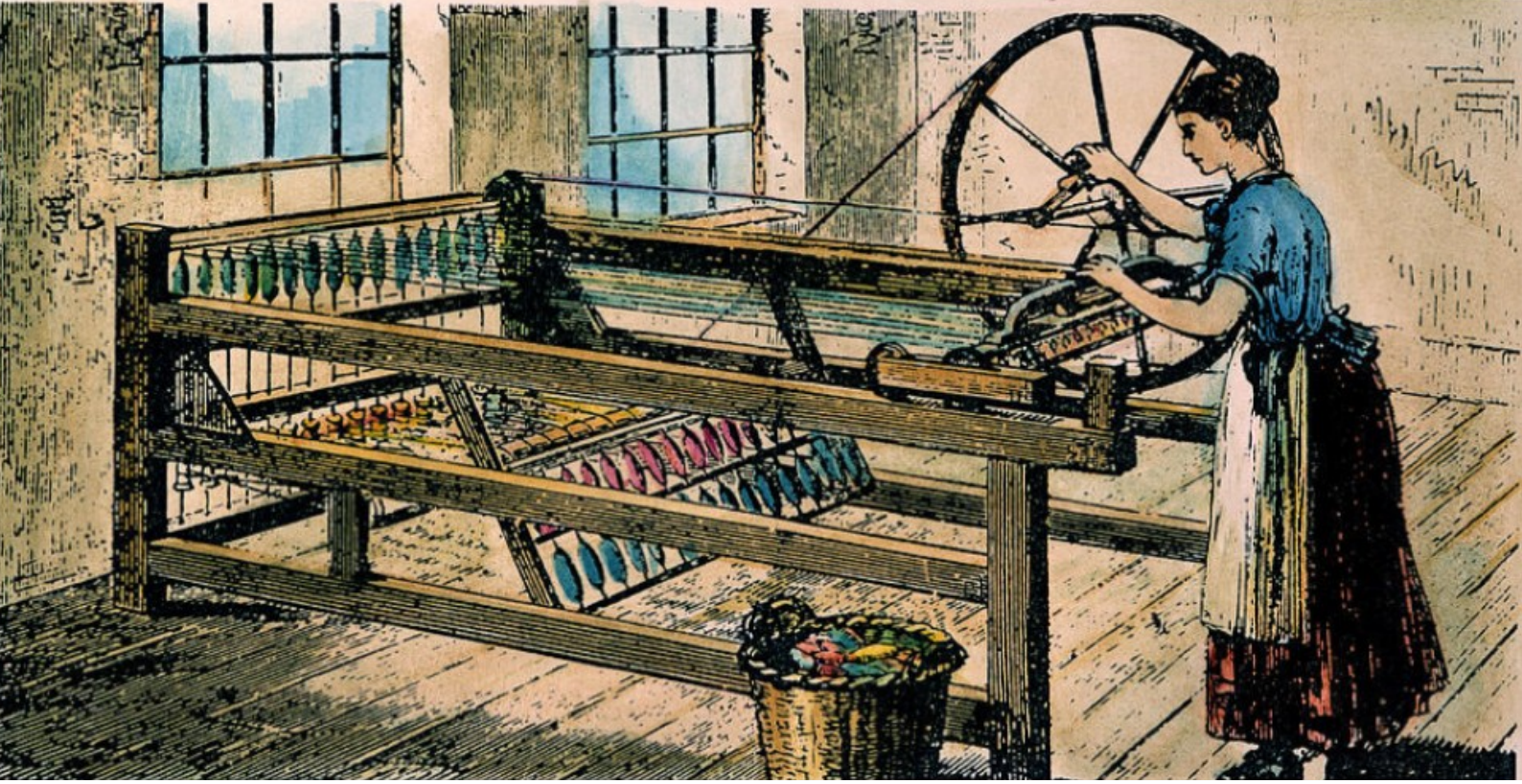

Call for papers

DIJON, 16-17th NOVEMBER 2020

CRANK HANDLES: A MUSCULAR HISTORY OF INDUSTRIALIZATION

(XVIII th -XXI th centuries)

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The crank handle is an apparently simple device, so simple that its historical study seems to stop when industrialization begins[1]. In the middle of the XXth century, André-Georges Haudricourt, is one of the few to take an interest in it. He observed that historians see engines in use only when it is steam powered. But "there is another engine, whose history we ignore: the human motor, and it is of singular interest. We should not assume that gestures that appear so simple to us are immemorial: in fact, they have varied over the ages, – they have influenced the machines they were powering, and in return suffered the influence of them" (Haudricourt, 1940, pp. 131-132).

Although first cranks were powering small hand mills in order to grind grains, during the XVIIIth and XIXth centuries, they begun to be applied to an increasing variety of mechanical devices. The first industrial machines did not run on coal and steam but on muscles and cranks. The crank handle was a cost-effective way to increase the force provided by humans, and the industrialization was less about large factories than about the intensification of humans and animals’ work. In the textile sector, the crank is the first motor of industrialization, it is the one that drives the new machines such as James Hargeaves’ spinning jenny. Thanks to the crank handle, women or children with little or no experience could be put to work in factories[2].

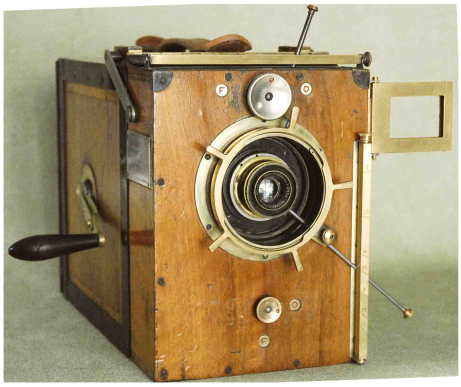
One of the aims of this workshop will be to highlight the modernity of the crank handle in the XIXth century and its central role in the history of industrialization. The crank handle is part of modernity: it benefits from the progress of mathematical physics —which allows to calculate the optimal size and weight of flywheels for instance— and from the advances of metallurgy and engineering (reduction of the price of steel, improvement in the precision of gears, worms drive, reduction of friction, etc.). Just like steam engines, the human motor, by gaining in efficiency, gains in utility and therefore in opportunity of use. The crank does not disappear with the growing use of coal. On the contrary: in the farms of the mid XIXth century, the development of machinery (choppers, crushers and other mechanical threshers) was based on both steam engines (and horses) *and* human strength.

[1] The study of the crank handle is indeed a classic problem in the modern history of technology, but the specialists on industrialization and on more recent periods have not paid any attention to it. Despite its simplicity, this device seems to be of little use in Antiquity. A rudimentary crank that moves a hand-wheel appears only with medieval windmills, grinding the grain by back and forth movements. The first representations of cranks emerge in the XIth and XIIth centuries, and the use of this device expands and diversifies along with the technical and industrial developments of the following centuries, accompanying the growing energy demand. It was not until the Renaissance that the use of crankshaft is being diffused. Nevertheless, the transformation of a circular movement into a linear one seems unnatural, especially as there existed complex obstacles such as the friction of the parts. (Jacomy, 1990, p. 161; L. White, 1969, p. 119).

[2] As the anthropologist Tim Ingold has noted, the hand crank is the decisive stage towards the invention of machines and technology. It is the crank that marks the frontier between a manual tool and a machine.

The importance of international companies such as *Ransomes* or *Mc Cormick* that dominate the agricultural machinery market in Europe and North America demonstrates the highly technical nature of the crank handle. Before the development of electricity, muscle energy and fossil fuel energy were not in opposition: the human motor remained competitive in small and medium-sized production unit.

The crank does not disappear in the XXth century neither. It powers the mechanization of domestic work, whether it be the first washing machines, or the various domestic appliances such as those marketed by the French company *Moulinex* in the middle of the XXth century, all with cranks before electrification took place (Delaunay, 2003). Crank powered mixers, mills, graters and choppers proliferate in the kitchens of the rich world in the 1950s. Let us also mention the example of the machine gun or the cinema, which, in its early days, made massive use of cranks. Influenced by the mechanism of sewing machines, the *Cinématographe Lumière* used a hand-operated crank.



Film movie cameras operated manually via a crank

In places where electricity or the internal combustion engine remain inaccessible or too expensive, the crank handle remains central. On military grounds and in the colonies, the crank coupled with a dynamo allowed the development of radio communication outside the power grid. In the Soviet Union and in Communist China, where steam, oil and electricity were supposed to bring emancipation to workers, the crank handle was in fact omnipresent in the small industry sectors at least until the 1950s. Artisanal threshing machines, skimmers and other agricultural crank powered machines continued to be produced and used. In the countryside while the official propaganda highlights the tractor, there were crank powered machines everywhere. In Sergei Eisenstein's film *The General Line* (1929), the manual skimmer even became a symbol of a prosperous future for the Soviet countryside. In the Soviet city, apartment buildings, presented as the modern urban way of

life, were equipped with communal laundries with crank-powered washing machines. And even as electricity developed, the crank did not disappear. In the shortage economy of the Soviet Union, spinning wheels continued to be used until the 1990s to spin wool, so as to compensate for the lack of industrial yarns.

Today, new crank-operated machines continue to be used and produced. In India, online sales sites offer small individual stone wheels, accompanied by Ayurvedic references on the benefits of the device for women's health. The use of an ancestral mill (traditional chakki) helps in this case to invent tradition. In the West, there is a proliferation of « low-tech » initiatives proposing the crank as an alternative to electricity. In 2016 the Dutch start-up MONONO even applied the dominant discourse of innovation to a crank powered washing machine which would supposedly be "50 to 100% more efficient and faster than a regular washing machine". Ironically, this crank machine is proposed as an innovation to Puerto Ricans, Indians and Malawians who do not have access to electricity: « low tech » does not change the colonial dynamics of introducing a technology from the outside.

Crank washing machine in Malawi, 2016

This workshop on the history of the crank will therefore shed light on a technology largely invisible despite its omnipresence in the global history of production. It aims to explore modest, incremental innovations, the persistence and renewal of simple mechanisms and their capacity to meet the increase of energy demand. It will raise questions about writing the history of technical development while shedding light on what the crank handle is, what it is used for, and how it forces the historian to shift his gaze in relation to the innovations that are generally at the heart of his story. At a time when questions are

being asked about "energy transitions" and the invention of resource-efficient technologies, the question of handwheels invites us to think about a disoriented history of technologies.

During the workshop, it will therefore be a question of thinking about the persistence of the crank handle driven by human force, even as new energy sources overlap. To what extent did the cranks accompany the mechanization of production in the past and today? How did they shape contemporary industrialization? How did these crank techniques coexist with large industry? In what spaces and under what conditions does this cohabitation take place?

The workshop will consider the following areas of inquiry:

1: Crank handle theory in mechanics and the optimization of the device.

2: The modern crank handle as the sum of improvements and incremental innovations.

3: The plurality and quantification of the uses of the crank handle from the end of the 18th to the 21st century, in the workshops, in large and small businesses, as well as in the rural world and domestic households.

4: The discourses on the crank handle, disqualifications and reinventions.

5: The crank handle as an example of "energy symbiosis".

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PRACTICAL INFORMATION

The workshop will be held at the University of Burgundy, in Dijon, on 16 and 17 November 2020. It is organized in partnership between the Center of Historical Studies (CRH - EHESS), the Center George Chevrier, University of Burgundy (UB, UMR CNRS) and the Academic Institute of France (IUF). The local organizing committee covers accommodation and meals.

Organization and submission procedures

The proposals for papers (400-500 words, one-page) must include a title, an abstract and the affiliation of the author. Abstracts should be written in French or English and should be sent along with a brief CV

by May 1, 2020 at the latest

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The response will be given to participants in June 2020. The authors will be invited to submit their paper for publication in a collective book, planned for 2021. For further information or any question, please contact Anna Safronova at anna.safronova@univ-paris1.fr