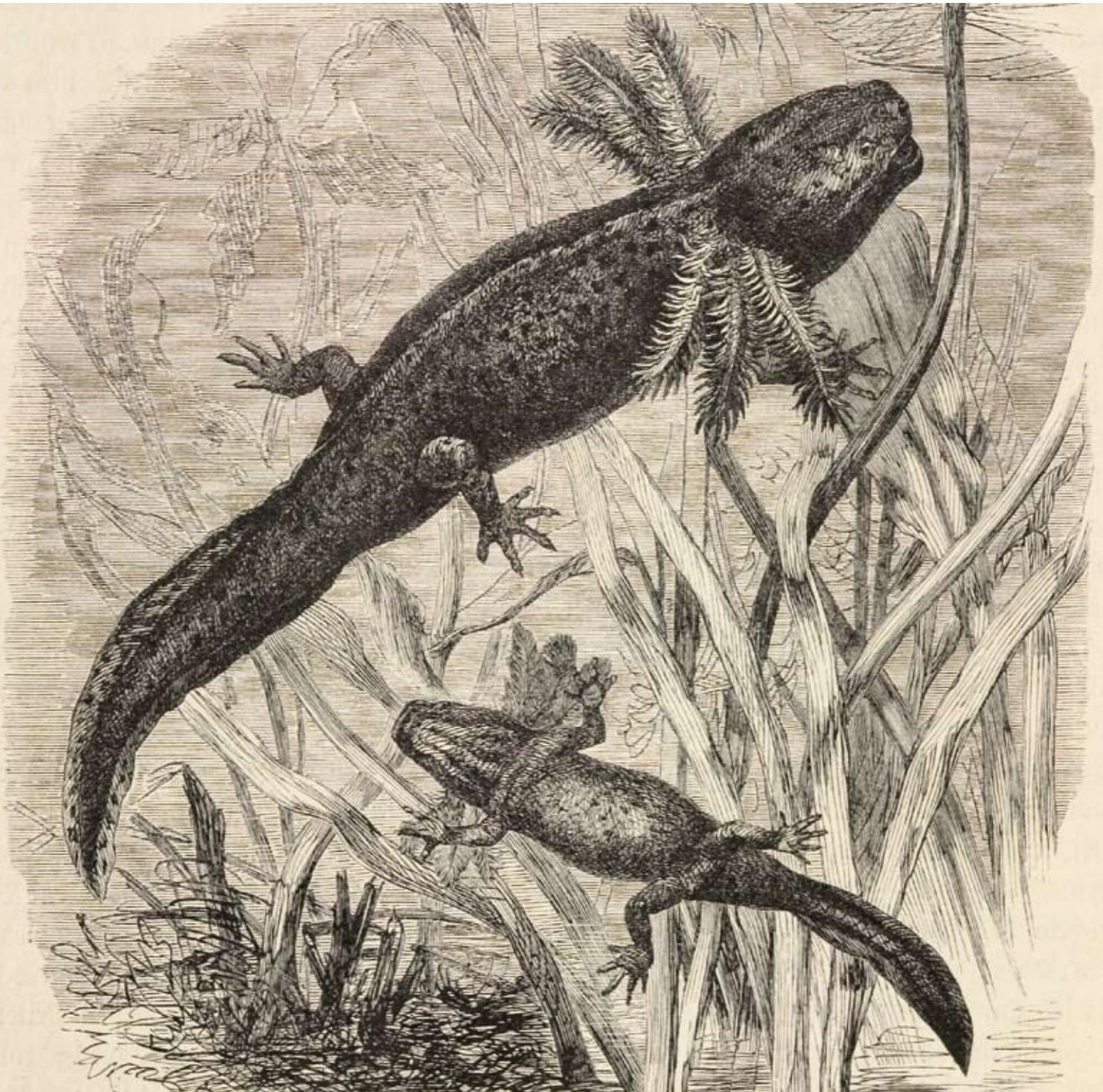


Department III

The Axolotl (*Ambystoma Axolotl*).
Alfred Edmund Brehm, *Illustriertes
Thierleben. Eine allgemeine Kunde des
Thierreichs. Fünfter Band. Dritte Abtheilung:
Kriechtiere*, Hildburghausen: Bibliogra-
phisches Institut, 1869, p. 426.



Department III

Experimental Systems and Spaces of Knowledge

Director: *Hans-Jörg Rheinberger*

Introductory Remarks

Department III is headed by Hans-Jörg Rheinberger. Having begun in January 1997, Hans-Jörg Rheinberger's leadership of the department will come to an end in January 2011. During this period a wide range of departmental projects has been accomplished. The disciplinary background of the department's researchers has ranged from the life sciences to psychology, sociology, philosophy, literary history, art history, history of science past and contemporary, technology studies, cultural studies, historical musicology, and history. Projects have covered widely different topics in the history of science, with a focus on the life sciences, stretching from the Early Modern period to the present, and addressing one of four main research topics: first, the history and epistemology of experimentation, more broadly speaking, the material constitution of the research process, including its objects, its instruments, and the spaces in which it is carried out; second, the ways and forms of scientific concept formation, both at the micro level and in the *longue durée*; third, writing and drawing as basic cultural techniques underlying all scientific activity and assuming different forms throughout history; and fourth, an ongoing reflection of historicity itself. The three current joint projects described below—"Experimentalization of Life," "Cultural History of Heredity," and "Drawing and Writing as Research Techniques"—can be seen as exemplary for the first three sets of research issues respectively; the fourth plays into all of them.



Hans-Jörg Rheinberger

This is the last research report of Department III in its present form. For this reason, Hans-Jörg Rheinberger would like to report briefly below about his own activities with respect to these four research horizons in recent years.

Experimentation

My fascination with the phenomenon of *experimentation* stretches back to my apprenticeship in a molecular biology laboratory. After having explored the historiographical and epistemological potential of the concept of the "experimental system" in a previous account, I have continued to explore the forms of experimentation in the life sciences from the end of the nineteenth to the late-twentieth century. Different

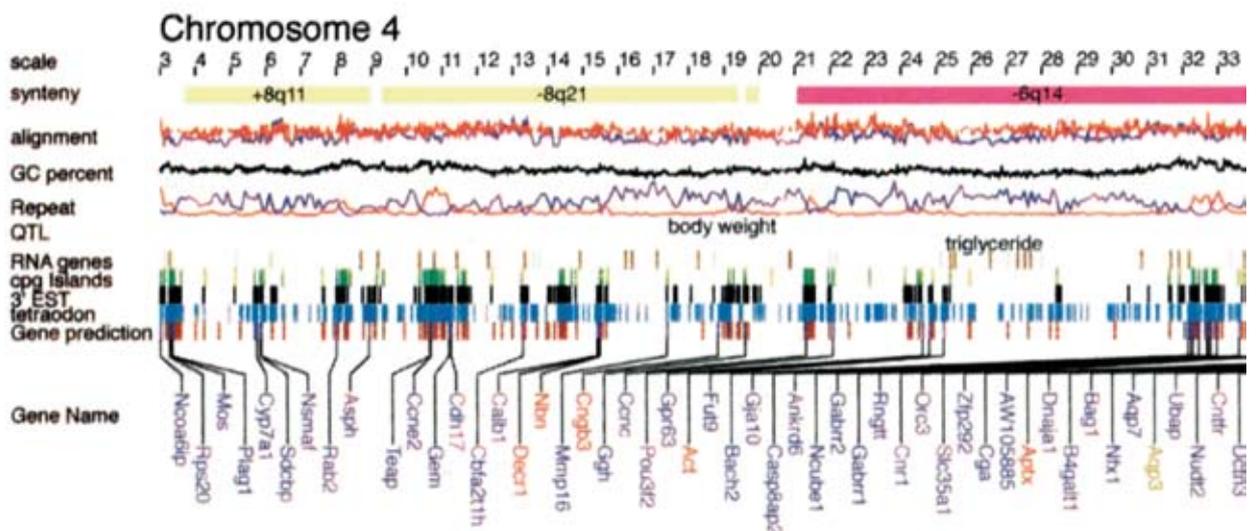
Writing

Writing, in the broad sense Jacques Derrida conveyed to this notion, has been a permanent motif in my studies on the history of laboratory life. Starting from the notion of “trace,” my aim has been to understand better the generative—not only the representative—power of the primary inscriptions and marks resulting from experimentation, and to follow their subsequent transformations. I think it is here, in the medium of the trace, that histories of science, art, and literature may enter into fruitful interaction. In 2005, I published a number of essays on this topic entitled *Iterationen* (Berlin: Merve). More recently, other essays on the topic have appeared in various exhibition contexts.

Historicity

As regards the history of science, *historicity* comes in two main forms. First, studies such as on heredity and on the gene make clear that even basic concepts—or, more to the point, precisely basic concepts—of any science undergo constant historical change. In other words, they are central because they are “open,” i. e., generative, research-enabling concepts. Second, in its engagement with objects, the history of science itself is constantly reshaping its own conceptual and narrative arsenal. Both insights are not completely new, but they call for ongoing reflection. In *Historische Epistemologie zur Einführung* (Hamburg: Junius, 2007), I have sketched the stages of this reflection from the late-nineteenth to the late-twentieth century. Here, I have tried to show that the ways of knowing the sciences are never independent of the changing ways the sciences know their objects. In early 2010, an English-language version of this book appeared with Stanford University Press entitled *On Historicizing Epistemology—An Essay*. With this short digression, let us return to the description of the projects within Department III as a whole.

Detail of the annotated chromosome map of the mouse of 2002.



Research Projects

Experimentalization of Life

RESEARCH SCHOLARS *Julia Kursell, Henning Schmidgen*

PREDOCTORAL FELLOWS *Christian Reiß, Sandra Pravica, Viola van Beek*

SHORT-TERM GUEST RESEARCHERS *Rand B. Evans, Florian Hoelscher* (Pianist in Residence at the MPIWG), *Maria Rentetzi, Dimitris Papayannakos, Costas Mannouris*

COLLABORATIONS Bauhaus Universität Weimar (Fakultät Medien); Hermann von Helmholtz-Zentrum für Kulturtechnik (Humboldt-Universität zu Berlin); Zentrum für Literatur- und Kulturforschung, Berlin; Freie Universität Berlin (Institut für Deutsche und Niederländische Philologie)

FUNDING VolkswagenStiftung, “Focus on the Humanities” of the Fritz Thyssen Stiftung and the VolkswagenStiftung, German Academic Exchange Service (DAAD), IKY State Scholarship Foundation (Greece), and MPIWG

General Description of the Project

“Experimentalization of life” refers to a process that began in Europe around 1800 involving a series of efforts to reconfigure science, art, and technology. After experimental physiology had established itself as one of the leading disciplines of the nineteenth century, psychology, linguistics, and many other disciplines became laboratory-based enterprises. Experimental cultures emerged in a variety of places, as for example in literary movements relying on automatism, procedures of chance, and montage. At the same time, philosophers began to reflect upon the broader implications of this renewed turn to experimentation. In addition, experimental media, such as photography and film, transformed the fine arts *and* the sciences. Entire cities became fields of experience in which people undertook all sorts of experiments in living.

Through a set of interrelated projects we investigate this experimentalization process by focusing on the material culture of instruments, buildings, and supply technologies. By the same token we show that experimentalization is not a one-dimensional process that can be easily equated to “mechanization,” “rationalization,” or “modernization.” Rather, it is a complex and highly distributed development that integrates and differentiates, i. e., configures various aspects of scientific, artistic, and technological activities in ways that allow phenomena of mechanization or modernization to occur.

Experimentalization of Life
Individual Projects

Julia Kursell (Research Scholar)

Historical Epistemology of Hearing (1850–2000)

This project investigates key concepts and practices that have contributed to our present understanding of sound, hearing, and music. After 1850, knowledge of acoustics, which had been guided by the symbolic code of music well into the nineteenth century, began to be transformed into an experimental science of hearing. Through research on the history of media and the material culture of experimentation, the aim of this project is to show the understanding of hearing as historically changing, and thereby to contribute to the current reorientation of research in the human sciences that deal with sound, hearing, and music.

The project is divided into three parts, each focusing on a different historic constellation. The first part is a book project titled “Ear and Instrument—Hermann von Helmholtz’s *On the Sensations of Tone as a Physiological Basis for the Theory of Music*,” which analyzes the relation among physiology, psychology, and the aesthetics of the acoustic around 1850. In 1856, Helmholtz began research on the physiology of hearing. He developed a theory of hearing, according to which the ear analyzes complex waveforms by resolving them into their sinusoidal components. The devices used to study this theory produced sounds that were not present in nineteenth-century music, and the aesthetics of music that Helmholtz had called upon to corroborate the physiological theory of hearing eventually collapsed. If Helmholtz left it to aesthetics to draw the line between sound and music, the music of the twentieth century, in the wake of Helmholtz, abandoned this distinction. In other words, his treatise *On the Sensations of Tone* suggested aesthetic experiments whose outcome was open.

The second part of the project, “Experimentalization of Hearing: Moscow 1920–1930,” deals with attempts to reconcile the diverging disciplines of aesthetics and scientific investigation into hearing in the early Soviet Union. Part three, “Music and Media After 1945,” explores the history of composition from the perspective of media studies. In musical composition of this time, knowledge of the mechanisms of hearing came to be a prerequisite for the creation of music.



Julia Kursell



Vowel Experiments II: Highest recording speed, May 1916. Cover of a box for a wax cylinder with phonographic recordings made by Carl Stumpf. Ethnologisches Museum Berlin SPK, Phonogramm Archiv.



Henning Schmidgen

Henning Schmidgen (Research Scholar)

Chronos and Psyche: The History of Physiological and Psychological Time Experiments

In 1850, Hermann von Helmholtz, then based in Königsberg, conducted path-breaking precision measurements on the propagation speed of the nervous impulse in animals and human beings. Following Helmholtz, a considerable number of nineteenth-century scholars began to study the time individual organisms required to respond to stimuli of all kinds (optical, acoustical, tactile, etc.). Around 1865, two main strands of research were established. While the investigations of scholars such as Albert von Bezdold, Gabriel Valentin, Julius Bernstein, and Etienne Jules Marey contributed to defining and demarcating, within physiology, the field of “nerve and muscle physics,” time experiments conducted by Franciscus Donders, Wilhelm Wundt, Edward Scripture, Hugo Münsterberg, and Alfred Binet prompted the establishment of “experimental psychology.”



Autographic curve of a muscle. Recording of muscle contractions in the frog, made by Hermann Helmholtz in the context of his time experiments.
© Académie des Sciences—Institut de France, Paris. Session of September 1, 1851.

Instead of merely accepting these disciplinary and/or institutional labels, this project argues that these developments can be studied as the history of one experiment, or “research machine,” that emerged and evolved over time, while being retooled in sometimes surprising ways. As a consequence, the concrete materiality of experimental set-ups is emphasized, as are the interactions among scientists, model organisms, and instruments that the set-ups entailed, and the technological as well as architectural surroundings that framed these practices. This approach provides the basis for demonstrating that physiological and psychological time experiments formed a network of “research machines” that constituted the backbone of theoretical debates and institutional developments.



Sandra Pravica

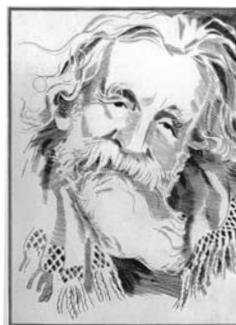
Sandra Pravica (Predoctoral Fellow)

Tentative Transgressions. Gaston Bachelard’s Experimental Epistemology

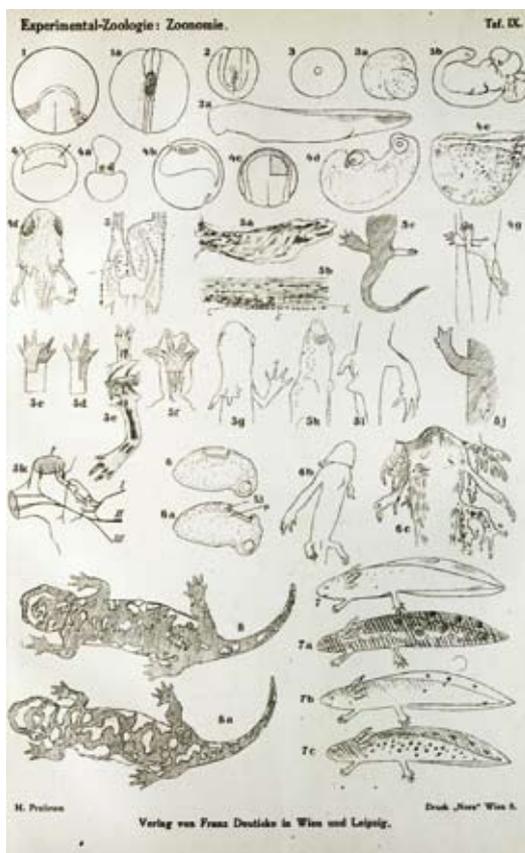
This project is concerned with “tentativity” as a philosophical concept. Exploring the works of Gaston Bachelard, it aims at determining an epistemology that is “tentative” or “experimental.” During the 1930s, Gaston Bachelard chose experimentation as the key topic for epistemological reflection. It will be demonstrated that he focused on experimentation in a way that renders epistemology “experimental” in itself. Inspired by the upheavals of quantum physics and the theories of relativity in the early-twentieth century, Bachelard relocates traditional problems in the philosophy of science to the

realm of means and instruments of scientific research. In so doing, he accentuates a concept of transgression to which the project will especially attend. His definition will be compared with similar concepts in art, literature, and science of that time. As Bachelard also adopted a broad range of notions from biology, evolutionary theory, experimental psychology, musicology, further conceptual implications in discourse besides philosophy of science will be examined. It will be argued that

Bachelard's approach enables a philosophy that is flexible and "tentative" in the sense that its principles, concepts, and vocabulary are deeply engaged in, and inspired by, the particularities of its objects of reflection. The result is an epistemology that—in comparison to other philosophical approaches of that time—does not offer a fixed and normative corpus of concepts and formalities, but rather admits uncertainties and regional characteristics of the respective domain of scientific knowledge. For this reason, a consideration of the connections between Gaston Bachelard's work and the movement of Logical Empiricism will be of particular interest to this study. Moreover, an historical examination of the epistemological discourse of the 1930s will show that the common view of the formation of a "continental" strand of philosophy on the one hand—and an "analytical" strand on the other—must be reconsidered.



Gaston Bachelard. Portrait by Albert Flocon. From André Parinaud, *Gaston Bachelard*, Paris 1996, p. 280 [B. N.-Edimédia.]



Christian Reiß

(Predoctoral Fellow)

The Way into the Laboratory: The Origins and Role of Model Organisms in the Experimental Life Sciences

Beginning in the mid-nineteenth century, experimentation increasingly became the method of choice in physiology and zoology. However, for successful experiments to be conducted, organisms had to be chosen, brought into the laboratory, stabilized, and finally integrated into the experimental setup.

This project argues that this process can neither be considered linear nor entirely driven by scientific rationality. One of the project's key examples is the Mexican axolotl (*Amblystoma mexicanum*), an amphibian nearly extinct in



Christian Reiß

Uses of the Axolotl in Zoology and Experimental Biology. From Hans Przibram, *Experimental-Zoologie, Bd. 6: Zoonomie. Eine Zusammenfassung der durch Versuche ermittelten Gesetzmäßigkeiten tierischer Formbildung (experimentelle, theoretische und literarische Übersicht bis einschliesslich 1928)*. Leipzig, Wien: Franz Deuticke, 1929, Table IX.

its natural habitat, although it populates aquariums in laboratories, households, and zoos all over the world. Initially brought to Paris in the course of France’s colonial activities during the 1860s, curiosity soon turned this organism into a scientific object for studies concerning evolution, ontogeny, and physiology. At about the same time, aquarium fanciers started to adopt the axolotl as one of their most popular “pets.” As this project shows, both developments went hand in hand, influencing each other by transfer of knowledge and technology. As a result, the axolotl was turned into a paradigmatic laboratory animal in the late nineteenth and early twentieth centuries. Among others, August Weismann and his assistant Marie von Chauvin played an important role in turning the axolotl into a laboratory animal. Taking axolotl’s case as a model, the project emphasizes the history of animals in their specificity, tracing their trajectories across disciplines, across the border between science and the public as well as across the great divide between “civilized” and “colonized” countries.

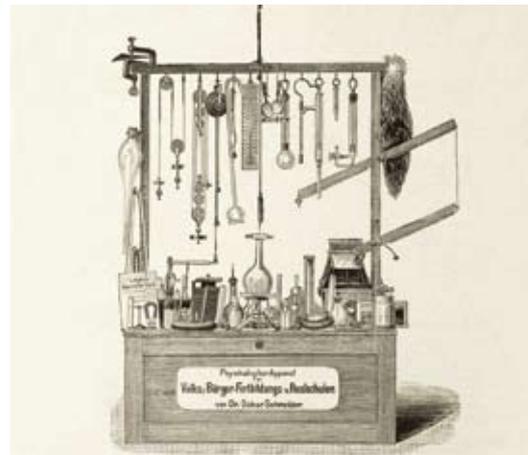


Viola van Beek

Viola van Beek (Predoctoral Fellow)

Codes of Experimenting and Experimental Spaces Around 1900

This project investigated natural science experimentation kits and instruction manuals between 1870 and 1930. During this period, the “experimentalization” of everyday life manifested itself in the revitalization of genres such as the experiment book, the popularization of hands-on experiments in educational institutions (as in the *Urania* in Berlin), and, above all, the widespread use of experimentation kits. These kits, such as physical



cabinets, chemistry sets, and electricity boxes designed for amateurs (and especially for children), began to gain huge popularity in Germany starting in the last third of the nineteenth century. Teaching aid producers and precision mechanics workshops offered mass-produced devices as well as customized kits through teaching materials catalogs and early forms of “mail-order” catalogs. Portable experimentation kits were designed to serve as extensions of classrooms and lecture halls. They illustrate the increased attention granted to experimental practices in general education between 1870 and 1930.

An examination of these objects shows how the miniature laboratories contributed to the creation of experimental spaces beyond the laboratory, in particular by providing specific “codes of experimenting.” Through archival material from the Deutsches Museum in Munich and the Kosmos Verlag in Stuttgart, together with evidence in the form of biographies, advertisements, teaching materials, catalogs, reviews, and introductions, this project depicted the ways in which experiments—and especially successful experiments—were supposed to take place around 1900.

Collection of instruments for the playful study of science. From *Haupt-Katalog der Leipziger Lehrmittel-Anstalt von Dr. Oskar Schneider*, ca. 1902, p. 227.

Experimentalization of Life

Projects of the Short-term Guest Researchers

- *Rand B. Evans* (East Carolina University, Greenville): “Wilhelm Wundt and the Astronomers: Stellar Transits and the Measurement of Prior Entry in the Beginning of Experimental Psychology”
- *Florian Hoelscher* (Hochschule Luzern): “Electro-acoustic Expansions of Piano Sound”
- *Maria Rentetzi* (National Technical University of Athens): “Gender Science and Politics: Queen Frederika and Nuclear Research in Post-war Greece.”
- *Dimitris Papayannakos* (University of Athens and National Technical University of Athens): “An Antiskeptical Reconsideration and Defence of Experimental Realism.”
- *Costas Mannouris* (National Technical University of Athens): “Darwin’s Eight-Year Study of Barnacles: Rethinking the ‘Long Wait.’”

Experimentalization of Life

The Virtual Laboratory

(<http://vlp.mpiwg-berlin.mpg.de>)

Department III’s Experimentalization project created and continues to use and develop a Virtual Laboratory (VL). Online since 2002, the VL has come to function as a unique archive and research tool for the history of the experimental life sciences during the nineteenth and early-twentieth centuries. Currently, it offers more than 32,000 complete bibliographical references and displays some 10,000 scanned items consisting of about 9,000 journal articles, 520 book chapters, 320 monographs and textbooks, as well as 180 trade catalogues of scientific instruments. In addition, it offers access to some 380 items that were digitized in cooperation with archives and museums, including laboratory notebooks, article manuscripts, letters, graphical recordings, and photographs.

Recently, the VL extended its scope by integrating scientific films and phonographic recordings. In cooperation with institutions such as the Bundesarchiv-Filmarchiv, Berlin, and the Berliner Phonogramm-Archiv, a collection of physiological and medical films covering the span from the 1920s to the 1950s has been included in the collections of the VL, as were numerous wax-cylinder recordings of acoustic experiments from the period 1900 to 1920. Similar projects are underway with the Staatsinstitut für Musikforschung PK, Berlin (library collection on acoustics and instrument making), and the Museum für Naturkunde, Berlin (photograph collection).

The project group continues to enhance the VL’s search options. In addition to simple and advanced searches on bibliographical records, the VL offers similar exploration tools for the image database containing some 20,000 fully referenced and captioned drawings, curves, and photographs. The VL also boasts embedded search tools for specific purposes, e. g., the “trend-scout” for statistical analyses of bibliographical references over time. Most recently, the VL has implemented a full-text search tool based on automatic optical character recognition (OCR). This tool allows researchers to search



Main page of the Virtual Laboratory.
http://vlp.mpiwg-berlin.mpg.de/index_html

all scanned text documents by using Boolean operators and term modifiers, i. e., with respect to single words, combined expressions, entire sentences, etc.

Since 2006, the VL has provided users with a new work environment called myLab. The myLab environment allows users to build, manage, and share personal sub-sets of annotated objects found in the VL (bibliographical references, scans of published and/or unpublished texts, short biographies, sites) and beyond. myLab has proven to be an excellent teaching tool, which project members regularly employ in their teaching.

The VL also offers a highly attractive platform for scholarly publication. The VL's essay section enables scholars to publish short articles about the ongoing research work of the Experimentalization project. Articles are linked to other holdings, including short biographies, laboratory descriptions, and instruments in the digital

library and other sections of the VL. External scholars working on related topics and sources have begun to use the publication site, which we intend to develop into a refereed online journal in the near future.

Experimentalization of Life

Activities Related to the Project

Workshops and Events

- “ZwischenRäume: Disorders.” Workshop organized together with the Media Faculty at Bauhaus University, Weimar, the Helmholtz-Zentrum für Kulturtechnik (HU), the Zentrum für Literatur- und Kulturforschung, and the Institut für Deutsche und Niederländische Philologie (FU). Weimar, July 17, 2009.
- “Physiologie des Klaviers.” Concerts and talks, organized by Julia Kursell together with the Musikinstrumenten-Museum SIMPK (2007/2008). Berlin, January 23, March 6, April 9, June 11, 2008, and May 13 and June 10, 2009.
- “Performing Voices: Between Embodiment and Mediation,” a conference organized by Julia Kursell (Dept. III) and Andreas Mayer (Dept. II) in collaboration with Martin Brody (American Academy in Rome), Rome, December 3–6, 2009.

Books

- Bernhard J. Dotzler, Henning Schmidgen (eds.), *Parasiten und Sirenen. Zwischenräume als Orte der materiellen Wissensproduktion*, Bielefeld: Transcript Verlag, 2008.
- Henning Schmidgen, *Die Helmholtz-Kurven. Auf der Spur der verlorenen Zeit*, Berlin: Merve, 2009.

Upcoming events

- “The Place of Experiment in Science and Technology Studies—Part II”, Berlin, July 2–4, 2010.

→ p. 96

Project

A Cultural History of Heredity

RESEARCH SCHOLARS *Christina Brandt, Bernd Gausemeier, Hans-Jörg Rheinberger*

POSTDOCTORAL FELLOWS *Stefan Borchers, Maria Kronfeldner, Vincent Ramillon*

VISITING SCHOLARS *Luis Campos, Edna Suárez*

SHORT TERM GUEST RESEARCHERS *Adam Bostanci, Jonathan Harwood, Brad Hume, Manfred Laubichler, Pablo Lorenzano, Brendan Matz, Staffan Müller-Wille, Alexander von Schwerin, Sophia Vackimes*

COLLABORATIONS ESRC Centre for Genomics in Society, University of Exeter (Staffan Müller-Wille, Christine Hauskeller); Universidad Nacional Autónoma de México—UNAM (Ana Barahona, Carlos López Beltrán); School of Life Sciences at Arizona State University, Tempe (Manfred Laubichler); Center for Literary and Cultural Research, Berlin

FUNDING Government of Liechtenstein, DFG, German Academic Exchange Service (DAAD), British Council, British Academy, CONACYT (Mexico), and the MPIWG

General Description of the Project

This project centers on the history of the scientific and technological practices in which knowledge of biological heredity became materially entrenched. The project also seeks to define cultural contexts in which this knowledge unfolded, as well as to trace its effects. Knowledge of heredity is taken here as encompassing much more than the scientific discipline of genetics. Rather, it circumscribes a much broader knowledge regime in which a naturalistic conception of inheritance gradually formed, one that in fact came to influence all areas of modern society, including medical, legal, political, and ethical discourses. The aim of the project is to explore the changing practices, standards, and architectures of this regime, as well as their particular historical conjunctions.

Collaborative and interdisciplinary in nature, the project aims to draw together expertise, besides from the history of science, from other historical disciplines such as the history of medicine, law, economics, art and literature, as well as political history and anthropology. The research group is exploring a variety of case studies, ranging from the history of generation and reproduction from the eighteenth to the twentieth century to developments in molecular biology and biomedicine at the turn of the twenty-first century.

During the last years, a series of four workshops was held, each concentrating on a specific epoch in the cultural history of heredity. Covering the period from the seventeenth through the early-twentieth century, these workshops facilitated a lively and growing cooperation of international scholars who constantly contributed to the joint

project of writing a cultural history of heredity from a long-term perspective. Results of the first two of these workshops were presented in the essay collection entitled *Heredity Produced. At the Crossroads of Biology, Politics, and Culture, 1500–1870* (Cambridge, MIT Press, 2007). A second volume, based on the last two workshops, is currently in preparation (*Heredity Explored: Between Public Domain and Experimental Science, 1850–1930*). The project will be concluded in the fall of 2010 with a workshop on the history of human heredity in the twentieth century.

A Cultural History of Heredity

Individual Projects



Staffan Müller-Wille

Hans-Jörg Rheinberger (MPIWG, Director) and *Staffan Müller-Wille* (Senior Lecturer, Exeter)

Heredity. History and Culture of a Biological Concept and The Gene in the Age of Postgenomics. An Essay

Both book projects have been concluded in 2009. A brief description has been provided in the introductory remarks of the Department's report.



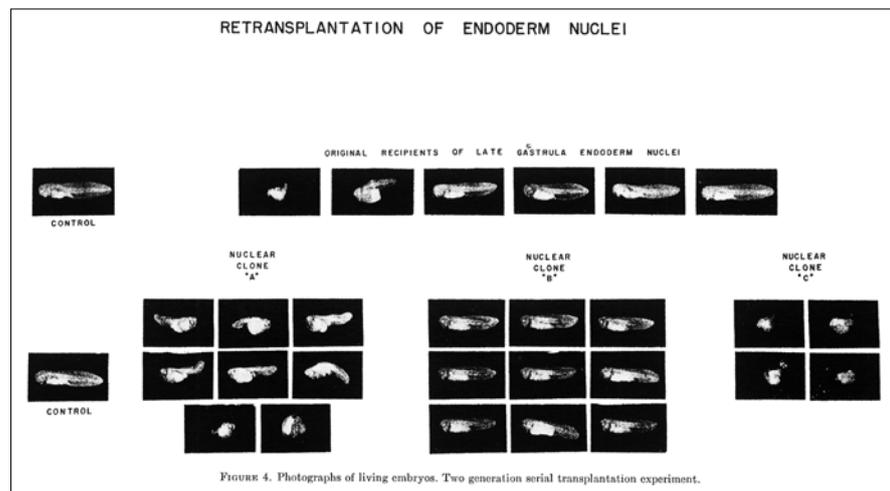
Christina Brandt

Christina Brandt (Research Scholar)

Reproduction in Biology. Configurations between Science and Culture, 1900–2000

Biomedical research on reproduction and research on related topics such as stem cell research are rapidly developing scientific fields with controversial impacts on society and culture. In this project, Christina Brandt explores the fundamental role reproduction played, both as a subject of study as well as an experimental technique, in the life sciences of the twentieth century. The study addresses the emergence and changing techniques of reproduction as well as their uses in different fields of the life sciences. "Reproduction" relates to different ways of propagation and multiplication, and it also refers to ways of making things similar or identical. In the latter sense, reproduction means "replication" and has a bearing on molecular copying and cloning techniques. This historical investigation is concerned with research fields in which reproduction

Photographic representation of one of the first cloning experiments (via transplantation of cell nuclei) with frogs in the 1950s (T. King, R. Briggs: Serial transplantation of embryonic nuclei, *Cold Spring Harbor Symposia on Quantitative Biology* 21 (1956), p. 271–290).



techniques (from artificial propagation to copying) were developed on the level of molecules, cells, and organisms. By exploring a number of case studies, the focus is on (1) the origin of cloning as a technical tool at the beginning of the twentieth century; (2) the history of cell biology (the emergence and reproduction of cell lines); (3) molecular biology and genetic engineering (the notion of replication and molecular copying techniques); and (4) cloning research in developmental biology and embryo research. A particular line of research concentrates on the public debates on human cloning and artificial reproduction beginning in the 1960s.

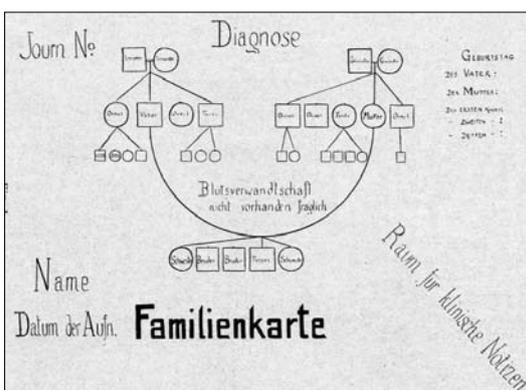
Bernd Gausemeier (Research Scholar)

Genealogy and Human Heredity from the Eighteenth to the Early-Twentieth Century

Knowledge about heredity is dependent on genealogical practices. The methodical investigation of heredity in a biological sense began with reports on families transmitting remarkable diseases or peculiarities, hospitals collecting patients' histories, and herd books kept by animal breeders. The project aims to investigate how these practices evolved, how they influenced each other, and, in particular, how they shaped concepts of heredity. Genealogy, however, does not merely consist of the application of techniques to record familial relations. In a wider sense, it forms a discursive field in which ideas about kinship, descent, reproduction, and social order are formulated



Bernd Gausemeier



and disputed. By taking into account both the material and the discursive aspect of genealogy, it is possible to view the history of human heredity in the broader context of social, intellectual, and institutional changes.

The project follows the interrelated histories of genealogy and human heredity. It begins in the eighteenth century, when genealogy was developing from a

way of representing social status to a method for illustrating vital phenomena. During the nineteenth century, systematic attempts emerged to investigate the regularities of human heredity and reproduction. In the early-twentieth century, a science of heredity took shape. This science was based on new forms of genealogical practice. In the end, it also profoundly changed our understanding of genealogical relations.

“Familienkarte” für den ärztlichen Gebrauch, nach: Arthur Crzelltizer, *Wie vererben sich Augenleiden?* Mit besonderer Berücksichtigung der Frage einer Verschiedenheit zwischen Erstgeburt und folgenden Kindern, *Medizinische Reform* 18 (1910), 120–124, 134–139, p. 121.

Stefan Borchers (Karl Schädler Postdoctoral Research Fellow)

Propagation of the Soul—Inheritance of the Sin

Stefan Borchers explores the influence of religious confession in shaping theories of generation and inheritance in eighteenth-century Lutheran Germany. Although the importance of theological thought is widely neglected in the historiography of biology, religious confession has to be considered as a central reference point for early

modern thought on generation and heredity. In regard to the question of how the embryo is formed, the emerging life sciences were accompanied by a parallel discourse on the soul's origin. Due to the fact that this discourse related the origination of body and soul with one another, physiological and metaphysical investigations were intertwined, sometimes limiting one another.



Res cogitans or res extensa? In Johann Amos Comenius's famous "Orbis sensualium pictus" (1658), the human soul is depicted as being spread throughout the whole body. "Anima hominis/Die Seele des Menschen." Woodcut by Paul Creutzberger in *Johann Amos Comenius: Orbis sensualium pictus/ Die sichtbare Welt*. Nürnberg: Ender, 1658 (Reprint ed. by Johannes Kühnel, Leipzig: Klinkhardt, 1910).

In the course of the seventeenth century, the problem of the soul's origin had become a subject of controversy between Lutheran and Catholic and Reformed theologians. The Lutheran doctrine amalgamated both physiology and the metaphysics of generation, teaching that parents engender both the body and the soul of their offspring. This doctrine made it problematic, if

not impossible, for Lutheran physicians and philosophers at the turn of the century to adopt preformation as enthusiastically as their Catholic and Reformed contemporaries. They, by way of contrast, embraced the dogma that parents only engender the body of their offspring, whereas ensoulment was to be regarded as God's own business (creationism). Yet orthodox Lutheran theologians opposed creationism, holding that the assumption of a continuous propagation of human souls since the times of Adam and Eve (traducianism) was the only possible way in which the inheritance of original sin could be properly understood. As God could not be accused of creating sinful souls, they argued that the offspring's soul was an offshoot (tradux) of the sinful parental soul (or souls). The Lutheran model of traducianism formed part of a non-dualistic anthropology that remained influential until at least the end of the eighteenth century. In this sense, religious confession reveals itself as a factor of *longue durée* for any cultural history of biology.



Maria Kronfeldner

Maria Kronfeldner (Karl Schädler Postdoctoral Research Fellow)

The Anthropological Concept of Culture in the Context of Evolutionary Debates

After an analysis of the conceptual landscape surrounding culture and evolution in the nineteenth century, the project concentrated on the emergence of the modern anthropological concept of culture between 1883 and 1917. This concept relies heavily on a sharp distinction between cultural and biological heredity. The establishment of this distinction depended on the denial of the Lamarckian idea of inheritance of acquired characteristics. August Weismann and Alfred Kroeber were two central figures in this conceptual "segregation" of culture from nature. The historical material was also used for the analysis of contemporary debates on evolutionary psychology, theories of cultural evolution, and the nature/nurture distinction.

Vincent Ramillon (Postdoctoral Research Fellow)

Norms and Practices in Genomic Research, ca. 1985–2003

This project seeks a better understanding of genomics from a historical perspective. Focusing on the material practices of this field of research, it attempts to articulate their evolution with reference to the transformations of the social and epistemic norms regulating biomedical activities during the late-twentieth century.

The history of genomics is characterized by the progressive differentiation of a managerial rationality and associated governmental practices in the institutions involved in genome mapping and sequencing or related technological and resource developments. The introduction of these managerial practices into the laboratories has led to various negotiations affecting the social, technical, and epistemic dimensions of sequencing. The use of Expressed Sequencing Tags to create gene indexes, one of



the most important applications of sequencing techniques in the 1990s, originated in the use of automata and the subsequent re-organization of sequencing procedures. The same concerns led to the emergence of factory-like production centers and to networks of laboratories as the two archetypal organizational models in genomic projects. Moreover, this managerial rationality constituted a shared language between scientific and non-scientific institutions that proved instrumental in fostering the development of companies whose business model was based primarily on the mass production of sequences. Finally, the transfer of mass production practices from sequencing to

other experimental procedures has played a critical role in the experimental and theoretical reconfigurations of molecular genetics during the second half of the 1990s, known first as the “post-genomic” and “functional genomic” turn, later theorized under the unifying label of “systems biology.”

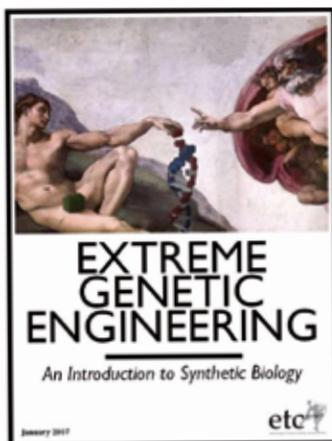


Vincent Ramillon

Cover *Nature*, 15 February 2001

Luis Campos (Visiting Scholar, Drew University)
Synthetic Biology

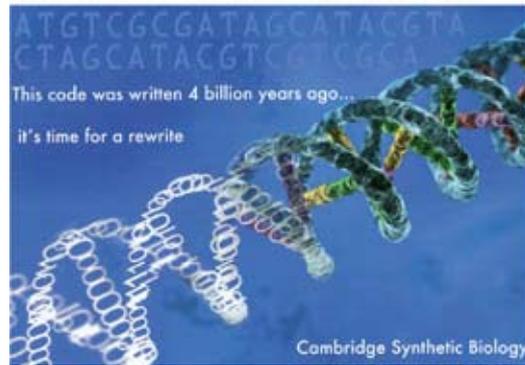
Luis Campos worked on the history of the newly-emerging field of synthetic biology, an epistemologically provocative disciplinary mixture of engineering, computer science, molecular biology, and artificial life that seeks to redesign living systems to accomplish human-desired functions. This attempt at a “plug-and-play” biology, characterized by an “open source” ethos as regards matters of intellectual property, has been claimed by some to be based on standardized biological parts with the goal of “making biology easier to engineer” and in ways that far supersede the



Luis Campos

“Extreme Genetic Engineering”: Front cover of a January 2007 report on synthetic biology issued by the ETC Group, a civil society organization based in Canada. The full report is available online at <http://www.etcgroup.org/en/node/602>

A leaflet distributed by a synthetic biology group at Cambridge University, with a phrase attributed to MIT's Tom Knight, a founding figure in synthetic biology (2007)



so-called genetic engineering of earlier generations.

In the first part of his project, Campos explored the “prehistory” of synthetic biology, relating the claims and aims of this newest of fields to institutional and disciplinary forebears and to deeper, longer-lasting themes in the history of biology in the early-twentieth century. These

include: using synthesis as an experimental tool; the idea of control as proof of understanding; and the application of principles of design and modularity to biological phenomena. In the second part of his project, he traced the evolution of synthetic biology as it has appeared in scientific publications, popular science news articles, public talks, and conferences and workshops from 2002 to the present, including both bibliographic and ethnographic data. Finally, Campos sought to characterize the development of newly emerging competing “schools of thought” within the field of synthetic biology, particularly following its internationalization. During his time at the institute, he observed the novel formation of a distinctively “European” interpretation of synthetic biology. Campos’ project not only uncovered important historical connections, but also revealed the contemporary ways in which natural, engineered, and social orders are being co-produced.



Edna Suárez

Edna Suárez (Visiting Scholar, Universidad Nacional Autónoma de México)

Representation and the Construction of Knowledge in Molecular Evolution

The aim of this project was to cover the production and representation of knowledge in the field of molecular evolution, from its beginnings in the early 1960s to the rise of bioinformatics and comparative genomics in the 1990s. The analysis took place at three different levels.

At the micro-level, molecular evolution offers a place to investigate the role of experiments and techniques in different scientific traditions and the ways in which they are connected with specific practices of representation. The goal was to extend a previous study on the uses of nucleic acid hybridization, to cover the role of electrophoresis in theoretical population genetics, and the effects of protein and DNA sequencing on the construction of phylogenies and comparative genomics.

At the disciplinary level, the project aimed to offer an account of how the idea of informational molecules came to provide a powerful rhetoric for a new style of evolutionary studies. By developing a new vocabulary, scientists such as Emile Zuckerkandl, Walter Fitch, Roy Britten, and others helped to create a technical, social, and political frontier between the new molecular evolutionists and the “old” organismal evolutionists.

At a transdisciplinary level, as molecular evolution has been constitutive in the development of the bioinformatics revolution, the historiography of genomics must be broadened to include the role of evolutionary approaches and tools. The elaboration

of the first computer programs as early as 1966 for the construction of trees based on molecular data and the first databases on proteins as early as the mid-1960s illustrate this point. The project included a study of the symbiosis between computer technology, bioinformatics, and genomics as a result of the Human Genome Project.

At all three levels, Suárez has detected important historical continuities. Such continuities arise around the study of human evolution and variation across the twentieth century. This insight has opened a wide range of collaborations with other scholars at the MPIWG and abroad.



Catalytic control of an enzyme by the last product of its activity. MON.Bio. 18, Dossier 9.2, Lectures on physiology and bacteria genetics, 1957, Humorous illustration of these lectures by a series of drawings by F. Lavallé, Legends by Georges Cohen (Institut Pasteur, Paris, France)

A Cultural History of Heredity

Projects of the Short-term Guest Researchers

- *Adam Bostanci* (Hughes Hall, University of Cambridge): “The Human Genome: A Study of Something We All Partake in.”
- *Jonathan Harwood* (Centre for the History of Science, Technology & Medicine, University of Manchester): “History of Plant-Breeding.”
- *Brad Hume* (Independent Scholar): “Heredity and the Temporality of the Body.”
- *Brendan Matz* (Yale University, New Haven): “Animal Breeding and the Study of Heredity in Germany and the United States, 1850–1929.”
- *Staffan Müller-Wille* (ESRC Centre for Genomics in Society at the University of Exeter): “The Dark Side of Evolution: Caprice, Deceit, Redundancy.”
- *Manfred Laubichler* (School of Life Sciences, Arizona State University, Tempe): “Regulation and the Origin of Theoretical Biology.”
- *Pablo Lorenzano* (National University of Quilmes/Consejo Nacional de Investigaciones Científicas y Técnicas): “Theoretical Incommensurability and Empirical Comparability in the History of Genetics.”
- *Alexander von Schwerin* (Technical University of Braunschweig): “Making Mutations: Objects, Practices, Contexts.”
- *Sophia Vackimes* (Universidad Nacional Autónoma de México): “Genetic Engineering in Cinema.”

A Cultural History of Heredity

Activities Related to the Project

Research Collaborations

The project has engaged in research collaborations with the ESRC Center for Genomics in Society (Egenis), Exeter, and the National University of Mexico City (UNAM). Three organizations funded these research collaborations: the German Academic Exchange Service (DAAD), the British Council, and the Mexican CONACYT.

1 Reproducing Organisms: A Comparative Analysis of Historical, Social, and Philosophical Aspects in Twentieth Century Biomedicine

(DAAD/British Council, July 2008–June 2010)

This ongoing joint project aims at a historical and philosophical investigation of central concepts in biomedicine and their cultural embeddedness. Taking the concept of “reproduction” as its focal point, the project explores different dimensions of the scientific, medical, and cultural practices connected to reproduction across the twentieth century. The goal is a better understanding of both the complex history as well as present developments in artificial reproductive technologies (ART) in the fields of agriculture and medicine. It also explores the ethical dilemmas surrounding this subject.

The collaboration allowed visiting scholars and PhD students from the MPIWG to stay in Exeter (Christina Brandt, Bernd Gausemeier, Mathias Grote, Maria Kronfeldner, and Florence Vienne from the Technical University of Braunschweig). It also made possible short stays of scholars from Exeter at the MPIWG (Christine Hauskeller, Jean Harrington, Sabina Leonelli, Marco Liverani, and Staffan Müller-Wille), as well as a one-day workshop in Exeter in April 2009. A second workshop was held in Berlin in May 2010.

2 Evolution and Heredity: Genetics and Epigenetics

(DAAD/CONACYT, January 2007–December 2009).

This project’s objective was to forge a close cooperation between the two research groups at the MPIWG and UNAM concerned with the history, philosophy, and sociology of heredity and evolutionary thinking from the second half of the nineteenth century up to the present time. The project aimed at a collective analysis of modern naturalistic thinking about nature, man, and society and at a study of cultural, national, and local differences.

The project enabled a group of highly motivated doctoral and postdoctoral students to participate in the exchange program. From 2007 to 2009, a number of German scholars (Maria Kronfeldner, Christina Brandt, Christian Reiß, and Mathias Grote from the MPIWG, Stefan Willer and Ulrike Vedder from the Berlin Zentrum für Literatur- und Kulturforschung) traveled to Mexico City for research stays of three to four weeks at the UNAM campus. Mexican scholars (Ana Barahona, Sergio Martínez, Edna Suárez) and three Mexican PhD students (Erika Torrens, Vivette García, and Fabrizio Guerrero) traveled to Berlin for research on their dissertation topics.

As a result of this collaborative research, an international workshop on “The Hereditary Hourglass” took place at the UNAM in October 2008. An international conference on the bicentenary of Charles Darwin was organized jointly with the Colegio Nacional de Mexico in November 2009 in Mexico City.

Workshops

- “History of Plant-Breeding Since 1880,” March 28–29, 2008, organized by Jonathan Harwood and Staffan Müller-Wille.
- “Graphing Genes, Cells, and Embryos: Cultures of Seeing 3D and Beyond,” June 12–15, 2008, organized by Sabine Brauckmann, Tartu University; Christina Brandt, MPIWG; Denis Thieffry, University of Marseille; and Gerd B. Müller, Konrad Lorenz Institute, Altenberg.
- “The Hereditary Hourglass. Narrowing and Expanding the Domain of Heredity,” National University of Mexico City (UNAM), October, 1–2, 2008, organized by Ana Barahona, Edna Suárez, Hans-Jörg Rheinberger.
- “Writing the History of Genomics,” October 29 – November 1, 2008, organized by Edna Suárez and Vincent Ramillon.
- “Making Mutations: Objects, Practices, Contexts,” January 13–15, 2009, organized by Luis Campos and Alexander von Schwerin.
- “The Tenacity of the Nature/Nurture Divide,” March 20–21, 2009, organized by Maria Kronfeldner and Carlos López Beltrán.
- “Darwin in Latin America” and “Darwin: The Art of Doing Science,” National University of Mexico City (UNAM) and El Colegio Nacional de México, November, 12–19, 2009, organized by José Sarukhán, Rodolfo Dirzo, Ana Barahona, Edna Suárez, Carlos López Beltrán, Sergio Martínez, and Hans-Jörg Rheinberger.

Books

- Staffan Müller-Wille and Hans-Jörg Rheinberger (eds.), *Heredity Produced: At the Crossroads of Biology, Politics, and Culture, 1500–1870*, Cambridge: MIT Press, 2007.
- Hans-Jörg Rheinberger, Staffan Müller-Wille: *Vererbung. Geschichte und Kultur eines biologischen Konzepts*, Frankfurt: Fischer Verlag, 2009.
- Staffan Müller-Wille, Hans-Jörg Rheinberger, *Das Gen im Zeitalter der Postgenomik. Eine wissenschaftshistorische Bestandsaufnahme*, Frankfurt: Suhrkamp, 2009.
- Florence Vienne, Christina Brandt (eds.), *Wissensobjekt Mensch. Humanwissenschaftliche Praktiken im 20. Jahrhundert*, Berlin: Kadmos Verlag, 2008.

Upcoming events

- “Human Heredity in the Twentieth Century,” Workshop, Exeter, September 2–4, 2010, organized by Staffan Müller-Wille, Bernd Gausemeier, Ed Ramsden.

Project

Knowledge in the Making. Drawing and Writing as Research Techniques

RESEARCH SCHOLARS *Christoph Hoffmann, Barbara Wittmann*

POSTDOCTORAL RESEARCH FELLOWS *Karin Krauthausen, Christof Windgätter, Stephan Kammer* (associated; funded by the DFG)

SHORT-TERM GUEST RESEARCHERS *Claudia Mareis, Nina Samuel, Barbara Wurm*

COLLABORATION Research Group at the Kunsthistorisches Institut in Florenz:

Omar W. Nasim, Jutta Voorhoeve

RESEARCH NETWORK Yale University (Rüdiger Campe); Freie Universität Berlin (Werner Kogge); Technische Universität Berlin (Cornelia Ortlieb); Universität Wien (Wolfram Pichler and Wolfgang Pircher).

FUNDING Fritz Thyssen Stiftung, Max Planck Society (Strategic Innovation Fund), and the MPIWG

General Description of the Project

“Knowledge in the Making” is an inter-institutional research initiative of the Max Planck Institute for the History of Science in Berlin and the Kunsthistorisches Institut in Florence (Max Planck Institute). The research project started in the fall of 2006 and will conclude in 2010. The two working groups in Berlin and Florence comprise seven individual research projects. The main focus of the Florentine group is on the aesthetic and epistemic aspects of drawing in the modern arts and sciences (1850–2000). Exemplary studies deal with “Constructing the Heavens. Drawings of Nebulae in Victorian Science” (Omar W. Nasim; he was a member of the Berlin group until March 2008) and “Drawing in Contemporary Art: Notation, Expression, and Experiment” (Jutta Voorhoeve). For further details, see the report of the Kunsthistorisches Institut in Florence.

Like the Florentine part of the project, the Berlin working group takes as a starting point the manifold forms of “paper work” in the arts and sciences. Apparently unsophisticated, though ubiquitous, drawing and writing techniques play a constitutive role in the creation and reworking of knowledge. The interaction of hand, paper, and pen involves much more than simply recording what was previously thought, observed, or imagined. Writing and drawing both have the power to *translate* ideas and observations into two-dimensional, manageable, and reproducible objects. That is, they *concretize* cognitive processes, and in this way open up an interaction between the securing of phenomena and the formation of theses—between conception and realization. In fact, the activities of writing and drawing constitute one of the most critical steps in epistemic and aesthetic processes: the step from (potentially)

ambiguous data to stable facts, and from preliminary, provisional ideas to materialized products.

Following the recent discussion on representational practices, the research initiative analyzes the potential of drawing and writing techniques in three main respects. First, they rely on a certain *setting* in which materials, human bodies, and sign systems become interrelated. In such settings, every element is dependent on the other, and all become effective as specific constraints, limiting and shaping the final result. Critical for evaluating the productive effects of drawing and writing processes is, second, the order of operations, which organize drawing and writing activities. Such *procedures* lead to some characteristic formation of the processed object. Finally the members of the research group are interested in the *languages* of inscription, i. e., sign systems which come into play in aesthetic and epistemic processes. In particular, the different projects focus on the creative power of representational modes which subvert and transcend the divide between drawing and writing, either by syntactically combining them or by blurring the differences as for instance in doodles and scribbles.

In addition to an internal perspective on the settings, procedures, and languages of drawing and writing, the research initiative follows the specific function of these tools of knowledge within the technologically advanced, abstract cultures of modern science and art. The target period (1800 to 2000) witnessed an intense competition between “old” and “new” media. The project therefore examines the tension between handwriting and drawing on the one hand and mechanical, photographic, and digital recording technologies on the other. An analysis of the various forms of their interaction opens up new perspectives on the relative potential of writing and drawing under the shifting technological conditions of modernity. Moreover, with the reconstruction of epistemic and aesthetic processes, the focus of the project highlights the underlying “techniques of creativity” which the cultures of scientific research and artistic practice share.

Knowledge in the Making

Individual Projects

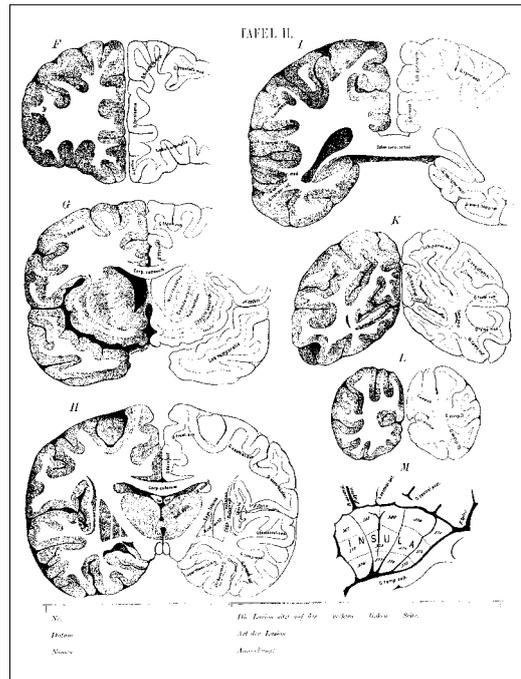
Christoph Hoffmann (Research Scholar)

Epistemic Writings

Writing practices in science implement procedures, i. e., an order of operations, which in a temporal sequence translates into a spatial arrangement of traces. The specific procedures can vary in their degree of complexity. They may be highly idiosyncratic or entirely standardized. They may follow implicit rules or can become the subject of explicit exercise. In any event, procedures are dependent on the context and flexible in their use. Paying attention to the procedures can allow one to identify and characterize ways in which writing processes unfold instrumentally. For example, autopsy reports in pathology result from a highly regulated practice. The writing of the record structures both the course of dissection and the observations of the dissector. The right way of describing was (and still is) part of the regular academic training.



Christoph Hoffmann



Scheme proposed for recording the findings of the dissection of the brain (1888).
Sigmund Exner: Schablone des menschlichen Gehirns zur Eintragung von Sectionsbefunden, Wien: W. Braumüller, 1888.

The settings for recording—note taking by hand, dictation, voice recording, usage of forms—is a matter of constant attention and innovation.

The recording regime in pathology is clearly due to the fact that the “paper body” of the autopsy report serves as a working document and genuine basis of knowledge production. A very similar function can be attributed to the observational notes of the biologist Karl von Frisch. In his research on the communication of honey bees, the records of field experiments represent only one step in a chain of operations. Underlinings and additional numberings point to the fact that von Frisch systematically archived his notes. Yearly compilations served both as an index for the records and as an overview of completed research. Frisch organized his reading notes in a similar manner. Series of booklets, each dedicated to a single theme, were filled with excerpts and sometimes comments. A separate index permitted a search for particular authors.

The physicist and philosopher of science, Ernst Mach, adhered to the opposite habit. Mach kept only one notebook, which covered almost every facet of his scientific life (and sometimes as well of his private affairs)—with one notable exception: primary recordings of experimental data and reading notes are almost absent. Mach’s notebooks represent less of a recording aid than a tool for management and, in the context of research, a space of reworking. Mach’s favorite means for ordering and relating phenomena and ideas were lists and combinations of writing and drawing. In addition, the notebooks provide an example for the instrumentality of the temporal sequence of writing in itself: sometimes, in early stages of concept formation, Mach jotted down series of notes exploring a certain problem. It appears in this respect that his train of thought developed from note to note, so that each time the preceding note became the starting point for his subsequent thoughts.

Barbara Wittmann (Research Scholar)

Meaningful Scribbles. Children's Drawings as Psychological Instruments, 1880–1950

The institutionalization of child psychology around 1900 was accompanied by techniques of observation and experiment that separated scientific attention from the education and everyday care of children. The experimental application and interpretation of children's drawings became one of those techniques. Prior to 1880, children's drawings were seen as mere scribbles, and not considered to be of any aesthetic or heuristic value. Psychologists and psychoanalysts such as James Mark Baldwin, James Sully, William Stern, Karl Bühler, Melanie Klein, and Jean Piaget changed this, considering drawings to be a major diagnostic device in the investigation of children. Like children's play and their stories, the "artistic production" was (and still is) believed to reveal sensomotoric functions and spatial perceptions, to give proof of children's intelligence and social development, and to document or even change their psychic disposition and etiology.

The emergence of children's drawings as psychological tools was supported by different kinds of methods, techniques, and tests that were developed to interpret what previously had been considered "meaningless." These interpretative practices had to control the dynamics of drawing and the transference between the child and the scientist. The experimental set-ups and tests framed and stabilized the scribbles: certain qualities of children's drawings were isolated; single gestures and motifs were repeated again and again. In this way, psychology began to conceive children's drawings as a more or less orderly process through which the visualization of irregular psychic symptoms and dysfunctions was enabled. Children's drawings were embedded and transformed into a calculated procedure that allowed the scientist to be surprised by unexpected phenomena.

The operationalization of children's drawings in psychology is certainly a special case in the history of drawing as a scientific instrument. Whereas all other kinds of scientific inscriptions are produced by scientists or commissioned artists, children's drawings can only be made by the scientific object itself. Still, the drawings produced in experimental and diagnostic contexts should not be considered as immediate "self-portraits" as they do not contribute to the constitution of subjectivity directly, but rather to its mediation and objectification. Thus,



Barbara Wittmann



"Die Olle ist wütend". Drawing from the analysis of a six year old child ("Erna") with explanations of Melanie Klein, 1925. Wellcome Trust, London, Melanie Klein papers, file PP/KLE/B.25.

the historical reconstruction of the experimentalization of children’s drawings around 1900 promises to illuminate the practices and methods through which an everyday activity was transformed into a research technique and how it shifted between these functions.



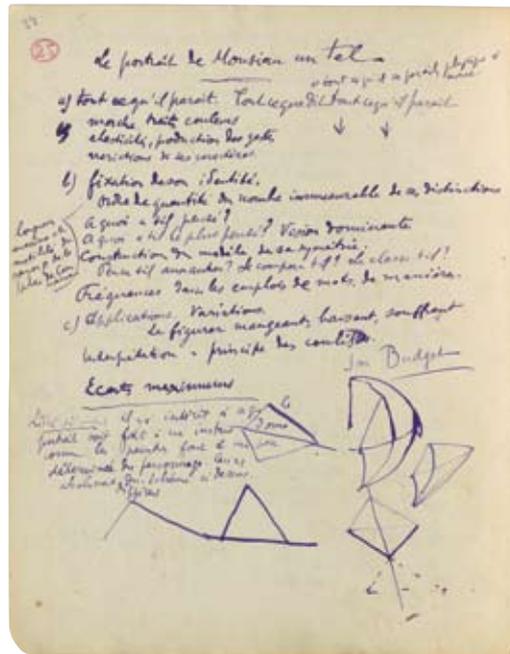
Karin Krauthausen

Karin Krauthausen (Postdoctoral Research Fellow)

Valéry’s Cahiers (1894–1945)—Drawing and Writing as a Practice of Thought.

The influence of the French author and poet Paul Valéry extends far beyond literature. His writings concern issues and discoveries in the arts and natural sciences and reflect on political developments and historical events. Valéry’s intellectual agility is most apparent, however, in the 261 notebooks that he left behind, the *Cahiers*, in which he ceaselessly fashioned new connections between different spheres of knowledge. As one leafs through these notebooks, one is astounded by the dense and varied interweaving of text fragments, drawings, and formulas. The writing is not ordered on the page in a purely sequential way, but is rather inserted all at once and with overlaps; it is distinguished by different “formats,” such as lists, philosophical or scientific aperçus, analytical passages, literary fragments, and comments on the drawings. Explanatory sketches alternate with associative, draftsmanlike designs and geometric diagrams. And amidst all this are doodles—stickmen, spirals, and fields of lines. The interweaving does not result in disorder, and thus Valéry’s notebooks reveal themselves again and again as a place for the appropriation of knowledge from the sciences (mainly mathematics and physics). The formulas and scientific drawings evince an imitation of, and a self-immersion in, conventions of thought and illustration from the sciences, and this especially in the first years of the *Cahiers*. But, bit by bit, what was appropriated is transformed, becoming a writing and drawing practice of its own. My research focuses on this practice, which oscillates between conventional application and personal appropriation, thereby unfolding a productive potential.

Valéry’s writing and drawing practice generates a technique of innovation and creation that undermines the disciplinary or epistemological sorting in science and art.



Page of Paul Valéry’s Cahier ‘Journal de bord’.
Madame Boivin-Champeaux, Bibliothèque nationale de France.

Stephan Kammer (Postdoctoral Research Fellow; associate, funded by the Deutsche Forschungsgemeinschaft)

Strokes and Expressions. The History of Graphological Knowledge (1750–1950)

The basic idea of graphological knowledge is a rather simple one: by the strokes of his pen, man records significant evidence revealing the secrets of his character and true nature. Thus, reliable anthropological knowledge results not from written utterances and their propositions—subjects of manifold skills of manipulation—, but instead from the unmistakable traces of one’s hand.

Writing was first designed to be a self-recording system of human individuality in the context of Johann Caspar Lavater’s sensational *Essays on Physiognomy* (*Physiognomische Fragmente, zur Beförderung der Menschenkenntnis und Menschenliebe*, 4 vol., 1775–1778). The evaluation of these traces obtains its methodical routine as well as its name (i. e. graphology) in the second half of nineteenth century. Despite its connections to *fin-de-siècle* psychology, psychiatry, and criminology (which focuses on writing beyond these physiognomic pretensions), graphology remains a controversial, if not dubious part of anthropology. Even its supporters soon split into at least two parties disputing the scope of graphological knowledge. Whereas “minimalists” were inclined to limit it to the identification of individuals from the strokes of their pen (e. g. in forensic graphology), “maximalists” tended to claim a complete interpretation of individual personality, considering the traces of writing as expressions of character.



Stephan Kammer



Psyche’s writing.
Illustration Louis Moe, from Karl Gjellerup’s
novel *Das Briefcouvert. Studie eines
Graphologen*, Berlin: S. Fischer 1898, p. 85.

Nonetheless, or perhaps precisely because of this discord, the history of graphological knowledge can be regarded as a model of the genealogy of modern anthropology. Oscillating between the concepts of individuality and subjectivity, between the competences of physical/psychological and cultural anthropology, between the effects of the *dispositif* of literacy and those of corporeality, graphology covers the complete area in which scientific and cultural knowledge of man has been produced across the past three centuries.



Christof
Windgätter

Christof Windgätter (Postdoctoral Research Fellow)

Typography of Knowledge. The Layout Policy of the Internationaler Psychoanalytischer Verlag (1919–1938)

In our culture, the production, distribution and evaluation of printed texts remain a central aspect of science. Despite new technologies, a major part of our scientific memory is managed, reworked, and handed down in the form of printed matter. Against this background, the project focused on layout strategies as a missing subject in the history of science. Its aim was to examine the epistemic function of the design tools of print. The basic assumption is that books are neither merely reading objects nor just the expression of an author's intentions. Rather, the graphic reality of printed texts influences and guides what can be understood through the act of reading.

The particular perspective of this project was directed toward the Internationaler Psychoanalytischer Verlag (IPV). Founded in 1919 in Vienna by a group around Sigmund Freud, the IPV was shut down in 1938 by the Nazis. The IPV published all the titles of the contemporary psychoanalytical movement—Freud's books starting in 1920, the first psychoanalytical dictionaries, the *Almanach*, the four leading journals, as well as the first edition of Freud's collected writings.

To investigate the IPV layout strategies, six areas of study were considered, which together aimed at an *epistemology of the IPV* and demonstrate that it introduced the practice of *corporate design* in the field of scientific publishing. The areas of study included the following: (1) The chronology of the IPV's business affairs. (2) The naming politics of the IPV. (3) The logo of the IPV, the Oedipus Vignette. (4) The color of the IPV books and journals, which, starting in 1924/25, were produced in yellow bindings or covers. (5) The typography of the books, for which the "Cochin" font was often conspicuously used. (6) The appearance of the shop windows for which the IPV books and journals were produced, ultimately represented the fundamental changes in product display around 1900.



Ödipus Vignette of the Internationaler Psychoanalytischer Verlag. Collection Philippe Helaers.

Knowledge in the Making

Projects of Short-Term Guest Researchers

- *Claudia Mareis* (Kunsthochschule Bern): “Interferences between Discourses of Design and Knowledge.”
- *Nina Samuel* (NCCR Iconic Criticism, Basel/Humboldt University Berlin): “Shaping Chaos. Otto Rössler’s Drawings.”
- *Barbara Wurm* (Internationales Forschungszentrum Kulturwissenschaften (IFK) Wien): “Beyond the Film Strip. Numerical-graphical Notation Procedures of the Medium Film.”

Knowledge in the Making

Activities Related to the Project

Workshops

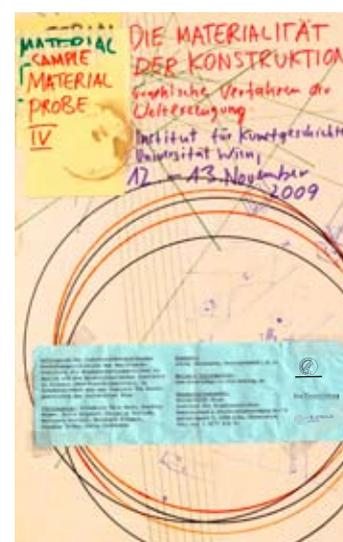
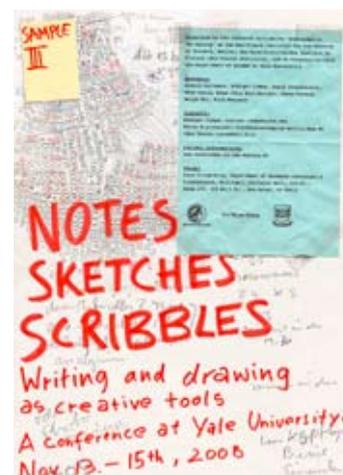
- “*Logik des Verfahrens*,” Wissenschaftskolleg zu Berlin, March 19, 2008.
- *Nachlese/Afterthoughts 2*: “Schreibszenen”/“Writing Scenes” (with Rüdiger Campe, Yale University), MPIWG Berlin, June 10, 2008.
- *Nachlese/Afterthoughts 3*: „Kritzeln und Schnipseln”/“Scrips and Scribbles” (with Hans-Jörg Rheinberger, MPIWG, Berlin), Kunsthistorisches Institut in Florenz — Max Planck Institute, Florence, July 17, 2008.
- *Materialprobe 3*: “Notes — Sketches — Scribbles: Writing and Drawing as Creative Tools,” Yale University, New Haven, November 13–15, 2008.
- “*Wissen im Druck. Zur Epistemologie der Buchgestaltung zwischen 1850 und 1950*,” MPIWG Berlin, December 12, 2008.
- *Nachlese/Afterthoughts 4*: „Erschriebene Denkräume” (with Werner Kogge, Freie Universität, Berlin), MPIWG Berlin, June 19, 2009.
- *Materialprobe 4*: “Die Materialität der Konstruktion. Graphische Verfahren der Welterzeugung,” Universität Wien, November 12–13, 2009.

Books

- Christoph Hoffmann (ed.), *Daten sichern. Schreiben und Zeichnen als Verfahren der Aufzeichnung* (= Wissen im Entwurf 1), Zürich/Berlin: Diaphanes, 2008.
- Barbara Wittmann (ed.), *Spuren erzeugen. Schreiben und Zeichnen als Verfahren der Selbstaufzeichnung* (= Wissen im Entwurf 2), Zürich/Berlin: Diaphanes, 2009.

Upcoming events

- Workshop “Paperwork: Writing (in) Books, 1650–1850,” MPIWG Berlin, June 17, 2010.



Additional Departmental Projects

Senior Researchers



Hans Erich Bödeker

Hans Erich Bödeker (Research Scholar)

The Emergence of the Modern Social and Human Sciences

Hans Erich Bödeker's research on the emergence of the modern social and human sciences focuses on the analysis of the Enlightenment epistemic culture. He inquires into the Enlightenment concept of science (*Gelehrsamkeit, Wissenschaft*). In terms of ideal types, science in the eighteenth century gradually became transformed from compilation to research. For this investigation, Bödeker consciously chose a conceptual history approach, intending to demonstrate its significance in the history of science. At the same time, he explores both relations between the history of metaphors and the history of concepts, as well as the feasibility of a comparative history of concepts. His exploration of the Enlightenment epistemic culture also considers the reciprocity between the concept of science and related scholarly practices such as reading, taking notes, authorization, as well as the varying modes of getting scholarly results published. The interrelations between natural history, anthropology, and history, a crucial issue of eighteenth century human sciences, is at the heart of his research.



Ursula Klein

Ursula Klein (Research Scholar)

Technoscience *avant la lettre* — Science and Technology in Prussia

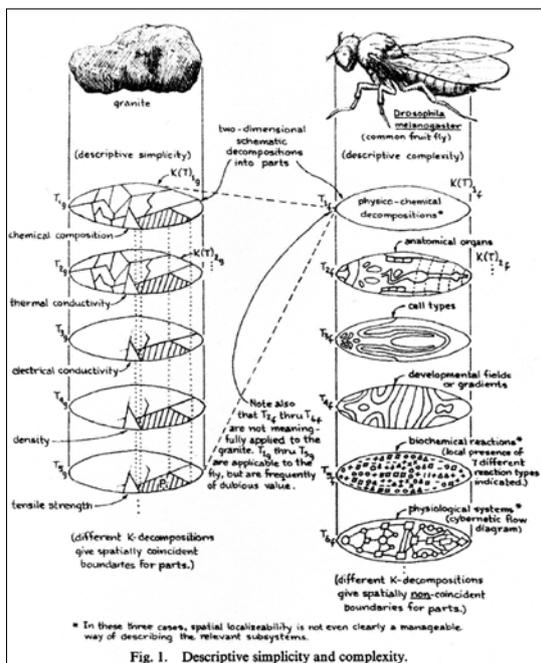
The systematic and stable interconnection of both scientific and technological inquiry into a “technoscience” is usually considered to be the outcome of the twentieth century, with forerunners in the second half of the nineteenth century. This project studies comparatively stable intersections of learned inquiries into nature and technological innovation in a much earlier period, namely from the eighteenth to the mid-nineteenth century. In laboratories, innovative workshops, and specialist market places of that period, artisanal skill and technical competence were combined with learned



The large laboratory of the Berlin Royal “Hofapotheke” (18th century).

knowledge about nature derived from experience. Numerous university chairs, professional schools, economic and philosophical societies, academies, and journals were founded that fostered technological innovation while simultaneously contributing to scientific understandings of nature. Central to this project are forms of such advanced expertise, developed between the early eighteenth and mid nineteenth century at sites where trade, manufacture, and learned natural knowledge intersected.

The specific focus of this project is the interconnection of scientific and technological expertise in Prussia. There is a host of new archival material that provides excellent insight in this issue. During the eighteenth century the Prussian state undertook numerous efforts to improve the balance of trade, innovate manufacture, and reform state administration. One element of this cameralist policy was intervention into commerce, for example, by founding state manufactories. Another was the promotion of so-called useful sciences along with experts willing to combine analysis of natural objects with technological ventures. Among the Prussian men of science, many were mining officials, artillery officers, pharmacists, and other “hybrid experts,” that is, individuals at home in the worlds of science, engineering, and among cameralist state officials. These men possessed advanced useful knowledge and skills and were acknowledged as authorities for solving technical problems. They engaged in commercial production or in technological projects supported by the Prussian state administration, the Prussian military, or the Berlin Academy of Sciences. At the same time, they were highly respected *Naturforscher* familiar with the literature of their field, publishing essays and books, enjoying memberships in academies and other learned societies. In their laboratories these men analyzed material substances regarded both as objects of nature and useful materials. The material culture of the eighteenth-century laboratory enabled them to shift with ease from natural inquiry to technological investigation and back again.



Silvia Caianiello

(Visiting Scholar, Istituto per la Storia del Pensiero Filosofico e Scientifico Moderno (ISPF), Consiglio Nazionale delle Ricerche, Napoli)

History and Philosophy of the Notion of Modularity in the Life Sciences

Silvia Caianiello’s research project on modularity in the life sciences offers a critical analysis of one of the key-notions of evolutionary developmental biology. This concept is particularly relevant as it marks the departure from the notion of organism still supported in the Modern Syn-



Silvia Caianiello

William C. Wimsatt, Complexity and Organization, SA: Proceedings of the Biennial Meeting of the Philosophy of Science Association, Vol. 1972, (1972), pp. 67– 86.

thesis to a new representation of ‘decomposability’ of living systems. The unquestionable appeal of the notion is connected to a new paradigm for naturalization, capable of encompassing several ontological levels, up to minds and societies, and therefore requires historical as well as philosophical investigation. Crossing several disciplinary borders, Caianiello’s analysis seeks to capture the overall relevance of a new metaphoric field connecting the life sciences, bio-computing, and the social sciences.



Tobias Cheung

Tobias Cheung (Visiting Scholar, Deutsche Forschungsgemeinschaft—Heisenberg Programm)

Stimulus-Reaction-Schemes in Psychologies, Anthropologies, Urban Systems, and the Life Sciences, 1830–1950

Organism-milieu-interfaces and stimulus-reaction-schemes are central to Henri de Blainville’s *Cours de physiologie générale et comparée* (1833) and Auguste Comte’s *Cours de philosophie positive* (1830–42). Théophile de Bordeu and the so-called Montpellier school had already explained gland activities and the sensibility of organs according to stimulus-reaction-schemes. Blainville and Comte refer to such schemes, combining instinct economies and Franz Joseph Gall’s organology of the brain. For both, the regulation of processes of the inner body and of the organism-milieu-interface were highly important. After Blainville and Comte, stimulus-reaction-schemes (related to organism-milieu-interfaces) appear throughout the nineteenth century and the first half of the twentieth century in various scientific domains (physiology, medicine, evolutionary theories, ecology, psychology, sociology, economy, and city planning).



Didier Debaise

Didier Debaise (Visiting Scholar, Humboldt Fellow)

Pragmatism and the Life Sciences. The Emergence of an Evolutionary Philosophy

This research project centers on Charles Sanders Peirce and Alfred Whitehead (philosophy of nature), John Dewey and George Herbert Mead (social sciences), and William James (psychology). It proceeds along three axes: first and foremost, it aims at a rereading of the pragmatist enterprise from the point of view of its evolutionary inheritance (Lamarck, Darwin, and Spencer). The major questions that constitute pragmatist philosophy (the theory of knowledge, the “functionalist” method, and the theory of experimentation) can then be relocated in the context of an evolutionary approach. Second, it seeks to analyze the manner in which an ensemble of scientific theories circulates in philosophy and how they are transformed. Finally the ambition of the project is to unfold certain epistemological implications of evolutionary theories. The pragmatists did not stop to insist on the fact that our theories of knowledge had been constructed in taking the physical world as their model and that they were thus inadequate for the interpretation of an evolutionary reality. This question of a transformation of models of knowledge towards biological realities is of vital importance today.

Sybilla Nikolow (Research Scholar, Institute for Science and Technology Studies, University of Bielefeld)

“Words Divide, Pictures Unite.” Otto Neurath’s Pictorial Statistics in Historical Context

Otto Neurath’s (1882–1945) famous slogan that words divide and pictures unite is frequently quoted in visual communication and media studies to support the apparent superiority of pictures over verbal languages. His Vienna method of pictorial statistics serves as evidence in proving that this assumption is correct. Looking at the contexts of its devel-



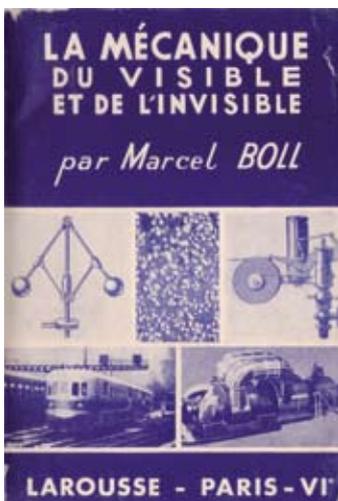
opment, meaning and use, actually reveals that the situation is more complex. Such a perspective also conveys an impression of the changes in society and media that occurred during the first half of the twentieth century, changes which not only produced innovations in visual culture, but which were also driven by them. Neurath’s method can be seen as a typical project of democratization and modernization of a period in which concepts of society and science were interrelated in a peculiar manner. The project illustrates how Neurath developed his communicative understanding of pictures along the methodological premises of the Vienna Circle to a counter-piece of artificial languages, while, at the same time, distancing himself from propagandistic methods and artistic forms of expression. It also shows how the method was systematically transformed from a product of Red Vienna to an International System of Typographic Picture Education (Isotype).



Sybilla Nikolow

Otto Neurath at the opening of the “World of Plenty” exhibition at the Food Conference in New York, circa 1944 (Isotype Collection, University of Reading).

Peter Schöttler (Visiting Scholar, Centre National de la Recherche Scientifique, Paris)
Marc Bloch and Scientism



The French medievalist Marc Bloch, born in 1886 and killed by the Gestapo in 1944, is probably one of the most frequently cited authors among historians. But one of the effects of this transformation into an icon is that the real author and his writings have faded in importance, as his work has been transformed, at best, into a stone quarry. While most of the literature on Bloch tends to present him as an historian of our time, a *toujours actuel*, Peter Schöttler attempts to situate the scholar and his work in his own time, marked, at least in France, by intellectual tendencies that are now depreciated as “positivism” and “scientism.” Schöttler’s work involves a wide-ranging empirical investigation of Bloch’s lifelong relationship with philosophy and



Peter Schöttler

Marcel Boll, *La mécanique du visible et de l'invisible*. Mouvements, mécanismes, moteurs, Paris, Larousse, 1948, 403 pp.

the natural sciences, which Bloch sought to expand to the historical disciplines, and the discursive formation Bloch described as “scientism.”

While the phenomenon emerged during the nineteenth century, the word “scientism” appeared only around 1900. With a few exceptions (like the late Casper Hakfoort), historians have taken for granted that it stood for a widely supported and influential movement. But as Schöttler’s study of French authors who described themselves as “scientists” reveals, this kind of radical scientific optimism concerns mostly outsiders, even if highly qualified and productive. One example is the chemist-physicist Marcel Boll, a student of Georges Urbain und Paul Langevin, who, in the late 1920s, became the decisive transmitter of the “Vienna Circle” to France, a movement that for Boll represented a novel and ideal form of “positivism,” e. g., “scientism.”



Mai Wegener

Mai Wegener (Independent Research Scholar)

Three Undiscovered Epistemologists: Paul Valéry, Kurt Goldstein, Jacques Lacan

The well-known poet Paul Valéry (1871–1945), the neuroscientist Kurt Goldstein (1878–1965), and the psychoanalyst Jacques Lacan (1901–1981) are less known as thinkers who also elaborated on epistemological questions. Each established his (respectively) poetic, neurological or psychoanalytic practice at a certain distance from their traditional disciplines (if poetry can also be called a discipline). Each felt encouraged to explore the conditions of these disciplines and highlight their place in the field between the modern sciences. Their epistemological reflections exceeded self-reflection; they examined the constitution of modern science as a whole. Each tended to focus on the life sciences, which had undergone radical changes in the nineteenth and at the beginning of the twentieth century. Paul Valéry was interested in the rules and structures common to both science and art, specifically the emergence of new objects prior to their definition as epistemic or artistic objects. Kurt Goldstein developed his experimental examinations by renouncing isolation as the basis of the scientific approach. In opposition to the traditional neurosciences, he posited a holistic understanding of the organism. Jacques Lacan’s epistemic interests were closely linked with his reformulation of psychoanalysis. Common to these three disparate approaches is the interest in language and the psyche’s relation to its bodily support. In their epistemic reflections, however, they assumed different positions. This project focuses specifically on the interaction between practice and epistemic considerations in the works of the three authors.

Additional Departmental Projects

Postdoctoral Fellows



Safia Azzouni

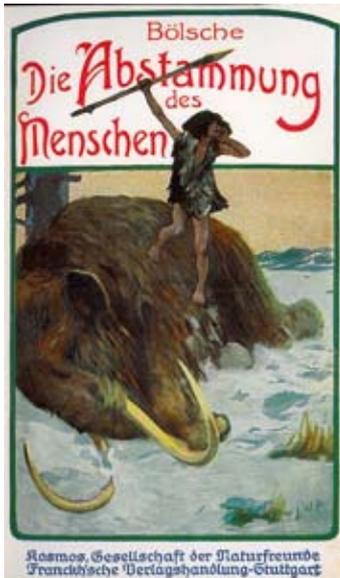
Safia Azzouni (Karl Schädler Postdoctoral Research Fellow)

The Popular Science Book: The Orientation of Knowledge Around 1900 Between Science and Popular Science

This project explores the emergence of popular science books in Europe during the second half of the nineteenth century and the role that these books played in the transfer—and the production—of knowledge. Popular science was written not only

by scientists, but also by professional popularizers. These authors—journalists, poets, or former scientists—often had their background in two fields: science *and* literature.

Over the course of the nineteenth century, the interest poets took in scientific experimentation and innovation continuously increased. Scientific topics and methods influenced positivist literary theory and the naturalistic movement in France and Germany. Accordingly, the research project addresses the question of the extent to which



the genesis of the popular science book was linked to the literary developments of the time.

Azzouni's project focuses on exemplary case studies from the realm of German popular science writings. Among the writers dealt with are the theorist of naturalism Wilhelm Bölsche, one of the most famous German popularizers up to the 1930s, and the mathematician, physicist, and philosopher Kurd Laßwitz, one of the first German science-fiction writers. In addition, Azzouni is investigating the role popularizers took in the philosophical debate over *Geisteswissenschaften* or *Kulturwissenschaften*. Furthermore, she treats the question of whether and if so, how, popular science influenced the production of new specialized knowledge.

The first volume of the German popular science series 'Kosmosbändchen' from 1904. Private.

Tamás Demeter (Postdoctoral Research Fellow)

Hume and the Ideology of the Scientific Revolution

Tamás Demeter's project has a double focus within a single framework. The framework is eighteenth-century science in the context of which Hume's epistemology and his "science of man" are studied. The first focus is on Hume's *Enquiry Concerning Human Understanding*. In this work Hume reflects on methodological and epistemological problems that arose in the context of the knowledge-making practices of contemporary natural and moral philosophy, and arguably, his solutions reflect the newly emerging worldview of Romanticism. From this perspective, the coherence of his work can be shown in a way that significantly differs previous interpretations. This part of the project combines the methods of historical epistemology and ideology-critique. The second focus is on Hume's *Treatise on Human Nature*. Here, Hume's anthropology is developed in the context of contemporary natural philosophy. The assumption is that Hume's account of human nature is fundamentally vitalistic, and belongs to the early phase of "Enlightenment vitalism," a movement that came to dominance during the second half of the eighteenth century and boasted intimate connections to early Romanticism. The project thus aims to recontext-



Tamás Demeter



Hume statue in Edinburgh (private photo).

tualize Hume, detaching him from the traditional historiographic reading in the context of the history of philosophy and of the Enlightenment, offering as an alternative framework an interpretation situated in the context of the history of science and early Romanticism.

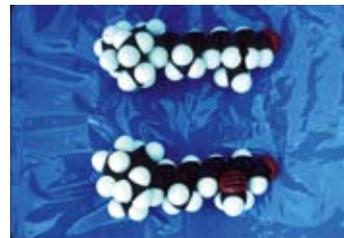


Mathias Grote

Mathias Grote (Postdoctoral Research Fellow)

Transformations of Scientific Objects: Cells, Membranes, and Molecules (1970–1990)

Around 1970, scientists in San Francisco made a startling discovery. In the cellular membrane of a salt-loving microbe, they discovered a protein similar to rhodopsin, the visual pigment in the retina of vertebrate eyes. Mathias Grote uses the case of research on microbial rhodopsins to pose the general question of how the objects of laboratory science and technology come into being and how they change in time. Within only five years, bacteriorhodopsin was transformed from a “labile object” at the intersection of different experimental effects to a substance prepared from cells and a thing-like macromolecule modeled in three dimensions. And yet, the story was all but settled after the boundaries of bacteriorhodopsin were drawn by the mid-1970s. The substance moved quickly into the focus of technologies, e.g., the production of photographic media or optical data storage. The story of microbiology and rhodopsin research, straddling as it does the worlds of fishery, trade, mundane scientific activities to membrane research, and molecular biophysics, offers a fresh perspective on the twentieth-century life sciences. Grote’s case study also makes explicit how the spatiality of cells, membranes, and molecules was explored and modeled. His work will provide a starting point for an epistemology of surfaces.



Molecular models. Slide displaying calotte models of retinal, the photoactive component within a bacteriorhodopsin molecule. The cellular membrane as a spatial object was tied to experimental interventions and representations on the molecular, compartmental, and cellular level.



Materials. Centrifuge tubes with fractions of cell membranes prepared as material for experimentation. Left, the purple membrane isolated from Halobacterium; centre, membrane depleted of pigment; right, a synthetically reassembled purple membrane.

Both figures ca. 1975. By courtesy of D. Osterhelt, Martinsried.

Hyo Yoon Kang (Postdoctoral Research Fellow)

Patent Classification and Scientific Taxonomies

The project explored relations between modern life science and intellectual property, a relatively unexplored field of research within the history of science, particularly from the viewpoint of patents as objects of the history of science. With the aim to trace the translation and representation of scientific and technological artifacts into the legal knowledge framework, Kang examined the emergence of scientific and technological artifacts as patentable inventions and their representation in patent classification. The guiding research questions were: what is the role of patents in scientific and technological practice? How are novel inventions understood and represented in the legal realm? Is the translation from the scientific realm to the legal one “truthful?” At the center of her study is a specific case study involving the creation of the latest patent class for “combinatorial synthesis,” a technology closely linked to developments in the fields of molecular biology, computer science, robotics, and instrumentation during the early 1980s.



Hyo Yoon Kang

Jeffrey Schwegman (Postdoctoral Research Fellow)

Metaphysics for an Enlightened Age: Condillac and the Construction of the Eighteenth-Century Human Sciences



Jeffrey Schwegman

Session at Madame Geoffrin's salon attended by Condillac (Musée du château de Malmaison).

Historians of the eighteenth century often speak of the birth of the human sciences during this period, even going so far as to portray “psychology,” “anthropology,” or “linguistics” as quintessential Enlightenment preoccupations. Yet there is much that is anachronistic about this view. In France, contemporaries often referred to these kinds of inquiries as “metaphysics,” viewing them as extensions of the problems that had motivated seventeenth-century philosophers like Malebranche and Descartes. Taking this perception seriously forces us to revise our understanding of this Enlightenment science in important ways. Eighteenth-century metaphysicians often had to struggle to assert the legitimacy of their enterprise, and they invested considerable

effort in constructing new kinds of identities for themselves. My project analyzes these struggles and the role they played in remaking this branch of knowledge. Its central protagonist is the influential Parisian *philosophe* Étienne Bonnot de Condillac (1714–1780), who did perhaps more than anyone else in France to redefine metaphysics. Yet throughout, Condillac’s place within larger scholarly networks and traditions and his interactions with readers and critics is emphasized. The project aims to move beyond accounts of the pre-history of social scientific ideas and offers a broader, cultural history of this important Enlightenment science.



Robyn Smith-Braun

Robyn Smith-Braun (Postdoctoral Research Fellow)

Encountering Hermes in the Unknown: Exploring Experimental Vitamin Research during World War I.

Robyn Smith-Braun’s project examines the second of three historical periods in the history of the vitamins. The context for her study is collaborative research carried out by British scientists on behalf of the British government during the First World War. Vitamin research was taken up by the U.K. in 1914 when the British government granted high political priority to questions of food supply and the quality of military and civilian diet.

Robyn Smith-Braun suggests that within the context of government-sponsored war research, British scientists witnessed the problem of vitamins shift suddenly from a problem of their physiological function in individual animals and humans to a problem of population health and food supply as means to meet various international and national nutritional needs. With this shift, vitamins were stabilized and developed as genuine bio-political objects even before they were isolated as biochemical objects.

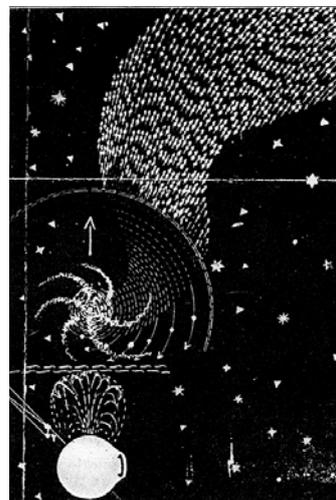


Christina Wessely

Christina Wessely (Postdoctoral Research Fellow)

Welteis. Science, Pseudoscience, and the Limits of Cosmological Knowledge, 1894 – 1945

The project deals with cosmological *Weltanschauungen* around 1900 from both a cultural-historical and an epistemological perspective. Christina Wessely investigates



left: Cosmology as ‘Cosmotechnic’
right: Gigantensternexplosion: The birth of the glacial-cosmological universe.
Courtesy of Technisches Museum Wien, Hanns-Hörbiger-Archiv.

the social and political conditions that explain the careers of theories like the Theory of the Hollow Earth, the New Theory of Geocentricity, or the Cosmic Ice Theory. Wessely seeks to map the specific circumstances that led to the renaissance of esoteric cosmologies during the first three decades of the twentieth century—a period of time that is generally regarded as *the* age of modern science, a period in which all forms of irrational *Weltanschauungen* appeared to be marginalized. Taking as her first example the Cosmic Ice Theory, developed in 1894 by the Austrian engineer Hanns Hörbiger, Wessely argues that these cosmologies were not anachronistic, marginal ideas brought forward by some obscurantists but that these forms of “scientific esotericism” were in fact an integral part of the discourse of modern science. While on the one hand their authors explicitly disapproved of the development of modern science, sharing a popular fear that a purely materialistic, abstract science would lead to cultural decline, they were at the same time emphatically committed to the scientific discourse they sought to revolutionize in the direction of a New Science: a universal, holistic perception of the world.

Monika Wulz (Postdoctoral Research Fellow)

Collective Theories of Knowledge Around 1930: Edgar Zilsel’s Epistemology of Mass Phenomena

The project focuses on Edgar Zilsel’s (1891 Vienna–1944 Oakland, CA) epistemology, which underlies his philosophical, natural-scientific and sociological works in the course from the 1910s to the 1930s. This epistemology also underpins Wulz’s collective and procedural perspective on the production of knowledge. The project emphasizes the mutual relation of Zilsel’s conception of a variable reality on the one hand and his epistemological account of a procedural knowledge on the other. Based on this fundamental instability and diversification of reality and knowledge, Zilsel aimed to establish a unified methodological foundation for the natural sciences, history, humanistic studies, and everyday experience.

The project examines conceptions of collectivity in Zilsel’s epistemology in three dimensions: first, the understanding of epistemic objects as mass phenomena; second, internal collective conditions for scientific rationality based on procedural rules; third, the collaborative organization of scientific practices such as, e.g., data collection.

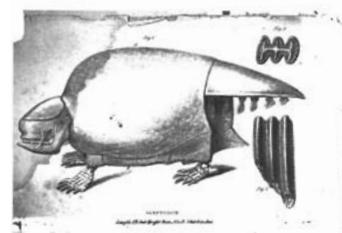


Monika Wulz

Short-Term Visitors and Their Projects

- *Marcel Beyer* (Writer in Residence, Dresden): “Explorations and the Nature of Language: Research as a Process.”
- *David Bloor* (Science Studies Unit, University of Edinburgh): “Rival Theories of Aerofoil, 1904–1926.”
- *Katharina Brandenberger* (University of Zürich): “Psychotropic Drugs in Clinics and Society.”
- *Thomas Brandstetter* (Institute for Philosophy, University of Vienna): “Knowledge and Imitation. Mimetic Experiments in the Natural Sciences around 1900.”
- *Jean-François Braunstein* (University of Paris I, Sorbonne and Institut d’histoire et de philosophie des sciences et des techniques): “History of Historical Epistemology.”
- *Charlotte Brives* (University Victor Segalen Bordeaux II): “Yeast *Saccharomyces Cerevisiae* as a Model Organism: Co-Emergence of a Natural Entity and an Epistemic Community.”
- *Vera Ehrenstein* (Ecole Polytechnique, Paris): “A Comparative Study (France/Germany) of the Participation of Lay People in the Scientific Debate about Genetically Modified Organisms (GMOs).”
- *Johannes Fehr* (Collegium Helveticum, Zürich): “On Ludwik Fleck’s Uses of Language as a Vehicle of Thought.”
- *Ragnar Fjelland* (University of Bergen): “On the Lifeworld Foundation of Science: Einstein and the Special Theory of Relativity; “Newton and Goethe on Reality and Scientific Method.”
- *Rodolphe Gasché* (Program in Comparative Literature, Arts and Letters, State University of New York at Buffalo): “The Concept of Process in Alfred N. Whitehead and Hannah Arendt.”
- *Amanda Goldstein* (University of California at Berkeley): “Tender Empiricism and Improper Bildung: Goethe’s Counter-Disciplinary Morphology.”
- *David Gugerli* (Institute for History, Federal Institute of Technology, Zürich): “Dealing with Human Capital.”
- *Ximo Guillem Llobat* (University of Valencia): “New Concepts of Food Quality and Safety in the Late-Nineteenth and Early-Twentieth Century. Artificial Sweeteners, Municipal Laboratories, and the Search for International Standards.”
- *Michael Hagner* (Chair for Science Research, Federal Institute of Technology, Zürich): “What is Dippoldism? On Sexuality, Criminality and Media Around 1900.”
- *Ina Heumann* (International Research Center for Cultural Studies (IFK), Vienna): “Styles of Science Communication. German-American Transfer Histories, 1945/1964.”
- *Philipp von Hilgers* (Humboldt University Berlin): “Mapping the Field of Vision. From Experimental Research of Reading to Pattern Recognition, 1860–1960.”
- *Giora Hon* (Department of Philosophy, University of Haifa): “On Magnification” and “Dissymmetry and Polarization in Biot and Pasteur. A Tale of Conceptual Analysis.”
- *Thierry Hoquet* (University Paris Ouest/Nanterre La Défense): “Sexual Selection: The Long Century of Absence, 1871–1972.”

- *Doris Kaufmann* (Institute for Historical Science, University of Bremen): “Extending Understanding Beyond Existing Borders’: The Discourse on Primitivism in the Cultural Sciences 1880–1930.”
- *Andreas Killen* (City College of New York/CUNY.): “The History of Early Cinema as a Discourse of Hypnosis and Suggestion.”
- *Marietta Meier* (University of Zürich and Collegium Helveticum, Zürich) “‘The Emotional Sting’—Psychosurgery after the Second World War.”
- *Jan Müggenburg* (Initiativkolleg “The Sciences in Historical Context”/University of Vienna): “Living Prototypes. A Media History of the Biological Computer Laboratory at the University of Illinois.”
- *Laura Otis* (Emory University, Atlanta): “Thinking with Images, Thinking with Words.”
- *Trevor Pinch* (Department of Science and Technology Studies and Department of Sociology, Cornell University): “Sound Studies and the Digitization of Audio.”
- *Irina Podgorny* (National University of La Plata): “America’s Mighty Skeletons.”
- *Jutta Schickore* (Department of History and Philosophy of Science, Indiana University): “Vipers, Venom, and the Vagaries of Experimentation.”
- *Oliver Schlaudt* (Philosophical Seminar, University of Heidelberg): “Measurement as Concrete Activity. Investigations on the Formation of Quantitative Concepts in the Natural Sciences.”
- *Thomas Schlich* (Department of Social Studies of Medicine, McGill University, Montréal): “The Perfect Machine: The Body and Modernist Surgery in Early-Twentieth Century Vienna.”



Glyptodon (from Woodbine Parish, *Buenos Ayres and the Provinces of the Rio de la Plata: their present state, trade, and debt; with some account from original documents of the progress of geographical discovery in those parts of South America during the last sixty years*, London: John Murray, 1839).

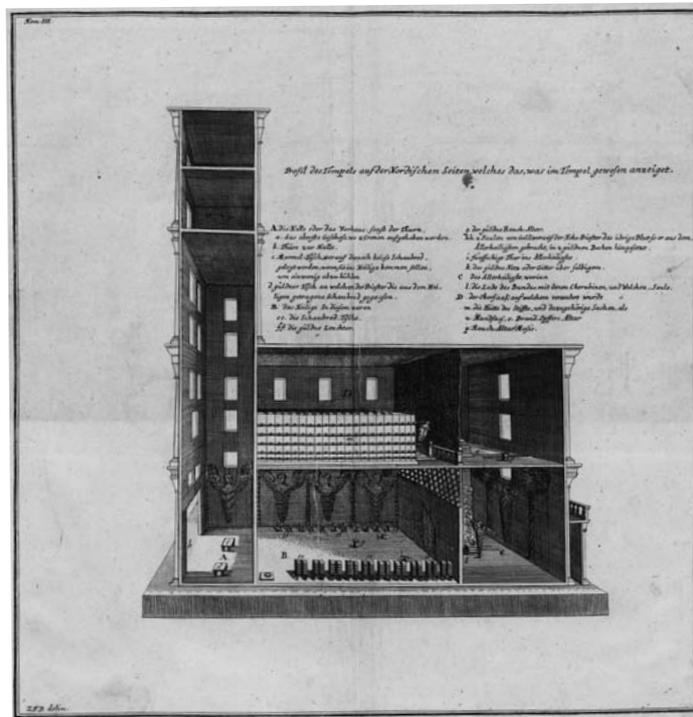


Standardized treatment of thigh fractures in Lorenz Böhler’s field hospital during WWI, ca. 1917. Source: Böhler papers, Department and Collections for History of Medicine, Medical University Vienna.

- *Max Stadler* (Imperial College, London): “Assembling Life. Models, the Cell, and the Reformations of Biological Science, 1920–1960.”
- *Georg Christoph Tholen* (Institute for Media Science, University of Basel): “Imagination and the Imaginary. Epistemological Studies on Concepts of Aesthetics and Mediality.”

- *Magaly Tornay* (University of Zürich): “History of Psychoactive Drugs: Psychoactive Drugs and Personality Concepts in Switzerland (1950–1990).”
- *Bettina Wahrig* (Technical University Braunschweig): “Poisons, Toxicologies, and the Figurations of the Abject, 1700–1900.”
- *Sonja Walch* (University of Vienna): “Sex Hormones in Laboratory Practice: Eugen Steinach’s Development of a Sex Hormone Theory, his Experimental Methodology and his Cooperation with Schering (1910–1938).”
- *Silvia Waisse Priven* (History of Science Graduate Program/CESIMA, Pontifical Catholic University of São Paulo): “From Signs to Remedies: Medical Ways of Knowing in the Eighteenth Century.”
- *Kelly J. Whitmer* (Fellow of the Max Planck International Research Network “History of Scientific Objects”): “Models of Solomon’s Temple as Objects of Scientific Inquiry—Models and the Middle Way: Performing Philanthropy in the Early Enlightenment.”

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Halle's model of Solomon's Temple as a scene painting (skenographia), 1718, copperplate engraving.

- *Lambert Williams* (Harvard University, Cambridge, MA): “Historical and Philosophical Issues in Complex Systems: Models and Simulations.”
- *Charles T. Wolfe* (Unit for History and Philosophy of Science, University of Sydney): “History and Philosophy of the Concept of Organism, 1650–1950.”
- *Gábor Áron Zemplén* (Budapest University of Technology and Economics): “Scientific Debates Around the Modificationist Theories of Color.”

Other Departmental Activities

- “Living Properties: Making Knowledge and Controlling Ownership in the History of Biology.” Workshop, May 29–31, 2008. Organizers: Jean-Paul Gaudillière (INSERM, Paris), Daniel Kevles (Yale University), Hans-Jörg Rheinberger (MPIWG, Berlin).
- “Müller’s Vision. Das wissenschaftliche Vermächtnis des Naturforschers Johannes Müller.” Symposium, October 9–11, 2008. Organizers: Philipp v. Hilgers (Hermann-von-Helmholtz-Zentrum für Kulturtechnik), Laura Otis (MPIWG, Berlin/Emory University), Thomas Schnalke (Medizinhistorisches Museum, Charité).
- 11th Ischia Summer School on the History of Life Sciences: “From Generation to Reproduction. Knowledge and Techniques from the Renaissance to the Present Day.” June 28–July 5, 2009, Villa Dohrn, Ischia. Organizers: Zoological Station Anton Dohrn, Naples (Christiane Groeben); Department of History and Philosophy of Science, Cambridge University (Nick Hopwood); Max Planck Institute for the History of Science, Berlin (Hans-Jörg Rheinberger); Department of History of Science, Harvard University (Janet Browne).

