Introduction

A strong connection exists between large-scale human intervention in ecological systems and the history of trade. Imagine throwing a stone into a water pool and a spatial model for what I want to argue emerges. The ever widening circles represent the increasing distance over time between centres of consumption and industrial processing, and areas of production of large amounts of biomass. The more trade networks develop and long-distance trade expands, the more, to cite a phrase of Richard Hoffmann, 'human intervention was pushed beyond the limits of local ecosystems, both by creating artificial production systems and by transferring biomass and energy from distant ecosystems'.[1]

With this issue of *Environment and History* I wish to contribute to the thesis that the expansion of trade systems and the emergence of large-scale human intervention in (formerly) natural ecosystems is a continuous, interactive process with a long history, long before the Industrial Revolution or the discovery of the New Worlds. This theme, the influence of long-distance trade on natural, local ecosystems, was the topic of a workshop I organised in Amsterdam at the Free University on the 8th April 1999. I am happy to have the opportunity to present some strands of the discussion of that day in this introduction and I thank the authors for their kind and attentive cooperation.

The manipulation of ecosystems in response to large-scale long-distance trade did not come to an end with the end of the Roman Empire, nor did it start with the mass imports of colonial goods to Europe and the Industrial Revolution in modern times.[2] In the period in between, in the Middle Ages, a network for long-distance trade gradually emerged. Towns, and, from about the year 1000 onwards, urban networks were very important. As a result of long-distance trade, previously separated areas and ecosystems became intertwined.[3] Before that, religious and commercial centres like abbeys and 'emporia' may have served as laboratories where prototypes of long-distance trade developed, albeit restricted to luxury goods, without the flows of mass goods that were to characterise the later long-distance trade.

The article by John Broich presents the development of such an emporium. The town of Wolin (near Gdańsk, Poland) was ahead of its time, a large-scale trading centre in mainly luxury products, like amber, jewellery, and crafts work made of precious metals. Situated on an isle surrounded by the sea, like a castle protected by its moat, it soon exhausted its natural reserves. In particular wood and grain had to be imported from afar. Unlike towns in the later Middle Ages, Wolin may have had too fragile a trade network. It was not able to establish new relationships with new resource producing areas in response to disturbances in its life lines, disruptions which occurred due to political troubles. And since it could not fall back on local resources, it collapsed by the end of the eleventh century,

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At the end of the thirteenth century Europe was relatively overpopulated, relative to the agrarian techniques and the surface of fertile land available and hence the environment began to show signs of stress. Marginal grounds were exhausted and deserted, harvests failed, undernourishment occurred and the population may have become less resistent to illness. The Plague, starting in 1348, finished it off and reduced the population by 30 to 50%. A period of economic change and reorganisation followed. Regional specialisation of production was established according to the availability of soil, labour, energy, raw materials and geographic position, which determined for instance the possibility for water transport. The two industrial centres in the South of Europe were South Germany-Bohemia and northern Italy. In the north, industrial activities centred on the densely populated southern Netherlands with towns such as Ghent, Bruges and Antwerp.

Richard Hoffmann's article shows how by the end of the Middle Ages, the great European centres of consumption had become dependent on the mass transport of staple goods such as grain, cattle and fish from the more peripheral, thinly populated and extensively used areas of Europe, including the North and Mediterranean Seas. Those areas at the fringes of Europe thus became a very important extension of Europe's effective resource base, its 'ghost acreage' as Eric Jones called it.[4]

One of the crucial elements in the history of long-distance trade in fish, his main case study, was the development of several preservation techniques, such as salting, drying and 'kaken'. Hoffmann describes how such new techniques contributed to enhance the demand, which, to be sure, was culturally determined and socially diversified. Fresh fish was much preferable. For this reason, the European elites established fish cultures, in particular for carp, once the inland fish populations collapsed and grain production dwindled on marginal lands. Such artificial ecosystems were still the exception in Medieval Europe. The extensive type of animal production such as cattle rearing in large herds in the Hungarian steppes was more common. Yet even here changes in the ecosystems can be discerned, changes in the land and in species. In Denmark cattle production may have caused sand drift, in Hungary a new breed of cattle may have been introduced to provide beef for the middle European centres of consumption.

What happened within the boundaries of Europe in the Late Middle Ages was repeated in the Modern Period when trading relationships were established with areas of seemingly inexhaustible natural reserves: the New Worlds, East-Asia and the oceans in between. Once more, but on a grander scale, the heavily populated centres of Europe became dependent on foods and fibres from afar, in particular cereals and lumber, and commodities such as tobacco, tea, coffee and indigo. Within the urban network a separation of production and processing took place. Some areas, like the northern Netherlands with Amsterdam as its centre, specialised in processing raw materials such as sugar or salt, and redistributed

them along with other imported goods like grain and lumber. However, if one considers all cities together as a co-ordinated processing and consumption system, then the opposition between, on the one hand, consumption and industrial processing, and, on the other hand, production of raw materials remains valid and useful.[5]

The article by Louwrens Hacquebord highlights a crucial trade of the modern period that had a lasting effect on the arctic waters. Whaling was founded on some of the techniques developed earlier in deep sea fishing, as with herring in the North Sea. Staying out for weeks on end became staying out for months on end, including summering in provisional settlements near the Polar circle such as Smeerenburg (Blubbertown), which have been so well preserved that their excavated remains are very informative. Butchering whales and walruses in large numbers provided Europe with a basic commodity, oil. Whale oil was of prime importance as a lubricant and an illuminant. The oil was used to soften leather in days when the leather trades were in the front rank, before they were supplanted by rubber and petroleum based synthetics. It was applied for softening coarse woollen cloth, and constituted a base for soft soap and for paint and tar, with which to caulk and coat the planking of trade and fishing ships and houses. Its truly indispensable use, however, was for industrial lubrication: to grease ever-faster and more numerous machines. Whales were the oil tankers of the pre-petroleum world.[6] Hacqebord describes how centuries of intensive whale and walrus hunting destroyed the populations and opened a niche in the arctic waters for smaller species that feed on the same plankton as the former big mammals. The article demonstrates how human demand, satisfied through international trade, drastically altered a seemingly endless natural resource, probably into a non-reversible state.

With the article by Castro Herrera we leave Europe and see how the mechanism was repeated in the New World. The Panama Canal Zone served as a centre of population and production, that came to rely on the agrarian imports of a large, extensively used area in the southwest of Panama. In this savannah ecosystem the former white-tail deer was replaced by European cattle with all the consequences for the natural and social environment, a fascinating theme introduced by Alfred Crosby in his classic study *Ecological Imperialism.*[7] Herrera calls for attention to be paid to the contemporary outcomes of the emergence of the two divergent systems and proposes the question whether development in two different types of societies, the intensive northern and the extensive southern, can be the same.

So far the articles concentrate on sturdy materials, animals and plants. In the twentieth century we have become witness to a new form of trade good: water. In his article on the Colorado River, Evan Ward evokes how water was (and is) transported over long distances and used (and abused) in large centres of consumption. For this phenomenon, and its many social, political and economic implications, Ward introduces the term ‘geo-environmental disconnection’. In

the South-west of the United States water became a key commodity in the early twentieth century. First it served as drinking and irrigation water. Soon it became a basic commodity for leisure activities and the expanding tourist industry: gardens, swimming pools and decorative hotel waterworks. The Colorado River ecosystem, meanwhile, was destroyed and so was the local Indian culture. Since tourism is becoming the main industry worldwide, this approach demands some follow-up research.

The circles in the water, starting when the stone was cast in the Early Middle Ages, have now become very large. The influence of long-distance trade no longer reaches beyond local ecosystems, but beyond imagination.

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NOTES

[1] Richard C. Hoffmann, 'A longer view: is industrial metabolism really the problem?' Conference '99: Nature, society, history. Long term dynamics of social metabolism', Vienna, 30 September–2 October 1999, CD-Rom: presenters: Hoffmann, p. 3.
[2] Europe inherited much of the Ancient World, including environmental degradation. For examples, among others, of deforestation due to Rome's lumber and fuel demand see Donald Hughes, *Pan's Travail* (Baltimore: Johns Hopkins University Press, 1994). However, after the collapse of the Roman Empire trade had to be re-established on an entirely new base.
[3] Britta Padberg was one of the first to investigate this relationship systematically, in *Oase aus Stein. Die humanökologische Aspekte des Lebens in mittelalterlichen Städten* (Berlin, 1996) 81–93: 'Verflechtung von raümlich weit von einander entfernt liegende Gebieten'.
[4] Eric L. Jones, 'The Economy and the Environment', in *The New Cambridge Modern History* XIII, ed. P. Burke, (Cambridge 1979), 15–42, see particularly 32.
[5] Michael Chisholm, 'The Increasing Separation of Production and Consumption', in B.L. Turner II, (ed.) *The Earth as Transformed by Human Action. Global and Regional Changes in the Biosphere over the past 300 years* (Cambridge 1990), 87–101.
[6] Jones, 'The Economy', 33.
[7] Alfred W. Crosby, *Ecological Imperialism. The Biological Expansion of Europe, 900-1900* (Cambridge, 1986, 1995); Elinor G.K. Melville, *A Plague of Sheep. Environmental Consequences of the Conquest of Mexico* (Cambridge, 1994, 1997).