La Technologie entre l'Europe et les États-Unis aux XIXe et XXe siècles : rencontre et ignorance

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RÉSUMÉS/ABSTRACTS

Francesca Bray (University of Edinburgh).

Between technologie and history of technology: frameworks, sources and other challenges.

A historian of technology in pre-modern China, I am a cross-breed between the two schools contrasted at this seminar. I worked for some years in the Techniques et culture group in Paris before moving to California in 1988. There I re-framed my research to attune it to trends and resources in US scholarship, in particular the emerging feminist historiography of technology. However I integrated into my research the essential concepts and methods of French histoire des techniques, including the very useful concept of the chaîne opératoire. This bridging exercise proved both productive and exhilarating, and the results have been enthusiastically received by American colleagues: I find more "meeting" than "ignoring" between the anglophone and francophone fields of material history. For me an unresolved challenge, however, has been and remains how historians can actually practice technologie, in the sense of the systematic observation and analysis of technical practices, tools and artefacts. A basic problem is the lacunae in the sources, and how or whether they can be addressed. I am currently investigating the C18-19th transfer of tea production techniques and institutions from South China to India, using the contrasting Chinese and British colonial materials to map which sources do or do not include données technologiques, of what nature, and why. I look forward to helpful input from this meeting.

Jérôme Baudry (CAK / Harvard University)

Les brevets d'invention et la technologie (France - États- Unis)

Au tout début des années 1790, les États-Unis et la France se dotent de législations nouvelles sur les brevets d'invention. Sur le modèle anglais, l'examen préalable des inventions est supprimé, mais les inventeurs doivent désormais déposer une description - textuelle et éventuellement graphique - de l'objet ou du procédé dont ils revendiquent la propriété. Petit à petit, c'est une immense littérature technologique qui voit le jour, et dont les inventeurs sont eux-mêmes les auteurs. En l'absence de règles explicites de la part de l'administration, comment écrivent-ils et dessinent-ils la technique ? En étudiant précisément les styles des textes, dessins et modèles déposés, ainsi que leur évolution pendant le premier XIXe siècle, nous

montrerons que dans le cadre de la propriété industrielle naissante, la technologie comme science appliquée (celle des ingénieurs) prend très tôt le pas sur la technologie comme science des arts, en particulier en France.

Patents and Technology (France – US)

At the very beginning of the 1790s, the US and France simultaneously adopted new patent legislations, which were modelled on the English system: prior examination of inventions was abolished, but inventors had to file a textual and pictorial description of the object or process they wanted to claim as their property. This requirement gradually led to the production of a huge technological literature, which was authored by the inventors themselves. In the absence of explicit regulations and norms from their respective patent offices, how did these inventors write and draw technology? I study the heterogeneous and changing textual and pictorial styles of patent specifications during the first half of the 19th century, and I show that in the context of the new "intellectual property," technology understood as a science of the arts quickly gave way to a conception of technology as applied science, especially in France.

Konstantinos Chatzis (ENPC/LATTS) et Thomas Prévéraud (Centre F. Viète, Université de Nantes).

La présence française dans la formation des ingénieurs américains durant les deux premiers tiers du XIXe siècle : aspects institutionnels et intellectuels

En 1872 sort à New York l'édition révisée (et largement augmentée) de l'ouvrage Military Schools and Courses of Instruction in the Science and Art of War, paru initialement dix ans auparavant. L'ouvrage, véritable mine d'information, dresse un panorama de l'enseignement militaire dans huit pays européens et aux Etats-Unis. La France, première nation citée sur la couverture, y occupe une place de choix : environ 270 sur les quelque 950 pages de texte que compte le livre sont consacrées à l'Hexagone, dont la moitié à la seule Ecole polytechnique. Cette publication est symptomatique de l'importance de la France dans la formation des ingénieurs américains militaires – les premiers ingénieurs à recevoir une formation scientifique aux Etats-Unis – durant les deux premiers tiers du XIXe siècle, importance illustrée, par exemple, par l'histoire de l'Académie Militaire de West Point ou par celle du Virginia Military Institute (notons ici que l'enseignement dispensé dans ces établissements militaires a aussi une composante « génie civil » très prononcée). L'influence française est étendue par ailleurs à la formation des

ingénieurs « non militaires », comme les exemples de Rensselaer Polytechnic Institute, de School of Mines au sein de Columbia College ou celui de Thayer School of Engineering (génie civil) à Dartmouth College le montrent pour les années 1850-1870.

La présente communication souhaite proposer une première cartographie de la présence française dans la formation des ingénieurs américains durant les deux premiers tiers du XIXe siècle. Pour ce faire, elle adoptera deux clés de lecture, certes en interaction mais qu'on peut isoler pour des raisons analytiques dans un premier temps. La première clé relève d'une approche « macro » et elle est plutôt de facture institutionnelle : nous allons établir les différentes types de connexions entre les établissements de formation américains et français durant la période 1800-1870. La seconde clé se situe à une échelle plus « micro » et elle est davantage de nature « intellectuelle » : en nous focalisant sur la géométrie descriptive et la mécanique, nous allons étudier les multiples interactions, tant au niveau des contenus qu'à celui des acteurs, entre les deux rives de l'Atlantique dans ces deux disciplines occupant une place importante dans les curricula des ingénieurs américains de l'époque.

The French presence in the American engineering education (1800-1872): institutional and intellectual aspects

It was in 1872 that the second, revised, and augmented edition of *Military Schools and Courses of Instruction in the Science and Art of War* was published in New York (the first edition appeared ten years earlier). Remarkably well documented, it offered to its reader a panoramic view of the military engineering education in eight European countries and the US. France was the first nation to be listed on the book-cover and was given special prominence. Indeed, *Military Schools*, a 950 pages long book, dedicated around 270 pages to France, half of which only to the *Ecole Polytechnique*. *Military Schools* testifies to the impact of France on the education of American military engineers, the first group of engineers receiving a science-oriented training in the US. The influence exerted by France over American engineering education is clearly visible through the trajectories of the US Military Academy (West Point) and the Virginia Military Institute in the period 1800-1872 (it is worth noting that these two institutions, although military in nature, also offered their pupils training in civil engineering). The French influences is also present in a series of civilian institutions, as the examples of the *Rensselaer Polytechnic Institute*, the *School of Mines* at *Columbia College* and the *Thayer School of Engineering* at *Dartmouth College* show over the period 1850-1870.

This lecture wishes to give a first comprehensive study of the French presence in

the training of American engineers in the period 1800-1872. To do so, it adopts two complementary approaches: 1) A rather macro-approach that focuses on institutions, and seeks to establish connections between the French engineering schools and their counterparts in the US; 2) A more micro-level and intellectual history approach: by focusing on mechanics and descriptive geometry, two academic disciplines enjoying pride of place within the engineering curricula at that time, we will study the multiple interactions between ideas and historical actors that cross the Atlantic.

Ludovic Coupaye (University College of London)

De l'anthropologie des techniques à l'anthropologie de la Technologie

L'étude des techniques a occupé une place de choix dans l'anthropologie française à partir des figures fondatrices de Marcel Mauss, André Leroi-Gourhan et André-George Haudricourt. Les recherches d'ethnologues (tels que celles des membres du laboratoire « Techniques & Culture ») et de préhistoriens (les chercheurs de l'ERA 28 notamment) ont mis au point des outils et des méthodes d'analyse précis permettant démontrer de façon irréfutable l'enchevêtrement des activités matérielles et des représentations.

Bien qu'ayant mis au jour aussi bien les dimensions sociales des processus techniques que les dimensions techniques des relations sociales, cette approche des techniques n'a pourtant pas franchi la frontière des études anthropologiques anglophones. D'une part, comme le rappellent les organisateurs de la journée d'étude, le concept de technology a largement pénétré le vocabulaire des sciences sociales, sans nécessairement recouvrir les mêmes domaines. D'autre part, les relations entre personnes et choses (people and things) sont davantage traitées en anthropologie sous l'égide des material culture studies (et plus récemment des digital anthropology ou anthropology of design) que sous l'angle, souvent aveugle, des processus techniques qui les associent.

Ce paysage disciplinaire invite l'anthropologue à s'interroger sur (1) la nature des phénomènes regroupés sous le terme de technology, comme il a l'habitude de faire, mais aussi sur (2) la signification anthropologique de l'usage du concept au sein des sociétés qui l'emploient.

Cette présentation tentera d'abord de démontrer l'actualité des approches francophones classiques (tels que la chaîne opératoire) puis, par un déplacement du

regard, d'esquisser les contours d'une anthropologie de la « technologie ».

From Anthropology of techniques to the anthropology of Technology

The study of techniques has occupied a privileged position in French Anthropology, building on the foundations set by Marcel Mauss, André Leroi-Gourhan and André-George Haudricourt. Research conducted by anthropologists (such as the members of the research unit *Techniques & Culture*) and prehistorians (from the ERA 28, in particular) have established methodological and conceptual tools able to demonstrate the irrefutable entanglement of material activities with representations.

Though having brought to light both the social dimension of technical processes and the technical dimension of social relations, this approach has not been taken up by Anglophone anthropologists. On the one hand, as the organisers of this day remind us, the concept of "Technology" has pervaded the vocabulary of social sciences, without necessarily covering the same domains as the French term *technologie*. On the other hand, the relations between "people" and "things" are approached in anthropology more from the angle of material culture studies (and more recently digital anthropology or anthropology of design) than from the one, almost a blind spot, of technical processes that relate them.

This disciplinary landscape invites anthropologists to investigate (1) the nature of the phenomena grouped under the term of "Technology", as they are already used to, but also (2) the (anthropological) significance of the concept used as an actor's category.

This presentation will first attempt to demonstrate the topicality of classical French approaches towards techniques (such as the chaîne opératoire) and then, by displacing the perspective, I will sketch what an "anthropology of technology" could be today.

Vincent Dray (IRTES-RÉCITS).

Le discours de la « Technology » aux Etats-Unis: rencontre, mobilités et diffusion (1914-1939)

Le projet a pour objectif la recension puis l'analyse d'archives historiques relevant des positionnements conceptuels étatsuniens sur la technologie et pouvant indiquer les formes de sa légitimation, du point de vue des acteurs comme des institutions à

l'intérieur desquelles elle se construit. Dans un premier temps il y a un intérêt à présenter un état des lieux de la question en insistant sur les travaux contemporains qui ont mis l'accent sur la « technologie » au concret dans le cadre de systèmes sociotechniques (Thomas Hughes) mais aussi sur la technologie en amont (David E. Nye, Technology Matters. Questions to Live With, 2006).

Ces outils bibliographiques montrent qu'au cours du premier XXe siècle le terme Technology connaît aux Etats-Unis une évolution rapide, recouvrant des formes nouvelles de la modernité, lesquelles sont dégagées de définitions encombrantes et sont inspirées par la nécessité de saisir l'essor de la technologie dans une approche historique et sociale. L'émergence d'un concept en mouvement semble être la caractéristique majeure du discours américain sur la technologie et que restituent à l'époque les professeurs des Schools of Engineering (Arthur Kennelly ; William Wickenden) et les sociologues des grandes universités (Lewis Mumford). Au regard de ce premier constat, il importe de faire débuter notre étude au début du siècle en insistant sur le renouveau du « progrès technique » vers 1914. En quelques années, les productions des instituts techniques et des departments of Social Science interrogent les rapports de la technologie à l'industrie (MIT), aux complexes militaires (National Research Council), à la ville (Chicago University), à l'éducation (Department of Education : NARA) et au social. De ce point de vue, l'étude séminale de William F. Ogburn : Technological Trends and National Policy, including the social Implications of New Inventions (1937) est très éclairante.
Ces réflexions "conceptualisantes" peuvent expliquer l'émergence d'un cadre épistémologique par lequel le discours sur la Technologie s'est émancipé de l'approche déterministe. En synthèse, ces productions révèlent l'évolution des réflexions sur le rapport triangulaire progrès/société/technologie. Une rupture ?

Une évolution. Car la machine-outil, importée aux Etats-Unis au XIXe siècle, a façonné outre-Atlantique une pensée exclusive de la technique mécanicienne et de la machine, immortalisées par exemple par les photographies de Paul Strand, encore au cours de l'entre-deux guerre.
Afin de mettre en lumière la production des discours, déterminés ou non par des cultures techniques nationales voir locale, la démarche ne peut laisser en marge les attentes d'une approche comparatiste mettant à l'étude quelques exemples européens. Face à ce déploiement des sources nous pouvons laisser la place à quelques hypothèses qui replaceraient l'histoire des techniques dans un cadre transnational en écho à l'internationalisation de la technologie interrogeant ainsi le panorama des mobilités et des influences tant institutionnelles qu'humaines (émigrations scientifiques) qui se développent dans les milieux internationalistes de

l'entre-deux-guerres.

The discourse of "technology" in the United States : encounters, mobility and diffusion (1914-1939)

This paper will review and analyze the historical archives that can teach us about US conceptual positionings in respect to technology, their forms of legitimation, the perspectives of the historical actors and the institutions in which they are constructed. First, we present the state of the art, referencing recent work that has focused on technology within sociotechnical systems (Thomas Hughes) and on the role of technology (David E. Nye, *Technology Matters*. *Questions to Live With*).

This bibliography shows that the meaning of the term "technology" changed rapidly in the first decades of the 20th century, involving new forms of modernity. They focus less on definitions and more on the development of technology from a social and historical perspective. The emergence of a concept that is continually adapted seems one of the typical characteristics of the American discourse about technology developed by professors of Applied Science within Schools of Engineering (Arthur Kennelly : MIT ; William Wickenden : Engineering Education, Cleveland) and scholars of departments of sociology and departments of history (Chicago University: Lewis Mumford). We will therefore start our study around 1914, insisting on the renewed discourse of technical progress.

Publications provided by Institutes of technology and departments of Social Science have been questioning the interplay between technology and industry (MIT), the interplay between technology and the Military-Industrial Complex (National Research Council), between technology and education (Department of Education : NARA). From this perspective, William F. Ogburn (chair of the Sociology Department at the University of Chicago) provided a significant study: *Technological Trends and National Policy, including the social Implications of New Inventions* (1937).

These conceptualisations may explain the emergence of a comprehensive epistemological framework by which the discourse of technology is emancipated from a deterministic approach. They show an evolution of thinking about the relation between progress, society and technology. A historical break? An evolution rather. Because the machine-tool, imported in the United States in the 19th century, created a strand of thought exclusively about mechanical techniques and the machine, immortalised for instance in the photographs of Paul Strand, still present during the interwar period.

In order to clarify the production of discourses about technology, determined or not by national or local technical cultures, we will also take a comparative approach, including some European examples. Secondly we speculate that the long-term

context of the internationalization of technology, building new internationalist movement formed by researchers, academics, scientists, engineers and economists during the interwar period, has played a important role regarding the transfer of knowledge and expertise: we have to focus attention on exchanges, scientific migration and influence.

Xavier Guchet (université Paris 1 / CETCOPRA).

Le tournant empirique en philosophie des techniques (1980-2015) : échanges Etats-Unis/France

Aux États-Unis, la philosophie des techniques commence à se constituer comme discipline à part à la fin des années 1970. Inspirée par plusieurs traditions importantes de la philosophie contemporaine (la phénoménologie, la théorie critique, sans oublier le pragmatisme de Dewey qui constitue une référence largement partagée), elle s'oriente dès le début des années 1980 vers un « tournant empirique », marqué par la volonté de se déprendre du caractère jugé trop spéculatif, distant et catastrophiste de la philosophie des techniques dite « classique » (dont Ellul et Heidegger sont les parangons), au profit d'une approche moins pessimiste et plus contextualisée de la technique comme activité sociale. Le courant des Science and Technology Studies (STS), en plein essor depuis les années 1970, constitue une référence majeure de ces nouveaux philosophes des techniques nord-américains. Or, à de rares exceptions près comme Ellul ou Latour, les penseurs français des techniques ne semblent pas avoir eu leur part à ce renouveau de la philosophie des techniques aux États-Unis . En retour, les philosophes français des techniques des années 1980-2000 ne se réfèrent que marginalement à leurs collègues nord-américains. Mon exposé fera dans un premier temps le point sur ce constat d'échanges limités entre la France et les États-Unis dans le domaine de la philosophie des techniques, sur l'ensemble de la période 1980-1990. Il montrera dans un second temps comment le paysage international de la philosophie des techniques s'est profondément transformé dans les années 2000, ouvrant de nouvelles possibilités de circulation de la philosophie des techniques entre les deux pays.

The "empirical turn" in the philosophy of technology (1980-2015): toward a US/France dialogue

In the last four decades, the philosophy of technology has achieved an unprecedented development worldwide, due in particular to the dynamism of American philosophers since the end of the 1970s. Combining several

philosophical trends such as phenomenology, critical theory or pragmatism, this new generation of American philosophers intended at that time to provide more contextualized and society-oriented approaches to technology, detaching themselves from the supposedly abstract, speculative and catastrophist character of "classical" philosophies of technology (cf. Ellul et Heidegger). As Dutch philosophers emphasized in the 1990s, these American philosophers supported an "empirical turn" in the philosophy of technology. Many of them drew closer to STS scholars and focused on how technological reality concretely shapes our lives. For the last thirty years, this "empirical turn" in the philosophy of technology has significantly expanded at the international level and has given rise to numerous challenging research programs. In this stimulating context however, French philosophy of technology has been less dynamic than elsewhere and especially in the US. Undoubtedly, American philosophers of the "empirical turn" were fed with French philosophy, but the philosophy of technology has not boomed in France as it did in the US and in other countries such as the Netherlands or Great-Britain in the last forty years. Admittedly, contemporary French philosophers of technology such as Ellul, Latour or Stiegler are stars in the US, even more than in France. Furthermore, American and French philosophers of technology quote each other frequently. However, the relation between them has been quite loose. In particular, until now French philosophers have not massively contributed to the international "empirical turn" in the philosophy of technology. In my talk I intend to give a general overview of this situation, focusing on the relationships between American and French scholars, which undoubtedly exist but are limited. Then I give insights into current developments of the "empirical" philosophy of technology at the international level and I suggest that these developments may boost the relationships between US and French scholars.

Steeve Sabatto (EHESS CAK)

Mode de circulation et de territorialisation des systèmes constructifs durant la Guerre Froide

L'esquisse par Michel Foucault d'une relation bijective entre le couple « espace et champ militaire » avec celui de « savoir et pouvoir » trouve dans l'art de la construction un écho retentissant, en particulier au travers de la question de son industrialisation élaborée en vue de l'obtention d'une suite de propriétés performatives (transportabilité, démontabilité, composabilité, flexibilité, économie, légèreté, modularité) largement redevable - directement ou indirectement- au commanditaire militaire. Avec le développement des systèmes constructifs, nous

mettrons en évidence qu'ils sont caractérisables par la formation -au sens simondien- d'ensemble technique, qui répondent à des politiques expansionnistes occidentales qui se confrontent à des environnements perçus comme difficile. Nous nous appuierons tout d'abord sur l'architecture coloniale anglaise et de l'architecture militaire prussienne au travers de l'activité de la Compagnie Christoph und Unmäck (1869- 1930), pour arriver, dans un second temps, sur le cas qui forme le corps de notre propos à savoir l'exportation par les États-Unis d'une automation de la construction développée sous supervision militaire à partir de la Seconde Guerre mondiale au travers de programmes gouvernementaux auxquels l'architecte américain d'origine allemande Konrad Wachsmann a activement participé de 1942 à 1960.

Nous observerons plus particulièrement un ensemble de systèmes constructifs dans les secteurs du logement (General Package System & General Panel Coporation of California pour la National Housing Agency) et de l'aéronautique (Mobilar System pour l'Atlas Aircraft Corporation, US Air Force Hangar) impliquant Wachsmann et le logicien et stratège Albert Wohlstetter pour établir que la radicalité des propriétés techniques recherchées pour le système constructif de l'US Air Force Hangar (1951-1954) et destiné à abriter les B52, a été coordonné préalablement par les deux « chercheurs-entrepreneurs» en marge des prestigieuses institutions (Illinois Institute of Technology-Chicago/Advanced Building Research Department, Rand Corporation/Division of Economics -Santa Monica) qui les intégreront en hiver 1950-1951.

A partir de ce premier point, nous établirons ensuite que la mise en capacité de l'US Air Force Hangar de former à lui seul un ensemble technique (entendu au sens simondien, c'est-à-dire d'atteindre un très haut degré par rapport aux ressources environnementales) ainsi que les difficultés attenantes à cette ambition, s'expliquent par le modèle tactique et stratégique développé par Albert Wohlstetter pour l'optimisation logistique et opérationnelle de l'implantation géostratégique des bases aériennes inter-continentales avant l'avènement des missiles balistiques. En dépit du fait que le système de l'US Air Force Hangar n'a finalement pas été retenu par son commanditaire, nous mettrons en évidence que cela n'empêchera pas son emploi pour former un support majeur dans la cristallisation un programme ambitieux quant à la question de l'automation et l'industrialisation (instrumentation). En effet, il sera l'objet de nombreuses « reformulations » qui ont répondu à chaque fois à des points repérés comme névralgique par la gouvernance nord-américaine. En effet, l'industrialisation de la construction, développée avec l'implication étroite et active de l'armée dans le programme de recherche de la construction civile de l'après Seconde Guerre, a été reconverti et mis en orbite dans le cadre offert par « l'offensive internationale » lancée par Dwight D. Eisenhower en janvier 1958, afin de pallier en terme militaire l'incapacité de détenir une

supériorité tactique avec l'avènement des missiles balistiques, et prendre désormais comme centre critique -non seulement- la course aux savoirs (technique et scientifique) mais aussi celui du champ de la culture. L'effet sera d'autant plus détonnant qu'il corrobore le renoncement à une utilisation fonctionnelle de ces systèmes constructifs repérés comme trop onéreux par les investissements qu'ils impliquent, au profit de leur mise en circulation internationale entre 1955 et la seconde moitié des années 1960, dans ce que nous pouvons nommer et caractériser comme étant un processus de territorialisation qui conduit à poser la question d'une structuration axiologique non seulement du savoir et du savoir-faire mais aussi de la culture.

Circulation and territorialization of building systems during the Cold War

Michel Foucault's one-to-one identification of "space and military field" with "knowledge and power" finds a resounding echo in the art of building, especially if we look at the industrialized building sector supervised directly or indirectly by the Army during the Second World War and the Cold War with the goal of reaching qualitative performances (transportable, dismountable) as well quantitative ones (cost, lightness, geometrical modularity). The lecture will aim at investigating the hypothesis that the industrialized building industry supervised by the US army during the Cold War is the continuation of the emergence of the productive capacities and of the material performances of the XIXth century industrialization (Herbert Gilbert). We will highlight that these building systems can be defined as a technical set (ensemble technique, cf. Simondon) in which the radical nature of its technical properties comes from the concern to be confronted to particularly difficult environments such as undetermined war conditions or colonial conditions. We find this concern during the XIXth century with the British colonial architecture or the Prussian military architecture in the activities of the *Christoph und Unmäck* Company, We will focus on one case study: the automation of the building sector under the military supervision during the Cold War in the United States of America, in which the German born architect Konrad Wachsmann was been involved from 1942 to 1960.

We will observe a set of building systems designed for housing (*General Package System & General Panel Coporation of California* pour la *National Housing Agency*) and the aeronautical sector (*Mobilar System pour l'Atlas Aircraft Corporation, US Air Force Hangar*) which involve Wachsmann and the logician Albert Wohlstetter. They contributed to the introduction of a radicality of technical features. The *US Air Force Hangar* building system (1951-1954) intended to shelter B52 aircraft had been first coordinated before the "two researcher entrepreneurs" had been admitted in their respective institutions, the *Illinois*

Institute of Technology (Chicago) with Konrad Wachsmann and the *Rand Corporation* (Santa Monica) with Albert Wohlstetter during the winter of 1951. We will also study how the *US Air Force Hangar* aimed at becoming a "technical set" on its own (in the sense of Simondon) and the difficulties encountered in realizing this ambition, by focusing on Albert Wohlstetter's tactical models and strategies for optimizing logistics and operations of the geostrategic placement of intercontinental airbases, during the years preceding the first intercontinental ballistic missiles. Even if the *US Air Force Hangar* has not been selected by it contractor, it has become an essential part of the ambitious quest of automation and industrialization and the introduction of new design methods (instrumentation).

Indeed, Wachsmann's work for military contractors has been reformulated many times in response to various crises identified by the US government. The industrialization of the building sector supervised by various agencies (civilian and military) has been reconverted in order to remedy the loss of a tactical superiority of the US Army when ballistic missiles became widespread (second half of 1950's). The stakes moved from the military operational field to include the scientific and cultural fields. Indeed, the *US agency* has given up the functional use of these building systems because they are too costly, and they have been recycled for an international exploitation (1955 to the first half of 1960's) for launching a territorialization process, which lead us to consider the question of an axiological structuring of knowledge, know-how and culture. The figures of Wachsmann and Wohlstetter embody and synchronize this instable reformulation in the quest of an automation in which space (through architecture) is as a highly recalcitrant objet for the economic policy of US governance.

Eric Schatzberg (University of Wisconsin-Madison).

Why There Is No Discipline of Technology in Anglo- American Scholarship

In terms of etymology, the term "technology" should refer to a discipline devoted to the study of techne, that is, the arts understood in a broad sense. Yet in the English-speaking world, "technology" has never existed as an organized discipline, even though 19th-century dictionaries commonly defined "technology" as "the science of the arts." Yet this definition never translated into any organized domain of scholarly knowledge.

This paper attempts to explain why no discipline of technology arose, despite several opportunities in the 19th century. These opportunities include Jacob Bigelow's Elements of Technology in 1829, George Wilson's position as the first (and last) Regius Professor of Technology at Edinburgh University from 1855 to

1859, the chartering of the Massachusetts Institute of Technology in 1860, the anthropologist John Wesley Powell's definition of "technology" as "the science of industry" in the late 1890s, and Thorstein Veblen's embrace of "technology" under the influence of Werner Sombart and Gustav Schmoller. Veblen's understanding of the term was probably the most successful attempt to conceptualize "technology" as a social science, but Veblen's ideas were vulgarized by later social scientists.

"Technology" failed to become a discipline in part because of competition from the concept of "applied science." In a sense, "applied science" appealed to industrial elites by obscuring the role of skilled workers in creating industrial modernity. "Technology" only rose to the status of keyword in the late 1930s when it was adapted to serve this mystifying function.

Koen Vermeir (CNRS, SPHERE).

The Prehistory of "Technology": the 16th and 17th centuries

In this paper, I will revisit the prehistory of "Technology", that is, of the history of "technologia", from the 16th till the 18th centuries. Technologia started out as a term referring to the classification of knowledge, of the arts and sciences. Later, it came to stand for the study of the mechanical arts specifically. In particular, in this presentation, I will look at the transmission of the notion of technology from Europe to New England, and I will gauge its continued relevance over time.

Adelheid Voskhul (University of Pennsylvania)

Philosophies in the Industrial Age: German and American Engineers in Trans-Atlantic Trade of Theories and Practices of Technology, 1870 to 1930

I propose a paper that uses methods from intellectual and cultural history to trace how engineers in the US and in Germany in the 1910s and 1920s were inspired, by the nascent sub-discipline "philosophy of technology" and the reading experiences it spawned, to engage in systematic reflection about their trade. Both sets of engineers were at the time struggling to constitute themselves as a new social group in their respective nation states and social orders. Temporary and permanent migration across the Atlantic Ocean connected them with each other: it generated sustained exchange of ideas and resources – both engineering ideas and philosophical ideas – and is a key phenomenon underlying the dynamics of the

Second Industrial Revolution. Engineers as a technical, intellectual, and political elite are often less visible than other elites, and so are details of their response to the lively interest at the time in theories of industry and technology. It is particularly interesting to trace how they found that philosophers' and cultural critics' work resonated with the realities of their daily work, their social status, and their political theories of technology. In the US, young, progressively inclined engineers were involved in the "efficiency movement," in the Taylor Society, and, later, in the technocracy movement. I am interested specifically in their perspectives on the crucial matter of governance in industrial modernity. In Germany, engineers experienced resistance from traditional, pre-industrial academic elites as they were trying to constitute themselves as a new professional group. Partly as a response to that, they increasingly engaged questions about the relationship of technology to such abstract entities as art, culture, and the state. English- and German-speaking philosophical work on technology quickly found their way into larger philosophical debates in Germany, where they were merged with philosophical and political concepts from established nineteenth-century philosophical traditions such as German Idealism. Engineers participated actively in this process, in particular through organizing themselves in (often elite) engineering associations founded for this purpose. Tracing this through the lens of engineers' struggle for professional identities on either side and across the Atlantic will help me shed light on the earliest moments of systematic reflection on the part of technical elites on problems of technology, culture, and subjectivity in the industrial age.

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