial pride and conceit: Watson later went on to pompously state that the greatest result of British antimalaria efforts was the construction of Singapore Naval Base and the general exploitation of Malaya's tin and rubber resources (Ibid: 164-5), the latter carried out by heroic British rubber planters in the face of lazy Malay peasants (Clerk, Cator, Beatty, Goodenough and Watson 1942: 172). The imperialist rhetoric attached to malaria is evident. Indeed, in a discussion after the oral presentation of Watsons's main paper (Ibid), Chester Beatty stated that "the health rate in the African copper mines is better than it is in Kensington; if we could all go out there this afternoon I could guarantee superior conditions, and climatic conditions far superior" (Ibid: 171-2). It is enlightening to read his description of how not one life was lost to malaria in the diamond fields of the Gold Coast and Sierra Leone "in the white population" (Ibid).

Conclusion

Fascist attempts to create a sustainable reclaimed environment in the Pontine Marshes illustrate the variety of stances which fascism took towards nature. Where reclamation was concerned, "negative" nature had to be cancelled in order to be replaced by a positive, "fascist" nature. This project relied on technology because through "modern science and techniques [man can] not only […] discipline and transform, but master [*padroneggiare*] natural elements" (Almagia' 1935: 530; italicized Italian word from

the original text). The use of the term "*padroneggiare*" is interesting, in that in Italian it literally means "to master" by having *power over* someone or something ("*padrone*" signifies "master"). Fascist views of marshland ecology included a problematic stance towards technology and natural elements which is characteristic and endemic to modernity: "In some ways fascist ecology seems to have been a sophisticated presentiment of the problems of twentieth-century urbanization and industrialization, long before social democrats became seriously aware of such problems" (Payne 1995: 478). The fascist emphasis on the technical and technological aspects of the land reclamation programme were also characteristic of a positivistic view of science and geographical knowledge, aimed at controlling, rationalising and ultimately creating an imperium over a previously unknown or "untamed" area (Atkinson 2003: 15-23; Worster 1985). This view of nature, and use of technology, was not only confined to a fascist, totalitarian society. Dickinson (2004) has argued that studies of biopolitical discourse in 1930s Germany are characterized by master narratives which see German biopolitics as leading to totalitarianism. In contrast to this, he contextualises German biopolitics and places it within a broader cultural context, establishing links between biopolitics before and after 1945. The rejection of an artificially construed 'totalitarian parenthesis' is also welcome with regards to Italian fascism, itself a product of Western modernity.

Malaria was not 'conquered' by fascism: *plasmodium falciparum* was eradicated after the post-war five-year national anti-malaria plan of 1947-1952 using dichlorodiphenyltrichloroethane (DDT). The World Health Organization finally declared Italy malaria-free in 1970, after *plasmodium vivax* had been tackled (Romi, Boccolini, D'Amato, Caraffa de Stefano and Maiori 2002). However, the fascist

struggle against malaria in the Pontine Marshes clearly greatly reduced the incidence of the disease, in a project which was more widely aimed at the elimination of a natural environment seen as non-fascist and as a hindrance to the regime's modernizing initiatives. The resulting socionatural landscape embodied, and embodies still, modernity's struggles and heterogeneity when contrasted with 'nature'.

Acknowledgements

I would like to thank the anonymous reviewers for their constructive comments, and James Ryan for comments on an earlier version of this paper. Staff at the Central State Archive, Rome, were of great help in finding sources. I also wish to express my gratitude to Ruth Pollington for her cartographic work.

Bibliography

Alessandrini G 1935 L'organizzazione sanitaria della bonifica pontina in **Istituto di Studi Romani** ed *La bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome 201-230

Almagiá R 1935 La regione pontina nei suoi aspetti geografici in **Istituto di Studi Romani** ed *La Bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome 51-66

Anonymous 1934a I bilanci delle colonie e delle comunicazioni: un discorso di De Bono e dichiarazioni di Ciano. *Corriere della Sera* **59**(4) 5 January 1934 2

Anonymous 1934b Sull'Appia Antica: rivincita degli eserciti rurali *Corriere della Sera* **59**(14) 17 January 1934 3

Anzimonti E 2 November 1932 Report ACS, MAFF, B.203, Pontine A, II Parte

Atkinson D 2003 Geographical knowledge and scientific survey in the construction of Italian Libya *Modern Italy* 8 9-29

Borca F 2000 Towns and marshes in the ancient world in **Hope V M and Marshall E** eds *Death and disease in the ancient city* Routledge, London 74-84

Braun B and Castree N eds 1998 *Remaking reality: nature at the millennium* Routledge, London

Bridge G and S Watson eds 2000 *A companion to the city* Blackwell, Oxford

Burgess R 1978 The concept of nature in geography and marxism *Antipode* 10 1-11

Castree N 1995 The nature of produced nature: materiality and knowledge construction in Marxism *Antipode* 27 12-48

Celli A 1933 *The history of malaria in the Roman Campagna* Bale, London

Clerk G, Cator G E, Beatty C, Goodenough W and Watson M 1942 The geographical aspects of malaria: discussion *The Geographical Journal* 99 170-172

Cortesi F 1935 La vegetazione e la flora della regione pontina in **Istituto di Studi Romani ed** *La bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome 103-120

Cosgrove D 1990 An elemental division: water control and engineered landscape in **Cosgrove D and Petts G eds** *Water control and landscape transformation in the modern period* Belhaven Press, London 1-11

Cosgrove D and Petts G eds 1990 *Water control and landscape transformation in the modern period* Belhaven Press, London

Cronon W 1991 *Nature's metropolis: Chicago and the Great West* Norton, London

Dainelli G 1939 *Atlante fisico economico d'Italia* Consociazione Turistica Italiana, Milan

Davis M 1998 *Ecology of fear: Los Angeles and the imagination of disaster* Metropolitan Books, New York

De Seta C ed 1985 *Insediamenti e territorio* Storia d'Italia, Annali 8 Giulio Einaudi, Turin

Desfor G and Keil R 2004 *Nature and the city: making environmental policy in Toronto and Los Angeles* The University of Arizona Press, Tucson

Dickinson E R 2004 Biopolitics, fascism, democracy: some reflections on our discourse about "modernity" *Central European History* 37 1-48

Drake R 1990 Sibilla Aleramo and the peasants of the Agro Romano: a writer's dilemma *Journal of the History of Ideas* 51 255-272

Elhance A P 1999 *Hydropolitics in the Third World: conflict and cooperation in international river basins* United States Institute of Peace Press, Washington DC

Featherstone M, Hepworth M and Turner B eds 1991 *The body: social process and cultural theory* SAGE Publications, London

FitzSimmons M and Goodman D 1998 Incorporating nature: environmental narratives and the reproduction of food in **Braun B and Castree N eds** *Remaking reality: nature at the millennium* Routledge, London 194-220

Fumagalli V 1994 *Landscapes of fear: perceptions of nature and city in the Middle Ages* Polity Press, Cambridge

Gandy M 2002 *Concrete and Clay: reworking nature in New York City* MIT Press, Cambridge, MA

Ghirardo D 1989 *Building new communities: New Deal America and fascist Italy* Princeton University Press, Princeton

Ghirardo D and Forster K 1985 I modelli delle citta` di fondazione in epoca fascista in **De Seta C** *Insediamenti e territorio* Storia d'Italia Annali 8 Giulio Einaudi, Turin 627-675

Haraway D 1990 *Primate visions: gender, race and nature in the world of modern science* Routledge, London

Haraway D 1991 *Symians, cyborgs, and women: the reinvention of nature* Routledge, London

Harrison G 1978 *Mosquitoes, malaria and man: a history of the hostilities since 1880* John Murray, London

Harvey D 1996 *Justice, nature and the geography of difference* Blackwell, Oxford

Hope V M and Marshall M eds 2000 *Death and disease in the ancient city* Routledge, London

Istituto di Studi Romani 1935 *La bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome

Kaika M 2004 Interrogating the geographies of the familiar: domesticating nature and constructing the autonomy of the modern home *International Journal of Urban and Regional Research* 28 265-286

Kaika M 2005 *City of flows: water, modernity and the city* Routledge, London

Kaika M and Swyngedouw E 2000 Fetishising the modern city: the phantasmagoria of urban technological networks *International Journal of Urban and Regional Research* 24 120-138

Katz C and Kirby A 1991 In the nature of things: the environment and everyday life *Transactions of the Institute of British Geographers* 16 259-271

Koot C W 1991 Marching through marshes: an historical survey of the Agro Pontino in **Voorrips A, Loving S H and Kamermans H eds** *The Agro Pontino survey project: methods and preliminary results* Instituut Voor Pre-en Protohistorische Archeologie, Amsterdam 9-20

Latour B 1993 *We have never been modern* Pearson Education, Harlow

Lepri G 1935 La fauna pontina prima e dopo la bonifica in **Istituto di Studi Romani ed** *La bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome 93-102

Magaritora F G, Ferrara O and Vagaggini D 2001 Predatory impact of the mosquitofish (*Gambsuia holbrooki* Girard) on zooplanktonic populations in a pond at tenuta di castelporziano (Rome, Central Italy) *Journal of Limnology* 60 189-193

Millon H A 1978 Some new towns in Italy in the 1930s in **Millon H A and Nochlin L eds** *Art and architecture in the service of politics* MIT Press, London 327-341

Millon H A and Nochlin L eds 1978 *Art and architecture in the service of politics* MIT Press, London

Moretti to Ministry of Agriculture and Forests 16 February 1932 Report ACS, MAFF, B.203, Pontine A, II Parte

Oliver S 2000 The Thames Embankment and the disciplining of nature in modernity *The Geographical Journal* 166 227-238

Payne S G 1995 *A history of fascism, 1914-1945* UCL Press, London

Pennacchi A 2001a La koiné dell'eucalyptus - viaggio per le citta` del Duce - 1 *Limes: Rivista Italiana di Geopolitica* (http://www.limes.it) Accessed 1 October 2004

Pennacchi A 2001b Carbonia hag (viaggio per le citta` del Duce - 3) *Limes: Rivista Italiana di Geopolitica* (http://www.limes.it) Accessed 1 October 2004

Pomfret D 2001 The city of evil and the great outdoors: the modern health movement and the urban young, 1918-40 *Urban History* 28 405-427

Pope A 1869 *Essay on man* Macmillan and Co, London

Prampolini N 1935 La bonifica idraulica delle Paludi Pontine in **Istituto di Studi Romani ed** *La bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome 141-158

Romi R, Boccolini D, D'Amato S, Caraffa de Stefano D and Majori G 2002. Malaria in Italy, 2000-2001 *Bollettino Epidemiologico Nazionale* **15**(7-8). (http://www.epicentro.iss.it/ben/pre_2002/lug-ago02/1_en.htm) Accessed 24 January 2005

Sallares R 2002 *Malaria and Rome: a history of malaria in ancient Italy* Oxford University Press, Oxford

Segreteria Particolare del Capo del Governo 2 October 1936 Note ACS, SPDCO, B.427, f.163.051

Smith N 1984 *Uneven development: nature, capital and the production of space* Basil Blackwell, Oxford

Smith N and O'Keefe P 1980 Geography, Marx and the concept of nature *Antipode* 12 30-39

Sotiroff-Junker J 1978 *A bibliography on the behavioural, social and economic aspects of malaria and its control* World Health Organization, Geneva

Sottoriva P G 1977 *Centri antichi e nuovi della provincia di Latina* CIPES, Latina

Speich D 2002 Draining the marshlands, disciplining the masses: the Linth Valley hydro engineering scheme (1807-1823) and the genesis of Swiss national unity. *Environment and History* 8 429-447

Stubbs B J 2001 From ‘useless brutes’ to national treasures: a century of evolving attitudes towards native fauna in New South Wales, 1860s to 1960s *Environment and History* **7** 23-56

Swyngedouw E 1999 Modernity and Hybridity: nature, regeneracionismo, and the production of the Spanish waterscape, 1890-1930 *Annals of the American Association of Geographers* 89 443-465

Swyngedouw E 2004 *Social power and the urbanisation of water: flows of power* Oxford, Oxford University Press.

Swyngedouw E and Kaika M 2000 The environment of the city or ... the urbanisation of nature in **Bridge G and S Watson eds** *A companion to the city* Blackwell, Oxford 567-580

Synnott A 1993 *The body social: symbolism, self and society* Routledge, London

Torri A P 1935 La rinascita dell'Agro Pontino nelle impressioni e nei commenti della stampa estera in **Istituto di Studi Romani ed** *La bonifica delle Paludi Pontine* Casa Editrice Leonardo da Vinci, Rome 291-310

Traina G 1988 *Paludi e bonifiche nel mondo antico* "L'Erma" di Bretschneider, Rome

Voorrips A, Loving S H and Kamermans H eds 1991 *The Agro Pontino survey project: methods and preliminary results* Instituut Voor Pre-en Protohistorische Archeologie, Amsterdam

Watson M 1942 The geographical aspects of malaria *The Geographical Journal* 99 161-170

Worster D 1985 Rivers of Empire Random House, New York