Introduction

> [A]t that time this sea was not navigable, and was called "Axine" (inhospitable) because of its wintry storms and the ferocity of the tribes that lived around it, and particularly the Scythians, in that they sacrificed strangers, ate their flesh, and used their skulls as drinking-cups; but later it was called "Euxine" (the hospitable), when the Ionians founded cities on the seaboard.
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> Strabo, *Geography* 7.3.6

The clear-cut outlines of the almost completely landlocked Black Sea bring to mind another geographical unit, the Mediterranean. Historians and archaeologists exploring the Black Sea often have been tempted to resort to ideas developed for the Mediterranean region (see Özveren 2001; Doonan 2009). However, the Black Sea is not the miniature of its southern neighbour: it is a region of striking ecological contrasts. The southern and eastern coastlands are a warm and humid country cut off from the outside world by the foggy and heavily forested chains of the Pontic Alps and the Caucasus. The north and northwest littoral of the Black Sea could not be in more contrast: an arid, grass-covered temperate plain which extends for hundreds of kilometres into the interior of the continent. Neither did the Black Sea ever develop into a cohesive region of culture and trade comparable to the Mediterranean world. The region actually enjoyed several short periods of political and economic integration, but the stimulus always came from outsiders who sought to exploit the Black Sea as a supplier of staples and exotic goods. Unity arose either by the initiative of foreign settlers, as in the period of the Greek colonies in Antiquity and of the Italian merchant cities at the end of the Middle Ages, or

by the political will of the Mediterranean empire which happened to control the Straits.[1] Today, research in the Black Sea region is informally divided between several disciplines, which are funded by separate grant-making bodies (see King 2004, 4). The southern littoral is treated as a part of the Middle East; the west is studied together with the Balkans, while the northern and eastern coasts belong to the vague field of "research in the former Soviet Union".

If peoples around the Black Sea never had a common history, except for the brief periods of intervention from the larger Mediterranean world, does it make sense to study the Black Sea as a unit in prehistory? External observers have expressed a spectrum of opinions of the Black Sea. It has been described as an isolated and hostile region on the far-off periphery of the known world, its indigenous peoples as backward and ignorant (Braudel 1966, 110; see also King 2004, 44, 65).[2] More significantly, the Black Sea has been conceived as a frontier, the zone along a political boundary, which is characterized by harsh conditions and inhabited by distinct "frontier" communities, serving as a buffer between the civilized world and the barbarians (see King 2004, 8–11; Ascherson 1995, 8, 60–64). There is also the view of the Black Sea as a *plaque tournante* (turntable) for the empires of the Middle East, the Mediterranean and the Eurasian steppes (Bratianu 1944). At the end of the Middle Ages, for example, when the steppes between the Danube and China fell under Mongol rule and the northern branch of the overland trade route to China was reopened, the Black Sea was transformed into a focal point in European trade with Persia, India and the Far East. For a short period Black Sea trade rivalled in global importance the largest trading ports of the Mediterranean (Özveren 2001, 75; King 2004, 87–90). In the late nineteenth century, the region attained an equally important political role as a part of the "Eastern Question". Yet the most fruitful idea of the Black Sea is probably the image of a bridge. Most obviously, the Eurasian steppes represent a geographical corridor connecting inner Asia and Europe. Moreover, in historical times, major overland trade routes from Central and Eastern Asia to Europe ended at the eastern Black Sea ports of modern Azov (Tana), Batumi and Trabzon (Trapezund), while the large rivers emptying into it acted as channels leading deep into the interior of Europe. It is this unique position of the Black Sea at the crossroads of Asia and Europe that makes it more than an arbitrarily circumscribed area and a meaningful unit of analysis.

THE SOVIET SEA

For most of the twentieth century, Black Sea archaeology developed under the shadow of the Soviet empire.[3] The unchallenged explanatory framework for all historical disciplines, including archaeology, was the official ideology of historical materialism (Trigger 1989, 235 f.). The writings of Marx did not provide many clues for the study of pre-class societies. Hence, Marxist study of prehistory was constrained only by the basic principles of Marx's philosophy, especially the recognition of change in the means ("forces") and relations of production as the principal source of change in human society (Trigger 1989, 219 f.). However, since conformity to the official ideology and to the policy of the Communist Party was closely overseen, many scholars were reluctant to engage with theoretical issues, which might have easily become politically dangerous. In the later decades of the Soviet period, the compilation and description of data in the tradition of cultural history dominated in archaeology. In field practice, the primary aim of reconstructing (Marxist) history encouraged an excavation strategy with large horizontal exposures. Together with the conduction of huge long-term salvage projects in the areas of industrial construction, this practice created an enormous body of archaeological data that was never sufficiently analysed and published. These peculiarities of theory and practice in Soviet archaeology strongly discouraged the writing of syntheses.

The fall of the Iron Curtain was followed by a period of economic crisis and ethnic conflicts in the Black Sea. A sharp decrease in state funding brought fieldwork virtually to a halt (see Dolukhanov 1993). Theoretical research also experienced difficult times. The theoretical framework of Marxism became unpopular, although there were no alternative explanatory models to replace it. On one side, the archaeologists were more concerned about mere survival than about theoretical sophistication (see Anthony 1995). The sections for theoretical research were among the first to close due to financial shortages (see Koryakova 2002, 245). On the other side, the abuse of Marxism for the purposes of political indoctrination led in the later decades of the Soviet period to a veritable trend of "methodological nihilism", a deep mistrust for any involvement with theoretical issues (Rassamakin 2002b, 274). Archaeological research focused on data description, and especially on the analysis of unpublished materials from past field expeditions. Thus,

while the political and linguistic boundaries between the East and West have become less impermeable in the recent two decades, the methodological and conceptual divide between former Soviet and Western (especially Anglo-American) archaeology has yet to be negotiated.

THE BLACK SEA BETWEEN EUROPE AND THE ORIENT

This book is a comprehensive study of the Black Sea littoral in the prehistoric period, from the arrival of the first farmers in the sixth millennium to the beginning of the Bronze Age in the early third millennium BC. Its main concern, however, is the fourth millennium, the best-studied and indeed the most significant period in the early prehistory of the Black Sea.

The fourth millennium was a time of dynamic change that witnessed one of the key events in the history of the Old World: the emergence of the first urban centres in Southwest Asia. Gordon Childe described urbanization as the transformation of small self-sufficient, kin-based villages into large complex societies supporting bureaucracy, full-time craft specialists and long-distance trade (Childe 1934; see Childe 1950, with a summary). Childe was the first to call attention to the "revolutionary" character of the process of urbanisation and to its wide repercussions across Eurasia. The effects of this major event on continental Europe were further pursued by Andrew Sherratt, who focused mainly on technological innovation in food acquisition and nutrition (see Sherratt 1997a, 2002).[4] The "second generation" of plant and animal products and the new technologies of animal-powered tillage and transportation, which emerged in the urban core and reached Europe in the course of the fourth millennium, Sherratt argues, profoundly changed the economy and the culture of its neolithic inhabitants. The innovations triggered an expansion of the settled area from the river valleys into the interfluve zone and an enlargement of the pastoral sector (Sherratt 1993).

Strategically situated between the Middle East and Europe, the Black Sea might have played an important role for the spread of technological innovations during the fourth millennium BC. The aim of this study is to explore the Black Sea as a case study for the transmission, adoption and impact of technological innovation on European societies in prehistory.

THEORETICAL BACKGROUND AND CONCEPTS

"Traditional" archaeologists study past societies and their technology by describing the variation in archaeological data in time and space and making empirical generalizations. The positivist reorientation in Anglo-American archaeology of the 1960s brought about a dramatic reaction against this standard approach. Patterns in material culture were now considered to reflect behavioural responses to environmental constraints; the "processual" archaeology of the 1970s and 1980s claimed to reconstruct the processes which happened in the past by investigating the linkages between the environment, human behaviour and the material record. Material studies, not only of artefact variability but also of technological variation, were considered obsolete by most adherents of the processual school unless they could be employed in support of theoretical generalizations (see Stark 1998, 3 f.).

A recent revival of studies of past technology in itself owes much intellectual inspiration to the French theoretical tradition, especially to the school of *cultural technology* which emerged in France in the early 1970s as a collaboration between ethnologists, ethno-archaeologists and experimental researchers and was inspired by the theoretical writings of Mauss (1936) and his student Leroi-Gourhan (1943).[5] Its members advocate a "technological" approach to technology, based on the awareness of the physical phenomena that take place during technical action (Lemonnier 1992, 27).[6] They put emphasis on the exact and complete account of technological information and have developed a recording tool which treats technology not as a compilation of isolated lifeless objects but as a sequence of actions and gestures, a *chaine operatoire*.[7] Moreover, French anthropology of technology does not assume a divide between society and technology. Its proponents argue that technology is a system of actions that are guided by human choices and are embedded in a social system of meanings (see Lemonnier 1986; 1992, 86).[8] The notions about technology on which this book is based derive from the French *technologie culturelle* and from the works of Ingold (1999, 2000, 2010).

A principal concern of the book is the holistic approach to technology. Observations of living technological systems show that the practice of "extracting" single technologies and studying them in isolation does not promote adequate understanding of past technological endeavours (cf. Sillar and Tite 2000, 14; Lemonnier 1986, 151).

What archaeological analysis habitually treats as separate technological areas (for example the processing of food, clay, bone, metal and stone) is actually a set of interdependent activities. Interdependence arises simply from the fact that practitioners of different crafts share and borrow from each other strategies of raw material procurement, tools and operations. Yet more significant than these superficial links is the common mental template that underlies and binds all techniques of a particular human group. Leroi-Gourhan (1945, 340, 344–345) demonstrated that this *milieu technique* is coherent with the general mental traditions of a given society and is embedded in a specific natural environment. In a similar line, Pfaffenberger (1988, 245) argued that the analysis of technology "requires at least a working knowledge of a society's biological environment, history, social organization, political system, economic system, international relations, cultural values and spiritual life. Such analyses are by no means easy; they require nothing less than a commitment to situate behaviours and meanings in their total social, historical and cultural context. Yet nothing less will suffice if we seek to illuminate the nature and consequences of our attempts to humanize nature".

ORGANIZATION OF THE BOOK

This study begins with an overview of the natural environment in the Black Sea littoral in the first chapter. Chapter 2 introduces the notions of technology and technological innovation and considers the factors that influenced the spread and adoption of innovations. Chapter 3 offers a brief account of the key technological innovations that accompanied the emergence of farming in Southwest Asia and reviews the evidence for their spread into the littoral of the Black Sea in the sixth and fifth millenniums BC. In Chapters 4 through 7, I focus on the fourth millennium and zoom in to details to situate the technology of the Black Sea inhabitants in their environmental, social and cultural contexts. Finally, Chapter 8 zooms out to the global picture and offers a discussion about the role of the Black Sea in the transmission of technological knowledge and experience between Europe and the Orient.

1

Environment

THE VALLEY OF THE LOWER KUBAN

The delta and the valley of the Lower Kuban are surrounded by extensive lowlands, the Azov-Kuban steppe, and are affected strongly by the seasonal floods of the river during snowmelt in the mountains. Springtide in the lower course of Kuban lasts from March until July and used to transform the plain into a vast wetland intersected by numerous tributaries, old channels, lakes and lagoons. During the Soviet era, however, this ecological system was irreversibly altered by the regulation of the water runoff of Kuban, the construction of a large water reservoir and irrigation system of channels and ditches, and the establishment of extensive rice fields and fish ponds (Fig. 1.1) (Marushevsky 2003).

The environmental conditions in the Azov-Kuban steppe are more favourable in comparison to other regions of the steppe belt. Abundant water, higher and more reliable precipitation, milder winter temperatures and longer periods free of frost and deeper chernozem soils provide for sustainable farming (Ivanov and Matychenkov 1996). Precipitation reaches 600–800 mm in the Caucasus piedmont and along the Lower Kuban, while in the steppe between Kuban and Don the annual precipitation decreases to 400–600 mm, an amount comparable to that in the Ukrainian Black Sea region (Volodicheva 2002, Fig. 15.2). The modern boundary between grassland and forest lies at 500 m altitude, but during the Early and Middle Holocene the steppe zone may have reached an altitude of 700 m (Alexandrovskij 1997; 2000, 245; Alexandrovskiy et al. 2001).

The coastal lowland of Kuban does not contain strategic resources, although numerous sources of copper and silver ores and alluvial deposits of gold are situated in the mountains some 100 km to the south of the Lower Kuban. A source of cinnabar exists at Sakhala, a mine in a remote location between Gelendzhik and Novorossijsk (Alexandrovskaja et al. 2000, 112).

THE GRASSLANDS OF THE NORTH BLACK SEA

The coastal plain between the Lower Don and the Southern Bug is a vast expanse of flat land crossed by deep ravines and intersected by numerous river valleys with longitudinal direction. The seashore is very low and straight, and the rivers flow into the Black Sea and the Sea of Azov through large estuaries surrounded by extensive marshy areas. There are only two regions with higher elevations. To the northeast of the Azov Sea, the plain changes to a rolling country, the Azov upland and the Donets ridge, rising to an altitude of 200–300 m. Along the southern periphery of the Crimean peninsula, the ridges of the mesa-like Crimean Mountains rise to an average height of 700–1200 m and fall abruptly toward the sea.

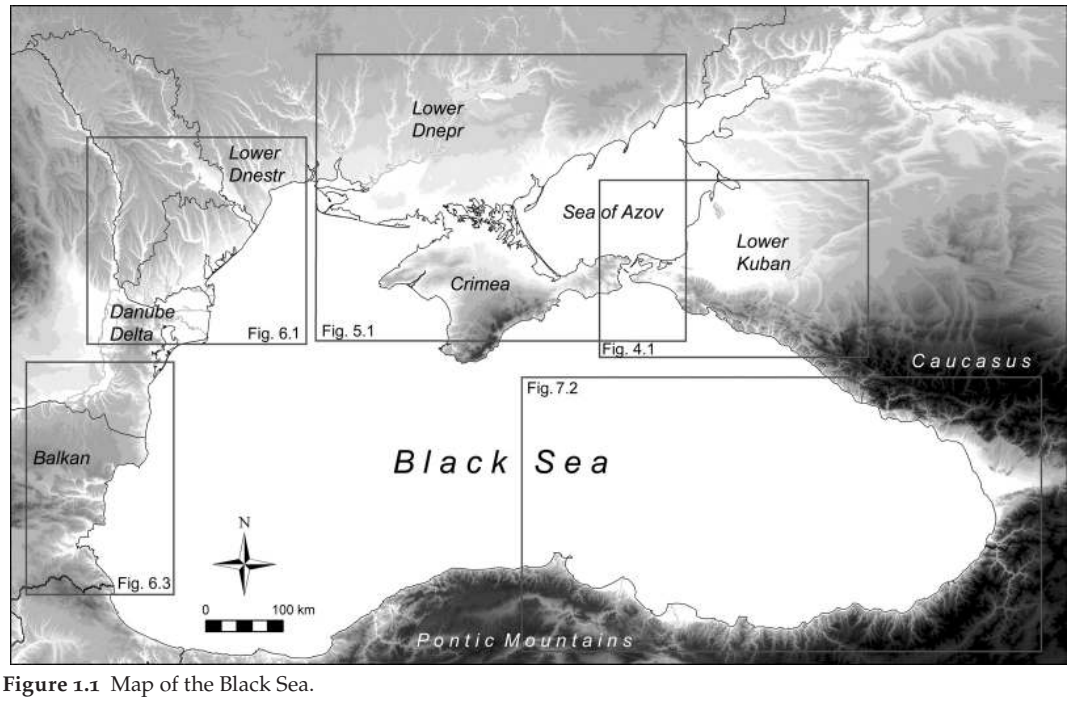

Figure 1.1 Map of the Black Sea.

The lowland north of the Black and Azov Seas belongs to the temperate dry grasslands of Eurasia, a zone characterized by continental climate with cold winters, low precipitation and high rates of evaporation. Northerly winds predominate throughout the year, and the hilly regions bordering the grasslands in the north retain most of the moisture. Annual precipitation in the steppe measures 350–450 mm, with a maximum of rainfall in June, followed by a long, hot and dry summer (Jordan et al. 2001, Table 2). Rainfall fluctuates strongly from year to year and summer winds cause severe droughts. The areas between the lower courses of Dnepr and Molochnaja and the northernmost part of the Crimea (the coastal areas of Lake Sivash) are very dry, and rainfall drops in some years to 300 mm. The low moisture supply, combined with evaporation rates far exceeding precipitation, prevent the spread of forests into the coastal plains. Trees (mainly oaks) and shrubs grow in humid areas such as the slopes of watercourses, ravines and depressions, while the mouths of the large rivers support extensive floodplain forests. The largest part of the region, however, is a treeless dry plain covered with drought-resistant grasses. The most inhospitable, desert-like region of the steppe is situated in the vicinity of the Sivash Lake in the North Crimea, whose salinized soils sustain only poor xerophytic vegetation.[1]

A notable exception of this environmental pattern is the southern periphery of the Crimean peninsula, a narrow strip of land sheltered from the cold winds and entirely different in its climate, vegetation and water supply from the surrounding grasslands. The coast of the Crimea receives annual rainfall of c. 700 mm, while the amount of precipitation at high elevations in the mountains reaches 1400 mm. The region features a sub-Mediterranean environment with cinnamonic (a variant of *terra rossa*) and brown forest soils, evergreen vegetation, densely forested slopes and abundant year-round streams and springs.

The temperate grasslands and river forests of the Black Sea used to support diverse fauna, while the coastal wetlands still represent a major station of migratory birds. Tens of thousands of waterfowl spend the winter in the marshy areas near the river mouths, especially in the large marshes of the eastern Crimea. Migratory fish, entering in spring for spawning and leaving in autumn, are abundant in the river estuaries and especially in the shallow brackish waters of the Sea of Azov. The migratory herds of large ungulates

(aurochs, saiga antelope, wild asses and wild horses), however, disappeared by the nineteenth century as a result of intensive hunting and rapid settlement expansion.

The spread of extensive farming in the nineteenth and twentieth centuries had devastating effects on the coastal grasslands and marshes of the north Black Sea.[2] In the first place, river flow regulation, the construction of huge water reservoirs and power stations during the early decades of the Soviet period, as well as the diversion of water for irrigation, deeply disturbed the natural water regime of the plains. Moreover, when crops replaced the natural grass vegetation, water and wind erosion dramatically increased and the formation of deep gullies and dust storms developed into major problems.

The north Black Sea region is generally poor in mineral deposits. Yet, the hills of the Donets ridge and the Crimean Mountains host several outcrops of mineral pigments, high-quality flint, ornamental stones and metalliferous ores. In prehistory, red mineral pigments were possibly obtained from the large cinnabar deposits at Nikitovskoe in the Donets ridge and the deposits of high-quality ochre at Izjum in the valley of Donets (Alexandrovskaja et al. 2000, Fig. 2). High-quality flint from the Donets ridge was a valued exchange item in prehistory; numerous quarries and specialized flint-working areas with huge quantities of production waste and semi-finished products dating to the fifth millennium BC have been identified near the sources, while hoards of long regular blades, retouched triangular points, prepared cores, and nodules of Donets flint have been recovered at distant sites (Rassamakin 1999, 103; 2002a, 49). Native copper and high-grade copper oxides (azurite and malachite) mixed with copper sulphides (e.g. chalcopyrite) are found in sandstones in the valley of the river Bakhmut (Černych 2003, 50 ff.; Tatarinov 1977, 193; Klochko et al. 1999). A major deposit of carnelian is situated in the Karadag ridge on the coast of the east Crimea (the "Carnelian bay"), while salt is plentiful in the estuaries of Dnepr and Bug and in the Sivash Lake (Thurmond 2006, 241; Multhauf 1978, 35). [3]

THE WESTERN COAST

The region between the mouth of the Southern Bug and the delta of the Danube acts as a narrow corridor of communication between