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*The Crisis of the 14th Century. Teleconnections between Environmental and Societal Change?*

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Richard C. Hoffmann

## Thoughts on a Connected Fourteenth Century

**Abstract:** As to be expected in collective volumes organized around a theme like this one, the concluding commentary aims to compare and contextualize the chapters. Scales, locations, sources, and methods of the studies vary but two main conclusions can be drawn: natural events are found to have had significant impacts on fourteenth-century societies; and the likelihood of some linkages among both widespread and local natural and cultural phenomena deserves continued purposeful investigation. Analytical concepts of ‘teleconnections’ and ‘crisis’ are explored and critiqued as tools for understanding this historic period. Some directions for further research are indicated.

**Keywords:** crisis; 14th century; Europe; teleconnections; environmental forces; cultural forces; historical methodologies; comparative perspectives

Fourteenth-century Europe is retrospectively diagnosed as being in ‘crisis’. Historical usage can be ambiguous, whether applying the term to catastrophic natural events of the 1310s–40s culminating in the plague epidemic of 1347–51, to the socio-economic effects of these, to politico-military disasters, or to longer-term conditions of demographic collapse, agrarian depression, commercial disarray, and cultural despair. Potential confusion hampers efforts to understand and explain. Plainly natural and cultural forces interacted, but how is this to be observed and interpreted? The editors’ introduction to this book proposes a pragmatic approach seeking interdisciplinary data sets to identify the triggers and drivers of change and response at multiple scales. When anomalous conditions extend over large temporal and spatial distances yet remain apparently parallel these ‘teleconnections’ need to be tested and explained. The core issue this book thus sets before its readers is the extent to which natural and socio-cultural phenomena in the fourteenth century may be thought independent or somehow related manifestations of larger systems.

Approaching the essays in this book as an environmental historian concerned to understand the multi-sided coevolution of medieval European society and its natural surroundings, I would identify their common and variant elements and observe how both features contribute to improved knowledge of environment-human relations in the 14th century and further directions for research. This will slide into some thoughts about the interpretive concept which hovers over the volume, namely ‘teleconnection’ and its links to historic crisis.

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After reading a work of historical scholarship it is reasonable to ask ‘What have we learned about some piece of the past?’ and/or ‘How did the author or authors use surviving textual or material remnants of the past to make truth-claiming statements about the world whence those came?’ The first answer may vary with the reader’s prior experience; the latter more depends on close reading of relevant evidence and clear argument. More than a dozen lead contributors to this book have brought various historical methods and reasoning to bear on a doubly-vexing topic, namely a great upset or hiatus after around 1300 in human societies of western Eurasia and the relative roles of human and non-human forces in shaping those events and their outcomes. As in other recently published works these authors collectively advance a decidedly more balanced engagement of natural and cultural agents in what has conventionally become ‘the 14th century crisis’. Or is it ‘crises’? Accepting nature as a historical protagonist while refusing *a priori* expectations of either cultural or natural determinates are hallmarks of environmental history research. In the introduction editors Martin BAUCH and Gerrit SCHENK described several perspectives and paradigms to explore possible interactions and outcomes.

Essays in this volume centre on the 14th century, notably its first half, and on questions of environmental variability and its impact on premodern societies. Most of the latter here were located in western Latin Christendom, but some authors bring important perspectives from that culture’s eastern margins (northeastern Europe, Byzantium) and its more distant neighbours in China. Contributors pay special attention to the period’s signature events: crop failures, epizootics, and famine ca.1315–21; widespread floods and food shortages in the 1330s–40s; the coming of the Black Death, 1347–51; a great windstorm and widespread coastal flooding in 1362. The largest group of papers – by Andrea KISS et al., Thomas LABBÉ, Tana LI, Johannes PREISER-KAPELLER/Ekaterini MITSIOU, Rainer SCHREG, and András VADAS – look for short and long-term preconditions and triggers both natural and socio-cultural. Those of Chantal CAMENISCH, Heli HUHTAMAA, and Maximilian SCHUH include critical assessments of sources from both the cultural and natural record to establish or refine parameters of events or trends. Certain writers here – Peter BROWN, Marko HALONEN, Paolo NANNI, and Maximilian SCHUH – highlight contemporary perceptions, representations, and responses to experiences of natural variability. An undercurrent thus swirls between the emic perceptions and understanding of people with lived experience of the turbulence and the etic view of present-day observers and explanations. Both approaches are germane to grasping material drivers, socio-cultural responses, and the necessarily hybrid socio-natural results.

Essential ‘take-aways’ from this book are two-fold. First are the indubitable impacts that natural events had on affected societies, in each instance more or less commensurate with the scale of the event and antecedent cultural and political structures. Does this evident fact really still require continual justification? Perhaps. While few if any working environmental historians espouse anything resembling environmental (including climate) determinism, certain widely-distributed popular writers

and some physical scientists do continue to preach mechanistic straight lines from geography, climate, weather, and even human environmental modifications to specific historical and future social formations and cultural features. On the other hand numbers of cultural analysts, medievalists among them, still purposely avert their eyes from the natural forces well known to prevail in premodern Europe. Yet neither the arrival in Europe of the bacillus *Yersinia pestis* nor the destruction of Basel by earthquake in 1356 were simply cultural constructs. So the worries NANNI and LABBÉ express in their essays may not after all be beating the dead horse perceived by colleagues working in other historiographic discourses.

Precise effects of gradual or catastrophic natural fluctuations varied with regional or local situations wherein human decisions shaped social responses and outcomes. The otherwise rather different approaches of NANNI and HUHTAMAA converge at this recognition. In the 21st century no serious student of the Middle Ages in general and their latest centuries in particular ought approach even cultural artifacts unaware of the documented environmental experience of those who created and used those artifacts. Even arguing that a particular object or behavior was apparently unaffected by material conditions of life should consider why this was the case.<sup>1</sup>

A second rich harvest to be gleaned from this book are the visible, though not invariant, connections it reveals, mainly as temporal coincidence or sequencing of specific natural or social phenomena at some or great spatial remove. These emerge with particular clarity in the explicit interregional comparisons provided by HUHTAMAA and LABBÉ, while left more tacit or inchoate in LI's work on China, PREISLER-KAPPELLER and MITSIOU on Byzantium, and the two contributions treating the Kingdom of Hungary. Could greater editorial intervention have yielded more definitive engagements with the problem of teleconnection? Some difficulties with retrospective comparison across the entire collection may be attributed to the huge differences in scale between working on China, the Nordic lands (HALONEN), and even the Carpathian Basin or southern Balkans as compared to Bresse or Florence. Taken together, though, as highlighted by the organizers and editors of this collective effort, these findings call for investigation of systemic linkages (socio-cultural or natural) and offering hypotheses of larger-scale systems, periodicity, or processual paradigms (perhaps resembling global circulation models or Victor LIEBERMAN's 'Strange Parallels'<sup>2</sup> as raised in the introduction).

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<sup>1</sup> As does Martin BAUCH, Jammer und Not. Karl IV. und die natürlichen Rahmenbedingungen des 14. Jahrhunderts, in: *Český časopis historický* 115/4 (2017), pp. 983–1011. Note, too, SCHUH's explanation in this volume for the absence of weather information in reports by English manorial reeves on the crop failures of 1315–17.

<sup>2</sup> Victor LIEBERMAN, *Strange Parallels. Southeast Asia in Global Context, c. 800–1830*. Vol. I: *Integration of the Mainland*, Cambridge 2003. Vol. II: *Mainland Mirrors: Europe, Japan, China, South Asia, and the Islands*, Cambridge 2009), initially vol. 1, pp. 85–110, and most broadly in vol. 2, pp. 49–270.

Even without substantive linkages what we here provisionally call ‘teleconnections’ remind a reader that history is not one seamless or central story but that much was and is going on simultaneously and being shaped by unique interplay of the local with multi-layered forces. Nothing in this collection is a true microhistory, but given serendipitous sources and a bold research design, one could imagine a Venetian merchant travelling the silk route a generation or two after Marco Polo to experience both the devastating flood that changed the course of the lower Yellow River in 1344 and the central Asian drought now thought instrumental in projecting the plague bacillus, *Yersinia pestis*, into the Pontic steppe and thence western Europe. He could not have known the latter connection but back in his lagoon in 1348 he’d have felt, as did Petrarch, the shock of the Friuli earth shaking on January 25. The latter event killed some ten thousand and reshaped regional trade routes; the catastrophe on the Yellow set in motion the fall of the Yuan dynasty; and the Black Death eliminated a third to a half of Europeans and cleared the ground for what Bruce CAMPBELL calls ‘the Great Transition.’ In this volume SCHREG argues that human transformation of central European landscapes helped make those high mortalities possible. Some years later, BROWN tells us almost in passing, the great windstorm that knocked buildings down upon people in England on 15 January 1362, followed a now-predictable track to drown some 20–25,000 in the *Grote Mantranke* flood of 16 January along recently drained and diked Saxon and Frisian coasts of the North Sea. Climate models now would explain the latter linkage; historical epidemiology may be helping grasp the Black Death and later plague epidemics but so far neglects other patterns of disease morbidity and mortality; and earthquakes close in time in China, in Italy, and (though not mentioned here) in Catalonia and Portugal lack comparable connective theory. So the teleconnections themselves, once recognized, elicit some potential oscillation between emic reimaginings and etic analyses.

As presently used, ‘teleconnections’ refers to synchrony but then at a second level they include possible lags. Whether they are to be expected or not may depend on what you already know. The term originated in late 19th century observations of weather and climate anomalies related to one another at large distances. Sets of these correlated, so the fluctuations were not random coincidence. Subsequent work in atmospheric and oceanic sciences worked out models and explanations, some involving stationery waves along which pressure systems move, others the patterns of zonal circulation. In both forms circulation takes time, so, for instance, sea surface temperatures in the central Pacific can serve to predict precipitation patterns in eastern North America weeks or months in advance. Hence ‘true’ teleconnections are not just correlation but not necessarily cause-effect either. All elements in some sets may derive independently from a more basic force or condition and so themselves be proxy indicators of an underlying driver. The 1362 storm pertains to a certain path of the North Atlantic Oscillation but wind in interior England hurt only people unlucky enough to be near unstable structures, while wind and tide from certain directions drives the North Sea on to coasts of the German Bight where human societies had

replaced thinly inhabited marshes with dense agricultural settlements. In geological terms the storm was everywhere a catastrophe (a sudden and violent event), but prior human actions made it a disaster.

Repeated contingency chains may extend well beyond climate to teleconnect biological and cultural phenomena. For example, mercury concentrations in 2000 years of datable remains of southern elephant seals (*Mirounga leonina*) from bottom cores in an Antarctic lake fluctuate by up to 25 percent above or below the long term mean, peaking during centuries when Mayans and Tang dynasty Chinese were mining much gold and silver (ca.750–900), during times of high silver extraction in medieval Europe and the Andes (ca1200–1500), and again when Spain took vast quantities of precious metals from Mexico and Peru (1650–1800). Intervening low mercury levels coincided with the collapse of Rome and Han China, civil strife in Mesoamerica and China, and the initial Spanish conquests in the Americas, all of which curtailed mining activity. Joining these apparently and widely separate phenomena was global circulation of methyl mercury from refining processes in Asia, Europe, and the Americas to surface sea water of the far Southern Ocean and bioaccumulation in the squid, fish, and krill consumed by seals and penguin species.<sup>3</sup> Close historical reading would, however, note the lags between curves of mining activity and contamination in the seals. Transport and bioaccumulation of pollutants at locations far from their emission are slow to take effect and so, too, the lowering of levels after production fell.

Without going deeply into the literature, it seems for now that Victor LIEBERMAN brought the concept of teleconnection into historical scholarship in the first 21st century decade. His *Strange Parallels*, however, works not only with some fairly general notions about medieval climate regimes but also with correlations across parallel stages of state formation. Benign medieval weather patterns at both ends of Eurasia, though differently beneficial to distinctive local agroecosystems, let certain socio-political communities emerge. Mechanisms, however, remain unclear. Teleconnections gained more explanatory power in CAMPBELL's *Great Transition*, which, working at the smaller scale of Latin Christendom ca1250–1450, relies more explicitly on climate-biology-economy linkages and repeatedly leaves room for contingent human responses to resulting conditions. CAMPBELL may further be responsible for introducing systemic lags into his explanatory system.

In some respects the papers in the present collection may be thought an initial research response to the CAMPBELL synthesis. Other than their shared engagement with interlocking narratives of key events in the 14th century, contributions range from explicit to tacit attention to temporally-related anomalies in environmental and economic conditions across Europe (or even Eurasia) to those which ignore the

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<sup>3</sup> Liguang SUN et al., A 2000-year record of mercury and ancient civilisations in seal hairs from King George Island, West Antarctica, in: *Science of the Total Environment* 368 (2006), pp. 236–247. Cores with much seal dung or penguin excrement show similar patterns.

teleconnection paradigm entirely for other ways to relate human engagement with natural phenomena. Among the latter HALONEN may be the most unorthodox in trying to document what appear to be shifts in how Italian and Nordic writers saw, defined, and dated the start of seasons, an important reminder that seasonality is in practice more a matter of biology and cultural activity than astronomy.<sup>4</sup> In a very different way PREISLER-KAPPELLER and MITSIOU provide a thorough overview of the *status questionis* regarding climate and culture in the disintegration of the Byzantine empire. While exhibiting great care to avoid simple causal connections from climate change to politics, their paper may also demonstrate the difficulty of arguing complex interactions in a situation of sparse information both environmental and socio-economic. There remains a great difference in scale between highly localized palaeoscientific records and the fragmentation of a society and polity.

The task of identifying potential teleconnections demands in the first place precision respecting time and place, each appropriate to the scale of the event. Contributors to this volume draw on a compelling diversity of sources and acknowledge that all need *critical* assessment and use. Control of medieval dating practices and toponomy are but a first step, followed by considering the rhetoric and purpose of the writer (or present-day palaeoscientist). The purpose is always to recognize the limits to what may reasonably be inferred from any well-considered source materials. SCHUH provides in this volume an especially plain example of necessarily close reading in remarking the difference in the Winchester Pipe Rolls between clear documentation of flooding because it affected returns from specific meadows and pastures while manorial officials had no need to document widespread weather-induced declines in cereal yields.<sup>5</sup> At a different level of enquiry, researchers must remember not to conflate evidence of a plausible effect (e.g. food shortages) with evidence of particular potentially causal conditions (e.g. weather or ‘climate change’). NANNI’s argument that market conditions, not weather, brought about most episodes of cereal price inflation in 14th century Florence is an important reminder of this critical distinction, namely that circular reasoning must be avoided.

Once an event, experience, or trend is identified, context becomes essential. Are the observed conditions normal or anomalous in surrounding territories and/or decades? LI asserts that the repeated catastrophes of late 13th-early 14th century China were plainly unusual and the richness of documentation convinces. We could, on the

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<sup>4</sup> The HALONEN paper deserves emulation by examining calendars from Britain, France, Spain, and the Empire, which will allow better judgement of any possible patterns. As HALONEN rightly points out in this volume by the end of the Middle Ages defects in the Julian calendar make seasonal dates deviate by more than a week from the Gregorian calendar now in use. Assessing the date of natural seasonal phenomena (phenology) must take this discrepancy into account.

<sup>5</sup> A highly relevant review and critique of long-term plague data sets and their digital access appears as Joris ROOSEN/ Daniel R. CURTIS, Dangers of Noncritical Use of Historical Plague Data, in: *Emerging Infectious Diseases* 24/1 (2018), pp. 103–110.

other hand, assess patterns in winter severity in central Europe had we records of river ice at sites on the Rhine, Elbe, and upper Danube, but cannot usefully do so from but occasional mentions in narrative sources. Clear identification of the potentially linked phenomena needs to precede assertion of the connection. As well-illustrated in the contributions, potentially linked phenomena range widely:

- Material or physical records start with weather (temperatures, precipitation, wind) and its effects (floods, droughts, material damage), but can also catalog medium-term consequences of tectonic or volcanic events.<sup>6</sup>
- Biological phenomena such as biomass production (wood, wine, grain, animals domestic or wild), seasonality, habitat, and range often lag due to the periodicity of reproduction and growth as well as differential susceptibility of the life stages.<sup>7</sup>
- Cultural (human) fluctuations can be material, i.e. aspects of economic life writ large (prices, tolls, rent receipts, building constructions) or symbolic, the latter commonly separated in medieval Europe between ‘high’ intellectual or artistic activities and those of ‘popular’ culture. LABBÉ documents contemporary awareness of a close connection between weather events and economic facts at the local level in Bresse, with social consequences emerging only in subsequent years.

Scale inevitably matters. The geological time wherein tectonic and volcanic events may be teleconnected dwarfs the temporality of human victims. Historians have become habituated to telling climatologists that what matters at planetary or hemispheric scale may not be all that important in Bresse, or vice versa. Whereas violent weather (or human conflict) is always damaging, there is no *a priori* ‘bad’ or even ‘deteriorating’ climate; assessment depends on local/regional conditions, expectations, and adaptations. This makes the search for local environmental events and their impacts undertaken by KISS, by VADAS, and by CAMENISCH critical to understanding socio-cultural responses. At levels of both sources and interpretation interdisciplinary knowledge is essential, exploiting different approaches to the same complex past. But when even the best preserved source-based data fails, wise scholars submit to the proverbial Scottish verdict, ‘not proven’. Should one want to hypothesize – the

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<sup>6</sup> The latter can lag or be intermittent for three to ten years; clusters of eruptions amplify and extend these effects. See Richard B. STOTHERS, Climatic and demographic consequences of the massive volcanic eruption of 1258, in: *Climatic Change* 45/2 (2000), pp. 361–374, here p. 370; Clive OPPENHEIMER, *Eruptions that Shook the World*, Cambridge 2011, pp. 53–76, 260–267 on the ‘pulse’ of volcanism in the second half of the 13th century; Michael Sigl et al., The history of volcanic eruptions since Roman times, in: *PAGES Magazine* 23/2 (2015), pp. 48–49.

<sup>7</sup> It takes two to three consecutive years of favourable conditions for successful locust reproduction to become dense and produce migratory swarms. After a cold spring in the North Sea causes failure of that year’s class of herring (*Clupea harengus*) larvae, three to five years later the missing mature fish result in low catches. An interval two or more times longer than the herring is needed to rebuild herds of draft oxen killed by rinderpest.

‘unexpected connection’ – readers reasonably anticipate reference to the kinds of information, now lacking, needed to test the hypothesis.

If ‘teleconnections’ are a new interpretive idea and, given appropriate operational definitions, can highlight potentially demonstrable sets of empirical ‘facts’ to be explained, ‘crisis’ has arguably become shopworn in historical discourse. This is no venue to reiterate philosophical critiques of the concept<sup>8</sup> other than to point out recent decades’ debasement of the word’s meaning to the level of ‘a bad situation.’ Identifying in putative crises a critical phase, tipping point, loss of confidence, and eventual historically immanent transition – or lack of same – may be useful for large comparative purposes, but in any given historical situation helps little to identify key variables, drivers, and consequences.

How is ‘crisis’ used? How, in particular, does a researcher decide if s/he had a ‘crisis’ in order then to discuss causes, effects, responses, or the like? Is it a crisis if visible only in historical retrospect? Or ought this diagnosis be treated as an emic proposition determined by what people in the past felt/said they were experiencing?

Contributors to this book are quite circumspect. Several (LI, SCHREG, SCHUH) speak instead of ‘disasters’, vulnerability, or environmental impacts. More seem to think of specific episodes. In chronological sequence LABBÉ finds the crop failures of 1315–22 to be a crisis which resulted in a ‘depression’; NANNI shows Florence to be subject to ‘general crises [plural *sic*] in food supply’ which accumulated as repeated local famines; KISS has bad harvests and food shortages producing ‘multi-year crises’ in lands of the Hungarian crown; while BROWN sees the 1362 storm as a ‘short term crisis.’ HUHTAMAA has the most elaborated process with weather plus warfare plus the Black Death pushing western Europe to a tipping point for a ‘pan-regional crisis’ to which the different social ecology of the northeast was largely immune. The larger scale is also where PREISLER-KAPPELLER/ MITSIOU approach the ‘fatal Byzantine crisis’ of early 14th century politics and CAMENISCH locates the confluence of socio-economic, politico-cultural, and demographic crises in the west. Readers with methodological propensities will want to puzzle over the investigative or other role this concept best serves in confronting the indubitable shocks, disruptions, and destruction many 14th century Europeans suffered, endured, or overcame. Insofar as these experiences and outcomes did extend across large territories, are they

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<sup>8</sup> See Richard C. HOFFMANN, *An Environmental History of Medieval Europe*, Cambridge 2014, pp. 345–347, and more analytically J. B. SHANK, *Crisis: A Useful Category of Post-Social Scientific Historical Analysis?*, in: *American Historical Review* 113 (2008), pp. 1090–1099. A.T. BROWN/ Andy BURN/ Rob DOHERTY, *Coping with Crisis: Understanding the Role of Crises in Economic and Social History*, in: BROWN/ BURN/ DOHERTY (eds.), *Crises in Economic and Social History: A Comparative Perspective*, Rochester 2015, pp. 13–14, are more comfortable with ambiguity. Less attentive to epistemology as such are Daniel R. CURTIS, *Coping with Crisis. The Resilience and Vulnerability of Pre-Industrial Settlements*, Farnham 2014, and contributors to John DRENDEL (ed.), *Crisis in the Later Middle Ages: Beyond the Postan-Duby Paradigm (The Medieval Countryside 13)*, Turnhout 2015.

now creatively grasped as teleconnections manifesting a deeper systemic malaise or as diverse societies confronting comparable local problems of perhaps mainly climatic origin?

Historical research and interpretation can start from the event, in this case commonly a natural occurrence or change of trend, and seek to learn its consequences or from certain socio-cultural phenomena and work back to their preconditions and triggers. Both approaches have their risks, the first an inclination toward fallacious *post hoc, propter hoc* reasoning and the second to failure of imagination or mindless adherence to the doctrine of social phenomena arising from social causes. Can teleconnections do more than confirm that a lot is going on at the same time and become a tool for understanding long-range relationships? Contributions here offer the germ of some ideas for interactions but not yet a shared sense of what is being sought or what purpose or use it might serve. Has simultaneity itself any significance? What more can it reveal about European and Eurasian antecedents to the Great Transition? Gaps in the coverage of essays in this book suggest testing these propositions on local and regional data from the Low Countries, Iberian peninsula, and heartlands of the medieval French kingdom. Weather patterns (day to day climate on the ground) seem less well known for medieval Mediterranean Europe. What strange parallels may link Castile, Naples, and peninsular and archipelagic Greece in, for instance, the transition to the Little Ice Age?<sup>9</sup>

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<sup>9</sup> Surely it is time to activate the static natural stage setting for human actors constructed in Fernand BRAUDEL's *The Mediterranean and Mediterranean World in the Age of Philip II*, transl. Siân REYNOLDS, 2 vols. (New York 1972), vol. 1, pp. 25–102, 231–275, and even in Peregrine HORDEN/ Nicholas PURCELL, *The Corrupting Sea. A Study of Mediterranean History*, Oxford 2000, who rather elide the millennium from late antiquity to the high Renaissance. A. T. GROVE/ Oliver RACKHAM, *The Nature of Mediterranean Europe. An Ecological History*, New Haven 2001 may point the way.