Chinese Annals of History of Science and Technology **2** (2), 001–010 (2018)
doi: 10.3724/SP.J.1461.2018.02001

Cropscapes and History

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Abstract: In this essay I introduce "Moving Crops and the Scales of History," an experimental project that proposes a new method for writing global history. Crops are a very special type of human artifact or technological product: living organisms literally rooted in their environments. Explanation of their historical trajectories therefore offers special challenges and opportunities. Working at the intersection of global history, agricultural history, and the histories of science and technology, "Moving Crops" develops the concept of cropscape to explore the dual nature of crops as rooted and moveable things, reconnecting local and global in history.
Keywords: cropscape, crops, global history, history of technology, history of agriculture

Global history, with its emphasis on encounters and flows, has brought many important new insights to the history of science and technology. Yet the focus on traveling and encounters, on knowledge and commodities on the move, tends to distract us from another equally important dimension of historical process, namely, that expertise and artifacts continue to evolve locally, in their place of origin—and that this too is an essential dimension of the global history we seek to trace.

How might we more effectively connect global and local histories of science and technology? In this essay I present an experimental project (and forthcoming book), "Moving Crops and the Scales of History," in which we seek to develop a new method for writing global history that embeds the local in the global. The "Moving Crops" project is a collaboration between four historians from Asia, Europe, and North America.[2] All of us are historians of science, technology, and agriculture; as a collective, we combine a spectrum of expertise from dryland and wet-rice systems in imperial

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2 In addition to myself, our team includes Barbara Hahn, Texas Tech University; John Bosco Lourdusamy, IITM (Indian Institute of Technology, Madras); Tiago Saraiva, Drexel University. Our project is hosted by MPIWG's Department III, directed by Dagmar Schäfer, and we gratefully acknowledge this indispensable support. We began our collaborative research in 2016, and we plan to submit the completed, co-authored book for publication in 2019.

China to American tobacco plantations, the Indian tea industry, and the breeding of "fascist pigs" in 1940s Portugal.[3]

We very deliberately chose "crops" as our medium for pursuing our goal of re-connecting the local and the global, through the lenses of technology and science, but also of materiality and of scale. Crops are a very special type of human artifact or technological product: living organisms literally rooted in their environments. Explanation of their historical trajectories therefore offers special challenges and opportunities. Working at the intersection of global history, agricultural history, and the histories of science and technology, we selected crops as our device to rethink narratives of global circulations because they are a very special type of technological artifact.

In order to examine and explore the entangled dynamics characterizing the transfer, adaptation or reproduction of crop-systems, we developed the concept of "cropscape" to explore the dual nature of crops as both rooted and moveable things, reconnecting local and global in history. By cropscape we denote: *the heterogeneous elements or actors assembled in a specific spatial and chronological location in order to make and grow that crop: plants, people, ideas, skills, tastes, environment, equipment, labor, pests, markets, etc.*[4]

1 Why crops?

Unlike most other human-made artifacts that feature prominently in the accounts of flows, exchanges, transfers, and appropriations typical of global history or history of technology, a crop-plant is something special, a life-form that is rooted in and adapted to a local ecology, developed within a particular social context. There is no guarantee that it will either survive uprooting or prosper if transposed to a new environment. Furthermore, in a helpful corrective to the narrow span of material engagement characteristic of much global history, and indeed history of technology,[5] as human-prompted life-forms crops oblige us to reckon seriously with the specifics of their materiality, its affordances and resistances, and how these affect movement, growth, and the creation or loss of meaning as crops move in various ways—or as they stay in place.

3 For the specializations just listed, see Bray 2007; Hahn 2014; Lourdusamy 2004; Saraiva 2016.

4 See https://www.francescabray.co.uk/cropscapes/ for examples of cropscapes contributed by ourselves and others.

5 See the critiques by, for example, Ingold, Bray, Timothy LeCain on why matter matters: Ingold 2007; Bray 2013; LeCain 2017. In both global history and history of technology we find that a narrow and impoverished notion of material engagement prevails, focusing narrowly on those technologies like transport, energy, arms, or telegraphs, that played recognized roles in modernization. Where tracing the history of commodities is concerned, the analytical turn towards consumption, emphasizing markets and meanings, tends to distract attention from the material conditions of production and their impact on the nature of the commodity.

The specific characteristics of crops, inseparably natural and social, inescapably material yet inherently symbolic, at once rooted and mobile, suggest many fruitful new ways to engage with historical movement, and with the relations between mobility and rootedness. Our project examines how cropscapes emerge and evolve, and how they move (or fail to move), sometimes as whole assemblages and sometimes as separate elements: a crop species, a mode of cultivation, an expertise or an associated life-form, an institution or a motivating ideology.

Plants move in various senses: growth and decay, movement across distances and periods small or large. Movement is inherent in the growth, survival, and evolution of individual plants and plant communities: with or without human intervention, plants are continuously on the move through space and time.

Crops are plants that collaborate with humans to move in particular ways. Crops are species or varieties deliberately selected and located in selected sites by humans. Yet like all life-forms that humans seek to control, they have their own preferred patterns of spatial and temporal behavior and innate propensities to vary, and they are endowed with their own agency and capacities for resistance.

Making a plant into a crop, that is to say, a regimented plant-form with features useful to humans, that will yield sufficient output to make production and distribution worthwhile, and that can be reliably reproduced from one year to the next, is a struggle requiring continual inputs of resources and ingenuity, not to mention ingenious and often brutal systems of exploitation. Making a familiar crop thrive in a new place is even more challenging, and may likewise involve considerable material or symbolic violence—or love.[6]

When humans began domesticating plants, turning them into crops, one tactic was to restrict movement: selecting, for example, for cereal strains that did not shed their seeds, and segregating the preferred plants spatially (thus creating weeds!). But at the same time they wanted their crops to be mobile: they wanted to plant them in new fields, different ecozones, or newly conquered territories, and to exchange them with trading partners. Over the roughly ten millennia since plants were first domesticated as crops, hunter-gatherers, nomads, migrants, plantation owners and landless peasants, empires, colonial and post-colonial governments, and transnational agribusinesses have all been in the business of moving crops.

This is a history littered with failures and unintended consequences, but also with spectacular transformations of landscapes and lifestyles. In explaining the history of the early-modern and contemporary world alone, historians have identified crop

6 By love, we denote a spectrum stretching from the attentions of bees or the human care that goes into cultivating a field, to the passionate attachment of human and non-human actors to a crop itself, or to the kind of cropscape that it promotes. Love and violence are often the opposite sides of the same coin.

movements as a key foundation and trigger of economic development and geopolitical transformation, from the quick-ripening Champa rice-varieties introduced into eleventh-century China, to the Columbian exchange, the rise of the colonial plantation economy or the 1960s Green Revolution, judged by many "the era's most significant phenomenon."[7]

The power attributed to these movements reflects the long-standing and pervasive belief that around a seed not just a crop but a whole social landscape, a realm of values or memories or proper social relations, will sprout: whether it be Catholic monks hewing out fields of wheat and vines along the coasts of New Spain as territories fit to nourish the true faith; enslaved Africans or destitute European peasants tucking seeds or slips of familiar foodcrops, tastes of home or tastes of freedom, into their bundles as they boarded ship for the Americas; or the conviction shared by medieval Chinese emperors, French colonial governments and Green Revolution scientists alike that promoting intensive rice-farming would trigger a whole process of civilizing the indigenes and making them into productive citizens (Morrisey 1957; Carney 2001; Carney and Rosomoff 2011; Bray et al. 2015). In our terms, these projects were intended not to move individual crops, but rather, to reassemble desired cropscapes.

2 How do crops move? The cropscapes perspective

The "cropscape" is the flexible, multi-focal unit of analysis that we propose for investigating the movement of crops and the socio-material systems within which they are embedded. We derive the concept of "cropscape" from that of "landscape." As used by critical archeologists, the landscape is not a natural fact but a historical and political product in continual flux, the outcome of multiple simultaneous engagements between humans and other humans as well as between humans and the land, contested and continuously evolving fields of action. Where the archeologist or historian then chooses to *frame* the cropscape, what to include or exclude, and what level of focus to bring, is a consciously political as well as epistemological choice: different boundaries or axes put different actors and factors in the limelight, and produce different stories.[8]

As already mentioned, by cropscape we denote a dense web of places, things and people competing or collaborating, an *assemblage formed around a crop*, the heterogeneous elements or actors brought together in a specific place and time *in order to make and grow*

7 Zeng 2018, 255-265; Crosby 1973; Earle 2012; Decker 2009; Curtin 1990; Kumar et al. 2017. On the earlier foundations of the 1960s Green Revolution, in Europe, Japan, Latin America and the Southern United States, see Harwood 2012; Harwood 2018; Soto Laveaga 2018.

8 The original political-historical theory of landscape was proposed by the cultural Marxist Raymond Williams; see Williams 1973. The concept was later developed by radical archeologists including Barbara Bender; see Bender 2001.

that crop. Cropscapes are dense webs of places, things, ideas, and people competing or collaborating. As we conceive them, cropscapes are not objects with strictly defined boundaries and components, but choices about ways of seeing and of looking. The concept offers a multi-focal, multi-scale *framing device*. Confronting or superposing different framings unsettles established accounts and calls into question assumptions about scale and scope, the relative significance of different actors, directions of flow, linearities of change or patterns of causation.

In examining how cropscapes emerge and evolve, grow, change and decay, travel or fail to travel, we may choose to look at a crop and the cropscape in which it is embedded at the scale of the field, the state or the market; or on a time-scale of diurnal or seasonal cycles, of plant, pest or human life-cycles, the passage of months or of centuries. Each perspective, each choice of scale engages different sets of actors, human and non-human, material and institutional, highlighting often unconsidered long- or short-term trends or periods in their historical change, oscillations, tensions, and counter-intuitive shifts. Playing with cross-cutting scales can thus help spotlight the theoretical or ideological assumptions woven into different choices of scale and boundary-setting.

The "Moving Crops" project follows STS (Science and Technology Studies) in relativizing without discounting the place of humans as actors. Humans figure in an environment they have helped create, but the cropscape can be observed, framed, and analyzed from many different perspectives or vantage points, not all of which place humans at the focal point or even in the foreground (Callon 1984; de Laet and Mol 2000).

The axes along which we rework the evidence from crop history in our forthcoming book constitute six dimensions or registers of mobility inherent in cropscapes, all of which play a key role in theorizing the impact of crops on history: "Time," "Place," "Size," "Actants," "Compositions," and "Reproductions." These are the chapter themes around which our forthcoming book is structured. Within each chapter we counterpose a set of cases, deliberately contrasting cropscapes from different periods and of different scales.

How have we selected our cases? Rather than aiming at exhaustive coverage, we aim to intrigue, to surprise, and to illuminate through contrast by juxtaposing different framings. We include crops such as wheat and cotton that are recognized as centrally important in global history and the emergence of modern capitalism, but we give equal prominence to supposedly "minor" crops like millets or cashews, to domesticates seldom considered as crops even though they are cultivated as such (tulips, yams, or marigolds, for instance), and to actors and interactions which typically escape our attention as crop historians or as global historians (elephants as both builders and destroyers of plantations; the relations between weevils and cotton "futures").

3 Cropscapes in action

Let me illustrate with the first chapter in our book, "Times." In "Times" we use the concreteness of cropscapes, and the elasticity of their histories, to question and experiment with time-scales, periodizations, and temporalities.

Dates, our first case in "Times," are good things to think with to complicate our notions of *longue durée* and long distance. They also bring into question conventional distinctions between pre-modern and modern. Date palms (*Phoenix dactylifera* L.) serve as pioneers in desert lands otherwise hostile to crops: other trees will grow under their canopies, and once they are established wheat and barley can also be grown (Tengberg 2012a; Tengberg 2012b). To establish a date-grove is to settle the land, rooting a cropscape and its relations of power. In a constellation of labor and capital evocative of nineteenth-century Western colonial and capitalist modes of production, extraction, and distribution, the medieval date plantations of the Saharan oases were speculative investments funded by merchant capital from the great port cities of the Arab Mediterranean, built and maintained by slave labor imported from the southern African states, and provisioning a far-flung inter-imperial network of commodity trade (Mattingly and Sterry 2013; Scheele 2010). The date-groves established in late-nineteenth-century California were, paradoxically, part of a project to reduce or eliminate dependency upon Mediterranean imports, closing the United States off to free-trade (Krueger 2015; Seekatz 2014). Thus standard world history narratives of East to West, old world to new world, local traditional agriculture to global capitalism are all thrown into question by the history of dates and their cropscapes.

Our second case is tobacco in Virginia between the seventeenth and the twentieth centuries, an excellent example of how domestication reshapes the "nature" and temporalities of a plant in making it into a crop (Hahn 2014). When tobacco was first cultivated commercially by European colonizers in Virginia, they harvested leaves through the year and also picked leaves from the new shoots (ratoons) that grew up after the plant was cut down. The sale of second growths was forbidden by the Inspection Laws of the 1720s, after which colonists learned to treat the plant as an annual. This human-controlled life-cycle of the plant created harvest imperatives assumed by the historical actors to be natural, dictated by the plant. After emancipation in the 1860s, new forms of labor contract and credit arrangements took shape that again were supposedly matched to the natural characteristics of tobacco. But comparing these successive tobacco cropscapes clarifies that their calendars were always a human product, rather than the natural expression of the plant's life-cycle. It also points to the importance of standardization and regulation as forms of control that "civilized" humans while stabilizing and specifying the crop itself.

Our third case looks at different ways in which humans have manipulated the life-cycle of rice in order to increase its output (Bray 1994; Bray et al. 2015). Sometimes, as with the case of ratooned rices, this has involved extending the life-cycle. More often, it has involved abbreviating it to produce multi-cropping varieties. The temporalities of the crop-plant affect the historical dynamics of its cropscape. The deep history of ricescapes in East Asia offers an excellent opportunity to observe the material, social and historical impact of quick-ripening cereal varieties over many centuries, long before the scientific breeding programs of the Green Revolution. Along with a recent revival of ratoon-rices, the contributions of long traditions of quick-ripening or high-yield rice-breeding in East Asia to modern breeding programs, including those of the Green Revolution, prompt us to reflect upon intersections between supposedly distinctive "pre-modern" and "modern" systems of knowledge and practice. Here we cast a critical gaze on the importance of "rice as self" or "rice as civilization," both for historical actors and for historians proposing models of historical change (for example "Asian despotisms" or "agricultural involution" vs. "industrious revolution") (Ohnuki-Tierney 1994; de Vries 2011; Bray 2013).

The story of millets in China, the northern cereals upon which early Chinese civilization and its cultural and institutional legacies were founded, provides a very different angle on crop essentialism. Very briefly, from around 800 CE millets lost their material importance as the major staple, yet retained a latent symbolic power and place in state rituals. Today millet is undergoing a revival in wealthy urban China as an "authentic," healthy and environmentally sustainable grain. Millet in China offers an excellent example of the long cultural and political afterlife of a crop and its cropscape, moving like a cultural capsule through time though stationary, or rather contracting, in space.[9]

Our final case in "Times" looks at oranges and the uses of history for creating a cropscape, and of a cropscape for introducing knowledge of a civilization. It explores how the agricultural botanist W. T. Swingle, a key figure in naturalizing oranges in the United States and building its citrus industry, decided that in order to succeed his citrus-breeding project must be rooted not only in the latest findings of modern plant science and agronomy, but also in the long-established and sophisticated repositories of technical knowledge from China and Japan, where so many cultivated citrus types originated. In pursuit of his goal of tracing citrus expertise to its source, and placing it in its broader civilizational context, Swingle became an Orientalist. He assembled an important collection of Chinese and Japanese documents, including works of history and philosophy as well as agriculture and materia medica, which he donated to the Library of Congress. Swingle was an eloquent and effective exponent of Chinese

9 Bray 2007; Sigrid Schmalzer on Wangjinzhuang, in Kumar et al. 2017.

civilization at a point when interest in sinology was still barely stirring in the United States (Webber and Swingle 1906; Library of Congress 1920).

In sum, the sequence of cropscapes in our chapter on "Times" demonstrates what can be learned by playing with temporalities, setting the micro against the macro to highlight processes often unacknowledged in broad-brush global history accounts. In re-framing the history of Virginia tobacco or East Asian rice, for example, around successive human manipulations of the crop-plant's reproductive cycle, our cases highlight crops as highly contextual encapsulations of science and technology, contingent embodiments of skill and knowledge in which the human ambitions and needs of the moment are veiled as the plant's "natural" characteristics. Finally, the cropscapes in our chapter on "Times" successively call into account some of the most cherished narratives in modern social theory about Big Civilizations: here the cropscape lens serves us to identify the work that the concept of civilization did for our historical actors.

4 Conclusion

"Moving Crops" provides an experimental approach to writing the history of complex systems that produces not a new grand narrative but a method. Although "Moving Crops" focuses on one particular product of human technological intervention, the crop-plant, and the assemblage (the cropscape) within which it is embedded, we believe that the method we develop is applicable to any of the other material artifacts or commodities that are the stuff of global history. Our micro- and macro-histories of changing cropscapes, while being the result of an intense engagement with the local, also unveil long distance connections in time and space, suggesting new opportunities for incorporating mobility, materiality, and science and technology into the writing of global history.

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