OTHER RESEARCH ACTIVITIES

OTHER ACTIVITIES OF THE RESEARCH SCHOLARS

Peter J. Beurton

Participation in the annual meeting of the "Deutsche Gesellschaft für Theorie und Geschichte der Biologie," Vienna, June 27-30, 1996.

Lecture "Was ist (oder war) die Synthetische Theorie?," during the workshop "Gab es eine Moderne Synthese in der deutschen Evolutionsbiologie?" organized by the Fakultät für Biologie of the Eberhard-Karls Universität Tübingen, December 6-7, 1996.

Introductory lecture "Reductionism and the present evolutionary landscape" and lecture "Organismic form gives rise to genes; not the other way around!", both held at the 7. International Symposium of the Senckenbergische Naturforschende Gesellschaft, "Organisms, Genes, and Evolution; Evolutionary Theory at the Crossroads," Frankfurt, October 9-12, 1996.

Participation in the annual meeting of the "Deutsche Gesellschaft für Theorie und Geschichte der Biologie," Tübingen, June 27-29, 1997

Lecture "What was wrong about Richard Dawkin's gene concept?" Participation in a symposium "100 Years of Species Concepts in Zoology" in Dresden, held by the Staatliches Museum für Tierkunde Dresden, November 15-16, 1997

Participation in a workshop on "Evolutionary Biology from Darwin to Today," organized by the Institute for the History of Science of the Georg-August-Universität Göttingen; December 5-6, 1997.

Sonja Brentjes

Lecture "Orthodoxy, Science, Power, and the Madrasa ('college') in the Middle East (13th-14th centuries)," workshop "Experience and Knowledge Structures in Arabic and Latin Sciences," Max Planck Institute for the History of Science, Berlin, December 16-17, 1996.

Lecture "European travellers to the Middle east during the 16th and 17th centuries and their descriptions of the sciences in Muslim societies," con-

ference “European travellers to Egypt and the Middle East,” University of Oxford, Oxford, July 9-12, 1997.

International Congress for the History of Science, July, 20-26 1997, Université de Liège, Liège, Belgium: Organization and chairing of the symposium: Crossing boundaries - new approaches towards the history of pre-modern sciences and technology, together with Nathan Sivin, University of Pennsylvania, Philadelphia.

Lecture “The ‘scientific revolution’ and the Middle East,” International Congress for the History of Science, Université de Liège, Liège, July 20-26, 1997

Lecture “Die ‘wissenschaftliche Revolution’ und der Nahe Osten,” Festkolloquium zum 70. Geburtstag von Hans Wußing, Sächsische Akademie der Wissenschaften and Karl-Sudhoff-Institut der Universität Leipzig, October 16, 1997.

Lecture “The ‘scientific revolution’ and the Middle East,” Max Planck Institute for the History of Science, seminar of Department II, November 26, 1997.

Peter Damerow

Lecture: “Die Entstehung des Zahlbegriffs,” Friedrich-Schiller-Universität Jena, April 23, 1996

Lecture “La Rappresentazione Elettronica del Codice Ms. Gal. 72,” (together with Jürgen Renn), Florence, February 14, 1997

Lecture “Archival Electronic Publication: The Galileo Archive in Florence,” (together with Jürgen Renn), Tufts University, Boston (Mass.) December 14, 1997

Editor of the series Materialien zu den frühen Schriftzeugnissen des Vorderen Orients (MSVO), together with R. M. Boehmer, R. K. Englund und H. J. Nissen.

Teaching Activities:

Aristotelische Physik. Universität Konstanz. (Kompaktseminar, 30 hours per semester).

Galileis Discorsi. Universität Konstanz. (Kompaktseminar, 30 hours per semester).

Die Theoretisierung der Waage: ausgewählte Texte zur antiken und mittelalterlichen Mechanik (Kompaktseminar, 30 hours per semester, together with Paul Weinig).

Lorraine Daston

Lecture "Description by Omission: Nature Obscured and Enlightened," delivered at conference on "Regimes of Description: In the Archive of the Eighteenth Century," Stanford, January 1-14, 1996.

Lecture "Wonders of Nature, Wonders of Art," delivered at Bar-Hillel Colloquium for the History and Philosophy of Science, Tel Aviv, May 14-20, 1996.

Lecture "Enlightenment Fears, Fears of the Enlightenment," delivered at conference on "The Career of the Enlightenment," Clark Library, Los Angeles, June 7-8, 1996.

Lecture "Mechanical and Communitarian Objectivity," delivered at Bologna/Berkeley/Uppsala Summer School for the History of Science, "The Ends of the Scientific Revolution," Bologna, September 15-21, 1996.

Lecture "Die Angst vor dem Fortschritt: Die Wissenschaften um 1900," Karl-Sudhoff-Gedächtnisvortrag, Berlin, September 29, 1996.

Lecture "Fear and Loathing of the Imagination in Science," delivered at conference Science in Culture: In Honor of Gerald Holton, American Academy of Arts and Sciences, Cambridge, October 12, 1996.

Lecture "The Enlightenment and the Anti-Marvelous," delivered at the Department of the History of Science, Harvard University, October 15, 1996.

Lecture "The Nature of Nature in Early Modern Europe," delivered at conference on The Scientific Revolution as Narrative: Local Knowledges or Global Frameworks?, Brandeis University/Harvard University, Boston, October 18-20, 1996.

Lecture "What Does Gender Matter to Objectivity?" delivered at Zentrum für interdisziplinäre Frauen- und Geschlechtsforschung, Technische Universität Berlin, October 30, 1996.

Lecture "What Does It Mean to Be Irrational? Historical Perspectives," delivered to Mind/Brain/Behavior Faculty Seminar, Harvard University,

December 2, 1996.

Lecture “Scientific Objectivity as Epistemic Ideal,” delivered at invitation of Ministry of Science and Technology, Lisbon, Portugal, January 31, 1997.

Lecture “Die Kultur der wissenschaftlichen Objektivität,” delivered at Max-Planck-Institut für Geschichte, Göttingen, March 5, 1997.

Lecture “What Kind of Culture is Science?” delivered at Duke University, Durham, March 8, 1997.

Lecture “Recherches en l’épistémologie historique des sciences: Empirisme et objectivité,” delivered at Centre Alexandre Koyré, Paris, March 24, 1997.

Lecture “Can Rationality Have a History?” delivered at History of Science Society Annual Meeting, San Diego, November 6-9, 1997.

Lecture “Objectivity versus Truth,” delivered at Max-Planck-Institut für Geschichte, Göttingen, November 12-14, 1997.

Lecture “Die Akademien und die Klassifizierung der Wissenschaften: Die Disziplinierung der Disziplinen,” delivered at Berlin-Brandenburgische Akademie der Wissenschaften, Berlin, November 28, 1997.

Lecture “Die Quantifizierung des Risikos im 18. Jahrhundert,” delivered at Eidgenössische Technische Hochschule, Zürich, December 2, 1997.

Advisory Editor, Ideas in Context series, Cambridge University Press (1991-).

Advisory Boards: Einstein Forum, Potsdam (1992-), Internationales Forschungszentrum Kulturwissenschaften, Wien (1993-), Forschungszentrum für Europäische Aufklärung, Potsdam (1996-).

Honorary Professor, Seminar für Kulturwissenschaften, Humboldt-Universität zu Berlin.

Organizing Committee for “Nature” conferences, Project on “Concepts and Symbols in Eighteenth-Century Europe,” European Science Foundation.

Christoph Gradmann

Lecture “Hermann von Helmholtz als Mediziner und Physiologe,” Braunschweigisches Landesmuseum/PTB, Braunschweig, July 6, 1997.

Lecture “Biographien und Medizingeschichte,” Humboldt-Universität zu Berlin, Lehrstuhl für Wissenschaftsgeschichte, October 23, 1997.

Lecture “Robert Koch, das Tuberkulin und die Gründung des Instituts für Infektionskrankheiten,” Institut für Geschichte der Medizin, Freie Universität Berlin, November 13, 1997.

Lecture “Tuberculosis and Tuberculin,”, Max Planck Institute for the History of Science, Colloquium Department III, Berlin, November 18, 1997.

Lecture “Das Problem der Tuberkulose. Ätiologie und Pathogenese der Infektionskrankheiten bei Robert Koch,” Infektiologischer Arbeitskreis, Hygieneinstitut der Universität Heidelberg, November 25, 1997.

Gerd Graßhoff

Lecture “Wittgenstein’s Tractatus,” Duisburg, June 24, 1997.

Lecture “‘Über die Erhaltung der Kraft’ von Hermann Helmholtz: Der Energiesatz und das vereinheitlichte Weltbild der Mechanik bei Heinrich Hertz.” Kolloquium zum 150. Jahrestag des Vortrages, Berlin, June 16, 1997.

Lecture “Von der Steinplatte zur Sonnenuhr. Über den Umgang mit gegenständlichen Quellen in der Wissenschaftsgeschichte,” Regensburg, September 29, 1997.

Lecture “Die sprachphilosophische Wende der Metaphysik,” Hamburg, December 10, 1997.

Teaching Activities: (Georg-August-Universität Göttingen)

— WS 97/98: Vorlesung: Die Kopernikanische Revolution

— WS 97/98: Seminar: Begleitseminar zur Vorlesung

— WS 97/98: Seminar: Experimentelle Forschungsmethoden am Beispiel der Anfänge der Biochemie

— WS 97/98: Wissenschaftshistorisches Kolloquium

Michael Hagner

Lecture “Monstrositäten im Kabinett. Zur Geschichte der Repräsentation körperlicher Deformitäten,” Medizinhistorisches Kolloquium, Institut für

Geschichte der Medizin, Freie Universität Berlin, January 11, 1996.

Lecture "Zur Physiognomik bei Alexander von Humboldt," Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, February 14, 1996.

Lecture "The frog as a stabilizing system in Müller's and Helmholtz's physiology," Workshop on Bedeutung und Vielfalt des Experiments, Zentrum für interdisziplinäre Forschung, Universität Bielefeld, March 29, 1996.

Lecture "Monstrositäten im Naturalienkabinett. Zur Repräsentation körperlicher Fehlbildungen im 18. Jahrhundert," 5. Jahrestagung der Deutschen Gesellschaft für Geschichte und Theorie der Biologie, Wien, June 29, 1996.

Lecture "Reil's Natural Philosophy of the Brain," 3rd Triennial Conference of the European Association for the History of Psychiatry, Munich, September 13, 1996.

Lecture "Hirnforschung um 1900," 1. Wissenschaftshistorikertag, Berlin, September 28, 1996.

Lecture "Aufmerksamkeit als Ausnahmezustand," Liechtensteiner Exkurse III: Aufmerksamkeit. Schaan, Liechtenstein, October 2, 1996.

Lecture "Monstrosities in the Age of Enlightenment between Natural Cabinets and Theories of Generation," Science Museum, London, October 23, 1996.

Lecture "Enlightened Monsters," The Wellcome Unit for the History of Medicine, University of Cambridge, October 25, 1996.

Lecture "The Emergence of Brain Localisation and the Modern Understanding of Man in the Nineteenth and Twentieth Centuries," Symposium on Mind and Brain in Historical Perspective, 25. Göttinger Neurobiologentagung, May 25, 1997.

Lecture "A short history of attention and vertigo," Conference on "The Varieties of Scientific Experience," Max Planck Institute for the History of Science, Berlin, June 21, 1997.

Lecture "Eine kurze Geschichte der Aufmerksamkeit," Wissenschaftshistorisches und wissenschaftsphilosophisches Kolloquium, Universität Leipzig, July 2, 1997.

Lecture "Radical Brains. Geniuses and criminals in nineteenth century brain research." XXth International Congress of History of Science, Liège,

July 22, 1997.

Lecture “Towards a History of Attention and Vertigo,” Department for History of Science, Princeton University, October 4, 1997.

Lecture “Selbstbeobachtung und Drehstuhl. Überlegungen zur Geschichte des Schwindels,” Zentrum für Literaturforschung, Berlin, October 9, 1997.

Lecture “The Representation of Monstrosities in Enlightenment between Natural Cabinets and Embryology,” Department for the History of Science, Harvard University, October 28, 1997.

Lecture “The 1874 Debate on the History of Aphasia in Berlin,” Department for the History of Science, Harvard University, October 29, 1997.

Lecture “Between Neurophysiology and Neuro-poetry: Natural-philosophical approaches to the brain around 1800,” Annual Meeting of the History of Science Society, San Diego, November 7, 1997.

Lecture “Geniuses, Brains and the Transformation of Nineteenth-century Anthropology,” Conference on Science as Cultural Practice, 1750-1900, Max-Planck-Institut für Geschichte, Göttingen, November 15, 1997.

Lecture “Zur Bedeutung der experimentellen Praxis bei Viktor von Weizsäcker,” Jahrestagung der Viktor von Weizsäcker Gesellschaft, Heidelberg, November 21, 1997.

Co-organizer of the conference “Varieties of Scientific Experience,” (with Lorraine Daston, Dorinda Outram and H. Otto Sibum), Max Planck Institute for the History of Science, Berlin, June 19-22, 1997.

Dieter Hoffmann

Lecture “Operation Epsilon: Die Protokolle von Farm Hall oder von der ‘Stunde Null’ deutscher Atomphysik(er),” colloquium of the Institut für Theoretische Physik der Ruprecht-Karls-Universität, Heidelberg, January 29, 1996.

Lecture “Operation Epsilon oder die Angst der Allierten vor einer deutschen Atombombe,” Soiree at the Staatstheater Hannover, February 8, 1996.

Lecture “Hermann von Helmholtz als ‘Reichskanzler der Wissenschaften,’” colloquium of the Medizinhistorisches Institut der Universität Bonn, February 9, 1996.

Lecture “Normung von Maß, Zeit und Gewicht. Vom deutschen Zollverein bis zur Physikalisch-Technischen Bundesanstalt,” 6. Dortmunder Symposium zur Vermessungsgeschichte “Europa wächst zusammen,” Dortmund, February 12, 1996.

Lecture “Wissenschaft, Technik und Industrie in Berlin - historische Reminiszenzen,” annual meeting of the Arbeitskreis Unternehmensführung der Schmalenbach-Gesellschaft, Berlin, March 14, 1996.

Lecture “Die Atombombe und ihre Erfinder,” colloquium Fachschaft Physik der Humboldt-Universität zu Berlin, May 5, 1996.

Lecture “Zuflucht am Bosporus. Deutsche Wissenschaftleremigration in die Türkei nach 1933,” Deutsch-Türkischer Club, Berlin, May 14, 1996.

Lecture “Die Physikalische Gesellschaft (in) der DDR. Zur Anatomie einer wissenschaftlichen Gesellschaft im Sozialismus,” Tagung Wissenschaft und Macht, Halle, May 15, 1996.

Lecture “Walther Nodsack and the Quantum Theory,” Symposium “Discovery of Elements,” Leuven, September 18-20, 1996.

Lecture “Wandlungen der Berliner Wissenschaftslandschaft im Spiegel der Entwicklung von Naturwissenschaft und Technik um 1900,” Berlin, September 28, 1996.

Lecture “Friedrich Herneck (1909-1993): Über Schwierigkeiten beim Schreiben von Wahrheit” auf der Karl-Sudhoff-Gedächtnissitzung der Gesellschaft für Geschichte der Medizin, Naturwissenschaften und Technik, Berlin, September 29, 1996.

Lecture “The Nazis and the Physicists” at the colloquium “La Scienza di Fronte ai Conflitti Etnici,” Dipartimento di Fisica, Universita Genova, Genua, November 12, 1996.

Lecture “Hans Geiger in Manchester und James Chadwick in Berlin - zum Forschungsnetzwerk in der Frühgeschichte der Radioaktivität,” VII. Physikhistorische Tagung des Fachverbandes Geschichte der Physik der DPG, Munich, March 19, 1997.

Lecture “Friedrich Möglich (1902-1957): Mann ohne Schatten. Zur Vorgeschichte und den Rahmenbedingungen einer Wissenschaftlerkarriere im Sozialismus,” Ernst-Alban-Gesellschaft Rostock, May 22, 1997.

Lecture “The ‘Radioactive Triangle’ Manchester, Berlin, Vienna: Cooperation and Competition in the Early History of Radioactive Research,” XXth

International Congress of History of Science, Liège, July 22, 1997.

Lecture “Die Kultur der Präzisionsmessung und die Rolle der Berliner Physikalisch-Technischen Reichsanstalt in der Frühgeschichte der Quantentheorie,” 80. Jahreshaupttagung der Deutschen Gesellschaft für Geschichte der Medizin, Naturwissenschaft und Technik, Regensburg, September 28, 1997.

Lecture “Tieftemperaturphysik an der Berliner Physikalisch-Technischen Reichsanstalt,” Abschiedskolloquium for Prof. Dr. H. Lübbig at the Physikalisch-Technische Bundesanstalt, Berlin, November 7, 1997.

Conception, book and illustration of the exhibition “Hermann von Helmholtz. Klassiker an der Epochenwende” (together with H. Laitko), organized by the Hermann von Helmholtz-Gemeinschaft Deutscher Forschungszentren, the Deutsche Museum Bonn and the Physikalisch-Technische Bundesanstalt Braunschweig/Berlin, Bonn, November/December, 1996.

Conception and organization of the exhibition “Max Planck - Leben, Werk, Persönlichkeit” of the German Physical Society and the Max Planck Society at the Magnus House in Berlin, October 3-30, 1997.

Co-Editor of the Planck-Issue of the “Physikalische Blätter” (10/1997).

Co-Editor of “Max Planck (1858-1947). Vorträge und Ausstellung zum 50. Todestag, München 1997.”

Member of the scientific board of the Symposium “Discovery of Elements,” Leuven September 18-20, 1996.

Co-organizer of the symposium “Physik im Umbruch 1900 - Neue Grenzüberschreitungen” auf dem Deutschen Wissenschaftshistorikertag, Berlin September 28, 1996.

Head of the Organizing Committee of the VII. Conference for History of Science of the German Physical Society at the Annual Meeting of Deutsche Physikalische Gesellschaft, Munich March 19-21, 1997.

Co-organizer of the symposium “150. Jahrestag des Vortrags ‘Über die Erhaltung der Kraft’ von Hermann Helmholtz,” Magnus-Haus Berlin, June 16, 1997.

Member of the Scientific Committee of the conference “Radioactivity: History and Culture (1896-1930’s),” Paris, July 8-10, 1997.

Co-organizer of the symposium “Science and Technology in the GDR”

(SM 27) at the XXth International Congress of History of Science, Liège July 26, 1997.

Head of the commission “Geschichte der Physik” of the Deutsche Physikalische Gesellschaft.

Member of the Board of the commission “History of Physics” of the European Physical Society.

Secretary of the commission “History of Modern Physics” of the International Union for History and Philosophy of Science/ Division History of Science.

Member of the Board of the Deutsche Gesellschaft für Geschichte der Medizin, Naturwissenschaft und Technik e.V.

Advisor for history of science matters to the Physikalisch-Technische Bundesanstalt Braunschweig/Berlin.

Member of the scientific board (wissenschaftlicher Beirat) of the Robert-Havemann-Gesellschaft, Berlin.

Referee for scientific journals and Volkswagen-Stiftung.

Teaching Activities

— Quantentheorie und Weimarer Republik, Humboldt-Universität zu Berlin, Institut für Geschichtswissenschaften, seminar (2 hours per week), summer semester 1996.

— Visiting professor, Humboldt-Universität zu Berlin, Institut für Geschichtswissenschaften (Lehrstuhlvertretung Prof. Rüdiger vom Bruch), winter semester 1996/97.

— Vom Kabinett und Seminar zu den Großforschungseinrichtungen der Moderne (lecture).

— Physiker- und Chemiker-Biographie des 19. und 20. Jahrhunderts (seminar).

— Von Helmholtz bis Einstein. Der Umbruch von Physik und Naturwissenschaften im 19./20. Jahrhundert. (seminar)

Research Colloquium

— Zur Geschichte des Energieerhaltungssatzes, seminar (2 hours per week), summer semester 1997.

— Max Planck (1858-1947) - ein Gelehrtenleben im wissenschafts- und zeithistorischen Spiegel, seminar (2 hours per week), winter semester 1997/98.

Horst Kant

Lecture “Hermann von Helmholtz, der Reichskanzler der Wissenschaft,” Kepler-Gesellschaft, Stuttgart, January 17, 1996.

Lecture “Wechselbeziehungen zwischen Physik und Technik in Berlin – das Beispiel Elektrotechnik um 1900,” Conference Wissenschaft - Innovation - Unternehmertum der Gesellschaft für Wissenschaftsforschung, Deutsches Patentamt Berlin, March 22-23, 1996.

Lecture “The German Uranium Project and the Kaiser-Wilhelm-Institute for Physics,” International symposium History of the Soviet Atomic Project in Dubna (Russia), May 13-19, 1996.

Lecture “The Establishment of Theoretical Physics as a Separate Field of Investigation and Teaching at the End of the Nineteenth Century,” 7th Biennial Conference of the European Physical Society’s Interdivisional Group on History of Physics, “History and Philosophy of Physics in Education,” Bratislava, August 21-24, 1996.

Lecture “Die Frühgeschichte des Kaiser-Wilhelm-Instituts für Physik - Physik und Wissenschaftspolitik,” Deutscher Wissenschaftshistorikertag Berlin, September 26-29, 1996.

Lecture “Emil Warburg und die Physik in Berlin,” Dahlemer Archivgespräche, Archiv der Max-Planck-Gesellschaft in Berlin-Dahlem, December 2, 1996.

Lecture “Andrej Sacharov und das sowjetische Atomwaffenprojekt - Physik und Verantwortung,” Ernst-Alban-Gesellschaft für Mecklenburg-Pommersche Wissenschafts- und Technikgeschichte, Rostock, January 23, 1997.

Lecture “Die Entstehung wissenschaftsbasierter Industriezweige: das Beispiel Elektroindustrie,” Conference Wissenschaft – Innovation – Unternehmertum II; Gesellschaft für Wissenschaftsforschung, Berlin, April 4, 1997.

Teaching Activities 1996/97

— Wissenschafts- und Hochschulpolitik in der Weimarer Republik, required lecture for the major in history of science and technology, Universität Stuttgart, January 18, 1996.

— Grenzüberschreitungen - Leben, Werk und Wirkungen Werner Heisenbergs, lecture and seminar course, Bischöfliche Akademie des Bistums Aachen, September 21-22, 1996.

— Frühgeschichte der Atom- und Quantenphysik, Pädagogisches Landesinstitut Potsdam, November 8, 1996.

— Der Weg zu Stalins Bombe - Die physikalischen Wissenschaften von der Oktoberrevoluton bis zum Ende der 40er Jahre, lecture on January 29, 1997 as part of the lecture series "Wissenschaftsgeschichte in Osteuropa," Osteuropainstitut of the Freie Universität Berlin.

— Zur Physik im 19. Jahrhundert - Hermann von Helmholtz als 'Reichskanzler der Physik, ' lecture on December 12, 1997 as part of the lecture series "19. Jahrhundert," Brandenburgische Technische Universität Cottbus.

Doris Kaufmann

Lecture "Verletzung des Körpers als Heilung der Seele. Heroische Kuren in der Frühzeit der Psychiatrie," Colloquium der Arbeitsstelle für historische Kulturforschung Universität des Saarlandes on "Der verletzte Körper. Schmerzerfahrung in der Frühen Neuzeit," Saarbrücken, March 2, 1996.

Lecture "Aufklärerische Öffentlichkeit: Identität und Devianz," Kulturwissenschaftliches Institut der Universität Leipzig, April 22, 1996.

Lecture "'Widerstandsfähige Gehirne' und 'kampfunlustige Seelen'. Psychiatrie im I. Weltkrieg," Historisches Institut der Universität Bielefeld, June 26, 1996.

Lecture "Johann Christian Reil's Natural Philosophy of Pain," Third Triennial Conference of the European Association for the History of Psychiatry, München, September 13, 1996.

Lecture "Die psychiatrische Hysteriediskussion 1880-1920: Vom Aufstieg und Niedergang einer Krankheitsdiagnose," 1. Wissenschaftshistorikertag, Berlin, September 28, 1996.

Lecture “Zwang zur Vernunft? Zur Frühgeschichte der ‘Reformirrenanstalten’,” lecture series of the Institut für Geschichte der Medizin und der Psychiatrischen Universitätsklinik Erlangen-Nürnberg, November 26, 1996.

Lecture “Wissenschaft als kulturelle Praxis. Psychiatrie im I. Weltkrieg und in der Weimarer Republik,” Sozial- und kulturgeschichtliches Colloquium des Soziologischen und Historischen Instituts der Universität Hannover, December 9, 1996.

Lecture “Wissenschaft als kulturelle Praxis. Psychiatrie im I. Weltkrieg,” Historisches Institut der Universität Gießen, January 20, 1997.

Lecture “Männliche Hysterie im ärztlichen Diskurs des I. Weltkriegs,” Forschungscolloquium des Zentrums für Interdisziplinäre Frauen- und Geschlechterforschung der Technischen Universität Berlin, February 5, 1997.

Lecture “Traum und Selbstbewußtsein. Zur Kartographie der Seele im 18. und frühen 19. Jahrhundert,” Institut für Geschichte der Medizin der Universität Bonn, June 23, 1997.

Lecture “Männliche Hysterie im I. Weltkrieg und in der Weimarer Republik. Neue Forschungsergebnisse in der Diskussion,” public discussion event with Paul Lerner (New York), Institut für Geschichte der Medizin, Freie Universität Berlin, June 26, 1997.

Lecture “Die heroischen Kuren in der Psychiatrie des 19. Jahrhunderts,” Workshop Körper-Macht-Geschichte of the Bielefelder Graduiertenkolleg at the Fakultät für Geschichtswissenschaft, June 28, 1997.

Lecture “Psychiatrie als kulturelle Praxis,” Workshop “Trauma-Zeit-Geschichte. Das Ereignis in der Epoche der Medien,” Zentrum für Literaturforschung Berlin, July 2, 1997.

Lecture “Wissenschaft als kulturelle Praxis. Die Psychiatrie im I. Weltkrieg und in der Weimarer Republik” at the history department of the University of Basel/Switzerland, December 9, 1997.

Teaching Activities:

— Max Weber als Historiker und Wissenschaftstheoretiker. Technische Universität Berlin, Department of History, Hauptseminar (2 hours per week) summer semester 1996.

— Neuere Ansätze in der Kulturgeschichte und in den Kulturwissenschaften. Technische Universität Berlin, Department of History, Übung (2 hours per week) summer semester 1997.

Ursula Klein

Lecture "The Production of Paper Orders - Two Case Studies from the History of Chemistry," Max Planck Institute for the History of Science, Berlin, February 21, 1996.

Lecture "Paving a Way through the Jungle of Organic Chemistry," conference "Bedeutung und Vielfalt des Experiments," Bielefeld, March 27-31, 1996.

Lecture "Do We Need a Philosophy of Chemistry?" conference "Philosophy of Chemistry," Athens, April 4-7, 1996.

Lecture "Nature and Art in 17th-Century French Chemical Textbooks," Sixteenth Century Studies Conference, St. Louis, Oct. 24-27, 1996.

Lecture "Chemical Formulas as Paper-Tools in 19th-Century Chemistry," annual meeting of the American Histroy of Science Society, Atlanta, November 7-10, 1996.

Lecture "Paper-Tools and Techniques of Modelling in 19th-Century Chemistry," Harvard University, Department of the History of Science, Physical Sciences Working Group, November 22, 1996.

Lecture "Alchemy and Early Modern Chemistry - A Comparison of Patterns of Knowledge and Experimenation." Harvard University, Department of the History of Science, Early Science Working Group, December 12, 1996.

Teaching Activities:

— Konzepte des Experiments in neueren Theorien der Wissenschaftsgeschichte. Freie Universität Berlin, Institute for Philosophy, Hauptseminar (2 hours per week, together with W. Lefèvre).

Wolfgang Küttler

Conference leader (together with Jörn Rüsen and Ernst Schulin) "Geschichtsdiskurs IV Krisenbewußtsein und Innovation 1880-1945," Universität Bielefeld. Zentrum für Interdiszplinäre Forschung. February,

22.-24, 1996.

Lecture “Die DDR-Historiographie in der Ökumene der Historiker. Selbstverständnis und Praxis als Wissenschaftsdisziplin ,” Göttingen, conference Geschichtswissenschaft in der DDR, Zentrum für Zeithistorische Studien Potsdam/Zentrum für höhere Studien Leipzig/ Max-Planck-Insitut für Geschichte, May 30- June 1, 1996.

Lecture “Formationstheorie als Basis der DDR-Gesellschaftswissenschaften. Dogma und heuristische Bedeutung,” Leipzig, Zentrum für höhere Studien / Zentrum für Zeithistorische Studien Potsdam, June, 14-15, 1996.

Lecture “Hat die marxistische Geschichtswissenschaft noch eine Zukunft?” Vilnius, Lithuania, Conference “Geschichtswissenschaft und offene Gesellschaft,” University of Vilnius, Department of History/George Soros Foundation Lithuania/ Kulturwissenschaftliches Institut Essen/ Georg-Eckert-Institut für internationale Schulbuchforschung Braunschweig, September, 24-29, 1996.

Lecture “Frühbürgerliche Revolution im Geschichtsdenken der DDR,“ colloquium on the occasion of the 65th birthday of Gerhard Brendler, Kulturwissenschaftliche Fakultät of the Europa-University, Viadrina, Frankfurt/ Oder, January 21, 1997.

Lecture “Formationstheorie und Geschichte - zwanzig Jahre danach betrachtet,“ colloquium on the occasion of the 70th birthday of Georg Iggers, Zentrum für Höhere Studien, University of Leipzig, March 15, 1997.

Lecture “Ranke’s lectures on the Epochs of Modern History” with commentary to the text, delivered to the working group “Varieties in scientific experience,” MPIWG, Department II, March 17, 1997.

Commentary “Problems of Periodization of Universal History,” conference of the International Commission of the History of Historiography: “Periodization in History and Historiography,” Budapest, July 4-6, 1997.

Conference leader (together with Jörn Rüsen, Essen, and Ernst Schulin, Freiburg), lecture: “Systemdenken - Denkstil einer Epoche? ‘Marxistisch-leninistische‘ Geschichtswissenschaften in der Systemkonfrontation” and chair of the 5th session: Geschichtsphilosophie, conference Geschichtsdiskurs V, “Globale Konflikte, Erinnerungsarbeit und Neuorientierungen seit 1945,” Zentrum für Interdisziplinäre Forschung at the University of Biele-

feld, July 10-12, 1997.

Lecture “Geschichte als Entwurf gesellschaftlicher Veränderung. Karl Marx im Geschichtsdiksurs der Moderne” and (together with Ludger Heidbrink (Lüneburg), Hermann Lübbe (Zürich) and Jörn Rüsen (Essen) round table: “Weltgesellschaft und Nation. Stiftet die Geschichte Identität?”. 129th conference of the Evangelische Akademie Iserlohn: “Zukunft und Geschichte. Vor der Jahrtausendwende: Perspektiven gegenwärtiger Geschichtsphilosophie,” November 21-23, 1997.

Member of the advising counsel of the journal *Comparativ*, Leipzig.

Member of the editorial board of the *Sitzungsberichte der Leibniz-Sozietät Berlin.*

Member of the Internationale Kommission zur Erforschung der Geschichte des Deutschen Ordens.

Coeditor (with Jörn Rüsen and Ernst Schulin) of the series *Geschichtsdiskurs* (Vol. III -IV).

Wolfgang Lefèvre

Chair of session at the workshop “Gene Concepts in Development and Evolution II,” Max Planck Institute for the History of Science Berlin, October 17-19, 1996.

Lecture “Hegels Geschichte der Philosophie aus wissenschaftsgeschichtlicher Perspektive,” XXI. Internationaler Hegelkongreß “Hegels Geschichte der Philosophie,” San Sebastian, October 1-4, 1996.

Lecture “The Limits of Pictures,” ESF Workshop “The Emergence of the Scientific Image, 1500-1700,” Berlin, September 19-21, 1997.

Member of the Board of the “Internationale Hegel-Gesellschaft”.

APL Professor for philosophy at Freie Universität Berlin.

Visiting Scholar at the Department of History of Science, Harvard University, Cambridge (MA), Fall 1997 - Spring 1998.

Guest Editor of issue IX/3 - “Fundamental Concepts of Early Modern Chemistry” - of *Science in Context.*

Teaching Activities (1996 and Spring Term 1997):

— Konzepte des Experiments in neueren Theorien der Wissenschaftsgeschichte, Freie Universität Berlin, Institute for Philosophy - Hauptseminar (2 hours per week, together with U. Klein).

— Philosophie - Wissenschaft - Gesellschaft, Freie Universität Berlin, Institute for Philosophy - research colloquium (3 hours per week, together with A. Arndt).

Andrew Mendelsohn

Lecture "The Model of War and the Problem of Peace in the Making of Immunology," Department of the History of Science, Medicine, and Technology, Johns Hopkins University, February 13, 1997; Princeton Workshop in the History of Science, Princeton University, February 15, 1997.

Lecture "Infection without Disease: The Crisis of Etiology, 1890-1910," Berlin-Brandenburgische Akademie der Wissenschaften, April 9, 1997.

Referee: *Medical History*

Book Project: *The Making of Bacteriology*, supported by a grant from the Alfred P. Sloan Foundation, to be published by Princeton University Press in 1998-99.

Folkert Müller-Hoissen

Lecture "Integrable models and noncommutative geometry," Universidade Federal da Bahia, Salvador, Brasil, February 14, 1996.

Lecture "Konzepte und Methoden nichtkommutativer Geometrie und deren Anwendungen in der Physik," Technische Universität Braunschweig, May 3, 1996.

Jürgen Renn

Lecture "Galilei und die klassische Physik," workshop "Neue Entwicklungen in der Galileo-Forschung," Zürich, January 22, 1996.

Lecture "Living with Diversity and Unification in Science," interdisciplinary workshop "The Changing Metaphysics of Science," Vienna, March 14, 1996

Lecture "Towards an Historical Epistemology of Space, Time, Matter, and

Force," symposium on "Epistemology as Genetic History of Science" at the international conference "The Growing Mind," Geneva, September 17, 1996.

Lecture "Von der klassischen Trägheit zur dynamischen Raumzeit," conference "1. Deutscher Wissenschaftshistorikertag," Berlin, September 28, 1996.

Lecture "La Rappresentazione Elettronica del Codice Ms. Gal. 72" (together with Peter Damerow), Florence, February 14, 1997

Lecture "The Rediscovery of General Relativity in Berlin" (together with Tilman Sauer), at "Boston Colloquium for Philosophy of Science," Boston, March 3, 1997

Lecture "The Birth of General Relativity: Mathematical Formalism and Physical Interpretation," at "Primo Congresso della S.I.F.F.," Trieste, April 7, 1997.

Lecture "The Parabola in Galileo's Research: a Curve and its Context" (together with Peter Damerow), workshop "The Emergence of the Scientific Image, 1500-1700," Berlin, September 19, 1997.

Lecture "Albert Einstein: Alte und neue Kontexte in Berlin," colloqium "Die Preußische Akademie der Wissenschaften zu Berlin im Kaiserreich," Berlin, November 29, 1997.

Lecture "Archival Electronic Publication: The Galileo Archive in Florence" (together with Peter Damerow), Tufts University, Boston (Mass.) December 14, 1997

Editor of *Science in Context* (together with G. Freudenthal).

Editor of *Boston Studies in the Philosophy of Science* (together with Kostas Gavroglu).

Member of the Editorial Boards of *Archimedes, New Studies in the History and Philosophy of Science and Technology* and of *Studies in History and Philosophy of Modern Physics*.

Member of the Scientific Committees of the "Centro Interuniversitario di Ricerca in Filosofia e Fondamenti della Fisica" of the universities Bologna and Urbino, and of the Conference Series of the European Science Foundation "Science and the Visual Image 1500-1800."

Head of commission "MPG im World-Wide-Web" of the Max-Planck-Gesellschaft.

Member of the MPG commissions: “Vorbereitung des 50jährigen Jubiläums der Max-Planck-Gesellschaft,” “Beratender Ausschuß für EDV-Anlagen in der Max-Planck- Gesellschaft,” “MPIWG für psychologische Forschung,” “Bibliotheca Hertziana,” “MPG/DFG-China-Koordinierungsausschuß,” “Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus.”

Vice-Chair of the “Verbund für Wissenschaftsgeschichte,” Berlin.

Adjunct Professor for history of science at Boston University.

Honorary Professor for history of science at Humboldt-Universität zu Berlin.

Teaching Activities:

— Geschichte der aristotelischen Physik von der Antike bis zur Neuzeit. Humboldt-Universität zu Berlin, Institute for History - research colloquium (2 hours per week).

— Galileis “Discorsi,” Humboldt-Universität zu Berlin, Institute for History - research colloquium (2 hours per week).

Hans-Jörg Rheinberger

Lecture “Augenmerk,” Liechtensteiner Exkurse III: “Aufmerksamkeit,” Schaan, October 3, 1996.

Lecture “Experimental Systems, Generators of Epistemic Things” and comment on A. Pickering: The Mangle of Practice, “Signatures of Knowledge Societies,” Joint Meeting of the Society for Social Studies of Science and the European Association for the Study of Science and Technology, Bielefeld, October 12, 1996.

Lecture “Gene Concepts: A Fragmented View From the Perspective of Molecular Biology,” Workshop on “Gene Concepts in Development and Evolution II,” Max Planck Institute for the History of Science, Berlin, October 19, 1996

Lecture “Über den Stellenwert der Wissenschaftsgeschichte für die Philosophie der Wissenschaften,” Philosophisches Institut der Universität Salzburg, October 24, 1996.

Lecture “Experimental Complexity in Biology: Epistemological and Historical Remarks,” Philosophy of Science Association, Fifteenth Biennial

Meeting, Cleveland, November 2, 1996.

Lecture “Experimental Complexity,” Mark M. Horblit Colloquium in the History of Science, Harvard University, Cambridge (USA), November 5, 1996.

Lecture “Experimental Complexity in Biology: Historical and Epistemological Remarks,” Instituto de Investigaciones Filosóficas, UNAM, Mexico City, November 8, 1996.

Lecture “Experimental Systems and the History of Molecular Biology,” Laboratorio de Historia de la Biología y Evolución de la Facultad de Ciencias, UNAM, Mexico City, November 13, 1996.

Lecture “Experimentelle Komplexität am Beispiel der Molekularbiologie,” Institut für Wissenschaftsgeschichte, Göttingen, November 19, 1996.

Lecture “Experimentalsysteme, Experimentalkulturen, Wissenschaftsgeschichte,” Kolloquium Spezielle Zoologie, Prof. W. Maier, Tübingen, December 5, 1996.

Lecture “Überlegungen zur Geschichte der Molekularbiologie,” Workshop “Gab es eine moderne Synthese in der deutschen Evolutionsbiologie?,” Lehrstuhl für Ethik in den Biowissenschaften, Tübingen, December 6, 1996.

Lecture “Medizinische Grundlagenforschung und Molekularbiologie: Zur Geschichte der Proteinbiosynthese,” Sächsische Akademie der Wissenschaften, Leipzig, May 22, 1997.

Lecture “Wie verändert sich die Biologie? Der Einzug der Molekulargenetik,” conference “Was wissen Biologen schon vom Leben,” Evangelische Akademie, Loccum, May 23, 1997.

Lecture “Research-Enabling Technologies: Lyle Packard’s Liquid Scintillation Counter,” Workshop on Instrumentation for Science, Industry and the State: Research-Technology Dynamics, Paris, June 6, 1997.

Lecture “Experimentalsysteme,” Kolloquium Berlin-Brandenburgische Akademie der Wissenschaften, Berlin, June 11, 1997.

Lecture “Ephestia: The Experimental Design of Alfred Kühn’s Physiological Genetics,” XXth International Congress of History of Science, Liège, July 25, 1997.

Lecture “Zwischen Ultrazentrifuge und Eiswanne - Zum Verhältnis von Präzision und Bastelei in der Geschichte molekularbiologischer Labor-

praxis," 80. Jahrestagung der DGGMNT, Regensburg, September 27, 1997.

Lecture "The Changing Fate of the 'Gene' in Molecular Biology," Historical-Philosophical Faculty, University of Oslo, October 24, 1997.

Lecture "Strukturen experimenteller Praxis," Wissenschaft als kulturelle Praxis, 1750-1900, Max-Planck-Institut für Geschichte, Göttingen, November 13, 1997.

Lecture "Conceptual Entities and Biological Processes," Sloan Workshop on "The Knowability of Scientific Entities - Genes and Genetic Programs," Oxnard (USA), December 5, 1997.

Lecture "Materiekonzeptionen in der Geschichte der Biologie," Colloquium, Institut für Philosophie, Wissenschaftstheorie, Wissenschafts- und Technikgeschichte, Technische Universität Berlin, December 9, 1997.

Member of the Advisory and Editorial Boards: *Journal for the History of Biology*, *Studies in History and Philosophy of Biological and Biomedical Sciences*, *Sociology of the Sciences Yearbook*.

Editor, *Jahrbuch für Geschichte und Theorie der Biologie* and its supplement series (together with Michael Weingarten).

President (until June 1997), Deutsche Gesellschaft für Geschichte und Theorie der Biologie.

Member of the MPG commission: "Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus."

Tilman Sauer

Lecture "Path Integral Monte Carlo Simulations of Quantum Chains," 5th International Conference on "Path Integrals from meV to MeV," Dubna, May 27-31, 1996.

Lecture "Staging versus Multigrid Algorithms in Path Integral Monte Carlo," workshop on "Algorithms for dynamical critical phenomena," Lyon, June 20-22, 1996.

Urs Schoepflin

Lecture "Zum Neuaufbau von Bibliotheken in den neugegründeten Institu-

ten in den Neuen Bundesländern," XIX. Fortbildungstagung für Bibliotheksleiter/innen der Max-Planck-Institute und Arbeitsgruppen, Tübingen, May 7-10 1996.

Section chair of "Neuaufbau von Bibliotheken in den neugegründeten Instituten in den Neuen Bundesländern," XIX. Fortbildungstagung für Bibliotheksleiter/innen der Max-Planck-Institute und Arbeitsgruppen, Tübingen, May 7-10 1996.

Lecture "A bibliometric study of reference literature in the sciences and social sciences" (jointly with Wolfgang Glänzel) at the joint EASST/4S Conference on Signatures of Knowledge Societies, Bielefeld, October 9-12, 1996.

Lecture "Job enrichment und job enlargement - Integration von Tätigkeiten" at Round Table Neue Organisationsstrukturen in Bibliotheken, Göttingen, October 13 1997.

Lecture "Ganzheitliche Arbeitsplätze und BAT - Zur Arbeitsorganisation in der Bibliothek des Max-Planck-Instituts für Wissenschaftsgeschichte" at Herbsttagung der Bibliotheksleiter der GW-Sektion der MPG, Hamburg, November 6-7 1997.

Member of the program committee of the 6th Biannual Conference of the International Society for Scientometrics and Informetrics 1997 in Jerusalem.

Chairperson of the Committee on Scientometrics of the Deutsche Gesellschaft für Dokumentation.

Vice-chair of the Research Association for Science Communication and Information (RASCI).

Volkmar Schüller

Lecture " Leibniz versus Newton - Über die Polemik zwischen Leibniz und dem Newton Schüler Samuel Clarke," Institut für Theoretische Physik der Universität Greifswald, December 12, 1996.

Lecture "Die Streitschriften zwischen Leibniz und Newtons Schüler Samuel Clarke," workshop of 61. Physikertagung München, March 19, 1997.

H. Otto Sibum

Lecture "James Clerk Maxwell and the Education Value of Experiment," delivered at workshop on "Bedeutung und Vielfalt des Experiments," Zentrum für interdisziplinäre Forschung, Universität Bielefeld, March 28-30, 1996.

Lecture "Experimental Performance and Limits of Representation," delivered at the Internal Colloquium of the Institute, Berlin August 28, 1996.

Lecture "Instrumente der Wissenschaftsgeschichte," delivered at workshop on "Perspektiven der Instrumentengeschichte in Deutschland," Forschungsinstitut des Deutsches Museums München, December 6, 1996.

Lecture "Experimentalkulturen im Wandel: Entstehungsgeschichte eines modernen physikalischen Standards," delivered at Universität Hamburg, Institut für Geschichte der Naturwissenschaften, Mathematik und Technik, February 17, 1997.

Lecture "Vermessene Gesten," La Villette, Centre de recherche en histoire des sciences et des techniques, Paris, April 22, 1997.

Lecture "Experimentalkulturen im Wandel. Zur Entstehungsgeschichte des Energiebegriffs," delivered at conference in commemoration of Hermann von Helmholtz's publication of "Die Erhaltung der Kraft," Magnus Haus, Berlin, June 16, 1997.

Lecture "Shifting Scales," delivered at the conference on Varieties of Scientific Experience at the Max Planck Institute for the History of Science, Berlin, June 19-22, 1997.

Lecture "Experimentalkulturen im Wandel" delivered at workshop Geschichtsdiskurse V: Globale Konflikte, Erinnerungsarbeit und Neuorientierung seit 1945 at the Zentrum für interdisziplinäre Forschung, Universität Bielefeld, July 10-12, 1997.

Plenary lecture "Experimentelle Wissenschaftsgeschichte," on historiographical and methodological perspectives on the history of experiment and instrumentation, delivered at 80th annual meeting of the Deutsche Gesellschaft für Geschichte der Medizin, Naturwissenschaft und Technik, Regensburg, September 26 -29, 1997.

Delta Lecture (a joint programme of Universities of Cambridge and Oxford and the South Kensington Institute, London) "Shifting Scales. The material culture of microstudies in early Victorian Britain," delivered at the Science

Museum, London, November 19, 1997.

Director of research project "Innovation, Historical Replication and Training in Classical Experimental Physics," British German Academic Research Collaboration Programme (British Council and German Academic Exchange Service), 1993 - March 1996.

Member of Board of the Interdivisional Group on "History of Physics" in the European Physical Society.

Affiliated Research Scholar, Department of History and Philosophy of Science, University of Cambridge, England, since 1996.

Referee for scientific journals, *Studies in History and Philosophy of Science*, *Science in Context*, *NTM*.

Teaching Activities:

Department of History and Philosophy of Science, University of Cambridge, England:

— "Working Experiments and Gestural Knowledge," three lectures each in Lent Term 1995/96 and Lent Term 1996/97.

— "Working Experiments. Machines and Gestural Knowledge in 18th- and 19th-Century Physical Sciences," three lectures Michaelmas Term 1997/98.

Stuart Strickland

Lecture "The Knowing Body in German Romanticism," annual meeting of the American Society for Eighteenth-Century Studies, Austin, Texas, March 29, 1996.

Lecture "Self-Knowledge and Self-Experimentation in the Romantic Era," Chicago-Wide Eighteenth-Century Studies Colloquium, Northwestern University, May 21, 1996.

Lecture "Die Suche nach 'objektiven Ursachen' und der Verdacht der Selbsttäuschung in der Physik des romantischen Zeitalters," Institut für Geschichte der Naturwissenschaften, Mathematik und Technik der Universität Hamburg, November 25, 1996.

Lecture "Zur Geschichte der Erfahrungswissenschaften um 1800," colloquium, MPIWG, Department II, November 27, 1996"

Denis Thieffry

Lecture “La modélisation du développement embryonnaire: de l‘organisme au gène et vice versa,” XXth International Congress of History of Science. Liège, Belgium, July 24, 1997.

Editor of the *Bulletin of the Canadian Society for Theoretical Biology*.

Referee for the *Journal of Theoretical Biology*.

Klaus A. Vogel

Lecture “La revolution cosmographique de la Renaissance a-t-elle eu lieu dans la cartographie grande échelle?” Université de Lille, March 21, 1996.

Chair of session at the international conference “Die humanistischen Sodalitäten im 15. und 16. Jahrhundert - Stowarzyszenia humanistyczne w XV i XVI wieku,” Krakau, Collegium Maius, May 15-19, 1996.

Chair of founding session of the “Arbeitskreis interdisziplinäre Gewaltforschung,” Max-Planck-Institut für Geschichte, Göttingen, July 1, 1996 (together with Prof. Dr. med. Manfred Cierpka, Leiter des Schwerpunkts Familientherapie der Universität Göttingen).

Member of the Board of the “Willibald-Pirckheimer-Gesellschaft für die Erforschung von Renaissance und Humanismus.”

Editor of the “Pirckheimer-Jahrbuch” (1996 ff).

Annette Vogt

Lecture “Female Scientists at the Berlin University and at the Institutes of the Kaiser-Wilhelm-Gesellschaft in Berlin between 1898 and 1945 - First approach,” Berlin, colloquium of Department II, Max Planck Institute for the History of Science, January 9, 1996.

Lecture “‘Wissenschaftlerinnen in der KWG’ Vortrag über das Projekt und erste Ergebnisse,” Berlin, colloquium of the research group of Prof. Dr. Beate Krais, Max Planck Institute for Human Development and Education, Berlin, January 16, 1996.

Lecture “Die Berliner Gelehrtenfamilie Remak - Aufstieg und Niedergang einer deutsch-jüdischen Familie,” Berlin, Jewish-Cultur-Club, in the series “Jewish scientists in Berlin,” March 19, 1996.

Lecture “Die Fräulein Doctores der Philosophischen Fakultät der Berliner Universität - Eine Längsschnittanalyse zur Entwicklung der Promotionen von Frauen zwischen 1898 und 1936,” Berlin, colloquium of the chair of the History of Science at the Humboldt-Universität zu Berlin, May 7, 1996.

Lecture “Die ersten Karriereschritte - Biologinnen als Promovendinnen an der Philosophischen Fakultät und als Wissenschaftlerinnen in einigen Kaiser-Wilhelm-Instituten (1900-1945),” Berlin, colloquium “41. Medizinhistorischer Nachmittag” of the Institut für Medizingeschichte at the Humboldt-Universität zu Berlin, May 21, 1996.

Lecture “Die Kaiser-Wilhelm-Institute wagten es: Frauen als Abteilungsleiterinnen,” Kaiserslautern, Lecture-Program “Frauen in Mathematik und Naturwissenschaften,” Mathematische Fakultät of Universität Kaiserslautern, June 3, 1996.

Lecture “Die vergessenen Kolleginnen von Lise Meitner - Naturwissenschaftlerinnen an der Berliner Universität und in den Kaiser-Wilhelm-Instituten zwischen 1911 und 1945,” Darmstadt, conference “Frauen in der Wissenschaft,” Technische Hochschule Darmstadt, June 20, 1996.

Lecture “Archivakten erzählen: Frauenpromotionen an der Philosophischen Fakultät der Berliner Universität zwischen 1899 und 1936 im Fach Mathematik,” Göttingen, workshop for the history of mathematics, July 16, 1996.

Lecture “Die Spielregeln der Objektivität. Die ersten Promotionen und Promotionsversuche von Frauen an der Philosophischen Fakultät der Berliner Universität 1898-1908,” Berlin, Wissenschaftshistorikertag, September 28, 1996.

Lecture “Karl Weierstraß Verbindungen zu Rußland,” Berlin, Wissenschaftshistorikertag, September 28, 1996.

Lecture “Und es gab sie doch - Physikerinnen in den Kaiser-Wilhelm-Instituten in Berlin-Dahlem,” Berlin, opening talk for the exhibition “Von der Antike bis zur Neuzeit - der verleugnete Anteil der Frauen an der Physik?” at the department of physics at Freie Universität Berlin, October 22, 1996.

Lecture “Lise Meitner und ihre Kolleginnen in den Instituten der Kaiser-Wilhelm-Gesellschaft zwischen 1911 und 1945,” interdisciplinary research colloquium “Wissenschaftsforschung als Geschlechterforschung,” Technische Universität Berlin, November 6, 1996.

Lecture “Brüche und Verschiebungen bei den Promotionen von Frauen

1900 bis 1945 am Beispiel der Universität Berlin," Göttingen, colloquium "Frauenforschung" in the sociological seminar of the Georg-August-Universität Göttingen, November 11, 1996.

Lecture "Die Physikerin Lise Meitner - Briefe erzählen aus ihrem Leben," Berlin, Jewish-Cultur-Club, in the series "Jewish scientists in Berlin," November 12, 1996.

Comment "The History of Measure, the History of Risk" of Stéphane Callens, Berlin, colloquium of Department II, Max Planck Institute for the History of Science, November 13, 1996.

Lecture "Emil Julius Gumbel (1891-1966) - Mathematiker und Publizist, Zeitzeuge und Emigrant," colloquium of the research group "Mathematikgeschichte," Bergische Universität/Gesamthochschule Wuppertal, November 29, 1996.

Lecture "Naturwissenschaftlerinnen in der Kaiser-Wilhelm-Gesellschaft," Berlin, colloquia "Sparkurs in der Wissenschaft - Einsparung von Frauen?" conference of the Deutsche Hochschullehrerinnenbund e.V., December 6, 1996.

Lecture "Von Petersburg nach Moskau: Zur Geschichte der russisch-sowjetischen Mathematik (1850-1975)," Lecture-Program "Wissenschaftsgeschichte in Osteuropa," Osteuropa-Institut of the Freie Universität Berlin, December 18, 1996.

Lecture "Die ersten Karriereschritte - Physikerinnen als Promovendinnen an der Berliner Universität und als Mitarbeiterinnen in Instituten der Kaiser-Wilhelm-Gesellschaft," lecture at the conference "100 Jahre Frauen in der Wissenschaft," Bremen, February 18, 1997.

Lecture "Von Elisabeth Schiemann bis Hildegard Strübing - Die Promotionen von Frauen im Fach Biologie an der Friedrich-Wilhelms-Universität Berlin von 1899 (1905) bis April 1945," lecture at the Institutskolloquium, Naturkundemuseum, Humboldt-Universität zu Berlin, February 26, 1997.

Lecture "Sonja Kovalevskajas Nachfolgerinnen - Promotionen von Frauen in der Mathematik an der Berliner Universität zwischen 1899 und April 1945," lecture in the seminar "History of Mathematics" at the Technische Universität Wien, March 13, 1997.

Lecture "Ilse Schneider-Rosenthal - eine Frau interpretiert Albert Einstein," lecture in the series "Jewish scientists in Berlin," Jewish-Cultur-Club Berlin, April 8, 1997.

Lecture “Vom Hintereingang zum Hauptportal - Wissenschaftlerinnen in der Kaiser-Wilhelm-Gesellschaft,” lecture in the series “Dahlemer Archivgespräche,” Berlin, April 21, 1997.

Lecture “Frauen an der Friedrich-Wilhelms-Universität zu Berlin,” lecture in the seminar “Rekonstruktion von historischen Biographien der Humboldt-Universität,” Kulturwissenschatliches Seminar, Frau Prof. Marlis Dürkop, Berlin, May 7, 1997.

Lecture “Scientific Experience - a report on a new effect to a learned society. Gerda Laski and her research on the infrared radiation - an example of a scientific experience. Introduction,” lecture in the Scientific Experience Group, Department II, Max Planck Institute for the History of Science, Berlin, May 12, 1997.

Lecture “Frauenpromotionen in Mathematik an der Mathematisch-Naturwissenschaftlichen Fakultät der Berliner Universität von April 1936 bis Februar 1945,” lecture at the conference, Deutsche Mathematiker-Vereinigung, Fachsektion Geschichte der Mathematik, Sektionstagung in Calw vom May 28 - June 1, 1997.

Lecture “Es gab überraschend viele Naturwissenschaftlerinnen in den Kaiser-Wilhelm-Instituten,” lecture in the Gymnasium in Osterholz (bei Bremen), Abiturstufe, June 4, 1997 (“Schulvortrag” on the occasion of the MPG-Jahreshauptversammlung).

Lecture “The Kaiser-Wilhelm-Gesellschaft and the career chances for female scientists between 1911 and 1945,” Symposium (SU 13) “Gender issues in scientific, technical and medical communities,” XXth International Congress of History of Science, Liège, July 23, 1997.

Teaching Activities:

— Lectures in the series “Jewish scientists in Berlin” in the Jewish-Cultur-Club Berlin, 1996 and in 1997.

— Seminar about the history of women scientists at the Berlin University from 1899 to 1945 cross-listed for the Historical Faculty and “gender studies,” Humboldt-Universität zu Berlin, winter semester 1997/1998.

Renate Wahsner

Lecture "Der Anfang der Naturphilosophie. Die Begriffsentwicklung von Raum über Zeit zu Materie und Bewegung in den §§ 254-261 der *Enzyklopädie*," Universität Kaiserslautern, Sitzung des Arbeitskreises zu Hegels Naturphilosophie, February 17-18, 1996.

Lecture "Philosophie als System und Ungeschichtlichkeit der Natur – ein antiquiertes Konzept?", San Sebastian/ Donostia, XXIth International Hegel Congress, October 1-4, 1996.

Lecture "Ernst Machs Lob der Erfahrung" (together with H.-H. v. Borzeszkowski), Institut für Philosophie der Johann Wolfgang Goethe Universität Frankfurt/Main, May 8, 1996.

Lecture "Messung als Begründung oder Vermittlung. Ein Briefwechsel mit Paul Lorenzen über Protophysik und ein paar andere Dinge" (together with H.-H. v. Borzeszkowski), Institut für Philosophie der Philipps-Universität Marburg, June 5, 1996.

Lecture "Die Suche nach der objektiven Sinnlichkeit. Über den Zusammenhang von Feuerbachs Sensualismus und Helmholtzens Programm einer empirischen Geometrie," International Institute Schloß Reisenburg/ Günzburg, Conference "Materialismus und Spiritualismus. Zwischen Philosophie und Wissenschaft nach 1848," February 26 - March 1, 1997.

Teaching Activities:

— Hegels Naturphilosophie I. Mechanik. Freie Universität Berlin, Institute for Philosophy, Hauptseminar (2 hours per week) winter semester 1995/96.

— Hegels Naturphilosophie II. Physik und Organik. Freie Universität Berlin, Institute for Philosophy, Hauptseminar (2 hours per week) summer semester 1996.

Paul Weinig

Chair of session at the workshop "Experience and Knowledge Structures in Arabic and Latin Sciences," Berlin, December, 16-17, 1996.

Lecture "Latin Medieval Tradition of Mechanics: Aspects of the Textual Tradition," workshop on "Experience and Knowledge Structures in Arabic and Latin Sciences," Berlin, December 17, 1996.

Lecture “Tradition and Context: Types of Transmission in the Medieval Science of Weights,” XXth International congress for the History of Science, Liège, July 26, 1997.

Organization of the international workshop “Experience and Knowledge Structures in Arabic and Latin Sciences” (together with Mohamed Abattouy), Max Planck Institute for the History of Science, Berlin, December 16-17, 1996.

Teaching Activities:

— Einführung in das Fach Deutsch als Fremdsprache. Humboldt Universität zu Berlin, Institut für Deutsche Sprache und Linguistik, seminar (2 hours per week), summer semester 1996.

— Landeskunde im Deutsch als Fremdsprache-Unterricht. Freie Universität Berlin, Fachbereich Germanistik, seminar (2 hours per week), summer semester 1997.

— Die Theoretisierung der Waage (together with Peter Damerow). Universität Konstanz, Kompaktseminar (30 hours a week), summer semester 1997.

Activities of the Visiting Scholars and Research Fellows

Mohamed Abattouy (University of Fez)

stayed from July 1, 1996 - October 25, 1996 and July 1 - December 31, 1997 as a visiting scholar at the Institute and contributed to the project 1 of Department I (see *p. 34*, *p. 48*, *p. 60*, *p. 107* and *p. 114*).

Hanne Andersen (Universität Konstanz)

stayed from February 1, 1996 - August 15, 1996 as a predoctoral research fellow at the Institute, funded by the Danish Natural Science Research Council. Her general research topic is conceptual change in conceptual revolutions. A central point of this work is to account for the dynamic of conceptual change, and especially the role played by anomalies in triggering such changes. During her stay at the Institute, Hanne Andersen worked on two case studies to illustrate these points: the discovery of nuclear fission, and the development of the theory of special relativity. On the discovery of

nuclear fission she presented some results in the Insitute's internal colloquium, and finished the paper "Noddack Neglected – the 1934 Suggestion of Nuclear Fission," presented at the conference "Discovery of Elements" in Leuven/Belgium, September 17-20, 1996. On the development of the theory of special relativity she has focused on analyzing the anomaly which Einstein saw in the asymmetric description of electromagnetic induction. She contributed to the research activities of the Institute on the development of relativity theory through her analysis of students' notes from Einstein's lectures on electromagnetism and relativity in Zürich during winter semester 1913/14. Together with Klaus Vogel she initiated the internal workshop "Revolutions in Science." For the South Scandinavian Consortium for Science Studies, together with Prof. Thomas Söderqvist, University of Roskilde, she organized the summer school "The Relation Between History of Science and Philosophy of Science" which was held at the Mols Laboratory in Aarhus/Denmark, July 26-31, 1996.

Mitchell G. Ash (University of Iowa, now Institute of History, University of Vienna)

stayed from May 13, 1996 - December 15, 1996, and from June 1, 1997 - September 30, 1997 as a visiting scholar at the Institute, with support from the National Science Foundation (USA). His research concerned the following topics: forced migration and scientific change – emigré German scientists after 1933; scientific changes in Germany following political upheavals in 1933, 1945 and 1989; and psychological twin research under Nazism and after 1945. During his two stays he presented *inter alia* a paper on psychology in Germany at the turn of the century at the Schiller National Archive in Marbach, as well as a keynote address to a conference on the history of the psychological institute at the Universität Würzburg, and accepted an invitation to address to the first national conference of historians of science (*Wissenschaftshistorikertag*) in Berlin. At the Institute he presented a department colloquium paper entitled "From 'Positive' Eugenics to Behavioral Genetics: Psychological Twin Research under Nazism and Since," and an Institute colloquium paper entitled "Scientific Changes in Germany after 1933, 1945 and 1989: Toward a Comparison."

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow at the Institute. She started work on a research project "Georg Ernst Stahl's Concept of the Chemical Processes." Stahl's research question, how the change of substances occurs, remains not only one of the central theoretical problems of chemistry as a natural science, but also one of the classical themes of natural philosophy, where it is generally known as "the problem of mixtio."

Today Georg Ernst Stahl (1659-1734) is best known for his phlogiston theory of combustion, which is usually regarded as the first generally accepted theory of eighteenth-century chemistry. Most historiographical research on Stahl has been done from this perspective, and thus classifies his research primarily as prehistory to the chemical revolution achieved by Lavoisier. Furthermore, his historiographical characterization appears to be rather ambivalent. On the one hand, he is thought of as one of the most important theorists of eighteenth-century chemistry; on the other hand he is described as obscure, mysterious and outdated. Starting from this contradiction, Berger attempted to look at Stahl's theory of matter and his ideas on chemical change from the reverse perspective of seventeenth-century chemistry. She focused her study on the works of the chemical practitioners Glauber, Kunckel, and Becher. In contrasting their notions of substantial change with those of the alchemists represented by the works of Geber Latinus and even Paracelsus, she demonstrated that the seventeenth century can be seen as a transitional period in chemistry, as the concept of "reaction" was just emerging.

"Reaction" means that changes in substances are interpreted as a naturally occurring process resulting from an interaction of different chemical substances to form a new combination. This idea must be distinguished from alchemical transmutation, which was interpreted as the qualitative change of a body effected by an alchemical operation.

Berger's study of ideas about chemical change focused on two problems: 1) the relationship between corpuscular notions and the use of the traditional concepts of qualities in explaining chemical change and, 2) the use, significance and development of the term "affinity" as the cause of a specific chemical behavior.

Additional activities:

Lecture "Zeit in der Chemie: Reaktionszeit und Affinität," research collo-

quium of the Institut für Philosophie, Wissenschafts- und Technikgeschichte, Technische Universität Berlin, January 7, 1997

Lecture "Chemische Mechanik und Kinetik," Fachgruppe Geschichte der Chemie of the Gesellschaft Deutscher Chemiker at Marburg, March 13, 1997.

Conevery Bolton (Harvard University)

stayed from June 15 - July 1, 1997 as a predoctoral research fellow at the institute. She was working on her dissertation "The Health of the Country: Environment, Health, and Sense of Place in the Making of the American West, 1800-1850." Her advisor is Professor Allan M. Brandt of the Department of the History of Science, Harvard University Faculty of Arts and Sciences, and the Department of Social Medicine, Harvard Medical School.

This project connects Arkansas and Missouri settlers' perceptions of body and environment with concerns of early nineteenth-century American culture, the quotidian experiences of immigration and agricultural work, and long-standing ideas about both health and the natural world. Documenting a pervasive and powerful set of beliefs, it asserts the centrality of health to Western immigration and American national expansion in the first half of the nineteenth century.

This project traces the perceived relationships between environment and health in the early histories of Arkansas and Missouri, setting those specific regions in a broader context of U.S. expansion into the trans-Mississippi West. Charting the interactions between popular writings and medical and scientific reports, it explores a world-view in which the human body was in thrall to forces both powerful and all-pervasive. The dissertation's six main chapters address, respectively: health concerns in the context of American Western immigration; the concept of bodily well-being and the multiple meanings of environmental miasma; relations between agricultural ideas and medico-scientific understandings of the body; the literature of medical geography and its utility in establishing a professional role for the physician/scientist in borderland regions; anxieties about the instability of race as revealed in discussions about acclimatization; and the interactions between perceptions of the health of Western environments and emerging conceptions of region and regionalism.

stayed from August 1, 1996 - February 28, 1997 as a predoctoral research fellow, and is staying from March 1, 1997 to February 28, 1998 as a CNRS postdoctoral research fellow at the Institute. In May 1997 he completed his dissertation on "Crafting and Disciplining the Tropics: Plant Science in the French Empire, 1870-1940," which straddled the disciplines of the cultural history of French colonialism, environmental history and the history of science. More specifically, he explored scientific practices in some spaces of knowledge – herbariums, botanical gardens, agricultural experimental stations, plantations – to elucidate the constitution of the tropical space as a field of investigation, intervention and control, as well as the production of visions of tropical nature and societies. The main issues addressed in this dissertation include: 1) the establishment of the Paris Muséum National d'Histoire Naturelle as an imperial institution of the Third Republic and the colonial culture of curiosity in the wake of exploration and conquest; 2) plant transfers, colonial botanical gardens and the creation of a Western/ cosmopolitan/urban tropicality in colonial cities (case study on Conakry, French Guinea); 3) the plantation as laboratory: the organization of space, agricultural research, and scientific management of workers in order to achieve the three goals of (contested) social order, higher yields and increased agronomical knowledge (case study of the rubber industry in Indochina); 4) the colonial monitoring of African agriculture: patterns of scientific research and forms of intervention which placed rural societies under experimentation and rendered them more receptive to the practices and objects of the experimental station as well as more amenable to administrative action (case study on peanut breeding in Senegal).

His present research interests are concentrated on the two following themes:

1. An archeology of "Development" – understood as a coherent nexus of discourses, knowledge, and modes of intervention in the peasantries in tropical regions – from the perspective of the experimentalization of agrarian societies. His previous work revealed a shift in the culture of French colonialism from a posture of "unveiler" to a posture of experimenter and demiurge transforming "less advanced" societies. The project explores how African agrarian societies were turned into objects of "development" in the period 1930-1970 both under French and British rule as well as by the new independent States, through a comparative study of some of the sites of experimentation that flourished during this period: irrigation projects

(the Office du Niger in Mali), units of mechanization (Groundnut Scheme in British Tanganyika), or units of technology transfer like the "Paysannats" in the Belgian Congo. Hybrids between a village and an experimental system, these sites were crucial for experimenting with "development," *i.e.*, for the production of both scientific knowledge on farming in Africa and expert knowledge on adequate ways to monitor agrarian communities. Bonneuil studies how space, land use, social relations and work were configured by experts, bureaucrats and researchers in order to render these transformed villages amenable to the production of such knowledge, and discusses how farmers reacted to these interventions.

2. The practices of classifying and naming in botany in the second half of the nineteenth century. Intense controversies erupted about the breadth and criteria of circumscription of species (not to mention more ontological questions) and about rules of nomenclature, which only can be fully understood in two contemporary contexts: the increasing flood of specimens collected at the periphery of expanding colonial empires, and the growing hegemony of huge public herbaria, such as those of Kew, Berlin and Paris. These major imperial centers trained botanists and instructed travelers' eyes and hands. They edited colonial floras, monographs and other unprecedented compilatory works, preparing the ground for a division of labor among botanists, and served as tools for controlling the production of new names and for standardizing classification practices. Bonneuil investigates the competing metrological activities of these herbaria and their relations to travelers, traders and indigenous botanical knowledge.

This second research theme is part of Department II's research project on "Science, Travel and Instrument," coordinated by Otto Sibum.

Additional activities:

Lecture "The Right Seeds in a Cleared Field: Peasants and Colonial Experts in Senegal (1900-1950)," at Berlin Summer Academy "Nature's Histories, August 18-29, 1997, MPIWG.

Francesca Bordogna (University of Chicago)

stayed from April 1, 1996 - December 15, 1996 as a predoctoral research fellow at the Institute. She worked on two different projects.

The first dealt with epistemological problems posited by psychical phenomena – *e.g.*, telepathy, clairvoyance, levitation of tables, etc. Based on

material collected in the archive of the Society for Psychical Research in Cambridge, UK in July 1996, she wrote a conference paper, "Objectivity and Psychical Research, 1880-1910," for the History of Science Society Meeting held in Atlanta in November 1996. This paper traced the change in psychical researchers' approach to the issue of objectivity over the period considered. Their increasing appeals to the apparatus and notion of mechanical objectivity suggest growing concerns with the introduction of epistemological distortions by the unconscious mind of the investigator. Bordogna also wrote one chapter of her dissertation, "The Scientist and the Ghost: The Epistemology and Method of Pragmatism in Context," presented at the Department II Colloquium on December 11, 1996. This chapter deals with evidential problems raised by psychical phenomena, and argues that James's pragmatist conception of evidence relates in complex ways to his investigation of such phenomena.

She also completed a long-term project on the history of algebraic number theory, writing a paper on the perception and conceptualization of ideal numbers in the second half of the nineteenth century.

Preprint: "Interpreting the Ideal: Embedding Ideal Numbers in the Mathematical Programs of Kummer, Dedekind, and Klein," preprint no. 47.

Additional Activities:

Conference paper "Objectivity and Psychical Research, 1880-1910," Atlanta, History of Science Society Meeting, November 9, 1996

Christina Brandt (Georg-August-Universität Göttingen)

is staying from October 1, 1996 - December 31, 1998 as a predoctoral research fellow at the Institute.

She is working on her dissertation on metaphors in the history of molecular biology. Her project deals with the emergence and development of language as a metaphor ('DNA as language' or tropes of reading and writing) and its connections to the 'information' metaphor in molecular biology throughout the 1950's and 1960's. She examines both the scientific literature of this period as well as the dissemination of 'language' tropes in the textbooks of the 1960's. Combining theories of metaphor with historical research, her work focuses on the constitutive role and the transformational power of metaphors. On the basis of case studies, she analyzes how linguistic metaphors were used and developed in different research contexts, how

they interacted with scientific practice, and how shifts of meaning took place through these processes. To this end, she is concentrating on two case studies: the development of tobacco mosaic virus research in Berkeley and Tübingen in the 1950's and the early 1960's, and the research on genetic fine structure by Seymour Benzer during the same period.

Stéphane Callens (Université de Lille 1)

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow at the Institute. He completed a study of the history of measure and probability theories in the nineteenth century. He currently is working on the topic of risks, specifically, on the relationship between economic theories of risk and public debates on economics in the twentieth century.

During the last trimester of 1996 he prepared the draft of his book *Les maîtres de l'erreur*, and wrote two research reports. The report "On se trompe toujours" concerns the local governance of risks; "Economie de la précaution" deals with the role of the *Vorsorgeprinzip* in the history of prudence and in the history of economic theories.

During this period, he participated in an internal colloquium on November 13, 1996 with the discussion paper "The History of Measure, The History of Risk." He also edited an issue of the review, *Clés*, on "Les économies de l'extrême," published by the University of Lille.

Michele Camerota (Università di Cagliari)

stayed from November 16, 1995 - February 15, 1996 and July 8, 1996 - October 8, 1996 as a postdoctoral research fellow at the Institute and contributed to the project 1 of Department I *(*see *p. 56* and *p. 108).*

Yoonsuhn Chung (Seoul)

stayed from May 1, 1996 - April 30, 1997 and October 1 - December 31, 1997 as a visiting scholar at the Institute. Her work focuses mainly on the historical investigation of the epistemological structure of the basic concepts and categories of physics. Tracing the shift of the basic categories from space and matter into field and vacuum in modern physics is one of its central questions.

During her stay she finished a paper with the title "Die Entwicklung des Kraftbegriffes im 18. und 19. Jahrhundert und die Entstehung des Feldbegriffes als einer Entität zwischen Raum und Materie" (MPIWG preprint, no. 68), in which the epistemological structure of the classical field concept and the influences of earlier ideas about space and matter are investigated. This work will be published in a book with the working title: *The Epistemological Structure of Michael Faraday's Field Concept*.

In her paper it is shown that the concept of force was first treated as a mathematical quantity in natural philosophy in early modern times and then "materialized" through Faraday's concept of lines of force in the nineteenth century. A part from the development of the mathematical formalism in the eighteenth century, the crucial role in the process of this conceptualization was played by the concepts of force in the monadological theories of Giordano Bruno and Leibniz, which were transformed through the writings of Rudjer Boscovich and of Immanuel Kant. This classical concept of field, which arose as an entity between (substantialized) space and matter, was expanded to provide the basis for the development of the modern concept of the quantum field.

The latest step in the "materialization" of the concept of force is achieved by the so-called second quantization of the fields in quantum field theory. The vacuum, now considered to be the ground state of the field (not an empty space), is thereby structured. Whether the concepts of field and vacuum build the basic categories of modern physics requires further investigation.

Nani Clow (Harvard University)

stayed from February 1, 1996 - August 31, 1996 as a predoctoral research fellow at the Institute. She worked on her dissertation project titled "The Laboratory of Victorian Culture: Experiments, Technicians, and Industry in Oliver Lodge's Liverpool Laboratory, 1881-1900." Using Oliver Lodge's (1851-1940) University College Liverpool Laboratory as a focal point, the dissertation examines the interplay of experimental physics with educational, technological, and industrial concerns in the late nineteenth century. The experimental physics laboratory became a site not only for education, but also for research, calibration, and metrology for both industry and academic physics. In general, the project examines how the requirements for expertise in both experiment and theory manifested themselves

in the physical spaces, instruments, practice and pedagogical tools of the laboratory.

Alix Cooper (Harvard University)

stayed from July 1, 1997 - August 31, 1997 as a predoctoral research fellow at the Institute. She is currently in the final stages of researching and writing her dissertation, "Inventing the Indigenous: Local Knowledge and Natural History in the Early Modern German Territories," which explores the emergence of the local flora and similar genres in the seventeenth century as ways of taking inventory of 'natural riches.' While at the Institute, she made use of Berlin's rich library resources to locate several sources she had not been able to find during her previous stay in Göttingen. She also took advantage of the opportunity to take part in the Institute's 1997 International Summer Academy, "Nature's Histories." Other research interests include the development of concepts of 'natural resources;' the environmental history of early modern Europe; the history of medicine and the body, in particular occupational and environmental medicine and the 'diseases of scholars;' and local, national and international divisions of labor in science.

Serafina Cuomo (Christ's College, Cambridge, GB)

stayed from October 1, 1996 - September 30, 1997 as a post-doctoral research fellow at the Institute. She completed a book on *The Faces of Mathematics in Late Antiquity: Pappus of Alexandria's Collectio Mathematica*. By combining an analysis of the text with a study of contemporary mathematical practices and a survey of their cultural and social background, she argued that Pappus (ca. 4th century A.D.) had a mathematical agenda which featured a strong interest in problem-solving and geometrical constructions, in generalizations and analysis of particular cases, and in applications of general statements to particular instances, carried out by numerical calculations. Moreover, Pappus used and, to a certain extent, created previous mathematical traditions as a means to assert his own expertise and authority, and to convey an image of the good mathematician which included ethical and social virtues, as well as knowledge of the subject and intellectual skills.

She also wrote a section on Roman engineering for the *Enciclopedia della*

storia della scienza and a paper on Roman land surveying for the conference "Mathematics in the Ancient World" in Oxford, September 20-21, 1997. This latter, which could become a larger project on surveying in the Roman Empire, focuses on Frontinus (1st century AD) and explores the meanings of land division, which was at the same time a way to facilitate the administration of a territory, a way of making a landscape into an object of knowledge, and a way to occupy and control space.

In the seminar of the Department II she contributed a paper, "The Machine and the City: Hero of Alexandria's War Engines." She is currently working on an article about rules for multiplication in antiquity, as well as on a general history of mathematics in antiquity (forthcoming in the Routledge series, *Sciences in Antiquity*, 1999).

Michael Dettelbach (Smith College, Northampton)

stayed at the Institute from January 1, 1997 - June 30, 1997 as an Alexander von Humboldt fellow at the Institute. As planned, much of his stay in Berlin was spent working at the Preussisches Geheimes Staatsarchiv in Dahlem and with the correspondence collections of the Humboldt-Forschungsstelle in the Berlin-Brandenburgische Akademie der Wissenschaften, collecting evidence of Humboldt's participation in Prussian political, economic, and cultural reform between the Revolutions of 1789 and 1848. He discovered traces of such activity in three areas – railroads and banking liberalization; mining (including an important memorandum on Prussia's acquisition of the Rhineland in 1815); military education and army reform – and presented his findings to the Akademie's Arbeitskolloquium in the history of the sciences (April 29, 1997). These findings will form the basis for an article on Humboldt as mediator between court, bureaucracy, and *Wissenschaft* in the interrevolutionary Prussian monarchy, intended for a forum such as the *Journal of Modern History*.

Unplanned, but no less important, were the colloquia and daily interactions with scholars at the Max Planck Institute, which drew him back towards statistics and mapping as expressions of political economy, and to Humboldt's role as an innovator in these fields, especially in the graphic display and manipulation of data and in the creation of new forms of topographical surveying. A presentation on this topic to the Institute's working group on scientific experience (April 21, 1997) yielded an essay, tentatively titled "Making the Face of Nature: Surveying Techniques and Nature-Physiog-

nomy in Humboldtian Science," forthcoming in *Studies in the History and Philosophy of Science*.

Bruce S. Eastwood (University of Kentucky)

stayed from July 1, 1997 - September 30, 1997 as a visiting scholar at the Institute and contributed to the project 3 of Department I (see *p. 104*).

Berna Kılıç Eden (University of Chicago)

stayed from September 1, 1995 - December 31, 1996 as a predoctoral research fellow at the Institute. Her project searches the roots of antipsychologism within philosophies of probability, by examining the development of empirical psychology, focusing mainly on the British intellectual scene.

During the middle decades of the nineteenth century, a central divide in the modern accounts of probability emerged, tending to polarize statisticians and philosophers of probability into objectivists and subjectivists. A new philosophy of probability, frequentism, appeared at this time, opening the received opinions on the subject to criticism, and emphasizing the objective nature of probability judgments. Why did this bifurcation take place during this period? Why were savants of the caliber of Jacob Bernoulli or Pierre-Simon de Laplace, whose mathematical insights were venerated by the frequentists Robert Leslie Ellis and John Venn, accused of subjectivism by the same? Not because Ellis or Venn thought the classical approach, formulated in the works of Bernoulli or Laplace, was only a descriptive enterprise, registering personal evaluations of uncertainties. The problem, as they saw it, was that classical probability could not live up to its normative aspirations. But, on the other hand, why did Bernoulli or Laplace fail to perceive any such gap between the descriptive and the normative features of probability theory?

The dismissive attitudes towards psychology found among the writers on logic and probability in this period hint at the answers to these questions. Psychology was accepted as a field of investigation, but only as long as it was bracketed out from the philosophies of logic and probability. The thesis of this project is that the studies in empirical psychology flourishing at the time revealed not only deviants, but also, and more importantly, variants to the classical ideal of rationality. Significant support for this devel-

opment was provided by the phrenological doctrines so popular in Britain in the first half of the nineteenth century. Charting out the mind directly from the shape of the brain, phrenology not only made minds transparent through the cranium, but implied that they were as infinitely variable as the bumps on an individual's head. An investigation of the impact of the phrenological movement on writers on logic or probability, such as William Hamilton, John Stuart Mill, Alexander Bain and Herbert Spencer, provides an explanation of the rise of this concern with objectivity. Psychology, as long as it continued to locate irrationality in the mutant as it had in previous centuries, posed no threat to those normative claims of probability theory which at the same time professed to be descriptive. But could a psychology which undermined the very substratum of rationality, the sacrosanct monolithic mind, by establishing the variability of minds, still be of service to a philosophy of probability?

In this context, the project seeks insights into a wider inquiry pertaining to the reasons for the rise of anti-psychologism within philosophies of logic at the turn of the twentieth century. Anti-psychologism, a persistent feature of the twentieth-century scientific world view that sought to eliminate forms of personal or communal knowledge as viable epistemological units, first became conceivable in the nineteenth century. Rather than construing anti-psychologism as a sudden realization by philosophers like Gottlob Frege and Edmund Husserl that logic had nothing to do with psychological considerations, further expansion and elaboration of this research will demonstrate that logic and psychology became incompatible because of the new orientation of empirical psychology.

As part of this research project, Eden has examined the archives in several locations in the U.K. A short article on the history of probability is forthcoming in *The Scientific Revolution: An Encyclopedia*, edited by W. Applebaum.

Eden is staying at the Institute for a second time from September 1, 1997 - August 31, 1998 as a postdoctoral research fellow. Her current research focuses on the scientific context of the rise of anti-psychologism and anti-anthropologism among German logicians at the end of the nineteenth century. The reasons for this hostility towards psychology and anthropology, most prominently exhibited in the works of Edmund Husserl and Gottlob Frege, are sought in the flourishing life and human sciences of the nineteenth century, particularly in the biological, psychological and anthropological conceptions of the mental individual which these sciences

promulgated. The study aims to ascertain whether the human and life sciences of the nineteenth century posed a challenge to logic through their articulation of a more detailed and complex picture of the mental individual than that of Enlightenment studies of human nature.

Elisabeth Emter (Freie Universität Berlin)

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow at the Institute. Her scientific interests center on the relation between perceptions of the human corpse and concepts of personal identity in Germany in the seventeenth and eighteenth centuries. This research, which contributes to a growing literature on changing constructs of the human body, rests on the premise that to historicize the body one must also historicize the corpse. Instead of limiting her analysis to representations of the dead human body, Emter focuses on the elaboration of the corpse in the context of various scientific and philosophical projects. She is currently using medical and anatomical texts to investigate how seventeenth- and eighteenth-century anatomists created their objects of observation. This work includes an examination of the terms used for the dead human being and of the historical context to which these terms belonged.

During her time at the Institute, Emter's interest led her to focus on the following research questions: How did the ancient idea of the separation of the consciousness and the body at death shape anatomists' view of the corpse? How were scientific perceptions of the corpse shaped by the introduction of new instruments and methods of anatomical examination? How was the unimportant individual reconciled with the important universal? How were others persuaded to accept dissection? How were the physical signs of death determined and described? How did the scientific treatment of the corpse differ from popular attitudes towards death? In a subsequent phase of this research, Emter related her analysis of explicitly scientific and medical texts with the portrayal of anatomy and corpses in seventeenth- and eighteenth-century literature and art, analyzing a novel published by the physician Johann Christoph Ettner in 1697 which focused on the role of anatomical practice in Ettner's concept of an ideal doctor.

Over the course of the year she also finished an article on the relation between modern physics and twentieth-century literature and completed a paper on the influence of Sören Kierkegaard on Max Bense's concept of *Augenblick*. In addition, she wrote the introduction for the second volume

of the collected papers of the philosopher Max Bense. She also participated in the workshop Constructing and Deconstructing the Body. Art and Anatomy XVth-XXth Century, held in Annecy, May 8-11, 1997.

Robert Englund (University of California at Los Angeles)

stayed from September 10, 1997 - September 24, 1997 as a visiting scholar at the Institute and contributed to the *Database of Proto-Cuneiform Texts from Archaic Babylonia* (see *p. 110)* and the *Cuneiform Texts of the Third Millennium B.C. in the Vorderasiatisches Museum, Berlin* (see *p. 113).*

Raphael Falk (The Hebrew University of Jerusalem)

stayed from September 20, 1996 - October 20, 1996 and July15, 1997 - September 19, 1997 as a visiting scholar at the Institute. The stay in 1996 was devoted to the preparation of the workshop on *"Gene Concepts in Development and Evolution II"* (see *p. 247).*

The two months in 1997 were devoted to editing fourteen papers submitted for the volume on "The Gene Concept in Evolution and Development" following the Workshop held on the subject in the fall of 1996.

All papers were intensively annotated and written comments were prepared for external reviewers and the authors, after consultation with the other two editors, Peter Beurton and Hans-Jörg Rheinberger.

Detailed notes were prepared, along with an early draft of a "Commentary Overview" paper which summarizes the ideas discussed at the Workshop and in the submitted papers. A comprehensive literature list of all the papers also was compiled. The remaining preparatory work should allow the publication of the volume within the next year.

July 22-26, 1997 Falk traveled to Liège, Belgium, to participate in the 20th International Congress of History of Science. He participated in the discussions and contributed a paper on "Muller on Development" to the session on developmental genetics.

Raymond Fredette (Fitch Bay, Canada)

stayed from November 25, 1997 - December 5, 1997 as a visiting scholar at the Institute and contributed to the project 1 of Department I *(*see *p. 68).*

Gideon Freudenthal (Tel-Aviv University)

stayed from June 1, 1996 - July 7, 1996, and from July 25, 1997 - August 25, 1997 as a visiting scholar at the Institute. During his first stay, he worked on the epistemological status of conservation principles in Leibniz's philosophy and on the concept "Scientific Controversy." He completed the paper "Leibniz als Transzendental philosoph malgré lui" which he presented to the conference "Labora diligenter," July 4-6, 1996, at the Einstein Forum in Potsdam. The paper will be published in a supplementary issue of *Studia Leibnitiana*.

In addition, he prepared a commentary on a paper of Prof. Alan Gross on scientific controversies. This commentary was read at the École des Hautes Études en Sciences Sociales, Paris.

During his second stay, he worked on the Leibniz-Papin controversy over the concept of "force" in physics. He translated most papers and letters from Latin and French into English and worked on the interpretation of the controversy. When completed, this work will be published accompanied by the relevant texts in a Volume *Leibniz the Polemicist*, to be edited together with Marcelo Dascal and Quintin Racionero.

Ofer Gal (University of Pittsburgh)

stayed from October 1, 1996 - December 31, 1997 as a postdoctoral research fellow at the Institute and contributed to the project 1 of Department I (see *p. 34* and *p. 68*).

Peter Geimer (Philipps-Universität Marburg)

is staying from June 1, 1997 - December 31, 1998 as a postdoctoral research fellow at the Institute. His research project concerns the photography of invisible phenomena around 1900. It deals with cases in which photographs functioned as visible (and often the only) proof of the existence of certain phenomena. The study aims at a description and analysis of this extra value of photography and its epistemological status. A comparative study of significant cases (photography of rays, forces and phantoms) will show the extent to which a common structure of these different kinds of photographic visualization of invisibility existed.

A special interest derives from the fact that photography was regarded both

as a means and a subject of scientific research. “La photographie est une des branches de la chimie et de la physique,” declared Albert Londe in 1889. Photography, then, could produce representations of chemical and physical processes by means of chemical and physical processes. Therefore scientific critics of spirit photography argued that photographs of supernatural and invisible phenomena were mere visualizations of chemical accidents deriving from the photographic process itself, products which normally would be treated as deficiency, failure and waste. Thus the project deals with a space of knowledge in which the interpretation of one and the same visual document balanced between worthless waste product and serious epistemological object, between technical fault and technically revealed truth.

Additional Activities:

Lecture “Die Blendung. Vom Trauma der Blitzlichtphotographie,” at the conference Trauma/Zeit. Das Ereignis im Zeitalter der Medien, Zentrum für Literaturforschung Berlin, July 9-10, 1997.

Martin Gierl (Georg-August-Universität Göttingen and Max-Planck-Institut für Geschichte, Göttingen)

stayed from October 1, 1995 - October 31, 1996 as a postdoctoral research fellow at the Institute. The history of coin collecting, *i.e.*, numismatics, in the eighteenth century was at the focus of his research interests. His project encompassed two parts. First, through an intensive study of the practice of eighteenth-century numismatics it became possible to understand the process of scientific rationalization in a novel fashion. This process may also be described as the co-evolution of numismatics and a “rationalized” society. The second part analyzed the interconnections between coin collecting and the emergence of modern historiography.

The eighteenth-century fashion of numismatics extracted coins of old vintage out of general circulation and had the startling effect of minting a uniform coinage. In response to the demands of numismatists, coin-descriptions were for the first time gathered and published in a comprehensive manner. By exhaustively describing all coins which were known to have existed, the field of numismatics became a central domain in the emergence of the “new” historiography. Numismatists determined the historical importance of events: Remarkable is what was minted on a coin. Thus numismatics contributed to the emergence of a new historical sensi-

bility – history which claimed to be universal. Instead of telling single stories about single events, historians began to investigate history in its all-embracing, singular form.

This two-pronged investigation traced the paths of numismatists from the contemplation of individual coins to economics and finance, an ambitious project whose completion they envisioned at the end of the century. Gierl's study illustrated the intentions of changing numismatics into finance and its correlation to a new form of a historic thinking: History no longer was seen as a store of past events, but as a continuous process. Production, rather than collecting, became the goal in this new epoch.

Additional activities:

Lecture "Pietismus im Streit. Theologischer Wahrheitsschutz und die Genese des Pietismus" at the Internationales Pietismussymposium in Spiez, March 4 - 6, 1996, organized by the Historischen Kommission zur Erforschung des Pietismus.

Lecture "Theologischer Wahrheitsschutz und die Geburt der Frühaufklärung" at the Friedrich-Meinecke-Institut der Freien Universität Berlin, May 15, 1996

Lecture "Die Reform der Gelehrsamkeit am Ende des 17. Jahrhunderts," October 21, 1996 as part of the Berliner Seminar für Wissenschaftsgeschichte, organized by the Berliner Verbund für Wissenschaftsgeschichte and the MPIWG.

Hubert Goenner (Georg-August-Universität Göttigen)

stayed from November 1, 1995 - February 29, 1996 and August 7, 1996 - August 30, 1996 as a visiting scholar at the Institute and contributed to the project 2 of Department I (see *p. 87* and *p. 90*).

Catherine Goldstein (CNRS/Université de Paris Sud)

stayed from July 7, 1996 - October 7, 1996 as a visiting scholar at the Institute. She is a researcher at the Centre National de la Recherche Scientifique (URA D-752) and worked at the Institute within the framework of a joint program between the CNRS and the Max Planck Society, on the theme of the transmission of scientific knowledge.

Her research focuses on numbers and number theory in the perspective of a social history of mathematical tools, results and practices. During her stay at the Institute she worked on the relations between German (especially Berlin) and French number theory between 1870 and 1914, adopting a strategy of textual 'micro'-history. More specifically, by taking into account all the articles published during this period and exploring their relationships at a variety of levels (references, tools, comments, contents) it was possible to delineate groups of texts where extensive exchanges (sometimes of an oppositional nature, sometimes based on explicit or implicit collaboration) are revealed and others which are specifically characteristic of one subgroup of a center. This approach also allowed a redefinition of the position and work of such important figures as Hermite: his training and mathematical interests relate him closely to German mathematicians, among other things through his attention to a unity of mathematics. Hermite sought this unity through the revelation of unexpected connections among various areas in opposition to other positions, where the stress is put on the purity of method and the necessity to maintain homogeneity of results, mathematical objects and tools. To this end Goldstein also used extensively the Berlin Archives, particularly those at the Academy of Sciences. She also began a similar work (in order to explore the potentiality of the approach) on unified field theory in the 1920's, in collaboration with another visiting scholar at the Institute, James Ritter.

Ton van Helvoort (Maastricht University)

is staying from October 1, 1997 - November 30, 1997 as a postdoctoral research fellow at the Institute.

Having published on the history of virology and the history of the concept of virus in particular, Helvoort's interest is now moving to cancer research in the first half of this century. His project is on the history of the Institut für Krebsforschung of the Charité in Berlin in general, and on the favourable reception of two experimental cancer models - one in chicken and one in plants - at this institute in the 1920's in particular. In these cancer models a virus and a bacterium, respectively, were claimed to be the aetiological agents.

The establishment of the Institut für Krebsforschung in 1903 was an initiative of Ernst von Leyden, who adhered to the hypothesis of an "Infectious Origin of Cancer." In the 1910's this hypothesis fell into disgrace and,

therefore, many clinical pathologists were more than skeptical about the validity of the models mentioned above. Aims of the study are to analyze 1) how the institute gained authority in its competition with neighboring clinical departments, *e.g.*, surgery, gynecology, and dermatology; and 2) how the aforementioned cancer models were given credibility in this clinically oriented institute.

Frederic L. Holmes (Yale University)

stayed from June 15 - July 15, 1996 as visiting scholar at the Institute. He began a project to study the origins of physiological chemistry as an example of the formation of scientific disciplines in nineteenth-century Germany. The example is chosen as representative of the type of subfield which arises, not by the subdivision of an existing field, but by the recombination of portions of previously existing fields. One of the questions asked is whether physiological chemistry acquired an autonomous disciplinary structure of knowledge, or whether it remained a boundary field between chemistry and physiology. For a preliminary exploration of the evolving structure of the discipline, he examined four textbooks of physiological chemistry spanning the period 1850 to 1900. To assess the results of this first phase in the project, he wrote an informal position paper which formed the basis for an internal workshop convened at the end of his visit (see also *Discovery of the Urea Cycle p. 99)*.

Wallace Hooper (Bloomington, Indiana)

stayed from August 11, 1997 - August 31, 1997 as a visiting scholar at the Institute and contributed to the project 1 of Department I (see *p. 62)*.

Blahoslav Hru¡ka (The Oriental Institute, Prague)

stayed from August 1, 1996 - August 31, 1996 and August 1, 1997 - September 30, 1997 as a visiting scholar at the Institute. Hru¡ka investigated systems of knowledge in Ancient Mesopotamia during the third through first millennia B.C., particularly the bilingual Sumerian-Akkadian cuneiform lexical lists. Ancient Mesopotamian knowledge is still incorrectly called a “science of lists” (*Listenwissenschaft*), although the thematically ordered lists already contain the first signs of a reflexive and associative

structuring of knowledge. Nor did these lexical lists serve only for the conservation of Sumerian – already a dead language by the second millennium B.C. Their authors and users – even in the educational system – possessed specific traditions and constituted socially differentiated groups of experts. List entries were memoranda, directed at people who already understood their use and were informed about their conceptual history. Hru¡ka sought in the bilingual lists the competence which the individual list entries assumed from their users, in order to illuminate the relation between students and scholars. The problem of ancient Mesopotamian knowledge brings together three questions: How did someone name and describe an object (concept formation)? How did he come to know and understand the object (concept content)? How did he transmit knowledge of the object (concept development and change)?

In order to achieve a broad basis for dealing with these theoretical problems, research has been pursued in three different areas: (1) the reflexions of the list entries in the Sumerian "dialogues," (2) the role of reflective thinking in the Sumerian mythological texts, and (3) the instructional texts and their didactic functions (proverbs, riddles, instructions and precepts, essays concerned with the Mesopotamian scribe and school).

Sarah Jansen

is staying as a postdoctoral research fellow from August 1, 1997 - September 30, 1999, and stayed before as a predoctoral research fellow from January 1, 1997 - July 31, 1997. In her dissertation on the history of pest control in Germany she provided a history of the mathematical, experimental, technical, economic, semantic and social-administrative construction of a scientific-technological object, the 'pests.' Her postdoctoral research project "Population as an Object of Experimental-Mathematical Systems: Ecology and Related Fields in Germany, 1850-1950," will use the example of animal population ecology and its forerunners to develop a historical-epistemological case study about mathematization in biology.

Additional Activities:

Lecture "'Sozialparasiten' und 'Tödlichkeitszahlen': Zu Repräsentationsformen der Schädlingsbekämpfung in Deutschland, 1900-1920," presented in Bielefeld, Institut für Wissenschafts- und Technikforschung, at the conference Faktizität, Kontext, Diskurs, Diskursanalyse in den Geschichts-, Kultur- und Sozialwissenschaften, February 1, 1997 and at the Berlin Sum-

mer Academy “Nature’s Histories, August 18-29, 1997, MPIWG.

Instructed seminar, “Geschichte der Geschlechterverhältnisse in Naturwissenschaft und Technik,” at the Technische Universität Braunschweig, Abteilung für Geschichte der Pharmazie und der Naturwissenschaften, winter semester 1996/1997.

Assistant docent and co-organizer at the Berlin Summer Academy “Nature’s Histories,” August 18-29, 1997, MPIWG.

Edward Jurkowitz (University of Toronto)

stayed from December 1, 1995 - December 31, 1996 and June 1, 1997 - August 15, 1997 as a postdoctoral research fellow at the Institute and contributed to the project 2 of Department I (see *p. 90*).

Shaul Katzir (Tel-Aviv University)

stayed from June 1, 1996 - July 31, 1996 and March 1, 1997 - April 30, 1997 as a predoctoral research fellow at the Institute and contributed to the project 2 of Department I (see *p. 84*).

Lily Kay (Massachusetts Institute of Technology)

stayed from May 5, 1997 - August 5, 1997 as a visiting scholar at the Institute. During her stay she completed the final chapter, “In the Beginning was the Word?” of her book, *Who Wrote the Book of Life? A History of the Genetic Code* (Stanford University Press, forthcoming). This chapter – dealing with language as/and the origin of life – is a culmination of the book’s thesis: The representation of gene-directed protein synthesis as a code of genetic information transfer, as primal writing and scriptural technology, is an historically and culturally situated technoepistemology – the rise of cybernetic, information, and computer sciences in the Cold War period.

The book traces the production of the information discourse in biology in the early 1950’s, and how the genetic code was constituted as a scientific object within those new discursive formations. It examines the first, theoretical-mathematical phase of the code work (1953-1961) during which time researchers, predominantly physical scientists, transported the infor-

mation discourse into the problem of gene expression. This discursive structure, in turn, shaped the biochemical work on the genetic code in the second phase, beginning in 1961 with the groundbreaking experiments of Marshall Nirenberg and Heinrich Matthaei at the National Institute of Health (USA) and completed in 1967. By that time the iconology of a genomic book of life was circulating widely, both in scientific circles and popular culture, and it continues to shape the discourse and practices of human genome projects as information technosciences.

Another goal was to work on the conference entitled Postgenomics? Historical, Techno-epistemic, and Cultural Aspects of Genome Projects, organized by Hans-Jörg Rheinberger with her collaboration and planned for July 8-11, 1998. Collaborative follow-up steps and other organizational aspects of the conference will continue throughout the academic year.

She has also had the opportunity to present various aspects of her work in various lectures and seminars:

"A Book of Life? How the Genome Became an Information System," Max Planck Institute for the History of Science, Berlin, May 20, 1997

"Biopower: Molecularizing and Disciplining the Body in the Twentieth Century," Universität Salzburg, May 23, 1997

"Writing the Book of Life: Information and the Emergence of Molecular Medicine," University of Athens and Athens Technical University, June 6, 1997

"Military Code? How the Genome Became an Information System," Hamburger Institut für Sozialforschung, June 17, 1997

"Writing the Book of Life: Information and the Emergence of Molecular Medicine," Humboldt-Universität zu Berlin, July 15, 1997

"The Curious Fate of Information Theory in Biology in the 1950's," International Congress of History of Science, Liège, Belgium, July 22, 1997

In August she began her research on the history of neural nets (1940's-1950's). During her stay at the MPIWG she has benefitted from the expertise of Michael Hagner and has compiled a preliminary bibliography on modern neuroscience.

Alexei Kojevnikov (Institute for History of Science and Technology of the Russian Academy of Sciences, Moscow)

stayed from April 1, 1996 - September 30, 1996 as a postdoctoral research fellow at the Institute and contributed to the project 2 of Department I (see *p. 90*).

Cheryce Kramer (University of Chicago/Wellcome Institute London)

stayed from September 1, 1995 - October 15, 1996 as a predoctoral research fellow at the Institute. She spent her stay writing a dissertation on the institutional culture of Illenau, one of the first purpose-built psychiatric asylums in Germany. This doctoral thesis, entitled "A Fool's Paradise – the Psychiatry of Gemueth in a Biedermeier Asylum," was supervised by Lorraine Daston and successfully defended at the University of Chicago in November 1997. It examines the Biedermeier conception of Gemueth, a "soul-organ" which was taken by those who believed in its influence to be both mental and physical as well as individual and collective. The conceptual and phenomenal framework which structured experiences of Gemueth is unearthed from the history of psychiatric practice, specifically, in the southern German asylum Illenau during the period 1842-1889, whose practitioners held mental illnesses to be, literally "illnesses of the Gemueth." Illenau's therapeutic approach is reconstructed from the organization of space, through the landscape and architecture, and of time, through the use of music and gymnastics. The last chapter explores the relationship between Gemueth and sexuality by comparing the sexual content of Illenau patient records to Richard von Krafft-Ebing's *Psychopathia Sexualis* (1877), a text informed by, yet at odds with, the culture of Gemueth at Illenau in which its author trained for five years, 1864-1869.

This research is being continued now during a two-year research fellowship at the Wellcome Institute London by comparative studies on Russian and German psychiatry in the nineteenth century based on a comparison of the therapeutic regimes at Illenau and an asylum in Kazan.

Morgane Labbé (Laboratoire de Démographie Historique, École des Hautes Études en Sciences Sociales, Paris)

is staying from October 1, 1996 - December 31, 1998 as a CNRS postdoctoral research fellow at the Institute. Her research deals with the history of

the concept of nationality in statistics. She had previously studied the case of the ethnic classifications used in the census of the Balkan states, emphasizing the process of objectivation of ethnic ascriptions through these statistical representations. Her present research focuses on the emergence of the project of ethnographic statistics as a part of population statistics collected by the census, which was proposed and discussed at the International Statistical Congress in the nineteenth century. The study of the proceedings led her to underline the reservations this project raised among statisticians, whose definitions of nationality inevitably remained linked with their political representations of a nation (differences which took acute expression in the opposition of French and German statisticians), which played a role in the defeat of the project.

During her stay at the Institute she is working on the national form of this project, focusing on the German case, and revealing that, contrary to the cohesiveness of their opinion at the international level, German statisticians held various conceptions of an ethnic statistic. She examines the effects of these differences on the questions of the census, working in the archives of the reports of the Statistical Office. From their discussions on the relevant criteria of nationality for the statistics, she concentrates on the distinction between what was considered as an objective criterium, or indirect indicator of nationality (such as the mother tongue), and a subjective, or direct, criterium, *i.e.*, self-declaration. This discussion is linked to a broader discussion of the validity of an individual answer insofar it is a self-assessment. In the particular case of nationality this will be examined in relation to the notion of "individual consciousness" or "national feeling" that the statisticians referred to in their definition.

Labbé also examines the effects of disciplinary claims on the definition of nationality as a scientific object, and in particular how these led statisticians to stress a distinction from the concept of race.

Karlheinz Lüdtke (Friedrich-Schiller-Universität Jena)

is staying from July 1, 1997 - January 31, 1998 as a visiting scholar at the Institute. The object of his work is the history of understanding of the "virus" from the end of the nineteenth century through the 1960's (including the history of phage research). His project conceives of this history as a complex bridging process linking virus research with the various scientific areas engaged by virus researchers, including genetics, biochemistry,

biophysics, and macromolecular chemistry, in order to elucidate the puzzling nature of this filterable, invisible and uncultivable agent. To this end he is especially interested in investigating the development of interdisciplinary interactions which made possible the change from a bacteriological to a molecular-genetic understanding of viruses. After appropriating different vocabularies to define the virus, referring to concepts like "gene," "macromolecule," "nucleoprotein," etc. – based on "similarities" assumed by researchers – methods and procedures were borrowed from the aforementioned disciplines. As a consequence, the identity of the virus as an object of research was altered, allowing it to function also as an object for genetical, biochemical and other studies.

The results of this research project are intended to provide empirical support to reflections on the sociology of science. In particular, this concerns the still controversial discourses about interdisciplinarity, about the correlation of empirical to theoretical knowledge, and about the emergence of scientific innovations understood as processes of social construction.

Christoph Lüthy (Harvard University)

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow at the Institute. During this time, he worked primarily on a book manuscript on the development of atomist imagery in the early modern period. Various articles written during his stay deal with questions related to the fundamental transformations undergone by early modern natural philosophy between 1400 and 1750. The most general treatment of this theme will be found in the essay "Renaissance Natural Philosophy," written for the Enciclopedia Italiana's forthcoming nine-volume *History of Science*. A special issue of "Early Science and Medicine," co-edited with William R. Newman, specifically examines the transformation of the Aristotelian key concepts of "form" and "matter" between 1580 and 1720. Historical studies on the life and work of Sébastien Basson, the author of what is often regarded as the earliest atomist textbook (1621), on Giordano Bruno's atomist iconography, and on the fruitful conflation of four *Democriti* in early seventeenth-century literature (*i.e.*, the authentic atomist of Abdera, the laughing moralist, the alchemist, and the anatomist, the latter three being pseudonymous) were the fruit of further specific historical investigations. The results of these studies were presented in a number of lectures presented in Germany and abroad.

stayed from October 1, 1995 - September 30, 1996 as a postdoctoral research fellow at the Institute. He worked in the field of sociology of science and technology, focusing on the way in which instruments contribute to the framing of practice. He investigated various aspects related to the use of instruments in modern societies: the transformation of know-how and technical competencies into ordinary activity, the role of visualizing and measuring devices in scientific experiments, and the construction of networks of metrology and standardization associated with the diffusion of instruments. This project considers the perspective developed on instruments in the sociological tradition (sociology of innovation and technical change) as well as in the historical disciplines (history of measuring practices, history of precision).

His research focused on the role of instrument makers in the construction and diffusion of instruments, at the interface between science and the market. A qualitative survey was conducted in the Berlin area, based on interviews with engineers and researchers working in instrumentation firms. It will lead to a first classification of innovation patterns in this domain, and to the identification of relevant criteria for further research on instrument makers: patterns of technology transfer from the university to industry, the role of the mobility of researchers, the structure of market for innovative products, the creation of enterprise, the activity of the users in the stimulation of innovation, the role of the economic and political context (in the case of Berlin, reunification, and various transformations in local networks of research and development).

Additional activities:

Lecture "De la philosophie à la sociologie des sciences," professional training Médiation artistique et culturelle of the Agence Rhone-Alpes de Services aux Entreprises Culturelles, Le Havre, March 21, 1996.

Lecture "The Observatory of Twentieth-Century Experiment. Ethnographical Account of the Relations Between Laboratory and Place of Knowledge in Air Quality Control Research," Berliner Seminar für Wissenschaftsgeschichte, July 8, 1996.

Lecture "Instruments, Inscriptions and the Construction of the Scientific Laboratory," Hamburger Institut für Sozialgeschichte, September 9, 1996.

Christopher Martin (University of Pittsburgh)

stayed from June 23, 1997 - July 20, 1997 as a predoctoral research fellow at the Institute and contributed to the project 2 of the Department I (see *p. 84*).

Michael May (Universität Hamburg)

is staying from April 1, 1997 - March 31, 1998 as a postdoctoral research fellow at the Institute and contributing to the project 3 of the Department I (see *p. 99*, *p. 111* and *p. 112*).

Alexandre Métraux (Otto Selz Institut, Universität Mannheim)

is staying from September 1, 1997 - February 28, 1998 as a visiting scholar. His project focuses on the various discursive (experimental, linguistic, metaphorical, pictorial, logico-inferential, etc.) resources by means of which Sigmund Exner, Sigmund Freud, and Charles Sherrington outlined the integrative action of the human nervous system before and after the turn of the century. Two aspects are of special relevance: the physical coordination of elementary, or simple, peripheral and/or cerebral reflexes on the one hand, and the integration of lower level physiological processes into conscious, purposeful behavior, on the other.

Additional Activities:

Lecture “Biography and memory” at the Institut für Psychologie of the Universität Erlangen, November 5, 1997

Gabriele Metzler (Eberhard-Karls-Universität Tübingen)

stayed from March 1, 1996 - April 30, 1996 as a postdoctoral research fellow at the Institute. Her research concentrated on a project dealing with the tensions between internationalism and nationalism among German physicists in the twentieth century. During her stay she gave a talk on this subject at the internal colloquium. She is now completing a book, *Science as Culture. German Physicists as Members of the International Community, c. 1900-1960*, which she prepared during her time at the Institute.

Helmut Müller-Sievers (Northwestern University Evanston)

stayed from June 19, 1997 - July, 31, 1997 as a visiting scholar at the Institute. His activities included the presentation of a paper at the international conference "Varieties of Scientific Experience" (June 18 - 22, 1997, Max Planck Institute for the History of Science). He also worked on a paper entitled "Skullduggery. Goethe and Oken, Natural Philosophy and Freedom of the Press," to be published in *Modern Language Quarterly*. The first draft of a new book with the working title *Disorientation. Georg Büchner, Science and Literature* was completed. This manuscript will be submitted for publication early next year. Müller-Sievers collaborated with Wolfgang Schäffner to rewrite for publication a short essay, "On Punctuation and Points in Philosophy and Mathematics."

Staffan Müller-Wille (University of Bielefeld, Institute for Science and Technology Studies)

stayed from May 1, 1996 - November 30, 1997 as a predoctoral fellow and since December 1, 1997 as a postdoctoral research fellow at the Institute. His work at the Institute was concerned with the completion of a dissertation on Carolus Linnaeus's theory of plant classification. While the historiography of biology has traditionally viewed Linnaeus's innovations in this field - epitomized in the introduction of binomial nomenclature - as innovations of a self-evident, purely practical value, his dissertation views these innovations as dependent on certain theoretical convictions about the structure of the "natural order" among organisms which are highly peculiar for modern biology. The overall thesis of his dissertation is that Linnaeus's "System" of plants (*i.e.*, the hierarchic order of genealogical-morphological relations among plant genera and species due to "natural laws" governing plant reproduction) can be understood as the theoretical result of an abstraction from the "Economy" of plants (*i.e.*, the complex seasonal and topographical distribution of plants due to their specific requirements towards their local habitat), which was realized by accumulating plant samples gathered on worldwide natural history travels in botanical gardens, and by reproducing and exchanging this material in and among these botanical gardens.

The dissertation was submitted to the University of Bielefeld on July 1, 1996 under the title "Varietäten auf ihre Arten zurückführen. Zur Begründung eines natürlichen Systems der Pflanzen durch Carl von Linné (1707-

1778).” The promotion procedure was completed in November 1997.

The facilities at the Institute offered Müller-Wille the opportunity to gain access to some additional, rare material and to work on the final text of the dissertation. Furthermore, the stay at the Institute allowed for fruitful contact with scholars working on related topics, and for the presentation of partial results of his work to the internal colloquium of the Institute and to a wider audience by:
- presenting the paper “Form und Funktion der Repräsentationsmittel in Linnés Botanik” at the Jahrestagung der Deutschen Gesellschaft für Geschichte und Theorie der Biologie in Vienna, June 28-30, 1996.
- presenting the paper “Form and Function of Means of Representation in Linnaeus’s Botany” at the session “Practices of Experience in Early Modern Natural History” organized by B. Ogilvie for the History of Science Society 1996 Annual Meeting in Atlanta, November 6-10, 1996.
- presenting the paper “The Disappearance of the Exotic in Linnaeus’s *Genera plantarum*, published in Leyden 1737” at the conference “Looking through the Habsburg’s glasses” organized by the “Internationales Forschungszentrum Kulturwissenschaften” in Vienna, November 29-30, 1996. This paper will be published in the proceedings of the conference under the title “Collating Plants of the Old and the New World in the Heart of Flourishing Holland,” presumably due to appear in 1998.
- presenting the paper “Pehr Kalm’s travels in North America” at the 11th International Conference of The Society for the History of Natural History in Charlottesville, Virginia, April 27-29, 1997.

He also prepared a preprint version of a paper (“‘Varietäten auf ihre Arten zurückführen’. Zu Carl von Linnés Stellung in der Vorgeschichte der Genetik”, preprint no. 49). Finally, since September 1997, he has taken initial preparatory steps to collaborate with the Institute’s library and computer staff, the Linnean Society at London, and Tomas Anfält at Uppsala University (currently working on an edition of Linnaeus’s letters) to provide an electronic edition of Linnaeus’s main taxonomic works on the Institute’s Computer Aided Source Collection.

Sybilla Nikolow (Centre de Recherche de l’Histoire Science et Technique, Paris)

stayed from September 15, 1995 - October 31, 1996 as a postdoctoral research fellow at the Institute, contributing to research activities on the

history of scientific objectivity. Her particular focus is the history of visual and graphical representations in the sciences and their bearing on the question of objectivity. The focus of this work is how graphical techniques developed between the late eighteenth and early twentieth centuries, and how they were to be employed to visualize statistical data and facts. At that time, graphs and diagrams were no longer used merely to illustrate scientific facts, but also to reduce, analyze and interpret data, and thus to produce new scientific facts and arguments. The politics of the modern use of graphical representation consisted of making the objectivity of the data immediately visible.

Nikolow's visual-graphic project, entitled "Die anschauliche Sprache der Daten," investigates the visual rhetoric utilized by advocates of the graphical representation in three case studies. At the center of the rhetorical analysis are questions of how statistical data and fact achieve visual credibility and persuasive force. In exploring these two questions, it became clear that credibility resulted from the use of objectified algorithms, which yield scientific objectivity as if produced mechanically by symbolic machines. The force of persuasion is derived from the graphs and diagrams semantically enriched with notions and images in order to link them to intuition (*Anschauung*) and make them understandable and communicable.

The first case study examines the relational graphs of the German cameralist August Friedrich Wilhelm Crome around 1800. Like Playfair in England, he employed regular forms like circles and rectangles to visualize the extent of surface, population and other public resources of different states in order to compare them. This practice took place at the intersection of geography instruction according to philanthropic Enlightenment educational practice and ideas, comparable methods of the strength of the states in cameralism and in the science of the state (*Kameralismus und Staatswissenschaften*) and novel techniques in mapping the social and economical activities. She reported on this work in the colloquium of Department II of the Institute on May 31, 1996.

The second case study investigates the International Hygiene Exhibition in Dresden in 1911, where more than 4,000 graphical representations of many varieties were employed. The graphic riches of the Dresden Exhibition are a striking example of the visual culture of modernity mixing pedagogy, called *Volksaufklärung mit Bildern*, as well as of the advertising skills of the organizer of this exhibition, the producer of the mouthwash Odol, Karl August Lingner. The purpose of using graphical representations in this case

was to objectify popular and scientific discussion about the recent results of social hygiene, concerning, for instance, the social conditions of diseases, the effects from the control of diseases for the mortality rates and the decline in birth rates. She reported on this work in the lecture "Graphisch-statistische Repräsentationsfomen in der sozialen Hygiene" at the Fifth Annual Conference of the "Deutsche Gesellschaft für Geschichte und Theorie der Biologie" in June 27-30 in Vienna, and in the lecture "Die anschauliche Sprache der sozialen Hygiene. Graphisch-statistische Darstellungen in der Internationalen Hygiene-Ausstellung in Dresden 1911" in the research colloquium of the Institut für Wirtschafts- und Sozialgeschichte of the Ludwig-Maximilians-Universität München on July 11, 1996.

The third case study deals with the picture statistics (*Bildstatistik*) of Otto Neurath, a universal visual language developed in the 1920's and 1930's for public education and exhibitions.

Nikolow also contributed to planning an exhibition at the Jüdisches Museum Wien, entitled "Der Shejne Yidd. The beautiful Jew: Jewish Bodies, Culture and Hygiene." The study explores the meaning and use of statistics in the construction of the social and biological body of the Jew. It deals with the discourse of German Jewish scientists around 1900. The analysis focuses on concepts of Jews as a race, supported by evidence of biological differences in rates of illness and mortality.

Brian Ogilvie (University of Chicago)

stayed from September 1, 1995 - July 31, 1996 as a predoctoral research fellow at the Institute. During this period he completed much of the research and writing for his dissertation on "Observation and Experience in Early Modern Natural History." In contrast to older historiography, his dissertation examines the structure of experience and the practices of observation, rather than taking these as primitive, unproblematic categories whose meaning is always and everywhere the same. It fits into the broad framework of recent literature on the culture of early modern natural history, but stresses the careful investigation of European plants and animals rather than introductions from the New World and Asia, and the close attention which naturalists devoted to ordinary, common objects as well as to the strange, marvelous, and foreign. He presented a chapter, "Travel and Natural History in the Sixteenth Century," to the Department II colloquium. In

addition, during his stay he researched and wrote a paper on "Encyclopedism in Renaissance Botany," which he presented at the International Congress on Pre-Modern Encyclopedic Texts, Rijksuniversiteit Groningen, July 1996.

Dorinda Outram (University of Cambridge and University College Cork)

stayed from September 1, 1995 - August 31, 1996 and from June 1, 1997 - September 30, 1997 as a visiting scholar at the Institute. Her major research area falls within the field of the Enlightenment. She focused on the relationship between Enlightenment and the new scientific knowledge produced by exploration of the non-European world in the eighteenth century, by such men as Alexander von Humboldt, Johann Reinholdt Forster, or Cook and Bougainville. Exploration science contributes to project 1 of Department II, because it explores a great variety of scientific experience within the confines of a particular activity. Direct observation under field conditions, and the making of large-scale series of instrumental readings, are both part of the exploration experience. The collection of specimens of plants and animals to send back to metropolitan institutions also contributes greatly to the institutional development of science in Europe, and enables much broader claims about taxonomy and distribution to be made than before. Equally, the correlation of large-scale series of instrumental readings gained within exploration enables a new understanding of climate and geophysics. Exploration science also raises broader questions concerning historical epistemology, questions such as the reasons for the acceptance of exploration knowledge as real and legitimate knowledge. How do explorers persuade others to accept as true experiences and observations which no one at home has seen as they occur? What beliefs about facticity, observation and generalization in the society at large, and in its scientific culture in particular, do they mobilize in order to do so?

Additional activities:

Seminar on the Career of the Enlightenment, William Andrews Clark Memorial Library, University of California, Los Angeles, June 1996

Coorganizer of the workshop "Varieties in Scientific Experience," MPIWG, Berlin, June 18-23, 1997

Lectures at Berlin Summer Academy "Nature's Histories," August 18-29, 1997, MPIWG.

stayed as a research scholar at the Institute until June, 1997. From July 1, 1997 - June 30, 1998 he continues to stay as a predoctoral research fellow.

In his project Ohad Parnes looks at the origins of fundamental concepts of microscopical biology and medical bacteriology in the period 1760-1850. Contrary to the prevailing historiography of microscopy, evidence has been gathered that microscopy already had been taken up systematically by investigators in the last part of the eighteenth century. Of special importance is the relation between epigenetic theories of generation and microscopy. The importance of C. F. Wolff's new theory of generation lay not only in its re-statement of epigenesis, but also in the constitutive role played by microscopy and the microscopical in his theory.

Moreover, a major problem in this pre-cellular period was the nature of organic substances, namely of the most fundamental units of organized structures. Here the task was to make sense of the amorphous, semi-solid substances which seemed to constitute living bodies and be present in a whole series of physiological phenomena – the pus of suppurating wounds, the mucus accompanying putrefaction, the slime secreted from many plants and so on. No unifying scheme for the life science would have been conceivable without reference to this very central problem – the Schleim problem.

In the last year special emphasis has been placed on careful scrutiny of the laboratory notebooks of Theodor Schwann for the years 1835-1838. During those years, while working as an assistant of Johannes Müller in Berlin, Schwann developed his cell theory, which was published shortly thereafter and remains a unifying scheme for the life sciences today. Careful study of these notebooks has corroborated the assumption that Schwann arrived at his cell theory less through a systematic, cumulative series of microscopical inspections of animal tissues than via other investigations into stomach digestion, spontaneous generation and fermentation, during the years 1835-1837. It was through this seemingly unrelated work that Schwann was able to conceive and explicate physiological processes as the manifestation of specific and genuine organic agents. This scheme of specific agency was at the heart of the cell theory and also of its remarkable impact. This demanded resolution of the Schleim problem as well. Many historians have stumbled over Schwann's erroneous theory of free cell formation, which was rejected in the 1850's in favor of the theory of cell division. It is usually

claimed that Schwann had the wrong theory for the right observation. But it can be shown that this "erroneous" theory was the key for his observations, and that it provided the solution to the long-standing problem of organic substances – by proposing a new order of causality between a specific agent (the cell or cell nucleus) and its environment (the "Cytoblastem," Schwann's designation for the amorphous fundamental organic substance). Moreover, Schwann arrived at an experimental demonstration of such causality in his work on fermentation and putrefaction.

Further research is envisaged on the impact of Schwann's cell theory and on the role of the idea of specific aetiology in the years 1840-1870, *i.e.*, in the period preceding the "bacteriological revolution" of Robert Koch and Louis Pasteur.

Additional Activities:

Lecture "Agents and Cells: Theodor Schwann's work in Berlin (1835-1838)" at the XXth International Congress of History of Science in Liège, Belgium, July 20-26, 1997

Trevor Pinch (Cornell University)

stayed from May 15, 1997 - August 31, 1997 as a visiting scholar at the Institute. He continued his research into the sociology of experimentation. His focus was on large-scale solar-neutrino detection experiments. During his time at the Institute he and Harry Collins completed the second volume in their Golem series entitled *The Golem at Large: What You Should Know about Technology*, Cambridge University Press: forthcoming, 1998. Pinch also completed a chapter, "The Social Construction of Technologies and Markets," to appear in J. Porac and M. Ventresca (eds.) *Constructing Industries and Markets*, Pergamon Elsevier, 1998. Pinch completed an article with Frank Trocco, "The Social Construction of the Early Electronic Music Synthesizer" to appear in *Icon: Journal of the International Committee for the History of Technology*, Volume 4, 1998. During his stay Pinch presented papers at the Gender, Science and Technology workshop and doctoral course in Trondheim, Norway; at the Institute for Science and Technology Studies, University of Bielefeld, Germany, and at the Science Peace Workshop, Southampton University, England. Pinch was also interviewed by the *Frankfurter Allgemeine Zeitung* for an article on the "science wars."

Gianna Pomata (University of Minnesota/Università di Bologna)

stayed from January 1, 1997 - March 31, 1997 as a visiting scholar at the Institute.

In this period she worked on revisions of several chapters of her new book *Similitudo Dissimilis. The Search for Sexual Difference in Early Modern Medicine*. She also finished revising the English translation of her book *La promessa di guarigione: malati e curatori in antico regime* (forthcoming from Johns Hopkins University Press). In addition, she wrote a paper that is part of a new research project on the use of "historia" in early modern medical observation. She reported on this work in an internal colloquium at the Institute on February 19, presenting a paper called "A New Way of Saving the Phenomena: From Recipe to 'Historia' in Early Modern Medicine." During her visit at the Institute, Pomata also gave lectures at the Freie Universität Berlin, and at the Institut Romand d'Histoire de la Médecine et de la Santé at Geneva and Lausanne. She participated in a colloquium on the history of the body organized by the Zentrum für interdisziplinäre Frauen- und Geschlechtergeschichte at the Technische Universität Berlin, presenting a paper entitled: "A Sexual Utopia of the Renaissance: Elena Duglioli Dall'Olio's Spiritual and Physical Motherhood, ca. 1510-1520." Her major research interest focuses on the cultural and social history of early modern medicine.

Albert Presas i Puig (Technische Universität Berlin)

stayed from September 1, 1995 - August 31, 1997 as a postdoctoral research fellow (1995/96: Walther Rathenau Fellow) at the Institute.

In the exploration of the origins of the Scientific Revolution, he studied the technical education and the transmission of practical knowledge in the early Italian modern period, in particular of the Accademia del Disegno, (Florence in 1563). The Accademia was the first known attempt to systematize and objectivize the common experience of engineers, architects, sculptors and painters. It is therefore an example which can aid in understanding the environment in which the new renaissance science originated and developed. As part of the analysis of the sources, he is preparing modern editions of the "Summa aritmetica..." (geometrical part) by Luca Pacioli and the Catalan translation of *La Nova Scientia* by Nicolò Tartaglia.

On December 13-15, 1996, he attended the Fourth Symposium on History

of Science and Technology at Alcoi, Comunitat Valenciana, Spain.

S. Ravi Rajan (University of California, Santa Cruz)

stayed from January 1, 1997 - September 30, 1997 as a Walther Rathenau postdoctoral research fellow at the Institute. He completed work on three edited volumes and journal special issues. The first of these, a special issue, "Ecological Visionaries, Ecologized Visions," appeared in the journal *Environment and History* (Volume 3, Number 2, 1997). The second volume, *Colonized Ecologies: Readings in the Environmental History of South Asia and Southern Africa*, is currently under review with the University of Wisconsin Press, and the third, a special issue on "Science, Democracy and Development," is about to be submitted for review to the journal *Science As Culture*. In addition, Rajan continued work on his forthcoming edited book based on the unpublished work of the historical geographer Clarence Glacken, entitled *Genealogies of Environmentalism, Clarence Glacken on Nature, Culture and History in the Nineteenth and Twentieth Centuries*, to be published by University of California Press. Rajan also had two articles accepted for publication during his tenure as Walther Rathenau Fellow: "Foresters and the Politics of Colonial Agroecology: the Case of Shifting Cultivation and Soil Erosion, 1920 - 1950," in the journal *Studies in History*; and "Bhopal and Beyond: An Anthropology of Relief and Rehabilitation Efforts and Prospects for a Socially Relevant Political Ecology of Disaster Management," in Anthony Oliver-Smith and Susanna Hoffman (eds.) *The Angry Earth: An Anthropology of Disasters* (Routledge, forthcoming).

Additional Activities:

Assistant docent and co-organizer at the Berlin Summer Academy "Nature's Histories," August 18-29, 1997, MPIWG.

Annelore Rieke-Müller (Universität Oldenburg)

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow at the Institute. She began her research on exoticism and its impact on science, on cultural development and on national identity in eighteenth-century Germany. Her topic centered initially on German scientific overseas experience in the eighteenth century, specifically on travels and travelers financed or organized by monarchical support, scientific

associations or by private funds. This work contributed to the project "The Varieties of Scientific Experience" of Department II. She was especially interested in the different approaches to undertaking scientific travels, taking the *Lebenswelt* concept as a framework. She analyzed the educational background of travelers and their professional lives both before traveling and after returning from overseas, examining not only well-known travelers like Georg Forster and Alexander von Humboldt, but also relatively little-known individuals like Friedrich Hornemann and Ulrich Jasper Seetzen. Initial results were presented in an internal colloquium at the Institute, German Research Travels and Travelers in the Eighteenth Century: A Cultural History, on May 28, 1997. In the second half of her stay her interests focused on the connection of exoticism and historicism in eighteenth-century Germany, interpreting historicism as a comprehensive paradigm in science.

She presented the paper "Von der lebenden Kunstkammer zur privaten Liebhaberei: Fürstliche Menagerien im deutschsprachigen Raum während des 18. Jahrhunderts" at the workshop The Display of Nature in Eighteenth-Century Europe, organized by P.H. Reill and L. Daston as part of the European Science Foundation's program "Concepts and Symbols of the Eighteenth Century in Europe." The revised version of this paper was published as preprint no. 74.

James Ritter (Université de Paris 8)

stayed from July 7, 1996 - September 30, 1996 as a visiting scholar at the Institute and contributed to the project 2 of the Department I (see *p. 70*).

Sophie Roux (École des Hautes Études en Sciences Sociales, Paris)

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow, and is staying at the Institute as a research scholar since October 1, 1997.

Her dissertation, "La philosophie mécanique. 1630-1690," led her to further inquiries into the epistemological conceptions of science and into the science of mechanics in the seventeenth century; she is generally concerned with texts by Gassendi, Galileo, Descartes, Hobbes, Glanvill, Charleton, Hooke, Boyle, Rohault, Régis, Mariotte or Huygens. First, she explores the epistemological differentiation between mathematical and physical truths,

and, more specifically, the emergence of new standards to evaluate physical hypotheses. She also examines the fundamental notions of classical mechanics (such as relativity of motion, principle of inertia, concept of force, law of action and reaction, etc.). Her goal is to clarify the relationships, if there are any, between these notions and the corpuscularian theories of matter flourishing at the time.

During her stay at the Institute she gave three lectures: "Descartes a-t-il formulé le principe d'inertie?" delivered at the conference Descartes Savant, in Paris, December 6-7, 1996; "La catégorie de scepticisme modéré et l'histoire des sciences," delivered at the conference Richard Popkin in Paris, January 11, 1997 and "Descartes atomiste?" delivered at the conference Atomism and Continuum in the Seventeenth Century in Naples, April 27-30, 1997.

Theodore R. Schatzki (University of Kentucky)

is staying from October 1, 1997 - December 31, 1997 as a visiting scholar and from January 1, 1998 - March 31, 1998 as a Alexander von Humboldt Fellow at the Institute. He worked primarily on a social theoretical book about the ordering of social life. The book's main thesis is that the social field, the site where social life transpires, is a net of interwoven practices and orders, where practices are organized human activities and orders are arrangements of people, artifacts, and things. In elucidating this thesis the book examines, *inter alia*, contextualist versus nominalist accounts of human coexistence, the role and prefiguration of human and non-human agency in the transformation of practices and orders, and the "divide" between society and nature. The work's theoretical contentions are developed through analysis of the mid-nineteenth-century American Shaker medicinal herb business at New Lebanon, NY, which pioneered the American pharmaceutical industry. While at the Institute he also continued work on an anthology he is editing on practice theory, which collects essays from philosophers, sociologists, and science studies scholars, such as Andrew Pickering, Joe Rouse, Hubert Dreyfus, Karin Knorr-Cetina, and Barry Barnes.

Britta Scheideler (Universität Bochum)

stayed from October 1, 1995 - September 30, 1997 as a postdoctoral research fellow at the Institute and contributed to the project 2 of Department I (see *p. 87).*

Jutta Schickore

is staying from April 1, 1997 - March 31, 1999 as a postdoctoral research fellow at the Institute. Her project in the history of microscopic anatomy focuses on studies of the retina carried out by G. R. Treviranus, J. Henle, G.G. Valentin and others during the first half of the nineteenth century. In examining the manner in which this research was performed, she seeks to trace the transformation of the retina into an object of microscopic research, and thereby to explore the way in which anatomists sought to understand its micro-structure and function. The explanatory framework for their findings was provided primarily by contemporaneous investigations into the nature of the peripheral ends of the nerves. The project deals with the question why and how that framework lost its binding force, and how it was replaced by new explanatory approaches.

Furthermore, the study attempts to determine the extent to which the microscopic findings influenced and modified the theories of sense-perception and vision of that period. The more general aim of the project is to assess the significance of anatomical studies of the sense organs as intermediaries in the transition from J. E. Purkyne's and J. Müller's subjective sense-physiology to the project of Helmholtzian experimental physiology.

Arne Schirrmacher (University of California at Berkeley)

stayed from January 1, 1996 - August 31, 1996 as a postdoctoral research fellow at the Institute and contributed to the project 2 of Department I (see *p. 90*).

Henning Schmidgen (Freie Universität Berlin)

is staying from March 1, 1997 - February 28, 1999 as a postdoctoral research fellow at the Institute. His main interest is in the discursive and non-discursive practices that connect modern psychological knowledge to technology. Currently, he is working on the history of the psychological

laboratory founded by Wilhelm Wundt at Leipzig University in the 1870's. The focus of his research is on the history of the "Hipp chronoscope," a precision time-measurement device that served to determine human reaction times. In the late nineteenth century, the chronoscope was the instrumental center around which psychological research activities were organized. Reaction experiments with the chronoscope, which offered a wide range of possible combinations and variations, became the *Fundamentalversuch* of the New Psychology. However, before entering into the practices and discourses of psychology, the chronoscope was used to assess the personal equation in astronomy and to measure the velocity of projectiles in ballistics. The chronoscope also played an important role in teaching physics: combined with a so-called *Fall-Apparat*, a device for producing the free fall of bodies (*e.g.*, balls), the chronoscope served as a means to verify, by demonstration, the laws of gravitation. In Wundtian psychology, the arrangement "chronoscope/fall-apparatus" was adopted up with only minor modifications. Thus the laboratory work in Leipzig had from the beginning not only a strong modernist, *i.e.*, technological appeal, but was also characterized by a dimension of staging and representing. The goal of the research project is to reconstruct the various scientific contexts in which the chronoscope was embedded. It is only against the background of these material cultures that the emergence of experimental practices specific to the New Psychology can be understood adequately.

Libby Schweber (Princeton University/École des Hautes Études en Sciences Sociales, Paris)

stayed from October 1, 1996 - September 30, 1997 as a postdoctoral research fellow at the Institute. Her research examines the relation between the elaboration of "statistical entities" and the creation of new disciplines in nineteenth-century France and Britain. Her work explores the hypothesis that the division of moral science into distinct disciplines corresponded with the introduction of new concepts of "population" and "society." Relevant disciplines include public health, epidemiology, demography, sociology and administrative statistics.

During her time at the Institute, Libby Schweber completed a manuscript on the development of demography in France and vital statistics in England. She also began a comparative study on the reception of mortality tables in the course of the nineteenth century in France and England. The

interest of mortality tables lies in their role as carriers of a particular project for social statistics – one which combined statistics, probabilistic modes of reasoning and social reform; in their representation of population as an abstract statistical entity; and in differences in their reception in the two countries.

In the course of the year, she presented this work at conferences at Princeton University, Princeton, NJ, at the REHSEIS, CNRS in Paris, and at the SHADYC, CNRS/EHESS in Marseille, and authored two articles for *Enquëte* and *Genèse*.

Marcel Sigrist (École Biblique et Archéologique Française de Jérusalem)

stayed from June 1, 1997 - August 31, 1997 as a visiting scholar at the Institute and contributed to the *Mesopotamian Year Names (p. 112).*

Skúli Sigurdsson (Harvard University)

stayed as a research scholar at the Institute until December 31, 1996. From August 1, 1997 - July 31, 1998 he is staying as a postdoctoral research fellow. The history of electrification presents a paradox. People expect electric power to be cheap, fast and reliable. Yet they do not consider carefully that pollution results from producing electricity and fulfilling these demands. Electric power production and consumption entails reconstructing waterways, building dams, cluttering the countryside with high voltage transmission lines, burning fossil fuel and accumulating radioactive waste. The light switch on the wall is emblematic of the modern technological order; it yields instant satisfaction, is shaped by people and in turn shapes them. The light switch was immortalized by Claes Oldenburg in the 1960's and 1970's in the form of large sculptures.

A focus on the small things which control or make large technological systems operational (bolts, cables, dials, fuses, light switches, norms, plugs, push buttons, rivets, screws, sockets, technical terms) enables the historian of electrification to take a fresh look at worldwide systems of electric power and consumption. This underscores the labor underlying modern technology, and the complex chain of events unleashed by flicking a light switch. In Sigurdsson's current investigation of the history of the electrification of Iceland, these are not idle concerns. From a slow start around 1910, the course of Iceland's electrification until the 1960's was largely

driven by domestic consumption in fishing villages and towns. The light switch highlights the centrality of domestic life in the history of the electrification of Iceland, and questions the importance currently ascribed to large-scale projects in its power saga. During the Cold War, hopes of modernizing the agricultural and fishing economy with energy-intensive industries was a charged political issue. Eventually, aluminium, cement, ferrosilicon and fertilizer plants were built. In order to supply them and the population with electric power, the downlands and the arctic hinterland were transformed, and the domestic/gendered nature of the electrifying early history passed into oblivion.

Sigurdsson is a member of the International Commission on the History of Mathematics.

Additional Activities:

"The Electrification of Icelandic Existence," [Rafvæding íslenskrar tilveru] Icelandic Historian Congress, Reykjavík, May, 1997.

"C is for Controversy," [K wie Kontroverse] Physikgeschichte Section at the Annual Meeting of the Deutsche Physikgesellschaft, Munich, March 1997.

"Problems in Writing a National History of Electrification," seminar on New Directions in the Social and Historical Study of Science and Technology, Copenhagen, December 1996.

"Mathematics, Exhibitions, Modernity," Seventh Annual Conference on the History of Mathematics, Heidelberg, November 1996.

"In Memory of Thomas S. Kuhn," 4S/EASST Conference, Bielefeld, October 1996.

"Technology and the World," [Technologische Weltkonstruktionen] seminar: Institute for History of Science and Technology, Universität Stuttgart, July 1996.

"Angst, Transcendence, Unity: Hermann Weyl and Spacetime Stories," workshop on the Historical and Philosophical Interpretation of the Work of Hermann Weyl, Universität Mainz, June 1996.

"From Infinitesimal Parts to the External World: Hermann Weyl, Mathematics and Physics ca. 1920," conference on History and Philosophy of Modern Mathematics, Roskilde University Center, April 1996.

"Weyl," conference and workshop on Geometry and Physics, 1900-1930,

Open University, Milton Keynes, March 1996.

Christopher Smeenk (University of Pittsburgh)

stayed from June 23, 1997 - July 20, 1997 as a predoctoral research fellow at the Institute and contributed to the project 2 of the Department I (see *p. 84*).

John Stachel (Boston University)

stayed from July 1, 1996 - July 31, 1996 and July 7, 1997 - July 13, 1997 as a visiting scholar at the Institute and contributed to project 2 of the Department I (see *p. 70, p. 79, p. 84* and *p. 70).*

Richard Staley (University of Melbourne)

stayed from October 1, 1996 - September 31, 1997 as a postdoctoral research fellow at the Institute. His research on interferometers and their uses contributes to the project on the relations among instruments, science and travel. The apparatus Albert Michelson first developed in 1881 has often been celebrated for its role in the now famous ether drift experiment which played such an important part in the development of relativity. Approaching the interferometer as an instrument – rather than as an experiment alone – provides a new perspective both on Michelson‘s activities and on the development of physics and its relations to high precision industry around the turn of the century. This change of optic prompts us to pay attention to major features of Michelson’s work commonly neglected by historians. Here the project investigates the role of travel in the conceptual formation and material realization of different forms of the instrument. How did the different institutions and people with whom Michelson worked enable a most delicate experiment to become a robust and versatile tool capable of use in a wide variety of contexts? Conversely, what role did Michelson’s travel play in the ability of others to take up the new instrument? Answering these questions involves both a new approach to previous scholarship on the ether drift apparatus, and archival work exploring, in particular, Michelson’s activities in the Bureau of Weights and Measures (establishing light as a standard of length), and his relations with important spectroscopists and astronomers (where the interferometer promised a new

precision of observation). A second means of approaching the interferometer as an instrument is provided through a study of the work of instrument makers. How did firms such as Adam Hilger propagate the new instrument, and how did their engagement with the instrument differ from that of Michelson himself? Here both published catalogs and company archives, with their ledger books and customer lists, constitute important resources. This research thus provides an opportunity to investigate what it means for apparatus to count as an experiment or an instrument – and how perception of it in one field may effect claims made for it in another field. It also complements previous studies of the important theoretical programs of the period by bringing into the picture communities of instrument makers and experimentalists, and by exploring the means by which these communities worked for a unity of methods and instrumentation.

Zeno G. Swijtink (Indiana University Bloomington)

stayed from October 1, 1995 - September 30, 1996 as a visiting scholar at the Institute. His project was on the changing relation between sensibility and reason in the late Enlightenment, exemplified in the early visual representations of experimental and observational data in the physical sciences, especially in the work of the polymath Johann Lambert; and on the consequences of this change for the natural sciences of the early nineteenth century, particularly in the work of Alexander von Humboldt.

These new graphical techniques were studied on the intersection of a number of distinct developments: 1) the use of construction diagrams within Euclidean geometry, the extension of these diagrams to include mechanical or curved lines in the new calculus of eighteenth century, and the purging of diagrams from analysis in the early nineteenth century; 2) the visual and manual culture of practical geometry and map making (with its use of the plane table, or *mensula praetoriana*, and its use and discussion of *Augenmaß*, or *coup d'oeil*, and free hand drawing - *proprio Marte*); 3) the development of the theory of errors, in which the earlier deterministic theory of errors, part of what we now call experimental design (Cotes, Marinoni, Lambert, Kästner, J. Mayer, Späth), turned probabilistic in Lambert, and algebraic in Gauss, Legendre, and Laplace; 4) the re-evaluation of sensibility in the late Enlightenment and early Romanticism (Schiller, Goethe, and the von Humboldt brothers).

Additional Activities:

Lecture "Two ways of looking: *coup d'oeil* and *point de vue* – From Johann Lambert to Alexander von Humboldt," Colloquium at the Institut für Wissenschaftsgeschichte, Universität Göttingen, April 30, 1996

Lecture "The disunity of data analysis," Dis/unity of Physics Conference, Technische Universität Berlin, June 7, 1996.

Lecture "In praise of unity," seminar on Revolutions in Science, Max Planck Institute for the History of Science, June 24, 1996.

Colloquium paper "The instrumental life of Alexander von Humboldt," Institute-wide colloquium at the Max Planck Institute for the History of Science, July 3, 1996.

Lecture "Das Individuum denkt nicht, die Gemeinschaft denkt," Seminar of the working group: Revolutions in Science, Max Planck Institute for the History of Science, July 5, 1996.

Ken'ichi Takahashi (Kyushu University, Fukuoka)

stayed from June 2, 1997 - June 20, 1997 as a visiting scholar at the Institute. His scientific interests are focused on both the historical reconstruction of Galileo's theory of motion and the medieval Latin tradition of Euclid's *De speculis*. As for the former topics, he benefited from an electronic edition of Galileo's manuscript 72 being prepared by the Institute and also from useful discussions with some members of the Institute including Jürgen Renn and Peter Damerow. As for the latter, he prepared an English draft of 'Euclid's *De speculis*: Its Textual Tradition Reconsidered' presented at the XXth International Congress of History of Science in Liège, and received useful information from Paul Weinig about some Euclidian medieval manuscripts whose locations were unknown to him.

Bernhard Thöle (Freie Universität Berlin)

is staying from November 1, 1995 - October 31, 1998 as a postdoctoral research fellow (1995/97: Lorenz Krüger Fellow) at the Institute.

His current research interests lie at the intersection of epistemology, philosophy of mind and the philosophical foundations of science in early modern thought. The first draft of a book on *Subjectivity in an Objective World*

has been completed. This work focuses on the project of physicalism as it relates to mental phenomena. Physicalism is the thesis that all phenomena are at their basis physical. The first chapter of the book provides a critical account of the physicalist programm, its motives and meaning. The remaining chapters investigate to what extent the physicalist program allows for a satisfactory integration of mental phenomena into its ontology. The discussion focuses on four main topics: qualitative experience, consciousness, self-knowledge and mental causation. It is argued that an adequate solution of the problem of integration presupposes an improved conception of scientific objectivity.

Related to this work are two papers presented at a conference on naturalism at the Humboldt University (Berlin) in February 1997 and at a congress on Rationality, Realism and Revision at the University of Munich in September 1997.

The problem of the relation between the scientific and the manifest image of the world as it appears in perception forms the background of a second main research project which might be seen as a historical counterpart to the first. This project continues work which originated as a joint research project with Lorenz Krüger on primary and secondary qualities. With the establishment of the mechanical world view, the distinction between primary and secondary qualities and the corresponding thesis about the subjectivity of sensory qualities became a central topic in philosophical reflection about the foundations of the scientific image. The project focuses on the interrelation between science and metaphysics with an emphasis on the "rationalist" tradition - especially concentrating on those philosophers who, like Descartes and Leibniz, contributed significantly to the development of modern science.

Kant's natural philosophy constitutes a third research topic. A commentary on Kant's Analogies of Experience, which will appear as part of a cooperative commentary of *Kant's Critique of Pure Reaso*n, has been completed. In addition, two papers on Kant's views about systematicity have been completed. The first, "The Unity of Experience in Kant" was presented at the meeting of the Engere Kreis der Allgemeinen Gesellschaft für Philosophie at the University of Halle in September 1997. The second, "Kant's Conception of a Philosophical System," was presented at a conference on Architectonic and System in the Philosophy of Kant in Vienna. This work is linked with a seminar on Kant's Metaphysical Foundations of Natural Science held at the Institute.

Carsten Timmermann (University of Manchester)

stayed from March 3, 1997 - May 31, 1997 as a predoctoral research fellow at the Institute. During his stay he did research for his doctoral dissertation on the 1920's debate over a "crisis in medicine" and its consequences for medical science and practice.

The main symptoms of the crisis were the increasingly difficult economic situations of doctors, medical scientists and students, and a tendency on the side of the public towards consulting and trusting unorthodox practitioners rather than medical science. Miracle healers, homeopaths, chiropractics and osteopaths prospered. While professional organizations blamed the Weimar state and the health insurance funds, other critics suggested that medicine itself was corrupted by too much science and a lack of spirit and soul: mechanization and specialization had allegedly replaced intuition and creativity. Many claimed that medicine, after all, could not be reduced to the laws of physics and chemistry. They were attracted by neovitalism and holistic ideas and appealed to early heroes like Hippocrates and Paracelsus.

Carsten Timmermann took advantage of his stay at the Institute to exchange ideas with other scholars working on related subjects.

Sabetai Unguru (Tel-Aviv University)

is staying from September 1, 1997 - February 28, 1998 as a visiting scholar at the Institute. He continues his work on a new interpretation of Apollonius's *Conica*, concentrating now on the analysis of the three books of the treatise preserved only in Arabic and recently translated into English by G. J. Toomer. His plan is to publish in due time a monographic study of the *Conica* and of its historical background, intended as a historically more acceptable substitute to H. G. Zeuthen's pathbreaking study *Die Lehre von den Kegelschnitten im Altertum.* This alternative interpretation will refrain from the use of analytical techniques and modern symbolical notation in explaining the Apollonian achievement. It will appeal only to available contemporary Greek techniques when unpacking Apollonius's assumptions, craftsmanship, and methods, attempting to place the *Conica* squarely within its appropriate historical context.

He has also completed an essay review for the *Annals of Science* and is in the process of writing another review for *Speculum*. In December he has been invited to give a talk on Alhazen's problem within the framework of

the research seminar of the Cohn Institute, and in April he will comment on a paper presented at the Bar-Hillel Colloquium on the History, Philosophy and Sociology of Science. At the Institute, he is organizing an international workshop on work in progress in the history of Greek mathematics, scheduled to take place from 3-6 February, 1998.

R. André Wakefield (University of Chicago)

stayed from April 1, 1996 - August 31, 1996 as a predoctoral research fellow at the Institute. His research during this period examined the institutionalization and formalization of useful knowledge in the universities and academies of *Aufklärung* Germany. More specifically, he focused on the importance of cameralism – a peculiarly German academic discipline of the eighteenth century – as the nexus of a debate concerning the proper place of productive and practical knowledge within the German lands of the *Aufklärung*. Currently, the main archival sites of his research, which correspond to competing sites of useful knowledge in the eighteenth century, include the archives of the Bergakademie and the Oberbergamt in Freiberg (Sachsen), the archives of the Akademie der Wissenschaften and the Georg-August-Universität in Göttingen, and the archival sources of the Hohe-Kameral-Schule in Lautern.

Eric Watkins (Virginia Polytechnic Institute and State University)

stayed from August 15, 1996 - December 15, 1996 as a Lorenz Krüger postdoctoral research fellow at the Institute. His research project was entitled "Kant's Justification of Newtonian Science." His research at the Institute focused on the reception of Newton's *Principia* in Eighteenth Century Germany, taking into consideration metaphysics textbooks (*e.g.*, in rational cosmology), the Berlin Academy of Sciences, and physics textbooks.

While at the Institute, he gave a series of informal presentations entitled "The Argumentative Structure of Kant's Metaphysical Foundations of Natural Science" and "Kant's Justification of the Laws of Mechanics." During his stay he worked on a preliminary draft of "The Laws of Motion from Newton to Kant." He also researched various Prize Essay questions given by the Berlin Academy of Sciences.

Gabriele Werner

stayed from October 1, 1995 - September 30, 1996 as a Walther Rathenau postdoctoral research fellow at the Institute. Her studies relate to the images and constructions of the body in art and science in the seventeenth century. Three works of early modern art form the basis of her investigation: Jan Saendredam's engraving "Allegorie auf die sinnliche und ideelle Erkenntnis/Der Maler und sein Modell" (1616), and David Teniers' "Der zwölfjährige Jesus unter den Schriftgelehrten" (1651/56) and "Der Alchemist" (1651/56). Saendredam's engraving contrasts two kinds of bodies: the effective and sensual body of the *nuda veritas*/the model and the rationalized body of the artist surrounded by a geometer, a chemist and an astronomer. Moreover, the painting draws attention to the relationship between the artist and the scientist. Examination of Teniers' paintings offers a better understanding of this relationship. In both paintings, the same Jew is reading a book is portrayed in the foreground. The paintings depict different kinds of knowledge, alchemy and elements of the Jewish Kabbala tradition, and link them together. Thus they elucidate what was as stake in seventeenth-century disputes about knowledge in the same way Saendredam's engraving does. Moreover, the body with its multiple connotations highlights different kinds of experience and sites of knowledge production. If the body is presumed to be crucial for experience and knowledge, then it is reasonable to analyze the function of body images in historical processes, in particular, the way in which they illuminate changing forms of experiences and knowledge. This approach does not subordinate art to science but investigates the cultural representation of science in art.

Additional Activities:

Instruction of a seminar at the Institut für Kunstwissenschaft at the Humboldt Universität zu Berlin (October 1995 - February l996): "Vom Golem zum Cyborg. Über die Faszination an künstlichen Wesen"

M. Norton Wise (Princeton University)

stayed from June 1, 1996 - June 30, 1996 and June 15, 1997 - July 15, 1997 as a visiting scholar at the Institute. The short work, "Muscles and Engines: Hermann Helmholtz in Industrializing Berlin," that emerges from this project will integrate Helmholtz's activities in the 1840's thoroughly into the culture of Berlin: educationally, economically, militarily, and aesthetically. Most narrowly, it shows how his muscle physiology and energy phy-

sics were tied together by the concept and practical measurement of "work," as realized in the indicator diagrams employed by engineers to measure the work done by steam engines. More generally, however, work had come to be seen as the real measure of value of all commodities in the political economy. The study explores how the value thereby vested in quantitative measurements of work, and of associated "modernizing" technologies, permeated those parts of Berlin culture within which Helmholtz and his circle of young friends located themselves. A key organization in the modernization campaign was the Verein zur Beförderung des Gewerbefleisses, organized by P.C.W. Beuth, the head of the Technical Deputation of the Ministry of Trade and Industry, who sought to unite art with industry in an aestheticized version of British accomplishments. The membership of the Verein included high-ranking government administrators, entrepreneurs, professors, state architects, and master mechanics. Closely associated with them was a network of institutions for technical education, linked in part by their shared professors, including most of those with whom Helmholtz studied during his training as a military doctor. It was the sons and students of these promoters of Prussia's industrial future, including considerable numbers of military engineers and instrument makers, who constituted themselves in the Berlin Physical Society in 1845, setting out to advance science in Berlin through the use of rigorous means of physical analysis. And it was as a member of this group of second-generation progressives that Helmholtz had access to the theoretical and instrumental means with which he carried out his remarkable efforts to unite energy physics with muscle physiology. In this light his research projects – mathematically, philosophically, and experimentally – take on a meaning quite different from their standard interpretations.

During a month at the MPIWG in June/July 1997 it was possible to draw up a detailed outline of the essay that will result from this project and to firm up its main arguments. Nearly all of the members of the Berlin Physical Society and their activities could be identified. This accomplishment alone opened up our cultural perspective in unforeseen ways. Important elements remaining include more research on technological modernization in the artillery, engineering, and medical corps, and on the specific ways in which aesthetic values always stood in intimate relation with the technical.

Michael Witmore (University of California at Berkeley)

stayed from 15 June, 1997 - 15 August, 1997 as a predoctoral research fellow at the Institute. During his stay he completed his dissertation, "Culture of Accidents: Unexpected Knowledges in Early Modern England," a project that analyzes tensions among theological, philosophical, and aesthetic modes of interpreting "accidental events" in England during the late sixteenth and early seventeenth centuries. Situating these events in the context of a learned philosophical and theological tradition which held that accidents could neither reveal natural processes nor give explicit insights into God's providential plan, the dissertation demonstrates the unprecedented degree to which accidental events began to function as moments of revelation in Bacon's natural philosophy, Shakespearean drama, and the English interpretation of Calvin's doctrine of special providence.

Numerous exchanges with colleagues and researchers from other institutions (the Wissenschaftskolleg) allowed him to produce a conclusion to the dissertation as well as substantial revisions of three chapters. He also attended the Varieties of Scientific Experience conference in June and served as a commentator on a presentation by Stéphane Callens to the Berlin Seminar for the History of Science concerning "precaution" and environmental risk.

COMPLETED DOCTORAL DISSERTATIONS

Christophe Bonneuil, Francesca Bordogna, Berna Kılıç Eden, Sarah Jansen, Cheryce Kramer, Staffan Müller-Wille, and Brian Ogilvie.

SERVICE UNITS

LIBRARY AND DOCUMENTATION UNIT

headed by Urs Schoepflin

Introduction. The Library is the central information unit of the Max Planck Institute for the History of Science. Its task is to assist research by providing literature, reference and modern information services in any form. This includes the acquisition and delivery of traditional printed sources like books or journals, microfiche and microfilms, bibliographic reference files, and extends to electronic documentation and electronic archives. Along with electronic documentation, the Library supplies not only reference information and sources in history of science, but also the appropriate tools to search and handle the wealth of electronic information available in-house and worldwide.

Library Developments. In late 1995 the Library moved to its new quarters. An official opening took place on January 18, 1996, with a ceremony in the presence of the President of the Max Planck Gesellschaft and a speech by Lorraine Daston on "Die Naturwissenschaften als eine neue, andere Kultur."

The book and journal collections are presented for open access and arranged systematically according to the Dewey Decimal Classification to meet user requirements for browsing. The Library offers a reading area with Intranet and Internet connections as well as a casual reading corner for newspapers. These areas can be configured for discussion groups and receptions. Local and Internet electronic resources are made available through the Library's homepage. The Library is permanently accessible for members of the Institute, including evening hours and weekends.

The development of the collections was continued and concentrated on reference works, major source works, and critical standard editions along with a selection of secondary literature. The Library benefitted from the acquisition of the private library of Robert P. Multhauf with valuable items in history of science, chemistry, and technology. The collection of printed books – current holdings of over 20,000 volumes – is arranged in the following divisions:

— Reference collection
— Lorenz Krüger collection
— Source works
— Secondary literature
— Rare books

As a further information resource, 120 current journals belonging to the core literature in the research areas of the Institute are available. These include a selection of current newsletters of the major learned societies and institutions in our field.

The Library's microform collection (*e.g.*, Landmarks of Science, Newton's Manuscripts and Papers and Einstein's Collected Works) was further expanded and now holds some 10,000 historical works and manuscripts. Microfilm readers, reader-printers and reader-scanners are provided to take full advantage of this strategic resource for research at the Institute (see *Project "Computer-Aided Source Collection in History of Science" p. 237).*

The Inter Library Loan (ILL), another service priority to support research at the Institute, has been expanded to the third research group and has gained a high level of acceptance. It provides bibliographic reference and document delivery from the major research libraries in Berlin, Germany and abroad. ILL also provides copies of journal articles as well as microfilms of books and other documents. Provisions are made for receiving remote documents in digitized form. Catalogs of the lending libraries can be consulted on microfiche, electronic files, and through the Internet as a part of the Library's reference service.

Electronic resources. The Library's electronic resources include references like the catalog of holdings, bibliographic reference and full-text databases, encyclopedias, and electronic library catalogs. Catalog information on all the Library's collections and holdings is provided via an internal Online Public Access Catalog (OPAC) available through the Intranet. Databases on CD-ROM can be searched on individual workstations.

A selection of remote bibliographic databases are made available for direct searches. These include table of contents files (Current Contents, Online Contents, Uncover) as well as subject databases (History of Science and Technology, Medline, Biosis, Inspec). For mediated searches in a wide

range of other databases (*e.g.* Science Citation Index, Philosopher's Index, Historical Abstracts or Dissertation Abstracts) the Library has access to the networks of Dialog, STN, Questel, and to the German Library Service Center (DBI, Berlin).

All local and remote electronic services are integrated in the Library's World Wide Web homepage providing a unified access to the various electronic resources. This page lists links to the Institute's library resources (catalog of holdings, new acquisitions lists, current journals), as well as to major library catalogs in Germany and abroad, to bibliographic information, to text archives, or to relevant sites in the history of science field.

Besides continuous support in library, archive, and bibliography matters, the Library periodically offers structured introductions to the collections and services. Special courses are taught for the use of remote bibliographic databases, library catalogs on the Internet, and for the use of personal bibliography makers (EndNote). Support is also provided for problems with reformatting various bibliographic software.

Hand in hand with the expansion of the services in 1996 and 1997, permanent library staff was raised to six, including one systems librarian. This team is currently supported by auxiliary staff.

Staff development was accompanied by training schedules covering systems administration, search techniques in bibliographic databases, Internet training, and language courses. Staff members were also delegates at conferences and exhibitions; one member joined a four weeks' visiting program at the Médiathèque Histoire des Sciences, La Villette, Paris, arranged by the German Library Service Center (DBI, Berlin).

Project "Computer-Aided Source Collection in History of Science". Since the institute is not endowed with an old library of gradually expanded holdings, many of the historical sources had to be acquired in the form of microfilm. To date, these microfilm archives store over 10,000 works and manuscripts. To offer state-of-the-art access to this resource, a digital library was conceived. This digital library includes tools for the management and access of electronic facsimile documents, as well as a digitization unit with paper and large-scale microfilm scanners. The *Computer-Aided Source Collection in History of Science* is a joint project of members of the research groups, the Computing service unit, and of the Library.

So far a pilot of the document server has been developed, making some 60

documents available. Care was taken to use widely available standard software for access and browsing (Web browser), both to immunize against dedicated and platform-dependent software solutions and to guarantee flexibility for future developments.

The digitization unit consists of a heavy-duty paper scanner for documents on paper and a recently installed SunRise microfilm scanner. It is planned to scan the core documents of the microfilm archive to make them available on the Intranet. The films will be digitized to gray-scale images in order to give the most detailed reproduction of the original possible. Production will be supported by assistant staff.

Integration into professional networks. Particular attention was paid to the integration of the Library's concepts and developments into professional networks. Besides participating in national and international conferences, the head of the Library regularly attended the librarians' meetings of the Max Planck Society to discuss policy and technical issues. The Library has become a member of Pica, one of Germany's major library networks with extensive activities in electronic text management. Urs Schoepflin discussed developments in this area with members of the Center for Electronic Texts in the Humanities while visiting the Rutgers and Princeton University Libraries. Legal and technical issues related to the digitization of Landmarks of Science microfilms were raised at the University of Oklahoma, Norman (Department of History of Science, host site of the original Landmarks of Science Library Collection).

Other foci were new concepts of information provision and service development. Urs Schoepflin investigated advanced concepts of information provision with bibliographic databases at the Research Libraries Group and at Dialog Inc. To this end he also studied the organization of information services at the Stanford University Library, the University Libraries of UC at Berkeley and San Francisco, at the Harvard University Library, and at the Dibner Institute (MIT).

In Europe he extended contacts to the Library of the Federal Institute of Technology, Zurich, to the new Bibliothèque Nationale de France, Paris, and to the Médiathèque Histoire des Sciences, La Villette, Paris, to discuss novel information service concepts.

Finally, the Library has become involved with the Institute of Library Science at the Humboldt University, Berlin, where concepts, services, and the organization of the Library are regularly presented at seminars.

Scholarly activities at the Library. In addition to his duties as head of the Library, Urs Schoepflin has also carried out scientometric research in the areas of scientific communication structures and reception processes of scientific literature.

In an ongoing study (in cooperation with Wolfgang Glänzel, Information Science and Informetrics Research Unit at the Library of the Hungarian Academy of Sciences, Budapest) the differences in reception between fields of science were investigated. Previous studies of the project focused on the differences in the aging of journal literature in science and the social sciences. It was shown that bibliometric standard indicators based on journal articles need to be modified for several fields and topics in order to yield valid results. In fields where monographs, books or reports are the central means of scientific information, science communication is not reflected in an adequate manner by journal literature alone. To extend this approach to subjects where the role of non-serial literature is considerable or critical in terms of bibliometric standard methods, the totality of the bibliographic citations indexed in the 1993 annual cumulation of the SCI and SSCI databases have been processed. The analysis is based on three indicators, the *percentage of references to serials*, the *mean references age*, and the *mean reference rate*. Applications of these measures at different levels of aggregation (*i.e.*, to journals in selected science and social science fields) lead to the following conclusions: The percentage of references to serials proved to be a sensitive measure for characterizing typical differences in the communication behavior between the sciences and the social sciences. However, there is an overlap zone which includes fields like mathematics, technologically-oriented science, and social science areas. In certain social science areas, part of the information seems to originate to some extent in non-scientific sources: references to non-serials do not always represent monographs, pre-prints or reports. Consequently, the model of information transfer from scientific literature to scientific (journal) literature assumed by standard bibliometrics requires substantial revision before valid results can be expected through its application to social science areas.

COMPUTING SERVICE UNIT

headed by Jörg Kantel

Introduction. The Computing Service Unit plays an important role within the scientific activities of the Institute. Its main task is to assist research by providing an electronic environment that ranges from standard computer applications like word processing and e-mail, up to highly sophisticated facilities for scanning historical documents, preparing them for Optical Character Recognition, publishing within the World Wide Web, etc. Additional tasks include:

— planning and acquisition of the computing equipment necessary for the Institute's research projects, administration, and the Library

— establishing and supporting the Institute's Internet connection

— providing training and support services

— planning, establishing, supporting, and expanding the Institute's Local Area Network

— designing future computing facilities for the Institute

— providing direct support to the research projects

— participating in the design of the computing facilities of the Library and Documentation Unit of the Institute, as well as supporting the computing facilities of the Administration Unit (SAP).

The personnel capacity of the computing service unit is very small, comprising only two members. To keep pace with the expansion of the Institute over the last two years, the unit is currently supported by two part-time student assistants.

Hardware. In order to preserve a homogeneous and comfortable working environment for the Institute's staff and visitors, Apple Macintosh computers were chosen as the standard equipment for each workplace. However, other machines and operating systems (Windows NT/95 as well as UNIX-based Linux boxes) are needed for special tasks. Besides these, additional workplaces have been equipped with high-end computers suitable for special tasks requiring more powerful computing facilities. Most of these computers are also UNIX based (Linux, Solaris), but due to developments in the computer technology, within the last year a number of Windows NT serv-

ers were also installed for such purposes.

The Institute's hardware capabilities again were expanded greatly during the last two years. Different services are distributed among different servers to avoid the "one-point-of-failure" problem. At the moment three database servers are in operation, one server is responsible for the Institute's calendar, and another handles the internal electronic-mail facilities. In addition there is a central backup server, as well as different servers providing external modem connections. Although most of these machines are Apple Macintosh, a Linux machine is used for the Internet connection, and the central server for the Institute's administration unit is SINIX. Finally, a Silicon Graphics Computer with the Irix operating system works as a RIP (Raster Image Processor) between the local network of the Institute and a Xerox color printer-scanner.

Outside the research workplaces, the administrative unit uses normal Windows 3.1 systems to work with the SAP applications.

The network. Like the Institute's central hardware, the network and the workplaces also have expanded greatly over the last two years. At the moment, the Local Area Network covers nearly 200 workplaces at the Institute. As mentioned in the Annual Report 1995, the LAN was designed with a 100-MBit FDDI backbone from the ground floor to the sixth floor. From here the backbone was extended last year to the newly occupied rooms in the west wing of the sixth floor. At strategically planned locations, six routers have been installed to connect the users to the Institute's LAN over 10-MBit Ethernet lines. In the near future, the Computing Service Unit plans to upgrade to a 100-MBit Ethernet, first for the high-end workplaces mentioned above, then subsequently for the rest of the desktop computers at the Institute. Due to security concerns, an additional isolated LAN was installed to separate the administration unit from the research network.

Through a CISCO router the Institute maintains a 64-kBit permanent ISDN link to the Fritz Haber Institute in Berlin-Dahlem, which connects the Institute via a 2-MBit line to the Internet.

The same CISCO router also connects the administration unit with a separate link to the SAP server of the administration unit located at the Fritz Haber Institute in Berlin-Dahlem.

Like all the other electronic facilities, the World Wide Web capabilities of the Institute also underwent great expansion. An external WWW server, an

internal WWW server and an internal document server were installed. (For more on the document server, a collaborative project with the library, see the library unit's report.) The external WWW server can be visited at *http://www.mpiwg-berlin.mpg.de/*.

Support of research activities. Despite the small capacity of the Computing Service Unit, it has been able to support Institute research activities such as

— consulting for several projects on the facilities of publishing and providing their research results through the World Wide Web

— programming and scripting support for several Internet projects of the Institute

— support of the scanning and OCR activities

— consulting and supporting the activities of the Library Unit to install a document server, as well as establishing a Microfilm/Microfiche scanner which will make these scans available electronically throughout the Institute

— electronic support for audio-visual presentations at workshops and conferences.

In addition, a weekly informal Computer Task Force session was initiated to offer a forum for the Computing Service Unit and the Institute's computer users to discuss computer problems and issues.

The Computing Service Unit also held several training sessions for users, including

— Internet for Beginners

— How to Use the Electronic Mail and Database Facilities of the Institute

— Working within the World Wide Web

— Scanning Images and Working with Optical Character Recognition

— HTML, Java and CGI – The Languages of the Web.

Besides these activities, the Computing Service Unit is expanding its competence to take advantage of the new possibilities provided by the growth of the World Wide Web. This includes HTML and Java programming, as well as the programming of client-server applications with CGI and database connection tools. To this end, the staff of the unit has participated in

several workshops and exhibitions on the technology and potential of the Web.

EVENTS AND PUBLICATIONS

WORKSHOPS AND CONFERENCES

Workshop "Revolutions in Science," August 13, 1996

Organized by Hanne Andersen and Klaus A. Vogel

Since the publication of Thomas S. Kuhn's pioneering study on "The Structure of Scientific Revolutions" (1962) there has been an ongoing debate on the usefulness and analytic distinctness of the concept of "revolution(s)" in the context of a processual analysis within the history of science. In a recent historiographic overview on "Revolution in Science" (1985), Bernard Cohen reconstructed the use of the term over the last two centuries both in general history and in the history of science, thereby pointing to a close interrelation of its political and scientific career. The last few years, however, have shown a remarkable reluctance in the use of the concept of "revolution(s)" in science, giving way to other processual terms like "transformation," "integration/disintegration," etc. Does this mean that "revolution" as descriptive and/or analytic term, combining notions of speed, intensity, discontinuity, transgression, incommensurability and "gestalt-switch," is altogether superseded? Or, on the contrary, has "revolution" as a concept in the historiography of science reached an already unquestionable status, only to be pinpointed anew in its range and specific qualities?

A number of preparatory working group sessions were devoted to successors and precursors of Kuhn's concept of scientific revolutions, for example Ludwik Flecks "Entstehung und Entwicklung einer wissenschaftlichen Tatsache" (1935). Speakers for these sessions were Hanne Andersen, Peter Barker (University of Oklahoma), Gerd Graßhoff, Wolfgang Küttler, Andrew Mendelsohn, Staffan Müller-Wille, Ohad Parnes, Skúli Sigurdsson, Zeno Swijtink, and Klaus Vogel from the Institute.

The workshop itself concentrated on historical case studies, each trying to evaluate from a specific empirical background the usefulness of the concept of a "scientific revolution" as a descriptive and/or analytic category. After an historical introduction to the notion of scientific revolutions by

Klaus Vogel and an analytical introduction by Skúli Sigurdsson, the following case studies were presented: "The Cosmographic Revolution" (Klaus Vogel), "Kepler's Revolution" (Gerd Graßhoff), "Linné" (Staffan Müller-Wille), "Cell Theory" (Ohad Parnes), "The Bacteriological Revolution" (Andrew Mendelsohn), "Faraday's Field Concept" (Yoonsuhn Chung), "The General Theory of Relativity" (Tilman Sauer), and "Max Weber" (Wolfgang Küttler).

The concluding debate (chair: Hanne Andersen) comprised a confrontation of the different approaches. There was consensus among the speakers that the use of the term "revolution" presupposes a spectacular reorganization of a subdiscipline or a field of knowledge, leading to a transgression of its boundaries. As the perspectives on this process vary among the actors and change through time, the term "scientific revolution," although useful for a general qualification, requires a number of specifications provided by historical description. Some of these specifications, like "discontinuity," "incommensurability," and "gestalt-switch," qualify particular aspects of the process, but do not delimit the possibilities of its reconstruction.

Workshop "Fundamental Categories of Prescientific and Scientific Cognition (Number, Space, Time, Matter, etc.) in Human Action," September 9-11, 1996

Organized by Peter Damerow and Jürgen Renn

In genetic epistemology it has been claimed that there are close connections between the development of fundamental structures of cognition in ontogenesis and the development of basic concepts in the history of science. Until now, this challenging claim had, however, scarcely an impact on theory formation in psychology and was almost completely neglected in the history of science.

The workshop brought together psychologists and historians of science in order to initiate a closer cooperation on epistemological questions. Basic results of psychological research concerning conceptual universals in the development of prescientific thought and conceptual changes in the individual development of cognition resembling conceptual changes in the history of science have been confronted with investigations concerning the sweeping changes of the concepts of number, time and space in the development from primitive societies and early civilizations to modern mathe-

matics and physics.

Discussions at the workshop centered on two questions: How do psychological and historical research account for the development of basic structures of cognition? And how can psychological and historical research be based on common epistemological assumptions in order to provide explanations for this development that do not contradict each other?

The following presentations were given at the workshop: Jonas Langer (University of California, Berkeley, Department of Psychology): "Conceptual Universals in Prescientific Thought Development," Helmut Reich (Pädagogisches Institut of the University of Freiburg): "Empirical Evidence for Parallelisms between the Scientific Developments from their Origins to Galileo and the Development of the World View of Children," Peter Damerow (MPIWG): "Historical Epistemology of the Number Concept," Jürgen Renn (MPIWG): "Historical Epistemology of the Concepts of Time, Space and Matter," Gerd Graßhoff (MPIWG): "The Concept of Time Developing with Instrumental Capabilities and Theoretical Requirements."

The workshop was organized in honor of Wolfgang Edelstein on the occasion of his retirement. The intention is to continue the work initiated at the workshop through a series of further workshops on different aspects of the relation between action and cognition.

Workshop "Gene Concepts in Development and Evolution II," October 17-19, 1996

Organized by Peter J. Beurton and Wolfgang Lefèvre

The gene concept and its present crisis provided the subject matter for the workshop "Gene Concepts and Evolution" held in 1995 with participants from America, Israel, France, Germany and Switzerland (see that year's Annual Report and the preprint no. 18 that arose from the workshop). The results of this workshop attest to the fact that research on "the gene" at present provides a unique intersection of historical, methodological, and empirical problems in the life sciences. It also became clear that different approaches to the conceptual problems of the gene affect a number of related subjects in unforeseen ways, *e.g.*, the nature – nurture debate, questions of the origin of life, or even questions of health care. In view of these promising beginnings, work on the subject was intensified, and after a

period of intensive communication, a second workshop on the subject was held in the fall of 1996. The theme of the workshop was slightly broadened into "Gene Concepts in Development and Evolution," to do justice to the most recent trends in concept formation.

The month before the workshop Raphael Falk (The Hebrew University of Jerusalem) joined the preparation group as a visiting scholar. Together with Peter J. Beurton and Wolfgang Lefèvre he finalized the program for the workshop and arranged the discussions during the plenary sessions and the outlines for round-table sessions. Special attention was paid to the policy and the procedures of editing the papers submitted for the conference into a publishable volume.

An "overview" draft was prepared in which major aspects of the different papers were summarized and commented. This was distributed to all participants before the conference convened. On the basis of the submitted manuscripts and the overview-intensive preliminary discussions, the possibility of integrating the workshop into a cohesive enterprise was considered, an enterprise that would provide not only historical-conceptual insights but may also be of some prospective value.

The workshop was attended by: Peter J. Beurton (Max Planck Institute for the History of Science), "The end of reductionism or a unified view of the gene from the perspective of population genetics;" Raphael Falk (The Hebrew University), "An overview" (based on all other participants' contributions); Thomas Fogle (Saint Mary's College), "The dissolution of protein coding genes in molecular biology;" Michael Dietrich (University of California, Davis), "From gene to genetic hierarchy: Richard Goldschmidt and the problem of the gene;" Fred Gifford (Michigan State University), "Gene concepts and genetic concepts;" Scott F. Gilbert (Swarthmore College), "Bearing crosses: the historiography of genetics and embryology;" James R. Griesemer (University of California, Davis), "Reproduction and the reduction of genetics to development;" Evelyn Fox Keller (MIT), "Decoding the genetic program;" Wolfgang Lefèvre (Max Planck Institute for the History of Science); Michel Morange (École Normale Superieure), "The developmental gene concept: history and limits;" Hans-Jörg Rheinberger (Universität Salzburg/Max Planck Institute for the History of Science), "Gene concepts: a fragmented view from the perspective of molecular biology;" Sara Schwartz (The Hebrew University), "The differential concept of the gene: past and present;" Marga Vicedo (Arizona State University West), "Unit-characters, factors, and genes: E.M. East's views

on the nature of hereditary units;" Marcel Weber (University of Minnesota), "Representing genes: co-linearity and the logic of genetic mapping;" Sahotra Sarkar (McGill University). Jean Gayon (Universtité de Bourgogne) and Frederic Holmes (Yale University), though unable to attend, remain "full members" of the project.

This second workshop was convened in the understanding that it forms an immediate stepping stone towards a book manuscript and that the papers presented at the workshop are drafts of the contributions to the volume. The papers covered historical, empirical, conceptual, and also linguistic and social aspects related to the question, "What is a gene?"

The volume, however, will not simply contain workshop proceedings, but is supposed to become a well-edited volume of interrelating contributions on the topic. To this end, most of the workshop activities centered on discussions of organized comments on each participant's paper by one other participant. These comments, in edited form, will become an integral part of the volume.

As already noted in the 1995 report, no final definition of the gene will emerge from the volume, but rather a diversity of concepts reflecting the background of the individual contributors (*e.g.*, developmental versus corpuscular gene, referential gene versus ontological gene, etc.).

The editorial work was and will be assisted especially by Raphael Falk during a second stay at the Institute in 1997 (see *p. 196*).

Workshop "The Display of Nature in Eighteenth-Century Europe" December 12-14, 1996

Organizer: Lorraine Daston

Workshop held under the auspices of the European Science Foundation project, "Concepts and Symbols in Eighteenth-Century Europe"

A workshop on "The Display of Nature in Eighteenth-Century Europe" (organized by Lorraine Daston) was held at the Max Planck Institute for the History of Science in Berlin, 12-14 December 1996, as the second of the five planned workshops under the rubric "Nature," organized as part of the European Science Foundation project, "Concepts and Symbols in Eighteenth Century Europe." All five of the workshops were conceived as

attempts to anchor traditional themes of eighteenth-century studies in the context of practices, representations, and values, as well as of concepts. In attempting to understand how the eighteenth-century aesthetics and metaphysics of nature was translated into the classifications of naturalists, the experimental demonstrations of physicists, the landscape paintings of artists, and the administrative units of statesmen, participants in the workshop paid close attention both to philosophical and scientific sources, such as treatises on the sublime and theories of electricity, and also to concrete objects, such as estate maps, collecting boxes, barometers, opera sets, and menagerie animals. The methodological aim of the workshop was to unite forms of evidence – texts, paintings, maps, scores, blueprints – as well as disciplines – the histories of philosophy, science, music, art, and geography – in order to reveal eighteenth-century nature as it was conceptualized, depicted, and experienced.

"Display" was the key organizing concept for all of the papers, echoing the peculiarly eighteenth-century tendency to imagine nature as a spectacle, as staged, framed, boxed, or otherwise demonstrated in the root sense of the word. It was not enough to observe and admire nature; nature must be presented from a carefully selected point of view, artfully designed to evince certain effects (in the case of the scientific experiment) or to cultivate a certain sensibility (in the case of landscape gardening or panoramic paintings) or to enforce certain norms of decorum (in the case of literary or theatrical allegories). The aesthetic appreciation of nature is at least as old as Pliny's rhapsodies on the beauty of flowers and seashells, and the sixteenth- and seventeenth-century *Wunderkammern* embodied a striking natural aesthetic of plenitude and variety. What was novel about the eighteenth-century European portrayal of nature in a wide range of milieux was its deliberate selectivity and theatricality.

Four major themes ran through the nine papers presented at the workshop: the blurred boundary between the natural and the artificial, the normative uses of nature, the material apparatus for the study of nature, and the shaping of sensibilities towards nature. In the brief account of each of these themes that follows, papers will be referred to by author in abbreviated form; please see the list of authors and titles at the end of the report for full references.

All of the papers emphasized that "nature" in eighteenth-century usage almost always referred to an ersatz nature, a representation of nature through a mathematical model, a map, a natural history collection, a paint-

ing, an allegorical figure, or a landscaped garden. In this sense, all of nature might be said to be artificial. Some of the papers, however, invoked the boundary between the natural and the artificial in a more specific context. For example, a 1778 painting of the Rhône glacier ordered what had earlier been perceived as a hideous chaos along strict geometrical principles (Klonk); the Viennese menagerie at Schönbrunn (est. 1752) was planned in concentric circles around a breakfast pavilion at the center, symbolizing imperial power and perhaps alchemical and emblematic associations with exotic animal species (Rieke-Müller); reforming British landowners called for a nature "improved" by human cultivation and engineering (Porter); the Museum d'Histoire Naturelle rejected offers by artists to paint decorative friezes on the grounds that works of nature were superior to those of art (Spary). The fact that almost all eighteenth-century examples of the "natural," from the menagerie to the exhibitions at natural history museums, partook of the artificial makes the struggle over labels all the more revealing of the meanings and values of nature for eighteenth-century Europeans. It is against this background that canonical texts like Denis Diderot's Supplément au voyage de Bougainville and Jean-Jacques Rousseau's Rêveries must be reread.

In the Latin West there exists a long tradition of moralizing nature since at least the thirteenth century, but invocations of nature's authority were generally restricted to the domain of familial relationships and sexuality. In eighteenth-century Europe, the moral authority of nature expanded dramatically; nature became the final court of appeal to which the legitimacy of governments, of religions, of specific laws, and even of weights and measures was submitted. Viewed against this background, the displays of nature could serve as implicit or explicit justifications for the distribution of power and prestige. The princely menageries of eighteenth-century Germany symbolized the far-flung dominion and commercial networks of their owners (Rieke-Müller); the portrayal of nature as reasonable and decorous at the ducal opera house in Parma exacted corresponding conduct from the Duke's formerly boisterous subjects (Feldman); the paternalistic land policies propounded by English gentry dovetailed neatly with paternalistic social policies (Porter). The marvelous, a staple of early modern poetry, drama, and art, was banished in the name of seemliness and verisimilitude. Nature, formerly so copious and varied, was held up as the standard of orderly uniformity, the underwriter of natural law's jurisprudence, and later, of the *Droits de l'Homme.* Each of the antonyms to the natural – arti-

ficial, preternatural, unnatural – was tainted either morally, aesthetically, or (more) both simultaneously.

During the eighteenth century, particularly but not exclusively in the natural sciences, an elaborate apparatus emerged with which to study and demonstrate nature. Leyden jars, static electricity machines, thermometers, barometers, specially designed boxes for collecting natural history specimens, vitrines and cabinets for displaying natural objects – all of these tools filtered observations of nature. Indeed, it is not too much to claim that they created a new nature. Electricians like the Abbé Nollet and Benjamin Franklin produced novel and wondrous phenomena before both expert and lay audiences (Licoppe); traveling naturalists brought home to their studies and museums specimens which were not only new to Europeans but also classified and arranged in an order that obliterated connections to their environments of origin (te Heesen). The savants-voyageurs who scaled first the peaks of the Alps and the Pyrenees in Europe and then the mountains of South America learned to cast an imaginary worldwide net of instrument measurements over objects widely separated in space; geologists came to understand glimpses into the depths of a ravine also as glimpses into depths of time from which the earth's history might be read (Bourguet).

"Sensibility" is a notoriously dense word in eighteenth-century parlance, referring simultaneously to perception, emotion, and judgment. The displays of nature at once formed and were formed by these collective ways of seeing, feeling, and discerning. Celebrated landscapes of alpine scenery or Vesuvian explosions colored perceptions of tourists who summed up sublime vistas in their journals by the name of the appropriate artist of that genre (Klonk, Porter). Estate maps commissioned for the prosaic purposes of tax collection became framed ornaments for English gentry, singling out those features of the terrain made meaningful by tradition and taste (Bendall). To possess a particular sensibility for nature became the badge of the learned or the lay observer: amateurs preferred their shells polished, while naturalists insisted upon having them "bruts" (Spary); Parisians who flocked to popular lectures in experimental physics gasped over artificial lightning, while electricians strained to catch barely visible effects (Licoppe). Alexander von Humboldt and other explorer-naturalists wrote paeans to the Olympian perspectives and contemplative solitude they enjoyed on mountain peaks (Bourguet). Strict attention to different sensibilities of nature divides spectators to nature's display into several different audiences, even for the same objects. Sensibility also calls attention to the

plurality of the senses, beyond vision, and the cultivation of synesthesia. The displays of nature in eighteenth-century Europe were schools of sensibility, disciplining the senses at the same time they instructed the mind.

List of Participants and Papers:

Sarah Bendall (Merton College, Oxford, UK), "Mapping and Displaying an English Marsh Landscape in the Mid-Eighteenth Century"

Marie-Noëlle Bourguet (Université de Paris VII), "Voyage et montagne au XVIIIe siècle: Le spectacle de la nature"

Martha Feldman (University of Chicago, USA), "Personifying Nature and Remaking Stage and Spectator in Eighteenth-Century Parma"

Anke te Heesen (Forschungszentrum Europäische Aufklärung, Potsdam), "Boxes in Siberia: Daniel Gottlob Messerschmidt's Ordering System on his Travels 1720-1727"

Charlotte Klonk (University of Warwick, UK), "The Art of Nature: The Depiction of Nature in Geological Publications"

Christian Licoppe (Paris, France), "Nollet's Electrical Show vs. the Devious Ways of Franklin's Electrical Atmospheres: A French Mid-Eighteenth-Century Crisis in the Legitimation of Experimental Philosophy through Experimental Display"

Roy Porter (Wellcome Institute, London, UK), "The Environment and the English Enlightenment"

Annelore Rieke-Müller (Oldenburg, Germany), "Von der lebenden Kunstkammer zur privaten Liebhaberei: Fürstliche Menagerien im deutschsprachigen Raum während des 18. Jahrhunderts"

Emma Spary (University of Warwick, UK), "Forging Nature: The Boundaries of Artificiality at the Republican Museum"

Workshop "Instruments, Travel and Science," December 15-16, 1996

Organized by H. Otto Sibum, Marie-Noëlle Bourguet, and Christian Licoppe

During the last year a number of scholars at the MPIWG have been working on different aspects of the history of travel and the history of experimentation and precision measurement. They have identified the study of

instruments, travel and science – and their relations – as an important theme for understanding historically the complex process of producing and communicating scientific knowledge. In order to explore the potentials of such a research project they invited a small group of scholars working in related fields for a first one-day meeting on December 15 and 16, 1996.

Participants of the workshop were Jim Bennett (University of Oxford), Christophe Bonneuil (MPIWG, Berlin), Marie-Noëlle Bourguet (Université VII-Denis Diderot, Paris), Lorraine Daston (MPIWG, Berlin), Christian Licoppe (CNET/CNRS, Paris), Guiliano Pancaldi (University of Bologna), Kapil Raj (CNRS/URA 1743, Paris), Simon Schaffer (University of Cambridge, U.K.), H. Otto Sibum (MPIWG, Berlin), Richard Staley (MPIWG, Berlin) and David Turnbull (Deakin University, Australia).

The workshop identified two main issues to examine more closely: 1) the uses of instruments, or the notion of local knowledge traditions, and 2) encounters, or the meaning of travel for the acquisition and transmission of scientific knowledge.

The first question picks up on historical studies about spaces of knowledge. Most of the recent work on the material culture of science, and especially that on experimentation, emphasizes the need for more fine-grained description of the places, people and practices surrounding the instruments scientists use in their investigations. The project of reworking experiments and the notion of gestural knowledge provide further methodological grounds to examine more closely those knowledge spaces, and emphasize the importance of working out how locales are coordinated with each other. The problem of coordination applies both to the linkages made by scientists and to the ways historians working on specific case studies can collaborate to achieve a more general portrayal of the sciences' development. Thus the tools and techniques explicitly designed for travel seem an excellent focus for our study.

A second major discussion concerned the notion of encounter. Historical accounts about encounters, explorations, and *Wanderjahre* support the assumption that a variety of spaces of knowledge or local knowledge traditions exist which are by no means the prerogative of traveling scientists, but rather are developed by a great number of different cultures. This discussion raises important questions, such as: What are the mechanisms of transmitting knowledge? What can travel? What cannot? How do these encounters effect a transformation of knowledge claims? What role do

instruments play in this transfer of knowledge? Is the distinction of center and periphery helpful in this analysis,? Do we have to distinguish between images of uniformity and practices which make uniformity? How do we differentiate between precision, practice of measurement, and standardization?

The organizers and the participants agreed to continue work on this subject and will meet again in September 1998 in order to discuss first results of the participants' research.

Workshop "Experience and Knowledge Structures in Arabic and Latin Sciences," December 16-17, 1996

Organized by Paul Weinig and Muhammad Abattouy (Fez University)

The international workshop was the Institute's first effort in the field of History of Arabic Science. Its primary aim was to attain a general view of selected disciplines of Arabic sciences (philosophy, mathematics, astronomy, cartography, cosmography, medicine). The workshop also offered opportunities to receive first-hand information from specialists and allowed insight into the actual state of the art in each field portrayed. Problems of transmission or transmission processes and the relationship between experience and knowledge structures in the selected disciplines comprised the core of the discussions.

Another function of the workshop was to present to the scientific community of Arabists a research initiative on medieval Arabic mechanics. Connected with the framework of a current project on the emergence of preclassical mechanics directed by Jürgen Renn, it was designed and is being conducted in cooperation with Muhammad Abattouy (Fez University) and Paul Weinig (MPIWG Berlin). They are collaborating to edit and translate into English numerous Arabic treatises on balances and weights from the ninth through the sixteenth centuries. Many of these texts have escaped previous notice or have yet to be sufficiently studied, and thus constitute a field that deserves urgent exploration. Work was prompted by the recent rediscovery of two manuscripts of the most important texts by Thåbit ibn Qurra: a copy of the Arabic version of his famous *Kitåb f• 'l-qaras†¥n*, and a copy of his edition of a text ascribed to Euclid, *On Heaviness and lightness*. Originally preserved in the Staatsbibliothek in Berlin, the two manuscripts were reported lost after World War II. Fortunately

project scholars were able to locate them in Krakov and present them to the specialists during the workshop.

The workshop was held in four sessions and included lectures given by twelve scholars from seven countries. In the first session, aspects of the "Transmission of Knowledge from Antiquity to the Middle Ages" were the main topics discussed. Papers were presented by Richard Lorch (Ludwig-Maximilians-Universität, Munich): "Transmission of Greek Mathematical Works through Arabic into Latin: Theodosius' *Sphaerica* as Example," Matthias Schramm (Universität Tübingen): "Theoretical and Practical in Antiquity and Middle Ages," and Charles Burnett (Warburg Institute, London): "The Coherence of the Arabic-Latin Translation Programme in Toledo in the Twelfth Century."

Speakers in the second session on "Social Structures of Knowledge Production and Transmission" were Françoise Micheau (Université de Paris I): "Production des traités médicaux au Proche-Orient arabe (VIIIe-XIIIe siècles), étude quantitative sur les conditions et les rhythmes de l'activité scientifique," Sonja Brentjes (MPIWG Berlin): "Orthodoxy, Science, Power and the *Madrasa* ('college') in the Middle East (13th-14th centuries)," and Jens Høyrup (Roskilde University): "Integration/Non-integration of Theory and Practice in Ancient, Islamic and Medieval Latin Contexts."

"Practical Experience and Scientific Knowledge, the Cases of Mathematics, Geography, Astronomy and Cosmography" was the topic of the third session. Papers were presented by Menso Folkerts (Ludwig-Maximilians-Universität, Munich): "Early Texts on Hindu-Arabic Calculation," David A. King (Johann Wolfgang Goethe-Universität Frankfurt/M.): "The Culmination of Medieval Islamic Mathematical Cartography, World-Maps for Finding the Direction and Distance of Mecca," Julio Samsó (Barcelona University): "Andalusian and Maghrebian Traditions of *zijes,"* and Jamil Ragep (American Research Institute, Istanbul): "Scientific Cosmography in Islamic Civilization: Social and Intellectual Context of *hay'a*, Readership, Ownership Lines of Transmission."

In the final session "Comparison studies and their Problems in Arabic and Latin Sciences (the case of Mechanics)" the speakers were Muhammad Abattouy (Fez University): "Arabic Tradition of Mechanics and Engineering," and Paul Weinig (MPIWG Berlin): "Latin Medieval Tradition of Mechanics, Aspects of the Textual Tradition." Additionally this session included a brief presentation of a paper submitted by the late Wilbur R.

Knorr (Stanford University): "On Heiberg's Euklid."

The papers of this workshop were edited as preprints of the Institute and will be published in a special issue of "Science in Context" edited by Muhammad Abattouy and Paul Weinig.

Colloquium "Einstein in Berlin: The First Ten Years," March 3-4, 1997

A joint colloquium by the Center for Philosophy and History of Science at Boston University, the Collected Papers of Albert Einstein, and the Max Planck Institute for the History of Science

The colloquium was dedicated to Einstein's scientific achievements in Berlin and their intellectual, institutional, and cultural contexts. The Institute contributed to the colloquium three presentations, "Albert Einstein in Politics – a Comparative Approach" (Britta Scheideler and Hubert Goenner), "The Rediscovery of General Relativity in Berlin" (Jürgen Renn and Tilman Sauer), and "Directing a Kaiser Wilhelm Institute: Einstein, Organizer of Science?" (Giuseppe Castagnetti and Hubert Goenner). All three presentations interpreted Einstein's activities as a choice among a range of possible reactions to external challenges, be they the political crisis of the First World War, the intellectual crisis of classical physics, or the demands of a new institutional organization of science. A further common perspective of the three contributions was that the intellectual resources upon which Einstein drew in these reactions were deeply rooted in various nineteenth-century traditions. These traditions shaped, in particular, his image of science as the lonely search for a conceptually unified understanding of nature by members of an elitist *république des savants.* In spite of Einstein's classical understanding of science, its protagonists, and its place in society, when faced with the challenges of the early twentieth century, he responded quite differently in the scientific, institutional, and political realms. The texts of the three presentations appeared as a preprint of the Institute under the title "Foundations in Disarray: Essays on Einstein's Science and Politics in the Berlin Years."

Symposium "The Varieties of Scientific Experience" June 19-22, 1997

Organizers: Lorraine Daston, Michael Hagner, Dorinda Outram, and Otto Sibum

The physician feels a pulse, the chemist tastes an unidentified compound, the naturalist dries an exotic plant, the physicist reads an instrument scale, the anthropologist notes down a myth, the physiologist severs an artery, the sociologist compiles a statistical survey. However multifarious these points of contact between inquirer and object of inquiry, they do not begin to exhaust the variety of what we summarily call "experience" in the sciences. One word must be stretched to cover the most immediate and obtrusive of sensations, and the most delicate laboratory manipulations mediated by an arsenal of instruments. Although we sometimes distinguish between "observation" and "experiment," we have no special terms for the sensory observation of an explorer who registers degrees of bodily cold and the instrumental observation of the astronomer who deciphers the signals collected by a radio telescope. In principle, "experience" can be made to span the zoological observations made by Aristotle on the island of Lesbos as much as the computer simulations that now count as experiments in certain areas of physics and cognitive sciences. This symposium posed philosophical questions about the nature of scientific experience – its multiplicity, mutability, and entrenchment – in a historical vein.

Building on the recent work of the history, philosophy, and sociology of experiment and fieldwork, the symposium invited a broader exploration and more refined taxonomy of scientific experience from the late sixteenth through the early twentieth centuries, in the human as well as in the natural sciences. An inquiry into the multiplicity and history of scientific experience inevitably expands into an inquiry into the sources of scientific authority, the shifting boundary between the public and the private in science, and the establishment of scientific discipline and disciplines. Who may presume to interpret the dictates of nature, from the reader of auguries to the reader of instrument dials? When and how do certain forms of experience, such as manual skill or introspection, sink below the level of what officially counts as public knowledge, although they remain communicable by word or deed? How are novices initiated into the experiential regimens that will ultimately qualify them as practitioners of a discipline, in every sense of the word? These are questions that can be posed only if one pries experience apart from nature, and relinquishes the assumption that experi-

ence, like nature, is the same everywhere and always.

The symposium consisted of six sessions:

Session 1: Towards a History of Experience

Where do the categories – "observation," "experiment," "phenomenon," "data," "fact" – into which we parse scientific experience come from? Although these structures may come to seem like the very model of the self-evident (*e.g.* "facts"), they must not only be invented; they must also be continually modified in light of new scientific ideals and practices. This session delves beneath the apparent immediacy and transparency of experience to uncover its structures and histories.

Session 2: Constituting Means of Experience in Science

Historians who describe science as practice concern themselves primarily with the silent representatives of the past, the instruments, but neglect the productivity of the human actors. This session examines the complex relations between material technologies and human performance in the production of scientific knowledge.

Session 3: Location and Dislocation of Experience

Locality as both a category of scientific experience and of its evaluation has become increasingly important due to the rise of fieldwork science of global scope since the eighteenth century. At the same time, science lays claim to universal truths, independent of time and space contexts. This session aims to delineate both the historical roots of these tensions and their conceptual and cultural consequences.

Session 4: Constructions of Self-Experience

What is the identity of the self, both body and mind, who undergoes scientific experience and discipline? This session explores both the abstract philosophical construction of the self through categories like self-reflexivity, and the concrete physiological construction of the self through categories like spatial orientation and vestibular balance.

Session 5: The Personal Authority of Experience

Historians of science have tended to concentrate on the authority of research programs, institutions, and techniques, at the expense of that commanded by individual practitioners. This session aims to ask how the definition of the authority of the scientific practitioner has changed, and with what consequences. New approaches may be found in anthropology and

other human sciences concerned with how other cultures construct authoritative persons who intervene in nature.

Session 6: Experience without an Experiencing Subject

Scientific experience can be heroically subjective, as in self-experimentation or introspection, or heroically objective, as in the recourse to photography and self-registering instruments. This session inquires into the origins and functions of objectified experience within both science and art, and into the creation of collective subjects of experience.

List of Speakers:

Robert Brain (Harvard University, USA), "Instrumental Currencies of Experience."

Michael Bravo (University of Manchester/University of Cambridge, UK), "Historioloquy and Hospitality in the Field."

Peter Dear (Cornell University, USA), "Experience, Authority, Expertise, Skill: How Can We See with the Eyes of Others?"

Michael Harbsmeier (Odense Universitet, Denmark), "Location, Dislocation and the Creation of Knowledge: Continuity and Change in Inuit-Danish Constellations."

Dorinda Outram (University of Cork, Ireland/ MPIWG), "The Explorer and Mimesis: Some Considerations on Personal Authority, and Translocation in the Enlightenment."

Simon Schaffer (University of Cambridge, UK), "On Astronomical Drawing."

H. Otto Sibum (MPIWG), "Shifting Scales."

Bonnie Smith (Rutgers University, USA), "Amateur and Professional Experiences of History in the Nineteenth-Century West."

Stuart Strickland (Northwestern University, USA, MPIWG), "The Ideology of Self-Knowledge and the Practice of Self-Experimentation."

Piers Vitebsky (University of Cambridge, UK), "Shamans, Patients and the Authenticity of Experience: The Sora of Tribal India."

List of commentators:

Rivka Feldhay (University of Tel Aviv, Israel/ MPIWG)

Peter Galison (Harvard University, USA)

Ian Hacking (University of Toronto, Canada/ Eidgenössische Technische Hochschule, Switzerland)

Dorinda Outram (University of Cork, Ireland/MPIWG)

Krzyzstof Pomian (École des Hautes Études en Sciences Sociales, France)

M. Norton Wise (Princeton University, USA)

Rivka Feldhay (University of Tel Aviv, Israel/ MPIWG)

Berlin Summer Academy 1997, "Nature's Histories," August 18-29, 1997

Organizer: Simon Schaffer (University of Cambridge)

Who writes nature's histories? In the past twenty years two groups of scholars have attempted to write the history of human interactions with nature. One group, historians of the natural sciences, have been preoccupied with how human knowledge about nature has been painstakingly achieved on the basis of voyages of exploration, collections, classifications, measurements, and theoretical frameworks for understanding the figure and history of the earth. These historians have concentrated their attention on naturalists – their tools, their travels, their practices, their ideas. The assumption which informs their work is that insofar as we know anything about nature, it is only through the lens of a natural knowledge firmly embedded in cultural and intellectual context. The other group, historians of the environment, have investigated how nature and human activity have mutually shaped one another. Mountains, rivers, and forests are as likely to figure as agents in their narratives as the humans who attempt to master, understand, protect, or eradicate these parts of nature. For these historians, scientific knowledge of nature is largely taken to be unproblematic, a transparent window onto nature itself. Instead of focusing on human knowledge about nature and its validity, they chart human impact upon nature, and nature's impact upon humans. Two sharply contrasting histories of nature emerge, written in almost complete isolation from one another: historians of science write about nature as a mosaic composed of selected specimens, instrument readings, taxonomies, and theories; environmental historians write about nature as the brutest of facts, which makes, and is made by, human culture in the concrete form of settlement patterns, deforestation, climatic change, and pollution. Perhaps the most striking contrast between the histories of nature written by historians of science and environmental historians is that

between narrative styles. For historians of science, naturalists carry the action of the story; nature is revealed (or occluded) through their investigations. For environmental historians, nature commands center stage; the story unfolds through nature's actions, and even interests and purposes. The aim of the Berlin Summer Academy 1997 was to bring these two groups of historians together in a forum that would promote exchange and reflection.

Following the format from previous Summer Academies, this eighth Berlin Summer Academy began with an intensive preparatory seminar for junior participants, led by senior docents Everett Mendelsohn (Harvard University, USA) and Dorinda Outram (University of Cork, Ireland and University of Cambridge, UK), assisted by Sarah Jansen (MPIWG) and S. Ravi Rajan (MPIWG). In addition to discussing key works at the intersection of the history of science and environmental history, seminar participants prepared commentaries on the papers presented during the second week of the Summer Academy by senior scholars:

List of speakers:

Dr. Christophe Bonneuil (MPIWG), "The right seeds in a cleared field": Peasants and colonial experts in Senegal (1900-1950)"

Prof. Robert Brain (University of Cambridge, UK), "The Geographical Vision and the Popular Order of Disciplines, 1848-1870"

Dr. Michael Bravo (University of Manchester, UK), "The Accuracy of Ethnoscience: a Study of Inuit Cartography and Cross-Cultural Commensurability"

Prof. Dr. Franz Brüggemeier (University of Hannover), "Eine Kränkung des Rechtsgefühls?"

Prof. Mark Cioc (University of California, Santa Cruz, USA), "The Rhine as Kunstwerk: The Geo-Politics of Engineering in the 19th Century."

Prof. Michael Dettelbach (Harvard University, USA), "The Face of Nature: precise measurement, sensibility, and physiognomy in Humboldtian Science"

Dr. Richard Drayton (Lincoln College, Oxford, UK), "Environmental History as a Just so Story?: Alfred Crosby's Ecological Imperialism and the Margins of Nature and History"

Prof. Peter Galison (Harvard University, USA), "Wastelands of the Weap-

ons Complex"

Prof. Dr. Gert Groening (Hochschule der Künste, Berlin), "The idea of land embellishment"

Dr. Susanne Hauser (Berlin), "Images of Nature in Reconstructions of Industrial Sites"

Dr. Sarah Jansen (MPIWG), "'Sozialparasiten' und 'Tödlichkeitszahlen' - Zu Repräsentationsformen der Schädlingsbekämpfung in Deutschland, 1900-1925"

Prof. Gregg Mitman (University of Oklahoma, USA), "High Over the Borders: Visions of International Conservation from Pan Americanism to the Arusha Conference"

Prof. Robert Proctor (The Pennsylvania State University, USA), "The Natural and Political History of Radon"

Dr. Ravi Rajan (University of California, Santa Cruz, USA), "Sylvan Technics: German Forestry and the Politics of Monocultures in Colonial India, 1870-1900"

Dr. James A. Secord (Cambridge University, UK), "Narrative Landscapes: Interpreting the Scottish Highlands."

Prof. Dr. Ludwig Trepl (Technische Universität München), "Gefühlte Theorien: Innerstädtische Brachflächen und ihr Erlebniswert"

Seminar Participants:

Niti Anand (New Delhi, India)

Peder Anker (Harvard University, USA)

Beatrix Bäumer (Hopsten, Germany)

Conevery Bolton (Harvard University, USA)

Christina Brandt (MPIWG)

Sabine Brauckmann (Münster, Germany)

Tobias Cheung (Technische Universität München)

Alix Cooper (Harvard University, USA)

Helen Denham (Wolfson College, Oxford, UK)

Kerstin Dressel (Lancaster University, UK)

Patricia Faasse (Amsterdam, Netherlands)

Palmira Fontes da Costa (Darwin College, Cambridge, UK)

Michael Gordin (Harvard University, USA)

Nina S. Hinke Schultze (Wellcome Institute, London, UK)

Martina Kaup (Göttingen, Germany)

Susanne Köstering (Berlin, Germany)

Julia Lajus (Russian Academy of Science, St. Petersburg, Russia)

Angela Mayer-Deutsch (Frankfurt/Main, Germany)

Gerhard Mener (Deutsches Museum, Munich)

Karen Oslund (Institute for Archaeology and Ethnology, Copenhagen, Denmark)

Thomas Potthast (Universität Tübingen)

Sara B. Pritchard (Stanford University, USA)

Eugenia Roldan-Vera (Darwin College, Cambridge, UK)

Jutta Schickore (Berlin, Germany)

Friedemann Schmoll (Tübingen, Germany)

Frank Uekötter (Bielefeld, Germany)

Thomas Zeller (Deutsches Museum, Munich)

The next Berlin Summer Academy will take place in August 1999 on the theme "Science, Technology, and the Law." Organizers are: Lorraine Daston (MPIWG), Peter Galison (Harvard University), Everett Mendelsohn (Harvard University), Hans-Jörg Rheinberger (MPIWG), Simon Schaffer (University of Cambridge), and M. Norton Wise (Princeton University). Senior docents will be Michael Hagner (MPIWG) and Robert Proctor (The Pennsylvania State University).

Workshop "The Emergence of Scientific Image 1500 - 1700," September 19-21, 1997

Organized by Jürgen Renn in the context of the ESF Network on Science and the Visual Image 1500-1800

This workshop was funded by the European Science Foundation in the context of a "Network on Science and the Visual Image 1500-1800," initiated

Workshop of the European Science Foundation

Network on the Visual Image 1500–1800

The Emergence of the Scientific Image 1500–1700

hosted by the Max Planck Institute for the History of Science

Berlin, September 19–21, 1997

Organizing Committee

André Aeschlimann, Bern
Steven de Clercq, Utrecht
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Tore Frängsmyr, Uppsala
Paolo Galluzzi, Firenze
Robert Halleux, Liège
Martin Kemp, Oxford
Jürgen Renn, Berlin
William Shea, Strasbourg
Walter Tega, Bologna

Participants

Annarita Angelini (Università di Bologna)
Michael Blay (Département des Sciences de l'Homme et de la Société, Paris)
Horst Bredekamp (Humboldt-Universität zu Berlin)
Anne-Françoise Cannella, Robert Halleux (Université de Liège)
Alan Cook (University of Cambridge)
Peter Damerow, Lorraine Daston, Gerd Graßhoff, Wolfgang Lefèvre, Christoph Lüthy, Jürgen Renn (Max-Planck-Institut für Wissenschaftsgeschichte, Berlin)
Bruce Eastwood (University of Kentucky, Lexington)
Allan Ellenius (Uppsala University)
David Freedberg (National Gallery in Washington)
Howard Gruber (Columbia University, New York)
Albert van Helden (Rice University, Houston)
Klaus Mauersberger (Technische Universität Dresden)
Renato Mazzolini (Università di Trento)
Brian Ogilvie (University of Chicago)
Klaus A. Vogel (Max-Planck-Institut für Geschichte, Göttingen)
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by William Shea, Strasbourg University. The aim of the workshop was to bring together historians of science and historians of art in order to discuss the role of visual representations in the emergence of early modern science.

The title of the workshop may be somewhat misleading: The use of images as representations of scientific thinking was, of course, by no means new in the period to which the workshop was dedicated, as becomes particularly clear in the case of astronomy. Precisely because of the relation of early modern imagery to such older traditions, the first session of the workshop was dedicated to "Astronomy between Geometry and Imagery: the Transformation of Visual Traditions." Astronomy was considered here as a testing ground for pursuing the question of what the early modern period changed in a visual tradition with a very long history, in particular with respect to the relationship between geometrical representations and other kinds of visual representations such as images of celestial phenomena.

In a study of the role of images in science, the question of their role in scientific thinking is central and was discussed in several sessions. The session "Images and the Architecture of Knowledge" addressed, in particular, the relation between images and other representations of scientific thinking, such as texts or symbolic representations, and pursued the question of how the relation between image and other media changed in the early modern period. The session also addressed the role of images in the early modern period as metaphors and models for the organization of knowledge.

As is particularly clear in the case of the illustrations of the life sciences, images were used in the early modern period as tools of research, a topic to which the session "Images in the Process of Research" was dedicated. These tools, which were shaped by literary, mythological, artistic, philosophical as well as scientific traditions, profoundly affected the way in which knowledge about nature was acquired, elaborated and communicated. In this session these processes were discussed not only for the life-sciences but, in a comparative spirit, for other fields of knowledge as well. A central question was, how imagery shaped the understanding of fundamental scientific problems of the early modern time, such as the laws of optics and the laws of dynamics.

A further question extensively discussed at the workshop was the mediatory function of images between different cultural traditions, such as those between art and science or geometry and natural philosophy, but also between scientific and public culture. This question of the mediatory role of

images was the focus of the session “Imagery as Link between Science and its Context.” Here the iconographical traditions that shaped the scientific imagery of the early modern period were discussed, including, for instance, the sources of the imagery employed for representing the abstract entities of early modern science such as atoms. In the session “Images between Art and Science,” art historians contributed their views of the role of images as mediatory instances between art and science and of the relation between the transformations which images undergo in both spheres at this time.

Finally, the central topic of the session “Visual Representation and New Experience” was the function of visual representations for reflecting on the new experiences of the early modern period, from the new worlds of machines to the new worlds beyond the ocean. It was studied, for instance, how the new experiences were assimilated to traditional imagery, such as that used in Aristotelian natural philosophy. With regard to the social history of early modern science, it was discussed which special role visual representations played as a medium of reflection for the protagonists of the new experience, the non-academic practitioners.

An edited book is planned, based partly on the workshop but also including contributions from other authors. The next workshop administered in the context of the ESF Network will take place in Strasbourg, and be organized by William Shea.

Speakers were:

Annarita Angelini, Università di Bologna

Michel Blay, CNRS, Paris

Horst Bredekamp, Humboldt-Universität zu Berlin

Anne-Françoise Canella, Université de Liège

Alan Cook, Selwyn College, Cambridge UK

Peter Damerow, MPIWG, Berlin

Bruce Eastwood, University of Kentucky

Allan Ellenius, Universitet Uppsala

David Freedberg, National Gallery of Art, Washington

Gerd Graßhoff, MPIWG, Berlin

Robert Halleux, Université de Liège

Albert van Helden, Rice University, Houston
Wolfgang Lefèvre, MPIWG, Berlin
Christoph Lüthy, MPIWG, Berlin
Klaus Mauersberger, Technische Universität Dresden
Renato Mazzolini, Università degli Studi di Trento
Brian W. Ogilvie, University of Massachusetts at Amherst
Jürgen Renn, MPIWG für Wissenschaftsgeschichte, Berlin
Klaus A. Vogel, MPIWG für Geschichte, Göttingen
Matthias Winner, Bibliotheca Hertziana, Rom

The ESF Network members are:

André Aeschlimann, Bern
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Gérard Darmond, Strasbourg
Tore Frängsmyr, Uppsala
Paolo Galluzzi, Firenze
Mirko Grmek, Paris
Robert Halleux, Liège
Martin Kemp, Oxford
Jürgen Renn, Berlin
William Shea, Strasbourg
Walter Teg, Bologna

Workshop "Greek Mathematics - Work in Progress," February 2-5, 1998

Workshop "QED: Mathematical Demonstration in Historical and Cross-Cultural Context," May 28-30, 1998.

Organizer: Lorraine Daston (MPIWG)

The aim of the workshop is to explore the ideals and practices of demonstration – primarily in mathematics, but also in natural philosophy, logic, and other fields which have at one time or another aspired to this standard of argument and proof – from a comparative perspective, both historical and cultural. Although demonstrative arguments (*i.e.*, ones which attempt to show that their conclusions are necessarily, not just contingently true) are statistically rare in the history of argument viewed worldwide, they have nonetheless exercised a vast influence in the sciences, philosophy, theology, and even practical fields like law and medicine. The workshop addresses three principal themes:

1) What kind of intellectual traditions demand demonstration (as opposed to other forms of argument, such as rhetoric, and proof, such as empirical test), and when, why, and for what do they demand it?

2) How do the strategies and techniques of demonstrative argument change over time, and what are the conditions for the acceptance and rejection of innovation?

3) How are demonstrations translated, transmitted, and re-interpreted among different intellectual and cultural traditions?

Workshop in Honor of John Stachel "Space-Time, Quantum Entanglement and Critical Epistemology," June 5-6, 1998

Symposium "Demonstration, Proof, Test." June 25-28, 1998

Organizers: Lorraine Daston (MPIWG) and Arnold Davidson (University of Chicago)

Epistemology studies how we know and how secure our knowledge is. Historical epistemology studies, *inter alia*, the history of the specific ways devised to make knowledge secure, from the mathematical demonstration to the judicial proof to the empirical test. Although the words "demonstration," "proof," and "test" in their narrow senses refer to very different aims and procedures – contrast, for example, the demonstration, which seeks to circumvent an induction over cases, with the eminently inductive test of a hypothesis or a machine – their histories and current usages are closely intertwined in the major European languages. This conference is dedicated to posing philosophical questions about how knowledge, both theoretical and practical, becomes trustworthy in a concrete, historical vein: what are the forms of argument, the techniques, the procedures that guarantee various kinds of knowledge, and how did they emerge and become authoritative? Although the conference takes mathematical and scientific knowledge as its departure point, it follows the broader disciplinary and practical traditions of the words "demonstration," "test," and "proof" in including theological, medical, legal, and technological cases as well. Particularly revealing are examples which treat 1) prototypical forms of argument that become models for all other forms of secure knowledge (*e.g.*, Euclidean geometry, or scholastic arguments for the existence of God); 2) procedures and standards that migrate from one disciplinary context to another (*e.g.*, the application of legal standards of evidence to early modern civil and natural history, or the adaptation of proofing techniques to assess the gold content of coins for chemical analysis); 3) the introduction of novel methods to prove or test (*e.g.*, the polygraph in the cross-examination of witnesses, or double-blind trials in medical research); and 4) the convergence and conflict of different methods for securing knowledge about the same objects (*e.g.*, bodily tact versus instruments, or computer simulations versus physical experiments).

Conference "Postgenomics? Historical, Techno-Epistemic, and Cultural Aspects of Genome Projects," July 8-11, 1998

Organized by Hans-Jörg Rheinberger and Lily Kay (Harvard University)

The agenda of this conference will be somewhat unusual. Although the ethical, social, political, economical, and judicial aspects of human and other genome research loom large throughout, the focus of this workshop lies elsewhere. Its predominant aim is to explore, in a discussion among scientists, historians, and scholars in science studies, the epistemic, technical, and cultural challenges of genome research – especially the human genome – and to set them in an historical context. The intention is to assess how this type of research has developed: What visions have guided it, what kind of structures it has taken, what interactions and networks it has created, which challenges it poses, and, eventually, to what sort of biology and society it might be leading. Genome research as it has been practiced during the last decade is increasingly seen – not only by critics but also by participants – as an historically transient episode on the way to a postgenomic biology that is, by now, still largely conjectural; developmental biology, evolutionary biotechnology and rational drug design might be elements of this distant vision.

A first issue addressed is "Re-Visions of Genetics." Major punctuations have marked the genetic discourse of the twentieth century. The field has come a long way from viewing the genes as the formal units of preclassical and classical genetics to their conception as the material/informational units of molecular biology, with all their attendant historico-cultural valences; from the genome as the book of life to commercial genomes in the age of gene technology and bioinformatics; and now to the prospects of postgenomics in its various aspects of epigenetics, and to a reevaluation of genotypic as well as phenotypic complexity. To assess where science and society stand with respect to genome research these visions need to be reevaluated. Of special interest in this context is the troubling discrepancy between a growing appreciation of organismic complexity and an ever more sophisticated scientific gene discourse, on the one hand, and a rising trend of naive genetic determinism in the public and economic sphere on the other.

The workshop's second issue concerns the question: "Whose Genome?" Since its inception, and to some extent contrary to its original impetus,

genome research has become a variegated enterprise. Besides the human genome program itself with its focus on some "standard" genome, the assessment of human diversity has entered the arena, as have diverse programs to sequence several model organisms (including several bacteria, yeast, Arabidopsis, Caenorhabditis elegans, and mouse). Among these genome projects, the European yeast program, successfully completed in 1996, represents the first eukaryotic organism to be genetically sequenced in its entirety. Participants will not only survey their underlying assumptions and how these different projects are realized, but also ask the question of how scholars in science studies can and should study such enterprises.

This leads to a third array of concerns about the techno-epistemic dimensions of genome research. What does the recent explosion of sequencing efforts amount to? What kind of questions – biological and other – does it evoke? What kinds and modes of data and representations of the body will it lead to? What kind of challenges does it pose to biocomputing? What kind of organization do such collaborative and globally distributed efforts necessitate, involving many different research groups entrenched in widely different local research contexts and research traditions? What spaces of knowledge/power would genome sequencing open? Contrary to early critical voices, the assumption is that such massive sequencing will not result merely in dull repetition, but will give rise to unprecedented scientific and social prospects.

In the wake of a new effort to promote human genome research in Germany, it is deemed necessary not only to assess the ethical, social, and judicial aspects of incumbent new forms of human genetics, but to make an effort to contemplate and rethink the techno-epistemic and cultural dimensions of these developments, which have led to remarkable new constellations of basic and applied biological research. As an opportunity to concentrate on these aspects, an interdisciplinary and international conference will be organized. It is understood that this conference should bring together prominent as well as junior scientists and scholars from Europe and the United States to represent national and global perspectives. They will explore the historical, epistemic, and sociocultural dimensions of molecular biology and gene technology in an effort to assess the achievements that have been made in this field over the past 15 years and to address the perspectives and practices that flow from these achievements.

This conference has been initiated by Jürgen Renn and is generously supported by the Bundesministerium für Bildung, Wissenschaft, Forschung

und Technologie (BMBF) as part of the Deutsche Humangenomprojekt (DGHP).

Workshop "Instruments, Travel and Science," September 3-6, 1998

Organizers: H. Otto Sibum (MPIWG), Marie-Noëlle Bourguet (Université de Paris VII) and Christian Licoppe (Centre National d'Études des Télécommunications)

The historical focus of this workshop is the new instrumental and measuring culture with its changing cognitive practices emerging in Europe between the mid-eighteenth and the twentieth centuries. The diversity of local knowledge traditions in this period raises the question of how these locales became coordinated with each other. The papers to be discussed will analyze particularly the increasing use of quantifying practices and the voyages of instruments and skilled individuals during this period. With a view toward identifying the long-term historical processes which gave rise to this instrumental culture, the participants will discuss French, German, and British initiatives, as well as the relationship between these initiatives and the knowledge and techniques of travelers in other cultural spaces (India, Africa, Polynesia, Southeast Asia and North America).

Workshop "Reworking the Bench. On Research Notebooks in the History of Science," November 12-15, 1998

Organizers: Frederic L. Holmes (Yale University), Jürgen Renn and Hans-Jörg Rheinberger (MPIWG)

Until recently seldom exploited by historians, research notebooks now are studied as valuable sources for understanding the investigative processes that lie behind public claims for discoveries and other novel findings. The growing interest in scientific practice among historians and other students of science is opening up a field of scholarly questions for which notebook records offer tools for fertile research.

Those who have worked with such documents have found them rewarding but challenging. Problems ranging from illegible handwriting to extreme compression and unexplained gaps pose obstacles to interpretation.

Research notebooks often cannot be read directly like other types of unpublished documents, requiring instead special techniques of analysis.

The intent of the workshop is to bring together scholars who have used such notebooks in their studies of past scientists to share their experiences with each other and with other historians who are beginning to use them, or plan to do so.

INTERNAL COLLOQUIUM OF THE INSTITUTE 1996/1997

January 17, 1996 - Bernhard Thöle: "Das klare und deutliche Bild der Welt"

January 31, 1996 - Hubert Goenner (Universität Göttingen): "The Quest for Ultimate Explanation in Physics, or Reductionism on the March"

February 28, 1996 - Klaus Vogel: "Kolumbus und Kopernikus. Die kosmographische Revolution und die Entwicklung der Wissenschaften"

March 13,1996 - Gabriele Metzler: "Zwischen Nationalismus und Internationalismus. Deutsche Physiker in der internationalen community, ca. 1900-1960"

March 27, 1996 - Mohamed Abattouy : "The Evolution of Galileo's Theory of Motion between 1600 and 1609: Analysis of some Manuscripts (vol. 72) and a Historical Reconstruction"

April 10, 1996 - Hanne Andersen: "From Transuranic Elements to Nuclear Fission: How Anomalies in Categorization Led to a Revolution"

May 22, 1996 - Doris Kaufmann: "Ein Experiment größten Stils an unserer psychischen Volksgesundheit - Psychiatrie im 1. Weltkrieg"

June 5, 1996 - Skúli Sigurdsson: "Mosaic of Language & History"

July 3, 1996 - Zeno Swijtink: “The Instrumental Life of Alexander von Humboldt”

July 17, 1996 - Dorinda Outram: “Passion and Interest: Patronage, Science and Gender in the Age of Absolutism”

July 31, 1996 - Cheryce Kramer: “Rhapsodien über die Anwendung von Kant, Reil und Moritz auf Geisteszerrüttungen”

August 14, 1996 - Edward Jurkowitz: “Phenomenological Physics: Phenomenological Theory as a Mediator of the Boundary Between Theory and Experiment in Superconductivity Research”

August 21, 1996 - Herbert Mehrtens (Universität Braunschweig): “Perspectives on 20th Century Mathematical Culture”

August 28, 1996 - H. Otto Sibum: “Experimental Performance and Limits of Representation”

September 11, 1996 - Gabriele Werner: “Männliche Weiblichkeit als Kreativitätsmodell - Künstlermythen im Surrealismus”

October 23, 1996 - Arne Schirrmacher: “Der Formalismus ist sowieso schlauer als wir... – Bemerkungen zur Philosophie der Naturwissenschaftler im 20. Jahrhundert”

November 6, 1996 - Staffan Müller-Wille: “Form and Function of Means of Representation in Linnaeus’ Botany”

November 20, 1996 - Mitchell Ash: “Scientific Changes in Germany after 1933, 1945, and 1990 – Steps Toward a Comparison”

January 29, 1997 - Mordechai Feingold: “Mathematicans and Naturalists: Isaac Newton and the Nature of the Early Royal Society”

May 21, 1997 - Sahotra Sarkar: “J.B.S. Haldane and evolutionary biology”

December 3, 1997 - John Ziman: “Evolutionary Reasoning in Science and Technology Studies”

December 17, 1997 - Henry P. Krips: “Catachresis, Quantum Mechanics and the Letter of Lacan”

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