

447 US 303 (1980).

(CAHBI), A. H. C. o. E. o. B. (1991). Draft Recommendation on Genetic Testing and Screening for Health Care Purposes and Draft Explanatory Memorandum, Council of Europe.

(CAHBI), A. H. C. o. E. o. B. (1991). Draft Recommendation on the Use of Analysis of deoxyribonucleic Acid (DNA) within the Framework of the Criminal Justice System and Draft Explanatory Memorandum, Council of Europe.

[Interviews with Botstein (Genentech) and Davis (Stanford University) January 1987, a. B. G., August 1988].

Academia Europaea (1991). Research on the Human Genome in Europe and Its Relation to Activities Elsewhere in the World, Academia Europaea.

Ackerman, S. (1988). "Taking on the Human Genome." Am. Sci. **76**(January-February): 17-18.

ADA regs (1991). The ELSI working group urged EEOC to circumscribe health inquiries to only those questions that would elicit information about conditions that would affect job performance. The proposed regulations indicated that employers could obtain the full medical record, but could only *use* information that was job-related to reject a job applicant. This shifted power to the employer and took power away from the prospective employee. To assert discrimination, an individual would have to prove that the reason he or she was rejected was *not* job related, but the job applicant would have supplied vast amounts of information with little knowledge of how it was used by the employer. If, however, the employer never had medical information beyond that relevant to job performance in the first place, then arbitrary decisions could not be masked. This would increase the effort necessary on the part of employers to define what job-related questions to ask, and on those responding to employer requests, as they would have to filter the medical record rather than ship it out whole. It implied a major change in standard practice, but one in harmony with the ADA statute.

Adams, M. B., Ed. (1990). The Wellborn Science: Eugenics in Germany, France, Brazil, and Russia. New York, Oxford University Press.

Adams, M. D., et al. (1992). "Sequence Identification of 2,375 Human Brain Genes." Nature **355**(12 February): 632-634.

Adams, M. D., et al. (1991). "Complementary DNA Sequencing: Expressed Sequence Tags and Human Genome Project." Science **252**(21 June): 1651-1656.

additional witnesses Two additional witnesses gave excellent testimony, but the action centered on exchanges between Rep. Wise, Bernadine Healy, and James Watson. W. French Anderson also came from NIH; Philip Reilly, director of the Shriver Center for Mental Retardation in Waltham, MA, spoke about activity in the States, concerns of the American Society for Human Genetics, and general principles to be considered in possible legislation. He also noted the likelihood of large databases generated from DNA typing in the criminal justice system. Paul Billings, from the California Pacific Medical Center, gave general background on genetic discrimination and sketched out a few specific cases for the committee.

Adler, R. (1992). Adler quoted the 1988 OTA report that stated "genome projects raise no new questions of patent or copyright law" and went on to speculate that "contributing to this lack of foresight may have been an urgency to start the genome program." As author of the offending OTA sentence, I admit to embarrassment about such a bold and misleading oversimplification in the summary chapter. The unfortunate result was to distract from a subsequent chapter on technology transfer in the 1988 report that considered the issues in considerably more depth. The lack of foresight was not quite as bad as alleged. OTA urged early filing of patent applications. Failure to do so could "inhibit full exploitation of an invention" and invited "foreign exploitation of research funded at US taxpayers' expense... Penicillin was discovered in England, but the patent was obtained by US corporations ... the United Kingdom claimed the Nobel Prize, but the United States reaped most of the economic benefits." OTA also noted "there is a gray area between invention of new methods and the data that result from using them," but did not predict how DNA sequences themselves, of the sort at issue in the NIH patent application, would become the subject of patent controversy. Like scientists, public policy analysts can be humbled by the march of events.

Adler, R. (1992). Interview, Office of Technology Transfer, National Institutes of Health.

Adler, R. and R. Eisenberg (1992). Adler pointed to how sequences might be used to identify a tissue of origin. Rebecca Eisenberg noted the NIH application listed uses for forensic identification or as genetic markers. Just as the use of DNA markers for identification were useful only if population frequencies were known, all these uses would also require a great deal more to be known about the population distribution of the sequences, or how different tissues expressed them. Since Venter's laboratory was identifying the genes for the first time, or they would not be novel, such information was by definition unavailable without further work. An added problem was that coming from protein-coding regions, their use for forensic typing would make these precisely the regions most likely to later prove related to a genetic disorder, making them poor candidates for general use because of the ethical problems this would raise. This does not, however, count against the contention that the sequences might someday be useful for something.

Adler, R. G. (1992). "Genome Research: Fulfilling the Public's Expectations for Knowledge and Commercialization." Science **257**(14 August): 908-914.

Advisory Committee on the Human Genome (1992). A Genome Program in Canada, Summary sheet of the committee's recommendations prepared for the Canadian Cabinet by Charles Scriver.

Advisory Committee to the Director (1988). Human Fetal Tissue Transplantation Research, National Institutes of Health.

Ager, S. (1989). "Geri's Gamble." Washington Post Health(13 June): 12-18.

Alberts, B. (1988). Interview, University of California at San Francisco.

Alberts, B. (1990). Interview, University of California at San Francisco.

Alberts, B. and J. Burrell (1991). Joint interview, National Academy of Sciences.

Alberts, B. M. (1985). "Limits to Growth: In Biology, Small Science is Good Science." Cell **41**: 337-338.

Aldous, P. (1990). "Imperial's Wellcome Support." Nature **344**(1 March): 5.

Aldous, P. (1991). "Closing a Loophole in Discrimination Rules." Nature **351**(27 June): 684.

Aldous, P. (1991). "HUGO Flirting with Johns Hopkins." Nature **352**(4 July): 3.

Aldous, P. (1991). "Who Needs a Genome Ethics Treaty?" Nature **351**(13 June): 507.

Aldous, P. (1992). "Britain Plans Large-Scale Sequencing Center." Science **256**(15 May): 958.

Aldous, P. (1993). "Geneticists Attack NRC Report as Scientifically Flawed." Science **259**(5 February): 755-756.

Aldous, P. (1992). "The Promise and Pitfalls of Molecular Genetics." Science **257**(10 July): 164-165.

Aldous, P. and C. Anderson (1992). "Reforms Win Praise, but Not Patrons." Nature **356**(19 March): 187.

Allende, J. (1988). Background on the Human Genome Project, Red Latinoamericana de Ciencias Biologicas.

Allende, J. E. (1991). "A View from the South." FASEB Journal **5**(January): 6-7.

Alwen, J. (1990). "United Kingdom Genome Mapping Project: Background, Development, Components, Coordination and Management, and International Links of the Project." Genomics **6**(January): 386-388.

American Society for Biochemistry and Molecular Biology (1987). Council Policy Statement on Mapping and Sequencing the Human Genome.

Anderson, A. (1990). "Japanese Papers Top Charts." Nature **343**(18 January): 199.

Anderson, A. (1992). "Yeast Genome Project: 300,000 and Counting." Science **256**(24 April): 462.

Anderson, C. (1991). "US Patent Application Stirs Up Gene Hunters." Nature **353**(10 October): 485-486.

Anderson, C. (1992). "Courts Reject DNA Fingerprinting, Citing Controversy After NAS Report." Nature **359**(1 October): 349.

Anderson, C. (1992). "Gene Wars Escalate as US Official Battles NIH Over Pursuit of a Patent." Nature **359**(8 October): 467.

Anderson, C. (1992). "New French Genome Centre Aims to Prove That Bigger Really Is Better." Nature **357**(18 June): 526-527.

Anderson, C. (1992). "NIH cDNA Patent Rejected; Backers Want to Amend Law." Nature **359**(24 September): 263.

Anderson, C. (1992). "NIH Defends Gene Patents as Filing Deadline Approaches." Nature **357**(28 May): 270.

Anderson, C. (1992). "US Genome Head Faces Charges of Conflict." Nature **356**(9 April): 463.

Anderson, C. (1992). "US to Seek Gene Patents in Europe." Nature **357**(18 June): 525.

Anderson, C. (1992). "Watson Resigns, Genome Project Open to Change." Nature **356**(16 April): 549.

Anderson, C. (1993). "Genome Project Goes Commercial." Science **259**(15 January): 300-302.

Anderson, C. and P. Aldhous (1992). "Genome Project Faces Commercialization Test." Nature **355**(6 February): 483-484.

Anderson, C. and D. Swinbanks (1992). "US Prepares to Adopt World Patent Standards." Nature **356**(23 April): 645-646.

Anderson, G. C. (1990). "Creation of Linkage Map Falts, Posing Delay for Genome Project." The Scientist **4**(8 January): 1, 10, 12, 13.

Anderson, G. C. (1990). "Genome Project Spawns New Research on Ethics." The Scientist(22 January): 20.

Anderson, G. C. and P. Coles (1990). "United States Still Angry." Nature **344**(26 April): 801.

Anderson, N. (1986). Informational Forum on the Human Genome, Howard Hughes Medical Institute.

Anderson, N. (1990). Phone conversation. September. I. Large Scale Biology.

Anderson, N. G. and N. L. Anderson (1985). "A Policy and Program for Biotechnology." Am Biotech. Lab. **Sept/Oct.** 1-3.

Anderson, N. G. and N. L. Anderson (1986). Program for Large-Scale Analysis of Nucleotide Sequences (PLANS), Proteus Technologies.

Anderson, W. F., et al. (1990). "The ADA Human Gene Therapy Clinical Protocol." Hum Gene Ther. **1**(Fall): 331-362.

- Andrews, L. B. (1990). DNA Testing, Banking, and Individual Rights. Genetic Screening. From Newborns to DNA Typing. B. M. Knoppers and C. M. Laberge. New York, Elsevier: 217-242.
- Andrews, L. B. (1990). "The Gene Prophets." Vogue(January): 198, 199, 241.
- Angier, N. (1990). "Vast, 15-Year Effort to Decipher Genes Stirs Opposition." New York Times(5 June): C1, C12.
- Annas, G. (1991). "Ethics Committees." Hastings Center Report(May/June): 20.
- Annas, G. J. and M. A. Grodin (1992). The Nazi Doctors and the Nuremberg Code: Human Rights in Human Experimentation. New York, Oxford University Press.
- Anonymous (1988). "Fear Stalks American Science." New Scientist(18 February): 34.
- Anonymous (1989). Strategic Plan: Mission Statement, Genome Data Base.
- Anonymous (1990). "GDB Introduced at HGM 10.5." GDB Forum **1**(No. 2, Fall): 1,3.
- Anonymous (1992). "Gone Private." National Journal(25 July): 1747.
- Anonymous (1992). "People: Washington's Movers and Shakers." National Journal(25 July): 1747.
- Ansorge, W. (1989). Interview. May. C. S. H. L. Genome Mapping and Sequencing Symposium.
- Appenzeller, T. (1990). "Democratizing the DNA Sequence." Science **247**(2 March): 1030-1032.
- Asch, A. (1986). "Real Moral Dilemmas." Christianity and Crisis **46**(#10, 14 July): 237-240.
- Asch, A. (1988). Reproductive Technology and Disability. Reproductive Laws for the 1990s. S. Cohen and N. Taub. Clifton, NJ, Humana Press.
- ASM News (1992). "Human Genome Advisors Reassess Progress, Scold NIH Patenting Efforts." ASM News **58**(No. 3, March): 129-130.
- Association of Biotechnology Companies (1992). ABC Statement on NIH Patent Filing for the Human Genome Project, Association of Biotechnology Companies, Washington, DC.
- Association of Biotechnology Companies (1992). Letter to President George Bush, Association of Biotechnology Companies, Washington, DC.
- Astrue, M. J. (1992). Letter to the Honorable Harry F. Manbeck, Jr., Patent and Trademark Office, US Department of Commerce, General Counsel, Department of Health and Human Services.
- Avery, O. T., et al. (1944). "Induction of Transformation by a Desoxyribonucleic Acid Fraction Isolated from Pneumococcus Type III." J. Exp. Med. **79**(1 February): 137-158.
- Avner, P. (1991). "Sweet Mice, Sugar Daddies." Nature **351**(13 June): 519-520.
- Baltimore, D. (1987). "Genome Sequencing: A Small-Scale Approach." Iss. Sci. Tech. **3**: 48-50.
- Baltimore, D. (1988). Keynote address. American Association for the Advancement of Science, Annual meeting.
- Baltimore, D. (1988). "'A Project Justified by Its Public Relations Value'." The Scientist(7 March): 12.

Balzer, H. (1992). Conversation following his return from Moscow, Russian Area Studies Program, Georgetown University.

Balzer, H. D. (1989). Soviet Science on the Edge of Reform. Boulder, CO, Westview Press.

Bankowski, Z. and A. M. Capron, Eds. (1991). Genetics, Ethics, and Human Values: Human Genome Mapping, Genetic Screening, and Gene Therapy. Proceedings of the XXIVth CIOMS Conference, Tokyo and Inuyama City, Japan, 22-27 July 1990. Geneva, CIOMS.

Barinaga, M. (1987). "Critics Denounce First Genome Map as Premature." Nature **329**(15 October): 571.

Barinaga, M. (1988). "Mathematics and Molecular Biology." Nature **326**(24 November): 301.

Barinaga, M. (1991). "And the Winner: Cetus Does Own PCR." Science **251**(8 March): 1174.

Barinaga, M. (1991). "Biotech Nightmare: Does Cetus Own PCR?" Science **251**(15 February): 739-740.

Barinaga, M. (1991). "Will 'DNA Chip' Speed Genome Initiative?" Science **253**(27 September): 1489.

Barker, D., et al. (1987). "Gene for von Recklinghausen Neurofibromatosis Is in the Pericentromeric Region of Chromosome 17." Science **236**: 1100-1102.

Barrell, B. (1990). "DNA Sequencing: Present Limitations and Prospects for the Future." FASEB Journal **5**(January): 40-45.

Barry, J. (1990). Phone and in-person conversations, Free-lance writer working on profile of James D. Watson.

Barry, J. M. (1991). "Cracking the Code." Washingtonian(February): 63-67, 180-184.

Bayev, A. A. (1988). Interview, First International Workshop on Cooperation for the Human Genome Project, Valencia, Spain.

Bayev, A. A. (1989). Early in the 1930s, Bayev took courses from V. N. Slepkov, whose brother was associated with Bukharin, whom Stalin came to see as a dangerous rival. Graduate students who had studied under Slepkov were rounded up and sent to prison. By such tenuous connections were many lives shattered.

Bayev, A. A. (1989). The Human Genome, A General Overview (Genom Cheloveka, Obshchii Uzgliud), Scientific Council for the State Scientific-Technical Program "Human Genome," Moscow.

Bayev, A. A. (1989). Interview, UNESCO-USSR workshop on the Human Genome Project, Moscow.

Bayev, A. A. (1990). "The Human Genome Project in the USSR." Biomed. Sci. **1**: 106-107.

Bayev, A. A. (1990). Interview, UNESCO Workshop on the Human Genome Project, Paris.

Bayev, A. A. (1990). Interview, Englehardt Institute for Molecular Biology, planning meeting for June 1990 international meeting on ethical, legal and social issues related to genome research in Bethesda, MD.

Beam, A. and J. O. C. Hamilton (1987). "A Grand Plan to Map the Gene Code." Business Week(April 27): 116-117.

Beardsley, T. (1986). "Hughes Money Talks Volumes." Nature **323**(30 October): 749.

Bearn, A. G. and E. D. Miller (1979). "Archibald Garrod and the Development of the Concept of Inborn Errors of Metabolism." Bull Hist Med **53**(Fall): 315-328.

Beatty, J. (1991). Genetics in the Atomic Age: The Atomic Bomb Casualty Commission, 1947-1956. The Expansion of American Biology. K. Benson, Rutgers University Press.

Beauchamp, T. (1986-1991). Kennedy Institute of Ethics Tuesday seminars, electronic mail communications, and conversations, Department of Philosophy, Georgetown University; Beauchamp was on the staff of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

Beaudet, A. L. (1990). "Carrier Screening for Cystic Fibrosis." Am J Hum Genet **47**: 603-605.

Beckman, A. O. (1985). Letters to Robert L. Sinsheimer, Chancellor, University of California, Santa Cruz, Arnold and Mabel Beckman Foundation.

Begley, S., et al. (1987). "The Genome Initiative." Newsweek(August 31): 58-60.

Benson, R. H. (1986). "Patent Wars." Bio/Technology **4**(December): 1064-1070.

Bentley, D. R. (1996). "Genomic sequence information should be released immediately and freely in the public domain." Science **274**: 533-534.

Berg, P. (1990). Note to author, commenting on a meeting of the Committee to Study Decisionmaking, Institute of Medicine, Beckman Center, Irvine California. March. S. University.

Berg, P. and W. Gilbert (1986). Comments taped by C. Thomas Caskey at session on the Human Genome project, symposium on the Molecular Biology of *Homo sapiens*, Cold Spring Harbor Laboratory.

Berg, P. and L. Lerman (1992). Letter to Dr. Frank Press, President of the National Academy of Sciences, Chairman, NIH Program Advisory Committee on the Human Genome (Berg) and Acting Chairman, DOE Health and Environmental Research Advisory Committee (Lerman).

Berg, P. and L. Lerman (1992). Letters to Dr. Frank Press and Dr. Bernadine Healy, Chairman, NIH Program Advisory Committee for the Human Genome; Acting Chairman, DOE Health and Environmental Research Advisory Committee; Co-chairman and Acting Co-chairman, NIH-DOE Joint Subcommittee.

Berg, P. and S. Wolff (1991). Letter to Evan J. Kemp, Chairman, Equal Employment Opportunity Commission, NIH/DOE Joint Subcommittee on the Human Genome.

Berns, K. I., et al. (1996). Resource Sharing in Biomedical Research. Washington, DC, Institute of Medicine, National Academy of Sciences.

Beyer, W. A., et al. (1983). "Quantitative Comparison of DNA Sequences." Los Alamos Science(Fall): 62-63.

Beyer, W. A., et al. (1974). "A Molecular Sequence Metric and Evolutionary Trees." Math Biosci **19**: 9-25.

Billings, P. (1990). Genetic Discrimination: An Ongoing Survey, GeneWatch, Council for Responsible Genetics, accompanying 27 June letter to Rep. Hoyer and Sen. Harkin.

Billings, P. (1991). "Beware of Insurers Offering Tests." San Francisco Examiner(11 July): A17.

Bilofsky, H., et al. (1987). Invited Speakers for a meeting of the Committee on Mapping and Sequencing the Human Genome, Board on Basic Biology, National Academy of Sciences.

Biosystems Reporter (1990). "Wolf Trap Conference Marks Turning Point in Developing Technologies for Sequencing the Human Genome." Biosystems Reporter(#7, February): 1, 6, 7.

Bishop, J. E. and H. Stout (1992). "Gene Scientist to Leave NIH, Form Institute." Wall St. J.(7 July): B1, B4.

Bishop, J. E. and M. Waldholz (1990). Genome: The Story of the Most Astonishing Scientific Adventure of Our Time — The Attempt to Map All the Genes in the Human Body. New York, Simon and Schuster.

Bishop, M. J., et al. (1987). Molecular Sequence Databases. Nucleic Acid and Protein Sequence Analysis: A Practical Approach. M. J. Bishop and C. J. Rawlings. Oxford, UK, IRL Press.

Bishop, M. J. and C. J. Rawlings (1987). Nucleic Acid and Protein Sequence Analysis: A Practical Approach. Oxford, UK, IRL Press.

Bitensky, M. (1986). Sequencing the Human Genome. Santa Fe Workshop, March 3-4, 1986, Santa Fe, NM, Office of Health and Environmental Research, US Department of Energy (Published by the University of California under contract W 7405-ENG-36, Los Alamos National Laboratory, NM).

Bitensky, M., et al. (1986). Memo to Charles DeLisi, DOE Los Alamos National Laboratory.

Bitensky, M. W. (1986). Letter to Charles DeLisi, Los Alamos National Laboratory.

Bitensky, M. W. (1986). Memo to Los Alamos Planning Group Los Alamos National Laboratory.

Blakeslee, S. (1991). Of Mice and Men, Blazing a Genetic Trail. Howard Hughes Medical Institute.

Blanchard, F. (1990). Press statement: The Howard Hughes Medical Institute Awards \$1 Million Grant to the Human Genome Organization, Howard Hughes Medical Institute.

Bloom, F. E. and M. A. Randolph, Eds. (1990). Funding Health Sciences Research. National Academy of Sciences. Washington, DC, National Academy Press.

Blow, M. (1968). The History of the Atomic Bomb. New York, American Heritage.

Blumenthal, D., et al. (1997). "Academic-industry research relationships in genetics: a field apart." Nature Genetics **16**(May): 104-108.

Blundell, T. L., et al. (1987). "Knowledge-Based Prediction of Protein Structures and the Design of Novel Molecules." Nature **326**(26 March): 347-352.

Bodmer, W. (1979). Molecular and Genetic Organization: The Future. Human Genetics: Possibilities and Realities, Excerpta Medica. **Ciba Foundation Series 66 (new series)**: 395-400.

Bodmer, W. (1986). "The 1985 Darwin Lecture: Genetics and Cancer." Biology and Society **3**: 108-117.

Bodmer, W. (1986). Genetic Susceptibility to Cancer. Accomplishments in Cancer Research, 1985, General Motors Cancer Research Foundation. J. C. Fortner and J. E. Rhoads, J. B. Lippincott: 198-210.

Bodmer, W. (1988). "Presidential Address 1988, British Association for the Advancement of Science, Genes and Atoms for Health and Prosperity." Science and the Public(September/October): 3-8.

Bodmer, W. (1990). "Social and Political Implications of the Mapping of the Human Genome." Science in Parliament **47**(April): 87-93.

- Bodmer, W. (1992). "Genome Research in Europe." Science **256**(24 April): 480-481.
- Bodmer, W. F. (1981). "The William Allan Memorial Award Address: Gene Clusters, Genome Organization, and Complex Phenotypes. When the Sequence Is Known, What Will It Mean?" Am. J. Hum. Genet. **33**: 664-682.
- Bodmer, W. F. (1986). "Human Genetics: The Molecular Challenge." CSH Symp. Quant. Biol. **51**: 1-13.
- Bodmer, W. F. (1986). "Two Cheers for Genome Sequencing." The Scientist(October 20): 11-12.
- Bodmer, W. F. (1987). The Human Genome Sequence and the Analysis of Multifactorial Traits. 1987 Molecular Approaches to Human Polygenic Disease. Chichester, Wiley. **Ciba Foundation Symposium 130**: 215-228.
- Bodmer, W. F., et al. (1987). "Localization of the Gene for Familial Adenomatous Polyposis in Chromosome 5." Nature **328**: 614-616.
- Bodmer, W. F. and L. L. Cavalli-Sforza (1976). Genetics, Evolution, and Man. San Francisco, W. H. Freeman.
- Boffey, P. M. (1986). Rapid Advances Point to the Mapping of All Human Genes. The Debate: Would Accelerated Project Distort Usual Methods of Biology? New York Times. New York City: Science Times, C1ff.
- Boffey, P. M. (1987). Medical Institute Shaken in Furor Over Its President. New York Times. New York City: Science Times, C1 and C3.
- Bostock, J. (1988). Interview, Office of Management and Budget, New Executive Office Building, 8th floor.
- Bostock, J. (1989). Interview, Office of Management and Budget, New Executive Office Building, 8th floor.
- Botstein, D. (1987). Implications for Basic Research, National Institutes of Health.
- Botstein, D. (1987). Interview, Genentech.
- Botstein, D. (1988). Interview, Genentech.
- Botstein, D. (1990). Interview, Genentech Headquarters, South San Francisco.
- Botstein, D. (1991). Electronic mail note, Stanford University.
- Botstein, D. and P. Berg (1986). Comments taped by C. Thomas Caskey at session on Human Genome Project, at the symposium on the molecular biology of Homo sapiens, Cold Spring Harbor Laboratory.
- Botstein, D. and G. R. Fink (1988). "Yeast: An Experimental Organism for Modern Biology." Science **240**(10 June): 1439-1443.
- Botstein, D., et al. (1980). "Construction of a Genetic Linkage Map in Man Using Restriction Fragment Length Polymorphisms." Am J. Hum. Genet. **32**: 314-331.
landmark paper on RFLP mapping in man.
- Bourke, F. A. (1992). Letter to Bernadine P. Healy, Director, NIH.
- Bowcock, A. and L. L. Cavalli-Sforza (1991). "The Study of Variation in the Human Genome." Genomics **11**(October): 491-498.
- Bowcock, A. M., et al. (1991). "Drift, Admixture, and Selection in Human Evolution: A Study with DNA Polymorphisms." Proc. Nat. Acad. Sci (USA) **88**: 839-843.

- Bowie, J. U., et al. (1991). "A Method to Identify Protein Sequences That Fold into a Known Three-Dimensional Structure." Science **253**(12 July): 164-170.
- Bradbury, W. (1970). Genius on the Prowl. Life: 57-66.
- Brady, D. (1990). "Breaking the Code." McLean's(27 August): 44-45.
- Braibant, G. (1988). Sciences de la Vie, De l'Éthique au Droit, Étude du Conseil d'État, Government of France, Paris.
- Brandt, J., et al. (1989). "Presymptomatic Diagnosis of Delayed-Onset Disease with Linked DNA Markers." JAMA **261**(2 June): 3108-3114.
- Breitner, J. C. S., et al. (1986). "Familial Aggregation in Alzheimer Dementia — I. A Model for the Age-Dependent Expression of an Autosomal Dominant Gene." J Psychiat Res **20**: 31-43.
- Breitner, J. C. S., et al. (1986). "Familial Aggregation in Alzheimer Dementia — II. Clinical Genetic Implications of Age-Dependent Onset." J Psychiat Res **20**: 45-55.
- Brenner, S. (1973). "Genetics of Behavior." Brit. Med. Bull **29**: 269-271.
- Brenner, S. (1974). "Genetics of *Caenorhabditis elegans*." Genetics **77**(1): 71-94.
- Brenner, S. (1986). Map of Man, Commission of the European Communities.
- Brenner, S. (1988). Foreword. The Nematode *Caenorhabditis elegans*. W. B. Wood. Cold Spring Harbor, NY, Cold Spring Harbor Laboratory: ix-xiii.
- Brock, D. W. (1987). "Truth or Consequences: The Role of Philosophers in Policy-Making." Ethics **97**(July): 786-791.
- Brown, D. and M. Gladwell (1992). "Nobel Prize Biologist Watson Plans to Resign US Position." Wash Post(9 April): A3.
- Brown, D. D. (1991). "Views of the Genome Project (letter)." Science **251**(22 February): 854-855.
- Brown, G. E. (1986). "Working Together, Benefiting All." Congressional Record(31 July): E 2668-2669.
- Brown, P. (1992). "A Wellcome Injection of Cash." New Scientist **135**(No. 1832, 1 August): 12-13.
- Brown, P. and D. Concar (1991). "Where Does the Genome Project Go from Here?" New Sci **131**(17 August): 13-14.
- Brown, S. and R. Woodbury (1989). "Battle for the Future." Time(16 January): 42-43.
- Brown, S. D. (1982). Translator's Introduction. The Diary of Kido Takayoshi. Sidney DeVere Brown and Akiko Hirota. Tokyo, University of Tokyo Press. **I: 1968-1971**: xvi-xxi.
- Buck v. Bell (1927). "274 U. S. 200." S.Ct. **47**: 584.
- Buddecke, M. (1990). Phone interview, New Mexico State Capitol.
- Budget tables for NIGMS genetics program (1992). By this reasoning, \$25 million, or just over 10 percent of the NIGMS genetics program, moved away with the genome center. Some unknown fraction of the science supported by the genome center would likely have been supported by NIGMS, but certainly not all. It seems likely that some would instead have gone for study of gene regulation, recombination, and other basic genetics.

Budget tables for NIGMS genetics program (1992). The year NIH first had a special genome budget, the Genetics Program Branch at NIGMS saw a budget increase from \$188.9 million (1987) to \$213.8 million (1988). In 1989, when the genome project left NIGMS, the Genetics Program Branch budget went down to \$209.6 million, and it dropped again to \$207.8 million in 1990, before rebounding to \$218.3 million in 1991 and an estimated \$229.5 million in 1992. During these same years, the NIH genome budgets were: \$17.2 million (1988, within NIGMS); \$28.2 million (1989); \$59.5 million (1990); \$87.4 million (1991); and \$104.9 million (1992 estimate). The 1993 increase was even larger than shown, as the GenBank contract amount of roughly \$4 million was transferred to the National Library of Medicine.

Bulger, R. J. (1991). "How the Genome Project Could Destroy Health Insurance." Washington Post, Outlook(4 August): C4.

Burke, D. T., et al. (1987). "Cloning of Large Segments of of Exogenous DNA into Yeast Artificial-Chromosome Vectors." Science **236**: 806-808.

Burks, C. (1989). *The Flow of Nucleotide Sequence Data into Data Banks: Role and Impact of Large-Scale Sequencing Projects*, Los Alamos National Laboratory.

Burks, C., et al. (1989). *GenBank: Current Status and Future Directions*, Los Alamos National Laboratory.

Burner, S. T., et al. (1992). "National Health Expenditures Projections through 2030." Health Care Fin Rev **14**(No. 2, Fall): 1-29.

Burrill, G. S. and K. Lee, B. (1991). *Biotech 92: Promise to Reality*, Ernst & Young, Associates, San Francisco.

Burris, J. (1986). Draft Minutes of 3 March meeting, Board Room, NAS Building, Washington, DC, Board on Basic Biology.

Burris, J. (1986). Minutes of Board on Basic Biology Meeting, 5 and 6 August, 1986, National Research Council, Commission on Life Sciences, Board on Basic Biology.

Burris, J. (1991). Electronic mail note to the author, National Academy of Sciences, Washington, DC. The check arrived from the McDonnell Foundation two days after the project was approved by the NAS Governing Board.

Burris, J. and F. Walton (1986). *Mapping/Sequencing the Human Genome*, National Research Council, Commission on Life Sciences, Board on Basic Biology.

Burris, J. E. (1986). Memo regarding 5 August Woods Hole meeting, Board On Basic Biology, Commission on Life Sciences, National Research Council.

Burris, J. E. (1986). Proposal: *Mapping and Sequencing the Human Genome*, National Research Council, Commission on Life Sciences, Board on Basic Biology.

Bush, A., et al. (1987-1990). Phone and personal interviews, Office of Pete Domenici, US Senate.

Bush, G. (1990). Text of Remarks by the President at the Annual Meeting of the National Academy of Sciences, Office of the Press Secretary, the White House.

Bush, V. (1945). *Science — The Endless Frontier*, Office of Scientific Research and Development.

Bush, V. (1970). Pieces of the Action. New York, Morrow.

By these same proportionate estimates " Italy's contribution was 29 percent that of the US, the UK's 66 percent, the USSR's 78 percent (at official exchange rates, but only 5 percent at unofficial Fall 1990 "black market" rates). Those without specific

genome programs could not be calculated. US figures are for the NIH and DOE programs. Japanese figures include the Monbusho, STA, and Department of Health programs, but not agricultural or related MITI programs. The UK figure is for the combined MRC-ICRF program, and Italy's includes only the Ministry of Science figures. GNP figures for these calculations are taken from *the 1990 World Almanac* (NY: Pharos Books) and *The Statesman's Yearbook, 1989-1990* (NY: St Martin's). Unofficial conversion rates for Rubles taken from black market rate, Leningrad and Moscow, June 1989. My estimates for Japan's funding are higher than those of the Department of State (\$3.5 million), which did not account for differences in budgeting practices for personnel and space. My calculations assumed that 40 percent of US research budgets covered salaries and other expenses not included in the European and Japanese budget items. Genome budget estimates for 1990 are taken from various references that follow."

Byrnes, M. (1990). Phone conversation, National Commission on AIDS, referring to period when Dr. Byrnes was staff to Senator Lowell Weicker, Committee on Appropriations, US Senate.

C. W. C. (1877). "Engineering Education In Japan." *Nature*(17 May): 44-45.

Cahill, G. (1988). Interview, Howard Hughes Medical Institute, Bethesda, MD.

Cahill, G. (1991). Letter to the author, Dartmouth College.

Cahill, G. F. (1986). Memo to Donald Fredrickson, Howard Hughes Medical Institute.

Cahill, G. F. and D. R. Hinton (1989). "Howard Hughes Medical Institute and Its Role in Genomic Activities." *Genomics* **5**: 952-954.

Cairns, J., et al., Eds. (1966). *Phage and the Origins of Molecular Biology*. Cold Spring Harbor, NY, Cold Spring Harbor Laboratory.

Cameron, G., et al. (1989). "Journals and Databanks." *Nature* **342**(21/28 December): 848.

Cann, R. M., et al. (1987). "Mitochondrial DNA and Human Evolution." *Nature* **325**: 31-36.

Cantor, C. (1990). Memorandum to HUGO-Americas Ad Hoc Mapping Committee, Human Genome Center, Lawrence Berkeley Laboratory.

Cantor, C. (1991). Interview, Lawrence Berkeley Laboratory.

Cantor, C. (1991). Phone interview, Phone interview.

Cantor, C. R. (1990). "HUGO Physical Mapping." *Nature* **345**(10 May): 106.

Capron, A., et al. (1990). Letters to Senator Tom Harkin and Steny Hoyer, Biomedical Ethics Advisory Committee.

Capron, A. M. (1983-1993). Conversations connected with Office of Technology Assessment activities, Institute of Medicine activities, the Biomedical Ethics Advisory Committee, and other events, University of Southern California; Capron was consultant to the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research and the Ethics Advisory Board (Department of Health, Education and Welfare); Executive Director of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research; and chair of the Biomedical Ethics Advisory Committee.

Capron, A. M. (1991). "Human Genome Research in an Interdependent World." *Ken Inst Eth J* **1**(September): 247-251.

Capron, A. M., et al., Eds. (1979). *Genetic Counseling: Facts, Values, and Norms*. New York, Alan R. Liss.

- Carlson, E. A. (1991). "Defining the Gene: An Evolving Concept." Am J Hum Genet **49**: 475-487.
- Carrano, A. V. and E. W. Branscomb (1986). Letter to Mark Bitensky, Lawrence Livermore National Laboratory.
- Caskey, C. T. (1990). Introduction of Kary B. Mullis, DNA Sequencing II, Hilton Head Hyatt Regency.
- Caskey, C. T., et al. (1990). "The American Society of Human Genetics Statement on Cystic Fibrosis Screening." Am. J. Hum. Genet. **46**: 393.
- Caspersson, T., et al. (1970). "Fluorescent Banding." Hereditas **67**: 89-102.
- Caspersson, T., et al. (1970). "Differential Banding of Alkylating Fluorochromes in Human Chromosomes." **60**: 315-319.
- Caspersson, T., et al. (1971). "Quinocrone Mustard Fluorescent Banding." **30**: 215-227.
- Caspersson, T. O. (1989). "The William Allan Memorial Award Address: The Background for the Development of the Chromosome Banding Technique." Am J Hum Genet **44**(#4, April): 441-451.
- Cavalieri, L. (1987). "Gene Sequencing: No Easy Answers." The Scientist **1**(No. 5, 26 January): 13.
- Cavalli-Sforza, L. L. (1990). "Opinion: How Can One Study Individual Variation for 3 Billion Nucleotides of the Human Genome?" Am J. Hum Genet **46**: 649-651.
- Cavalli-Sforza, L. L., et al. (1992). Epilogue. History and Geography of Human Genes. Princeton, NJ, Princeton University Press.
- Cavalli-Sforza, L. L., et al. (1988). "Reconstruction of Human Evolution: Bringing Together Genetic, Archaeological, and Linguistic Data." PNAS **85**(August): 6002-6006.
- Cavalli-Sforza, L. L., et al. (1991). "Call for a Worldwide Survey of Human Genetic Diversity: A Vanishing Opportunity for the Human Genome Project." Genomics **11**(October): 490-491.
- Cavenee, W. K., et al. (1985). "Genetic Origin of Mutations Predisposing to Retinoblastoma." Science **228**: 501-503.
- Cawthon, R. M., et al. (1990). "A Major Segment of the Neurofibromatosis Type 1 Gene: cDNA Sequence, Genomic Structure, and Point Mutations." Cell **62**(13 July): 193-201.
- Chaitin, G. J. (1987). Conclusion. Algorithmic Information Theory. New York, Cambridge University Press: 160-161.
- Chakraborty, R. and K. Kidd (1991). "The Utility of DNA Typing in Forensic Work." Science **254**: 1735-1739.
- Chang, J. C. and Y. W. Kan (1982). "A Sensitive New Prenatal Test for Sickle Cell Anemia." N Engl J Med **307**: 30-32.
first use of Mst II to directly cut HbS gene at mutation site. Generates 1.1 kb frag with HbS, 1.3 kb with HbA
- Chapman, M. A. (1990). "Predictive Testing for Adult-Onset Genetic Disease: Ethical and Legal Implications of the Use of Linkage Analysis for Huntington Disease." Am J Hum Genet **47**: 1-3.
- Charles, D. (1988). "Labs Struggle to Promote Spin-Offs." Science **240**(13 May): 874-876.
- Charles, D. and A. Coghlan (1992). "Ministers Move to Limit Genome Patents." New Sci(14 March): 9.
- Cherfas, J. (1988). "A Guide to Being Human." New Scientist(25 February): 30-31.

- Chijiya, M. (1990). Interview at 2-2-1 Kasumigaseki, Chiyoda-ku, Tokyo 100, Director, Life Sciences, Science and Technology Agency (kangaku jijutsu-cho), R&D Bureau.
- Childress, J. F. (1991). Human Fetal Tissue Transplantation Research. Biomedical Politics. K. E. Hanna. Washington, DC, National Academy Press: 215-248.
- Childs, B. (1970). "Sir Archibald Garrod's Conceptions of Chemical Individuality: A Modern Appreciation." N Engl J Med **282**(#2, 8 January): 71-77.
- Chiles, L., et al. (1988). "S. 1966, Biotechnology Competitiveness Act of 1988." Congressional Record(17 June): S 8061-8074, S 8097-8101, D8781.
- Chiles, L. and R. Snell (1988). Joint interview, Room 250, Russell Senate Office Building.
- Choppin, P. (1991). Foreword, Blazing a Genetic Trail. Howard Hughes Medical Institute.
- Chumakov, I., et al. (1992). "Continuum of Overlapping Clones Spanning the Entire Human Chromosome 21q." Nature **359**(1 October): 380-387.
- Church, G., et al. (1987). Invited speakers to the Committee on Mapping and Sequencing the Human Genome, Board on Basic Biology, National Academy of Sciences.
- Cimons, M. (1992). "A Straight Shooter Energizes Troubled NIH." LA Times(14 April): E1, E2.
- Ciotti, P. (1985). "Fighting Disease on the Molecular Front." LA Times Magazine(20 October): 18-19, 38, 50, 56.
- Cleeton, D. L., et al. (1992). "What Does the Consumer Price Index for Prescription Drugs Really Measure?" Health Care Fin Rev **13**(No. 3, Spring): 45-51.
- Clift, E. (1992). "Body Politics." Working Woman(September): cover, 60-63, 98-99, 106, 108.
- Code of Federal Regulations (1989). Part 46 — Protection of Human Subjects, revised as of March 8, 1983, reprinted July 31, 1989, Code of Federal Regulations, Title 45; available through the Office of Protection from Research Risks, National Institutes of Health.
- Coghlan, A. (1992). "US Gene Plan 'Makes a Mockery of Patents'." New Sci(22 February): 16.
- Cohen, S. and H. Boyer (1976). US Patent 4,237,224, Stanford University and University of California, San Francisco.
- Collected papers and letters (1986). From March 1986 Santa Fe Workshop. G. Department of Energy Headquarters, MD.
- Collins, F. S. (1990). Speech at the first of two conferences organized by J. Robert Nelson and others "Genetics, Religion, and Ethics: Implications of the Human Genome Project for Medicine, Theology, Ethics, and Policy, MD Anderson Cancer Research Center.
- Collins, F. S. (1991). "Medical and Ethical Consequences of the Human Genome Project." J Clin Eth **2**(Winter): 260-267.
- Collins, F. S. (1993). Note to author, National Center for Human Genome Research, NIH.
- Collins, J. F. and A. F. W. Coulson (1987). Molecular Sequence Comparison and Alignment. Nucleic Acid and Protein Sequence Analysis: A Practical Approach. M. J. Bishop and C. J. Rawlings. Washington, DC, IRL Press: 343-350.

Comer, D. B. (1992). Letter to Michael J. Astrue, General Counsel, Department of Health and Human Services, Patent and Trademark Office, US Department of Commerce.

Comings, D. E. (1986). Letter to Mark Bitensky, City of Hope National Medical Center.

Commission of Inquiry into Human Fertilisation and Embryology (1984). Report, Her Majesty's Stationery Office.

Commission of the European Communities (1988). Proposal for a Council Decision Adopting a Specific Research Programme in the Field of Health: Predictive Medicine: Human Genome Analysis (1989-1991), Commission of the European Communities.

Commission of the European Communities (1989). Modified Proposal for a Council Decision, Adopting a Specific Research and Technological Development Programme in the Field of Health — Human Genome Analysis: (1990-1991), Commission of the European Communities.

Committee for the Study of Inborn Errors of Metabolism (1975). Genetic Screening: Programs, Principles, and Research, National Research Council, National Academy of Sciences.

Committee on Computer-Assisted Modeling (1987). Computer-Assisted Modeling. Contributions of Computational Approaches to Elucidating Macromolecular Structure and Function, Board On Basic Biology, Commission on Life Sciences, National Research Council, National Academy of Sciences.

Committee on DNA Technology in Forensic Science (1992). DNA Technology in Forensic Science, Board on Biology, Commission on Life Sciences, National Research Council.

Committee on Japan (1991). Intellectual Property Rights and US-Japan Competition in Biotechnology: Report of a Workshop, Office of Japan Affairs, National Research Council, National Academy of Sciences.

Committee on Japan (1992). US-Japan Technology Linkages in Biotechnology: Challenges for the 1990s, Office of Japan Affairs, Office of International Affairs, National Research Council, National Academy of Sciences. Chapter 1 and table 2, yielding an estimate of 24 percent.

Committee on Models for Biomedical Research (1985). Models for Biomedical Research, National Academy of Sciences.

Committee on Policies for Allocating Health Sciences Research Funds (1990). Funding Health Sciences Research. A Strategy to Restore Balance, Institute of Medicine, National Academy of Sciences, National Academy Press.

Compton, A. H. (1956). Atomic Quest: A Personal Narrative. New York, Oxford University Press.

Concar, D. (1992). "French Find Short Cut to Map of Human Genome." New Scientist(23 May): 5.

Constantinidis, J., et al. (1965). "L'incidence familiale des alterations neurofibrillaires corticales d'Alzheimer." Psychiat Neuro **150**: 235-247.

Consultants to the Advisory Committee to the Director (1988). Report of the Human Fetal Tissue Transplantation Research Panel, Vol. 1, National Institutes of Health.

Consultants to the Advisory Committee to the Director (1988). Report of the Human Fetal Tissue Transplantation Research Panel, Vol. 2, National Institutes of Health.

Consumer Reports (1990). "The Telltale Gene." Consumer Reports(July): 483-488.

Cook, R. H., et al. (1981). "Twins with Alzheimer's Disease." Arch Neurol **38**(May): 300-301.

Cook-Deegan (1989). "The Alta Summit, December 1984." Genomics **5**: 661-663.

Cook-Deegan, R. (1986). Notes from Informational Forum on the Human Genome, Building 31, National Institutes of Health, Bethesda, MD, Howard Hughes Medical Institute.

Cook-Deegan, R. (1986). Personal notes from meeting, National Institutes of Health.

Cook-Deegan, R. M. (1986). Memo on possible OTA project, Office of Technology Assessment.

Cook-Deegan, R. M. (1991). The Genesis of the Human Genome Project. Molecular Genetic Medicine, Vol. 1. T. Friedmann. San Diego, Academic Press. **1**: 1-75.

Cook-Deegan, R. M. (1991). The Human Genome Project: Formation of Federal Policies in the United States, 1986-1990. Biomedical Politics. K. Hanna. Washington, DC, National Academy Press: 99-168.

Cook-Deegan, R. M. (1992). The Gene Wars: Science, Politics and the Human Genome. New York, WW Norton.

Cook-Deegan, R. M. (1994). Survey of Genome Research Companies. Washington, DC, Office of Technology Assessment.

Cook-Deegan, R. M., et al. (1990). "The Large DNA Insert Cloning Workshop." Genomics **7**(August): 654-660; based on Olson's summary on p. 655.

Cook-Deegan, R. M., et al. (1990). DNA Sequencing Conference, II, Hyatt Regency Hotel, Hilton Head, SC. Unpublished meeting summary.

Cook-Deegan, R. M., et al. (1990). The Human Genome and the Pharmaceutical Industry, Unpublished report of a conference on Hilton Head Island, South Carolina, 30 September 1990.

Cooper, S. G. (1991). note to author. 22 January. C. S. H. L. Communications Office director.

Coulson, A., et al. (1986). "Toward a Physical Map of the Genome of the Nematode *Caenorhabditis elegans*." Proc. Nat. Acad. Sci. (USA) **83**(October): 7821-7825.

Coulson, A., et al. (1988). "Genome Linking with Yeast Artificial Chromosomes." Nature **335**(8 September): 184-186.

Council for Aeronautics Electronics and Other Advanced Technologies (1988). Comprehensive Strategy for Promoting R&D on Human Genome Analysis, Science and Technology Agency, Government of Japan.

Council for Responsible Genetics (1990). Position Paper on the Human Genome Initiative, Council for Responsible Genetics.

Council of the European Communities (1990). "Council Decision Adopting a Specific Research and Technological Development Programme in the Field of Health: Human Genome Analysis (1990 to 1991) (90/395/EEC)." (L 196, 26 July): 8-14.

Counts, C. L. (1987). "Human Genome Sequencing (letter)." Science **236**(26 June): 1613.

Courteau, J. (1991). "Genome Databases." Science **254**(11 October): 201-207.

Coutelle, C. (1989). Interview at meeting of UNESCO Director General's Scientific Coordination Committee on Human Genome Research, UNESCO Headquarters, Paris.

Coutelle, C. (1990). Interview at meeting of UNESCO Director General's Scientific Coordination Committee on Human Genome Research, UNESCO Headquarters, Paris.

Coutelle, C. (1990). Interview at meeting of UNESCO Director General's Scientific Coordination Committee on Human Genome Research, Englehardt Institute for Molecular Biology, Moscow.

Cowan, R. S. (1992). Genetic Technology and Reproductive Choice: An Ethics for Autonomy. The Code of Codes: Scientific and Social Issues in the Human Genome Project. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 244-263.

Crawford, M. (1987). "Document Links NSF Official to Biotech Firm." Science **238**: 742.

Crawford, M. (1987). "Wyngaarden to Chair Biotech Council." Science **238**(11 December): 1504-1505.

Crawford, R. (1990). "Under the Microscope: Japan's Lackluster Effort to Contribute to the Human Genome Project." Far East. Econ. Rev. **149**(No. 36, 6 September): 82.

Crawford, R. (1991). "Gene Mapping Japan's Number One Crop." Science **252**(21 June): 1611.

Crick, F. (1974). "The Double Helix: A Personal View." Nature **248**(26 April): 766-769.

Crick, F. (1988). What Mad Pursuit: A Personal View of Scientific Discovery. New York, Basic Books. Same quote also found in "The Double Helix: A Personal View," Nature **248** (April 26): 766-771, 1974; reprinted in James D. Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*, Gunter S. Stent, Ed., Norton Critical Edition, W. W. Norton, 1980.

Crow, J. F. (1990). "R. A. Fisher, A Centennial View." Genetics **124**(February): 207-211.

Crow, J. F. and W. F. Dove (1988). "Anecdotal, Historical, and Critical Commentaries on Genetics: A Diamond Anniversary: The First Chromosome Map." Genetics **118**(January): 1-3.

Culliton, B. J. (1985). "Watson Fights Back." Science **228**(12 April): 160.

Culliton, B. J. (1987). "Fredrickson's Bitter End at Hughes." Science **236**(12 June): 1417-1418.

Culliton, B. J. (1987). "Hughes Settles with IRS." Science **235**: 1318.

Culliton, B. J. (1989). "GM, Hughes Settle Stock Fight." Science **245**(10 March): 1283.

Culliton, B. J. (1989). "NIH: The Good Old Days." Science **244**(23 June): 1437.

Culliton, B. J. (1990). "Mapping Terra Incognita (Humani Corporis)." Science **250**(12 October): 210-212.

Culliton, B. J. and R. Pool (1991). "Presidential Address Sets the Tone." Nature **349**(21 February): 642.

Cunningham, G. C. (1990). Balancing the Individual's Rights to Privacy Against the Need for Information to Protect and Advance Public Health. Genetic Screening. From Newborns to DNA Typing. B. M. Knoppers and C. M. Laberge. New York, Elsevier: 205-215.

Curien, H. (1991). "The Human Genome Project and Patents." Science **254**: 1710.

Curtis, D. and C. Coles (1989). *The Gene Machine*, Innovation, WNET.

Darwin, C. (1958). The Origin of Species. New York, Mentor.

Data Management for Physical Mapping (1988). Report of a Workshop, May 12-13, 1988, National Institute of General Medical Sciences, National Institutes of Health; Office of Health and Environmental Research, Department of Energy; and Howard Hughes Medical Institute.

Dausset, J., et al. (1990). "Centre d'Etude du Polymorphisme Humain (CEPH): Collaborative Genetic Mapping of the Human Genome." Genomics **6**(#3, March): 575-577.

Davies, K. (1989). "The Search for the Cystic Fibrosis Gene." New Scientist(21 October): 54-58.

Davies, K. E., et al. (1983). "Linkage Analysis of Two Cloned Sequences Flanking the Duchenne Muscular Dystrophy Locus on the Short Arm of the Human X Chromosome." Nuc Acids Res. **11**: 2302-2312.

Davis, B. (1990). Testimony before the Senate Subcommittee on Energy Research and Development, Committee on Energy and Natural Resources, US Senate.

Davis, B. (1990). Watson Doesn't Use Gentle Persuasion to Enlist Japanese and German Support for Genome Effort. Wall Street Journal. New York: A12.

Davis, B. D. (1990). "Human Genome Project: Is 'Big Science' Bad for Biology? Yes, It Bureaucratizes, Politicizes Research." The Scientist **4**(#22, 12 November): 13,15.

Davis, B. D. and Colleagues (1990). "The Human Genome and Other Initiatives." Science **249**(27 July): 342-343.

Davis, M. and P. Hoben (1988). Phone and personal conversations, Office of the Assistant Secretary of Health, Department of Health and Human Services.

Davis, R. (1987). Interview, Stanford University.

Davison, D. (1990). Bitnet communication, Stanford University.

Dayhoff, M. O. and R. V. Eck (1966). Atlas of Protein Sequence and Structure. Silver Spring, MD, National Biomedical Research Foundation.

Dean, M. (1988). "Molecular and Genetic Analysis of Cystic Fibrosis." Genomics **3**: 93-99.

Decker, J. F. (1987). Letter to James Wyngaarden, Office of Energy Research, Department of Energy.

del Guercio, G. (1987). "Designer Genes." Boston(August): 79-87.

Delehanty, J., et al. (1986). "Approaches to Determining Mutation Rates in Human DNA." Mutation Res **167**: 215-232.

DeLisi, C. (1985). Note to David Smith, Office of Health and Environmental Research, US Department of Energy.

DeLisi, C. (1985). Note to David Smith, Office of Health and Environmental Research, US Department of Energy.

DeLisi, C. (1986). Interview.

DeLisi, C. (1986). Letter to Mark W. Bitensky, Department of Energy.

DeLisi, C. (1986). Memo to Alvin Trivelpiece, Office of Health and Environmental Research, Department of Energy.

DeLisi, C. (1986). Second memo to Alvin Trivelpiece, Office of Health and Environmental Research, Department of Energy.

DeLisi, C. (1987). Interview.

DeLisi, C. (1987-1988). "various meetings and phone conversations."

DeLisi, C. (1988). "Computers in Molecular Biology: Current Applications and Emerging Trends." *Science* **240**(1 April): 47-52.

DeLisi, C. (1988). "The Human Genome Project." *Am. Sci.* **76**: 488-493.

DeLisi, C. (1990). Conversation before a Senate Hearing, Dirksen Senate Office Building, US Senate.

DeLisi, C. (1990). "DeLisi left DOE employ 1 September 1987, two years after joining it, to chair a department of mathematical biology at Mt. Sinai Medical Center in New York City. He left that post in January 1990 to become Dean at the College of Engineering, Boston University."

DeLisi, C. (1990). Letter commemorating retirement of Akiyoshi Wada, Boston University.

DeLisi, C. (1990). Letter to author.

DeLisi, C. (1990). Letter to author.

DeLisi, C. (1991). Interview, Boston University School of Engineering; interview in Senator Pete Domenici's office, Dirksen Senate Office Building.

DeLisi, C. (1991). Letter to author.

Desruisseaux, P. (1987). Hughes Will Spend Extra \$500-Million on Grants to Science Over Next 10 Years. *Chronicle of Higher Education*.

Devlin, B., et al. (1993). "Statistical Evaluation of DNA Fingerprinting: A Critique of the NRC's Report." *Science* **259**(5 February): 748-749; 837.

Dickman, S. and P. Aldhous (1991). "Helping Europe Compete in Human Genome Research." *Nature* **350**(28 March): 261.

Dickson, D. (1988). "Europe Seeks a Strategy for Biology." *1988 Science*(6 May): 710-712.

Dickson, D. (1988). "Focus on the Genome." *Science* **240**(6 May): 711.

Dickson, D. (1989). "Britain Launches Genome Program." *Science* **245**(31 March): 1657.

Dickson, D. (1989). "France Introduces Bioethics Law." *Science* **243**(10 March): 1284.

Dickson, D. (1989). "Genome Project Gets Rough Ride in Europe." *Science* **243**(3 February): 599.

Dickson, D. (1989). "Unesco Seeks a Role in Genome Projects." *Science* **243**(17 March): 1431-1432.

Dickson, D. (1989). "Watson Floats a Plan to Carve Up the Genome." *Science* **244**(5 May): 521-522.

Dickson, D. (1993). "Britain Plans Broad Strategy on Genome, Approves Therapy." *Nature* **361**(4 February): 387.

Dickson, D. and A. Abbott (1993). "Cambridge and Heidelberg Compete for New European Gene Database." *Nature* **361**(4 February): 383.

Dietrich, W., et al. (1992). "A Genetic Map of the Mouse Suitable for Typing Intraspecific Crosses." Genetics **131**(June): 423-447.

DNA Sequencing Conference, I. (1990). Hilton Head, SC, Laboratory on Molecular and Cellular Neurobiology, NINDS.

DOE initial cost estimates (1986). "The DOE-OMB agreement is dated 18 December 1986. DeLisi had briefed OMB in July and got a preliminary go-ahead signal on 5 September. DeLisi thus cut his deal some time before HERAC reported. Indeed, he reported to the HERAC subcommittee at its meeting on 6 and 7 November (in Denver) that he had reprogrammed several millions of dollars in fiscal year 1987 and expected a \$20 million annual budget two years hence. While they did not influence the initial DOE plans, the HERAC subcommittee's budget figures were to figure in the larger budget debate that developed later."

Domenici, P. (1987). "S. 1480." Congressional Record(10 July): S 9706-9720.

Domenici, P. (1989). "The Government-Industry-University Link." Roll Call(10-16 July): 3.

Domestic Policy Council (1987). Subcommittee on Characterization of Complex Genomes, list of questions to be asked of agencies, White House.

Donahue, R. P., et al. (1968). "Probable Assignment of the Duffy Blood Group Locus to Chromosome 1 in Man." PNAS **61**: 949-955.

Donis-Keller, H. (1988). Interview, Collaborative Research, Inc.

Donis-Keller, H. (1991). Telephone interview, Washington University, Saint Louis.

Donis-Keller, H., et al. (1987). "A Genetic Linkage Map of the Human Genome." Cell **51**(October): 319-337.

Doolittle, F., et al. (1989). Mapping and Sequencing the Human Genome: A Program for Canada.

Doolittle, R. (1987). Of URFs and ORFs: A Primer on How to Analyze Derived Amino Acid Sequences. Mill Valley, CA, University Science Books.

Doolittle, R. F., et al. (1986). "Relationships of Human Protein Sequences to Those of Other Organisms." CSH Symp Quant Biol **51**: 447-455.

Doolittle, R. F., et al. (1983). "Simian Sarcoma virus *onc* gene, *v-sis*, Is Derived from the Gene (or Genes) Encoding a Platelet-Derived Growth Factor." Science **221**: 275-277.

Dorfman, P. (1983). "The Rifkin Resolution: Less Than Meets the Eye." Gen Eng News(July-August): 4, 12.

Dorit, R. L., et al. (1990). "How Big is the Universe of Exons?" Science **250**(7 December): 1377-1382.

Dorozynski, A. (1991). "Privacy Rules Blindside French Glaucoma Effort." Science **252**(19 April): 369-3700.

Dorozynski, A. (1992). "Gene Mapping the Industrial Way." Science **256**(24 April): 463.

Downward, J., et al. (1984). "Close Similarity of Epidermal Growth Factor Receptor and *v-erb-B* oncogene protein sequences." Nature **307**: 521-527.

Drmanac, R., et al. (1990). Towards Genomic DNA Sequencing Chip Based on Oligonucleotide Hybridization, Cold Spring Harbor meeting on Genome Mapping and Sequencing.

- Dulbecco, R. (1986). "A Turning Point in Cancer Research: Sequencing the Human Genome." Science **231**: 1055-1056.
- Dulbecco, R. (1987). Interview. January. S. Institute.
- Dulbecco, R. (1987). A Turning Point in Cancer Research: Sequencing the Human Genome. Viruses and Human Cancer, Alan R. Liss: 1-14.
- Dulbecco, R. (1990). Interview, Salk Institute, La Jolla, CA.
- Dulbecco, R. (1990). "The Italian Genome Program." Genomics **7**(June): 294-297.
- Dulbecco, R. (1991). Letter, Salk Institute.
- Dupree, A. H. (1985). Science and the Federal Government. Baltimore, MD, Johns Hopkins University Press.
- Duster, T. (1990). Backdoor to Eugenics. New York, Routledge.
- Dyer, H. (1904). "Education and National Efficiency in Japan." Nature(15 December): 151-152.
- Eckholm, E. (1992). "A Tough Case for Dr. Healy." NYT Magazine(1 December): 67, 118, 122,124, 126.
- Eckstrand, I. and J. Greenberg (1989). Meeting at Westwood Building, Bethesda, MD, National Institute of General Medical Sciences.
- Eckstrand, I. A. (1987). Memo to Kirschstein on Meeting of the OHER subcommittee on the Human Genome, 5-6 February, National Institute of General Medical Sciences, National Institutes of Health.
- Economic and Social Committee (1988). Opinion of the Economic and Social Committee on the Proposal for a Council Decision Adopting a Specific Research Programme in the Field of Health: Predictive Medicine: Human Genome Analysis (1989-1991) (COM(88) 424 final — SYN 146), Commission of the European Communities.
- Edgar, R. and H. Noller (1984). Human Genome Institute: A Position Paper, Biology Board of Studies, University of California at Santa Cruz.
- Edgar, R. S. (1985). Letter to Walter Gilbert, University of California, Santa Cruz.
- Editorial (1988). "Why Sequence the Human Genome?" Nature **331**(11 February): 465.
- Editorial (1991). "Ethical Problems to Merit the Name." Nature **352**(1 August): 359-360.
- Editorial (1991). "Ethics and the Human Genome." Nature **351**(20 June): 591.
- Editorial (1992). "Gene Patents." Nature **359**(1 October): 348.
- Editorial (John Maddox) (1991). "Free Trade in Human Sequence Data?" Nature **354**(21 November): 171-172.
- Editorial (John Maddox) (1992). "Genetics and the Public Interest." Nature **356**(2 April): 365-366.
- Editorial (John Maddox) (1992). "Genome Propaganda." Nature **357**(18 June): 524.
- Editorial (John Maddox) (1992). "Healy in a Hurry." Nature **356**(16 April): 547-548.
- Edman, P. (1950). "A Method for the Determination of the Amino Acid Sequence in Peptides." Acta Chem Scand **4**: 283-293.

Edwards, A., et al. (1990). "Automated DNA Sequencing of the Human HPRT Locus." Genomics **6**(April): 593-608.

Edwards, C. Q., et al. (1988). "Prevalence of Hemochromatosis Among 11,065 Presumably Healthy Blood Donors." NEJM **318**(21): 1355-1362.

EG&G Biomolecular (1987). Interviews. May. M. Watertown.

Eijgenraam, F. (1992). "Yeast Chromosome III Reveals a Wealth of Unknown Genes." Science **256**(8 May): 730.

Eisenberg, R. S. (1990). "Patenting the Human Genome." Emory Law Journal **39**: 721-745.

Eisenberg, R. S. (1992). "Genes, Patents, and Product Development." Science **257**(14 August): 903-908.

Eisenberg, R. S. (1997). "Structure and function in gene patenting." Nature genetics **15**(February): 125-130.

Eisner, R. (1989). Interview, Englehardt Institute of Molecular Biology and long treks through Moscow in search of an open restaurant.

Elmer-DeWitt, P., et al. (1989). "The Perils of Treading in Heredity." Time(March 20): 70-71.

Endo, I., et al. (1991). "Human Genome Analysis System." Nature **352**(4 July): 89-90.

English, W. H. (1942). "Alzheimer's Disease." Psychiat Q **16**: 98.

Enquetekommission (Enquete Commission) (1987). Chancen und Risiken der Gentechnologie, Deutscher Bundestag (German Parliament).

Equal Employment Opportunity Commission (1991). "Equal Employment Opportunity for Individuals with Disabilities; Final Rule. 29 Code of Federal Regulations, Part 1630. 29 Code of Federal Regulations, Parts 1602 and 1627. Recordkeeping and Reporting Under Title VII of the Civil Rights Act of 1964 and The Americans With Disabilities Act (ADA); Final Rule." Federal Register **56**(144, 26 July): 35726-35756.

Equal Employment Opportunity Commission (1991). "Equal Employment Opportunity for Individuals with Disabilities; Notice of Proposed Rulemaking, 29 CFR 1630." Federal Register **Part VI**(28 February): 8578-8603.

Erdheim, E. (1987). conversation in staff offices, Rayburn House Office Building, Subcommittee on Natural Resources, Agriculture Research, and Environment of the Committee on Science, Space and Technology, US House of Representatives.

Erllich, H. A., et al. (1991). "Recent Advances in the Polymerase Chain Reaction." Science **252**(21 June): 1643-1651.

Erllich, H. A., et al. (1988). "Specific DNA Amplification." Nature **331**(4 February): 461-462.

Essen-Moller, E. (1946). "A Family with Alzheimer's Disease." Acta Neurol Scand **21**: 233-244.

Ethical, L., and Social Implications Program, (1991). Grant-Making Status Report, National Center for Human Genome Research, National Institutes of Health.

European Science Foundation (1991). Report on Genome Research 1991, European Science Foundation.

Evangelista, P. (1992). Hoffmann-La Roche Expands Access to PCR Technology for Diagnostic Testing Services — Move Expected to Continue to Accelerate Pace of PCR Development, Roche Diagnostics Group, Hoffmann-La Roche, Inc., Nutley, NJ.

- Evangelista, P., et al. (1991). Hoffmann-La Roche Acquisition of PCR Technology Completed. Roche and Perkin-Elmer Form Strategic Alliance, Hoffmann-La Roche, Inc.
- Faden, R. R. and T. L. Beauchamp (1986). A History and Theory of Informed Consent. New York, Oxford University Press.
- FDC Reports (1988). "Biotech Competitiveness Act Draws Administration Opposition in Subcommittee Hearing on National Policy Commission; Industry Groups Endorse Senate Bill." The Pink Sheet(18 July): 12.
- FDC Reports (1988). "Biotechnology Act Draws Administration Opposition in Congressional Hearing; Industry Endorses." The Blue Sheet(20 July): 6.
- FDC Reports (1988). "Human Genome Project: Interagency Task Force." The Pink Sheet(16 May): 7.
- FDC Reports (1992). "Sen. Hatfield Foregoes Gene Patenting Moratorium Proposal After Kennedy, DeConcini Agree to Hearings; HHS, White House, PTO Opposed to Amendment." FDC Reports(6 April): 14.
- FDC Reports, T. B. S. (1992). "Senator Hatfield Foregoes Gene Patenting Moratorium Proposal After Kennedy, DeConcini [sic] Agree to Hearings: HHS, White House, PTO Opposed Amendment." FDC Reports, the Blue Sheet(6 April): 14.
- Feldman, R. G., et al. (1963). "Familial Alzheimer's Disease." Neuro **13**: 811-824.
- Ferguson-Smith, M. A. (1991). "European Approach to the Human Gene Project." FASEB J **5**(January): 61-65.
- Ferrell, J. (1991). "'Office Ladies' Aid Research." Nature **353**(12 September): 99.
- Fetrow, J. S., et al. (1988). "Protein Folding: New Twists." Bio/Technology **6**(No. 2, February): 167-171.
- Fifth Conference on Bioethics of the Seven Highly Industrialized Nations (1988). International Conference on Bioethics. The Genome Mapping and Sequencing: Ethical Issues, Rome, Italy.
- Fine, M. J. (1991). "Coping with Consequences of Genetic Testing." Phila Inq(3 July): 1A-14A.
- Fink, L. (1990). "Human Genome Office Attains Center Status." NIH Record **42**(9 January): 1,4.
- Fink, L. (1990). NCHGR Bioethics Program Addresses Social and Ethical Implications of Knowledge about Human Genes, National Center for Human Genome Research, NIH.
- Fitch, W. M. and E. Margoliash (1967). "Construction of Phylogenetic Trees." Science **155**: 279-284.
- Flander, J. (1992). "Trouble-Shooter: Dr. Bernadine Healy Takes Washington by Storm." Sunday(17 May): 10-11, 39-41.
- Fletcher, J. C. (1986). Memo to Ruth Kirschstein, Director, National Institute of General Medical Sciences, Magnuson Clinical Center, NIH.
- Flugel, F. E. (1929). "Zur Diagnostik der Alzheimerschen Krankheit." Ges Psych **120**: 783-787.
- Fogle (1992). "Rest, Relaxation, and RFLPs." J NIH Res **4**(January): 66-71.
- Foote, S., et al. (1992). "The Human Y Chromosome: Overlapping DNA Clones Spanning the Euchromatic Region." Science **258**(2 October): 60-66.

foreign commissions The British Warnock Report touched on genetics in several of its recommendations. The German Benda Commission proposed a broad set of laws to cover gene therapy, embryo research, and genetic technologies. This was followed a few years later by a report from the Enquete Commission of the German Parliament, and ultimately led to new German statutes governing scientific research. The French government considered a report on ethics and the life sciences, and produced legislation to protect human subjects of research. The Glover Report to the European Commission included a section on handicaps that discussed the role of genetic testing. A January 1990 genome conference in Paris devoted a session to discussion of eugenics, and scientists' responsibilities in genome research. Santiago Grisolia's second conference in Valencia was entirely devoted to discussion of the social implications of genome research. And finally, the Council of Europe's *Ad Hoc* Committee of Experts on Bioethics (CAHBI) worked towards reports on the use of genetic testing and screening in medicine and on DNA testing in the criminal justice system.

Foundation for American Communications (1989). *The New Genetics and the Right to Privacy*, Foundation for American Communications.

Foundation on Economic Trends (1983). *The Theological Letter Concerning the Moral Arguments Against Genetic Engineering of the Human Germline Cells. Taking Sides: Clashing Views on Controversial Bio-Ethical Issues*. C. Levine. Guilford, CT, Dushkin Publishing, 1984: 276-280.

Foundation on Economic Trends (1988). Human Genome Fact Sheet, Press statement.

Foundation on Economic Trends (1989). Disability Rights Leaders from Across the Country, Jeremy Rifkin, and the Foundation on Economic Trend [sic] Challenge First Human Genetic Experiment at NIH Meeting January 30, 1989, Foundation on Economic Trends press statement.

Fowlston, B. J. (1988). "Biotechnology Patents in Europe." *Bio/Technology* **6**(August): 911-913.

Fox, J. L. (1987). "Contemplating the Human Genome." *BioSci.* **37**(July/August): 457-460.

Fox, J. L. (1988). "\$200 Million a Year for Human Genome." *Bio/Technology* **6**(April): 370.

Fox, J. L. (1988). "Critics Converge on Genome Project." *Bio/Technology* **6**(June): 643.

Fox, J. L. (1988). "Watson to Head Genome Efforts." *Bio/Technology* **6**(November): 1274.

Fox, M. (1989). Dinner with Evelyn Fox Keller and Diane Paul, Boston.

Fox, P. (1989). "From Senility to Alzheimer's Disease: The Rise of the Alzheimer's Disease Movement." *Milbank Quart* **67**(No. 1): 58-102.

Fredrickson, D. S. (1985). Letter to Robert L. Sinsheimer, Chancellor, University of California, Santa Cruz, Howard Hughes Medical Institute.

Fredrickson, D. S. (1987). "Challenge of Change in Biology." *Nature* **329**(22 October): 686-687.

Fredrickson, D. S. (1991). *Asilomar and Recombinant DNA: The End of the Beginning*. Biomedical Politics. K. E. Hanna. Washington, DC, National Academy Press: 258-298.

Friede, R. L. and K. R. Magee (1962). "Alzheimer's Disease." *Neurol.* **12**: 213-222.

Frieden, J. (1991). "Genetic Testing: What Will It Mean for Health Insurance?" *Business and Health*(March): 40-46.

Friend, S. H., et al. (1986). "A Human DNA Segment with Properties of the Gene That Predisposes to Retinoblastoma and Osteosarcoma." *Nature* **323**(16 October): 643-646.

- Frye v. United States* (1923). 293 F. 1013, District of Columbia Circuit Court.
- Fuchs, V. R. (1990). "The Health Sector's Share of the Gross National Product." *Science* **247**(2 February): 534-538.
- Fujimura, B. K. (1988). *Biotechnology in Japan*, International Trade Administration, US Department of Commerce.
- Fujiyama, A. (1990). Interview, Englehardt Institute for Molecular Biology, Moscow.
- Gage, L. P. (1988). *Human Genome Mapping and Sequencing: Why We Should Do It — Now!*, Annual meeting, Industrial Biotechnology Association, Charles Hotel, Cambridge, MA.
- Galas, D. (1990). Statement before the Subcommittee on Energy Research and Development, Committee on Energy and Natural Resources, US Senate.
- Gall, J. G. (1986). "Human Genome Sequencing." *Science* **233**(26 September): 1367-1368.
- Gallagher, H. G. (1990). *By Trust Betrayed: Patients, Physicians, and the License to Kill in the Third Reich*. New York, Henry Holt.
- Gamow, G. (1954). "Possible Relation between Deoxyribonucleic Acid and Protein Structures." *Nature* **173**(13 February): 318. I thank Maynard Olson for pointing out this reference.
- Garrod, A. E. (1909). *Inborn Errors of Metabolism*. Oxford, Oxford University Press.
- Genetics Study Conference (1984). Report, Hiroshima: Radiation Effects Research Foundation.
- Genome Patent Working Group (1992). *Intellectual Property Protection and Genome Research: Background Information for a Public Meeting*, Committee on Life Sciences, Federal Coordinating Council for Science, Engineering and Technology, Office of Science and Technology Policy, Executive Office of the President.
- Genome Research in an Interdependent World (1991). Workshop, Building 38A, National Institutes of Health, Bethesda, MD.
- Gershon, D. (1990). "Cetus Battles with DuPont." *Nature* **343**(25 January): 301.
- Gershon, D. (1991). "Is Cetus Selling the Family Silver?" *Nature* **352**(1 August): 364.
- Gibbons, A. (1991). "Systematics Goes Molecular." *Science* **251**(22 February): 872-874.
- Gibbons, A. (1992). "Mitochondrial Eve: Wounded, but Not Dead Yet." *Science* **257**(14 August): 873-875.
- Gilbert, W. (1978). "Why Genes in Pieces?" *Nature* **271**: 501.
- Gilbert, W. (1985). Letter to Robert Edgar, River Associates, Inc.
- Gilbert, W. (1986). Comments taped by C. Thomas Caskey at session on the Human Genome project, symposium on the Molecular Biology of *Homo sapiens*, Cold Spring Harbor Laboratory.
- Gilbert, W. (1986). "Two Cheers for Human Genome Sequencing." *The Scientist*(October 20): 11.
- Gilbert, W. (1987). "Genome Sequencing: Creating a New Biology for the Twenty-First Century." *Iss. Sci. Tech.* **3**: 26-35.

- Gilbert, W. (1988). Interview. 11 November. H. U. Biological Laboratories.
- Gilbert, W. (1988). Watson 60th Birthday Tape, Cold Spring Harbor Laboratories.
- Gilbert, W. (1991). "Towards a Paradigm Shift in Biology." Nature **349**(10 January): 99.
- Gilbert, W., et al. (1988). 60th Birthday Videotape. Taken at "James D. Watson: Celebrating 60 Years" symposium, Cold Spring Harbor Laboratory.
- Gilbert, W. and A. Maxam (1973). "The Nucleotide Sequence of the *lac* operator." Proc Nat Acad Sci **70**(12): 3581-3584.
- Gilbert, W., et al. (1976). Contacts between the *lac* repressor and DNA Revealed by Methylation. Ninth Alfred Benzon Symposium, Copenhagen: Control of Ribosome Synthesis. N. O. Kjeldgaard and O. Maaloe. New York, Academic Press. : 139-143 and discussion 144ff.
- Gilbert, W. and B. Muller-Hill (1966). "Isolation of the *Lac* Repressor." Proc Nat Acad Sci **56**: 1891-1898.
- Gilbert, W. and J. D. Watson (1989). Conversations at Engelhardt Institute of Molecular Biology, Moscow.
- Gillespie, R. D. (1933). "Discussion on the Mental and Physical Symptoms of the Presenile Dementias." Proc Roy Soc Med **26**: 1080-1084.
- Gillis, A. M. (1992). "The Patent Question of the Year." BioScience **42**(No. 5, May): 336-339.
- Gladwell, M. (1992). "Biologist Watson Quits Position at NIH." Washington Post(11 April): A9.
- Gladwell, M. (1992). "Clarifying Patent Law for Genes." Wash Post(23 September).
- Gladwell, M. (1992). "New Face for Science." Washington Post Magazine(21 June): 8-13, 23-25.
- Glover, J. (1989). Fertility and the Family: The Glover Report on New Reproductive Technologies. London, Fourth Estate.
- Goad, W. B. (1979). Proposal to Establish a National Center for Collection and Computer Storage and Analysis of Nucleic Acid Sequences, Los Alamos Scientific Laboratory.
- Goad, W. B. (1982). Acquisition, Integration and Analysis of Molecular Genetic Information: A Workshop, Aspen Center for Physics.
- Goad, W. B. (1983). "GenBank." Los Alamos Science(Fall): 52-61.
- Goad, W. B. (1983). Terminal Progress Report: Workshop on Computational Analysis of DNA Sequences, Aspen Center for Physics, August 30-September 19, 1982, Biotechnology Resources Program, Division of Research Resources, Conference Grant 1 R RR01628-1.
- Goad, W. B. (1987). "Sequence Analysis. Contributions by Ulam to Molecular Genetics." Los Alamos Science Special Issue(No. 15): 288-291. Republished in "From Cardinals to Chaos: Reflections on the Life and Legacy of Stanislaw Ulam" (NY: Cambridge University Press, 1989).
- Goad, W. B. (1988). "GenBank—A Retrospective." News From GenBank **1**(No. 3): 1-2.
- Goate, A. M., et al. (1991). "Segregation of a Missense Mutation in the Amyloid Precursor Protein Gene with Familial Alzheimer's Disease." Nature **349**(21 February): 704-706.

Goate, A. M., et al. (1989). "Predisposing Locus for Alzheimer's Disease on Chromosome 21." Lancet **I for 1989**(18 February): 352-355.

Second report of chrm 21q21 assoc with FAD, 4 families

Gocayne, J., et al. (1987). "Primary Structure of Rat Cardiac Beta-Adrenergic and Muscarinic Cholinergic Receptors Obtained by Automated DNA Sequence Analysis: Further Evidence for a Multigene Family." Proc Nat Acad Sci **84**(December): 8296-8300.

Gödel, K. (1930). Some Metamathematical Results on Completeness and Consistency. From Frege to Gödel. A Source Book in Mathematical Logic, 1879-1931. J. van Heijenoort. Cambridge, MA, Harvard University Press, 1967: 595-596.

Gödel, K. (1931). On Completeness and Consistency. From Frege to Gödel. A Source Book in Mathematical Logic, 1879-1931. J. van Heijenoort. Cambridge, MA, Harvard University Press, 1967: 616-617.

Gödel, K. (1931). On Formally Undecidable Propositions of Principia Mathematica and Related Systems I . From Frege to Gödel. A Source Book in Mathematical Logic, 1879-1931. J. van Heijenoort. Cambridge, MA, Harvard University Press, 1967: 596-616.

Goodfellow, P. (1992). "Variation is Now the Theme." Nature **359**(29 October): 777-778.

Goodman, H. M., et al. (1977). "Nucleotide Sequence of a Mutant Eukaryotic Gene: The Yeast Tyrosine-Inserting Ochre Suppressor SUP4-o." PNAS **74**(December): 5453-5457.

Of 8 tRNA-tyr genes in *S. cerevisiae*, found 8 dif restr frags. Sup4-o (ochre suppressor mutant) linked to one of these variants. Sup4 gene and two other tRNA-tyr genes cloned. Used RFLP fragments for cloning (in lambda), hybridized to find tRNA-tyr genes, then M-G sequenced from Xma I site at 3' end of gene; recloned in pBR 322, which has no Xma sites, and thus was used for sequencing. Sequenced approx 20 bp to 5' end, through 150 bp gene (incl 14-bp intron), and 40-60 bp 3' to gene. Found GC to AT mutation in Sup4-o at position 37 in tRNA that was wobble position in anticodon. Also found 14 bp intron in all 3 genes, just 3' to anticodon triplet in all 3, but terminology 'intron' not yet used (although did cite Roberts and Sharp papers, and Tilghman in press). Basically, used RFLP to localize, and tool to isolate gene for sequencing.

Gore, A. (1992). "Statement on proposed Hatfield amendment to HR 2407." Cong. Rec. **138**(No. 49, 2 April): S4726-S4727.

Gostin, L. (1990). Genetic Discrimination: The Use of Genetically Based Diagnostic and Prognostic Tests by Employers and Insurers, American Society of Law and Medicine.

Gottesman, M. E. (1992). Press Statement, National Institutes of Health, Building 1, First floor conference room.

Government of Italy (1988). Sequencing the Human Genome, Ethical and Social Issues, Government of Italy organized conference of Economic Summit nations and the European Commission.

Grady, D. (1987). "The Ticking of A Time Bomb in the Genes." Discover(June): 26-37.

Graham, L. R. (1974). Science and Philosophy in the Soviet Union. New York, Vintage.

Gray, R. M. (undated). Note on conversation with Lesley Russell, National Institutes of Health.

Greely, H. T. (1992). Health Insurance, Employment Discrimination, and the Genetics Revolution. The Code of Codes. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 264-280.

- Green, E. D. and M. V. Olson (1990). "Chromosomal Region of the Cystic Fibrosis Gene in Yeast Artificial Chromosomes: A Model for Human Genome Mapping." Science **250**(5 October): 94-98.
- Green, R. (1990). "Tinkering with the Secrets of Life." Health **22**(January): 46-50, 53, 84, 86.
- Greenberg, D. (1990). "Q&A with James Watson, Genome Project Chief." Science & Government Report **20**(#5, 15 March): 1-5.
- Greenberg, D. S. (1991). "Programs and Plans Discussed by New NIH Director." Science and Government Report(1 May): 3-5.
- Grisolia, S. (1982). *Recollections*, University of Kansas Medical Center, College of Health Sciences and Hospital.
- Grisolia, S. (1989). "Mapping the Human Genome." Hastings Center Report(July/August): 18-19.
- Grisolia, S. (1991). "UNESCO Program for the Human Genome Project." Genomics **9**(February): 404-405.
- Grodzicker, T., et al. (1974). "Physical Mapping of Temperature-Sensitive Mutants of Adenoviruses." CSH Symp. Quant. Biol. **39**(Tumor Viruses): 439-446.
- Gros, F. (1992). The Gene Civilization. New York, McGraw-Hill. Translated by Lee F. Scanlon from *La Civilisation du gène*, Hachette, Paris, 1989.
- Gruskin, K. D. and T. F. Smith (1987). "Molecular Genetics and Computer Analyses." CABIOS **3**(No. 3): 167-170.
- GTA Note 244 (1989). UK Human Gene Mapping Project, Government of the United Kingdom.
- Gusella, J. F., et al. (1983). "A Polymorphic DNA Marker Genetically Linked to Huntington's Disease." Nature **306**: 234-238.
- Guston, D. H. (1986). Notes from "Informational Forum on the Human Genome" Howard Hughes Medical Institute.
- Guston, D. H. (1990). *Congress and the History of Science: The Allison Commission, 1884-1886*, American Political Science Association Annual Meeting, San Francisco.
- Guyer, R. L. and D. E. Koshland (1989). "The Molecule of the Year." Science **246**(22 December): 1543-1544.
- Haerlin, B. (1988). *Conversation on National Institutes of Health campus*, Bethesda, MD.
- Hall, M. (1988 and 1989). Phone interviews, Subcommittee on Labor, Health and Human Services, Education and Related Agencies, Committee on Appropriations, US Senate.
- Hall, S. S. (1987). Invisible Frontiers: The Race to Synthesize a Human Gene. New York, Atlantic Monthly Press; paperback Tempus Press.
- Hall, S. S. (1988). "Genesis: The Sequel." California(July 1988): 62-69.
- Hall, S. S. (1990). "James Watson and the Search for Biology's 'Holy Grail'." Smithsonian **20**(February): 40-49.
- Hamilton, D. P. (1990). "House Prunes Genome Budget." Science **249**(10 August): 622-623.
- Hamilton, D. P. (1991). "HUGO to Get a New Director — And a Mission?" Science **254**(4 October): 19.
- Hamilton, D. P. (1992). "Venter to Leave NIH for Greener Pastures." Science **257**(10 July): 151.

Hammond, A. (1988). "\$3 Billion Gene Map." Sci Impact Let **1**(March): 1 and 8.

Hanna, K. (1992). Biomedical Politics, Institute of Medicine, National Academy of Sciences.

Harrelson, W. (1991). Commentary. Biomedical Politics. K. E. Hanna. Washington, DC, National Academy Press: 255-257.

Harvey, P. (1988). S-S-S-S-S-SH, It's Genetic, Paul Harvey News.

Haseltine, W. A. (1998). Life by Design; Gene-Mapping, Without Tax Money. New York Times. New York, NY: OpEd.

Hastings Center, I. o. S., Ethics and the Life Sciences (1972). "Ethical and Social Issues in Screening for Genetic Disease." N Engl J Med **286**: 1129-1132.

Hastings Center, I. o. S., Ethics and the Life Sciences (1979). "Guidelines for the Ethical, Social and Legal Issues in Prenatal Diagnosis." N Engl J Med **300**: 168-172.

Hatfield, M. (1992). "Statement on an amendment to the NIH authorization bill (HR 2507), proposed and withdrawn." Congressional Record **138**(No. 49, 2 April): S4719-S4720, S4723-S4724.

Hatfield, M. O. (1983). "Genetic Engineering." Congressional Record **129, No. 82**(10 June): S8202-8205.

Hayes, C. V. (1992). "Genetic Testing for Huntington's Disease — A Family Issue." N Engl J Med **327**(12 November): 1449-1451.

Health and Environmental Research Advisory Committee (1987). Report on the Human Genome Initiative, Office of Energy Research, US Department of Energy.

Health and Welfare program Akira Ooya was the principal scientist for the Ministry of Health and Welfare program, which was budgeted for ¥460 in 1991. Of this amount, ¥100 million (\$740,000) supported a cell line repository and the bulk of the remainder was for scientific grants [Matsubara, 1992 #1086].

Healy, B. (1988). "Innovators for the 21st Century: Will We Face a Crisis in Biomedical Research Brainpower?" N Engl J Med **319**(20 October): 1058-1064.

Healy, B. (1992). Interview, Building 1, Room 126 (Director's Office, National Institutes of Health).

Healy, B. (1992). Letter to Gerald J. Mossinghoff, J.D., President, Pharmaceutical Manufacturers Association, Director, National Institutes of Health.

Healy, B. (1992). "On Patenting Genes." N Engl J Med **327**(No. 9, 27 August): 664-668.

Healy, B. (1992). Press statement, National Institutes of Health, Building 1, first floor conference room.

Healy, B. (1992). Statement of Bernadine Healy, National Institutes of Health.

Healy, B. (1992). Testimony by Bernadine Healy, M.D., Director, National Institutes of Health, before the Subcommittee on Patents, Copyrights, and Trademarks, Senate Judiciary Committee.

Healy, B. (1993). Statement announcing her intention to resign by 30 June, released at a press conference, National Institutes of Health.

Healy, B. and G. A. Keyworth (1985). "The NIH and Numbers: A Vital Concern's Concern." N Engl J Med **312**(30 May): 1450-1452.

Healy, B. P. (1988). "Tour of Duty: A Medical Academic in the White House." Harv. Med. Alum. Bull. **61**(Spring): 49-53.

Hedetniemi, J. N. (1992). Letter and budget table sent to the author in response to letter requesting information on NIGMS Genetics Branch and GenBank funding 1987-1993, National Institute of General Medical Sciences, National Institutes of Health.

Heller, M. A. and R. S. Eisenberg (1998). "Can Patents Deter Innovation? The Anticommons in Biomedical Research." Science **280**(1 May): 698-701.

Henig, R. M. (1989). "High-Tech Fortunetelling." New York Times Magazine(24 December): 20, 22.

Herman, R. (1992). "The Great Gene Gold Rush." Washington Post Health **8**(No. 24, 16 June): 11-16.

Hersey, J. (1985). Hiroshima. New York, Vintage.

Heston, L. L., et al. (1966). "Alzheimer's Disease." Arch. Neurol. **15**: 225-233.

Hewick, R. M., et al. (1981). "A gas-liquid solid phase peptide and protein sequenator." J Biol Chem **256**: 7990-7997.

Hewitt, M. and N. A. Holtzman (1988). The Commercial Development of Tests for Human Genetic Disorders, Office of Technology Assessment, US Congress.

Hilts, P. J. (1992). "Head of Gene Map Threatens to Quit." New York Times(9 April): A26.

Hinton, D., et al. (1990-1991). Conversations Fall 1990 through Summary 1991, Howard Hughes Medical Institute (DH), Johns Hopkins University (PP), Cold Spring Harbor Laboratory (JDW) and National Center for Human Genome Research (JDW).

Holden, C. (1987). "The Genetics of Personality." Science **237**(7 August): 598-601.

Holden, C. (1991). "New Genome Centers." Science **251**(15 February): 742-743.

Holley, R. W., et al. (1965). "Structure of Ribonucleic Acid." Science **147**: 1462-1465.

Holley, R. W., et al. (1965). "Nucleotide Sequences in the Yeast Alanine Transfer Ribonucleic Acid." J Biol Chem **240**: 2122-2128.

Holtzman, N. A. (1989). Proceed with Caution. Baltimore, MD, Johns Hopkins University Press.

Holzman, D. (1987). "Mapping the Genes, Inside and Out." Insight(May 11): 52-54.

Hood, L. and L. Smith (1987). "Genome Sequencing: How to Proceed." Iss. Sci. Tech. **3**: 36-46.

Hood, L. E. (1988). "Biotechnology and Medicine of the Future." J. Am Med Assoc **259**(25 March): 1837-1844.

Hood, L. E. (1990). "Human Genome Project: Is 'Big Science' Bad for Biology? No: Anyway, the HGP Isn't Big Science." The Scientist **4**(#22, 12 November): 13,15.

Hood, L. E., et al. (1987). "Automated DNA Sequencing and Analysis of the Human Genome." Genomics **1**: 201-212.

Howard Hughes Medical Institute (1983). Thirtieth Anniversary Report, Howard Hughes Medical Institute.

Howard Hughes Medical Institute (1987). Annual Report, Howard Hughes Medical Institute.

Howard Hughes Medical Institute (1988). Annual Report, Howard Hughes Medical Institute.

Howard Hughes Medical Institute (1989). Annual Report, Howard Hughes Medical Institute.

Howard, T. and J. Rifkin (1977). Who Should Play God? New York, Dell.

Hoyer, S. (1990). Letter to Alexander Morgan Capron, Biomedical Ethics Advisory Committee, US House of Representatives.

Huang, H. (1991). Telephone interview. 26 March. S. L. Washington University, MO.

Hubbard, R. and N. Wilker (1989). Evaluating the Human Genome Project, Annual Meeting, American Association for the Advancement of Science, San Francisco.

Huggins, M., et al. (1990). "Ethical and Legal Dilemmas Arising during Preedictive Testing for Adult-Onset Disease: The Experience of Huntington Disease." Am J Hum Genet **47**: 4-12.

HUGO Originators (1988). Walter Bodmer (Imperial Cancer Research Fund, London), Sydney Brenner (Medical Research Council, UK), C. Thomas Caskey (Baylor University, USA), Jean Dausset (Centre d'Etude du Polymorphisme Humain, Paris), Renato Dulbecco (Salk Institute and Italy), Leroy Hood (Caltech, USA), Kenichi Matsubara (Osaka, Japan), Frank Ruddle (Yale, USA), John Tooze (EMBO), James D. Watson (Cold Spring Harbor, USA), and Harold Zur-Hausen (Germany). letter about founding the Human Genome Organization.

Human Genetics Committee (1990). Position Paper on Genetic Discrimination, Council for Responsible Genetics, accompanying a letter to Rep. Hoyer and Sen. Harkin.

Human Genome Analysis Programme (1992). Announcement of Grants, European Commission.

Human Genome Committee (1991). Position Paper on Patenting of Expressed Sequence Tags, American Society of Human Genetics.

Human Genome Committee and Board of Directors (1991). "The Human Genome Project and Patents." Science **254**: 1710-1712.

Human Genome News (1992). "New GDB Remote Node Opens in Australia." Human Genome News **3, No. 6**(March): 9.

Human Genome Organization (1992). "HUGO Position Statement on cDNAs: Patents." G-Name News(Number 9, March 1992): 2-3. The HUGO statement did not "oppose patenting of useful benefits derived from genetic information. HUGO does, however, oppose the patenting of short sequences from randomly isolated portions of genes encoding proteins of unknown function...The filing and approval of genome patents, whether in this particular case or in other types of genome patent cases, must incorporate global perspectives.

It is HUGO's position, therefore, that the US EST patent applications should not be approved. We join the American Society of Human Genetics in supporting this view.

The Human Genome Project is a major scientific area that now depends heavily on international cooperation in order to avoid both costly competition and duplication of effort...it is the entire spectrum of international scientific collaboration that may be jeopardised. HUGO therefore urges a quick resolution to the EST case.

HUGO urges the development of a process that allows for flexible negotiation and also mediation between the potentially conflicting needs of different scientific communities. Scientists, policy-makers and administrators world-wide must work together and accept responsibility for balancing the many competing priorities."

Human Genome Research (1990). Strategies and Priorities, Committee on Genetic Experimentation (COGENE), International Council of Scientific Unions (ICSU), European Community (EC), Federation of European Biochemical Societies (FEBS), International Union of Biochemistry (IUB), and the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

Human Genome Workshop (1985). Notes and Conclusions from the Human Genome Workshop, May 24-26, 1985 University of California, Santa Cruz.

Hunkapiller, M. (1991). Interview. 18 March 1991. F. C. Applied Biosystems, CA.

Hunkapiller, M. W. and L. E. Hood (1983). "Protein Sequence Analysis: Automated Microsequencing." Science **219**: 650-659.

Hunkapiller, T. (1988). Interview. July. C. I. o. Technology.

Hunkapiller, T., et al. (1991). "Large-Scale and Automated DNA Sequence Determination." Science **254**(4 October): 59-67.

Huntington's Disease Collaborative Research Group, et al. (1993). "A Novel Gene Containing a Trinucleotide Repeat That Is Expanded and Unstable on Huntington's Disease Chromosomes." Cell **72**(26 March): 971-983.

Hurd, S. N. (1990). "Genetic Testing: Your Genes and Your Job." Empl Resp and Rights J **3**(No. 4): 239-252.

Huxley, A. (1932). Brave New World. Garden City, NJ, Doubleday, Doran.

II Workshop on International Cooperation for the Human Genome Project (1990). International Conference, Fundación BBV, Fundación Valenciana de Estudios Avanzados.

Ikawa, Y. (1988). Interview, First International Workshop on Cooperation for the Human Genome Project, Valencia, Spain.

Ikawa, Y. (1989). Conversations, Englehardt Institute of Molecular Biology and Hotel Ukraina, Moscow.

Ikawa, Y. (1991). "Human Genome Efforts in Japan." FASEB Journal **5**(January): 66-69.

Industrial Biotechnology Association (1987). Results of the IBA Membership Survey on Mapping the Human Genome, Government Relations Committee, IBA.

Industrial Biotechnology Association (1992). IBA Position Paper: Recommended Federal Policy Concerning Human Genetic Sequences Discovered by Federal Researchers, Contractors, and Grantees, Industrial Biotechnology Association, Washington, DC.

Ingram, V. M. (1957). "Gene Mutation in Human Hæmoglobin: The Chemical Difference between Normal and Sickle Cell Hæmoglobin." Nature **180**: 326-328.

INSAN (1984). Designer Genes: IQ, Ideology, and Biology, Instituto Analisa Sosial, Selangor, Malaysia.

Institute of Medicine (1984). Responding to Health Needs and Scientific Opportunity: The Organizational Structure of the National Institutes of Health Institute of Medicine, National Academy of Sciences.

Institute of Medicine (1988). A Healthy NIH Intramural Program: Structural Change or Administrative Remedies?, National Academy of Sciences.

Inter-Council Human Genome Advisory Committee (1991). Report to the Granting Councils: Medical Research Council; Natural Sciences and Engineering Research Council; Social Sciences and Humanities Research Council; and the Secretary to the Advisory Committee, Dr. Lewis Slotin, Medical Research Council.

International Advisory Committee for DNA Sequence Databases (1988). Summary, National Institutes of Health.

Interviews (1988-1991). L. H. J. N. J. a. v. s. m. T. H. O. a. J. M. Hunkapiller (January 1987 and 24 August 1988); Lloyd Smith (January 1987; 2 March and 25 March 1991) and Henry Huang (26 March 1991).

Ismail, S. (1991). Phone interview, Judiciary Committee, US House of Representatives.

Israelsen, N. A. (1992). Letter to James Haight, Office of Technology Transfer, NIH, Knobbe, Martens, Olson & Bear.

Jacob, H. (1970). Muscular Twitchings in Alzheimer's Disease. Alzheimer's Disease. G. E. W. Wolstenholme. London, Churchill: 75-89.

Jaroff, L. (1991). "Science Under Siege: Crisis in the Labs." Time **138**(26 August): 45-51.

Jaroff, L., et al. (1989). "The Gene Hunt." Time(March 20): 62-67.

Jasny, B. (1992). "Genome Delight." Science **258**(2 October): 11.

Jasny, B. R. (1990). "The Human Genome Map 1990." Science **250**(12 October): Pull-out insert.

Jasny, B. R., et al. (1992). "Genome Maps III." Science **258**(2 October): Pull-out insert.

Jeffreys, A. J. (1979). "DNA Sequence Variants in the G- γ , A- γ , δ , and β Globin Genes of Man." Cell **18**: 1-10.

Jeffreys, A. J. and R. A. Flavell (1977). "A Physical Map of the DNA Regions Flanking the Rabbit Beta-Globin Gene." Cell **12**(October): 429-439.

Rabbit liver DNA-EcoRI, Pst I, or KpnI; frags denatured, electrophoresed, blotted, hybridized with beta-blobin cDNA. Determined restriction map, orientation of expression, and estimated only one gene copy/genome by ration of gene DNA to total DNA. One of first uses of physical mapping techniques in mammalian genome.

Jenks, S. (1989). "Gene Map Budget Given a Boost." Med World News(February 13, 1989): 94.

Johannsen, W. (1909). Elemente der Exakten Erblchkeitslehre. Jena, G. Fischer.

Johnstone, B. (1990). "The Human Gene War." Asia Technology(February): 51-53.

Joint Working Group on Ethical, L., and Social Issues (1991). Genetic Discrimination and the Americans with Disabilities Act, Submitted to the Equal Employment Opportunity Commission.

Jones, R. H. (1986). "Is There a Property Interest in Scientific Research Data?" High Technology Law Journal **1**: 447-482.

Jonsen, A. (1985-1992). Conversations at Institute of Medicine activities and other events, University of California, San Francisco and then University of Washington, Seattle; Jonsen was a commissioner on both the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research and the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research.

Jonsen, A. R. (1984). Public Policy and Human Research. Biomedical Ethics Reviews. J. M. Humber and R. T. Almeder. Clifton, NJ, Humana Press: 3-20.

Jordan, B. (1990). Letter to the author, Centre d'immunologie de Marseille-Luminy.

Jordan, B. (1991). Letter, ICRF Laboratories, London.

Jordan, B. R. (1991). "The French Human Genome Program." Genomics **9**(March): 562-563.

Jordan, E. (1990). Interview, National Center for Human Genome Research, National Institutes of Health.

Jordan, E. (1990). Reply to Syvanen and Davison postings, BIONET electronic bulletin board, National Center for Human Genome Research, National Institutes of Health.

Josephy, H. (1956). "Discussion Note." J. Neuropathol Exp Neurol **15**: 234-235.

Joyce, C. (1987). "Companies Line Up to Claim Rights Over the Genetic Map." New Scientist(20 August): 31.

Joyce, C. (1987). "The Race to Map the Human Genome." New Scientist(5 March): 35-39.

Judson, H. F. (1979). The Eighth Day of Creation: The Makers of the Revolution in Biology. New York, Simon and Schuster.

Judson, H. F. (1987). Mapping the Human Genome: Historical Background Office of Technology Assessment, US Congress.

Juengst, E. T. (1991). Recent Developments and Plans, National Center for Human Genome Research.

Juengst, E. T. and J. D. Watson (1991). "Human Genome Research and the Responsible Use of New Genetic Knowledge." Intern. J Bioeth **2**(No. 2): 99-102.

Kan, Y. u. W. and A. M. Dozy (1978). "Polymorphism of DNA sequence adjacent to Human Beta-Globin Structural Gene: Relationship to Sickle Mutation." Proc. Nat. Acad. Sci. (USA) **75**: 5631-5635.

Kanehisa, M. (1990). Phone interview, Kyoto University.

Kanigel, R. (1987). "The Genome Project." NY Times Mag.(December 13): 44, 98-101, 106.

Karjala, D. (1992). "A Legal Research Agenda for the Human Genome Initiative." Jurimetrics **32**(No. 2, Winter): 121-310. See especially pp. 192-203.

Karlin, S. and V. Brendel (1992). "Chance and Statistical Significance in Protein and DNA Sequence Analysis." Science **257**(3 July): 39-49. See especially items referenced in footnote 35.

Karp, W. (1968). Controversy and Conquest. Charles Darwin and the Origin of Species. T. E. o. H. Magazine. New York, American Heritage: 120-135.

Kass, N. (1990). The Ethical, Legal, and Social Issues Concerning the Use of Genetic Tests by Insurers: Toward the Development of Appropriate Public Policy, Program in Law, Ethics, and Health, Johns Hopkins University.

Katz, J. and A. M. Capron (1974). Authority and Capacity of Professional and Public Institutions. 2. Commissions — Congressional and Presidential. Catastrophic Diseases: Who Decides What? A Psychosocial and Legal Analysis of the Problems Posed by Hemodialysis and Organ Transplantation. New York, Russell Sage Foundation: 130-134.

- Katz, J. and A. M. Capron (1974). *Catastrophic Diseases: Who Decides What?*, Russell Sage Foundation.
- Katzman, R. (1976). "The Prevalence and Malignancy of Alzheimer's Disease: A Major Killer." *Arch Neurol* **33**: 217-218.
- Kaye, H. L. (1992). "Are We the Sum of Our Genes?" *Wilson Quart* **XVI**(Spring): 77-84.
- Kayton, I. (1982). "Copyright in Living Genetically Engineered Works." *George Washington Law Review* **50**(No. 2): 191-218.
- Keith, S. and M. Sarfaty (1988-1990). Personal and phone interviews, Subcommittee on Health, Committee on Labor and Human Resources, US Senate.
- Keller, E. F. (1992). Nature, Nurture, and the Human Genome Project. *The Code of Codes: Scientific and Social Issues in the Human Genome Project*. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 281-299.
- Kendrew, J. (1990). Note to James D. Watson, The Old Guildhall, Cambridge, UK.
- Kenyon, C. J. (1988). "The Nematode *Caenorhabditis elegans*." *Science* **240**(10 June): 1448-1453.
- Kerem, B.-S., et al. (1989). "Identification of the Cystic Fibrosis Gene: Genetic Analysis." *Science* **245**(8 September): 1073-1080.
- Kevles, D. (1986). "Unholy Alliance." *The Sciences*(September-October): 24-30.
- Kevles, D. (1992). "Controlling the Genetic Arsenal." *Wilson Quart* **XVI**(Spring): 68-76.
- Kevles, D. J. (1985). *In the Name of Eugenics*. Berkeley, CA, University of California Press.
- Kevles, D. J. (1992). Out of Eugenics: The Historical Politics of the Human Genome. *The Code of Codes: Scientific and Social Issues in the Human Genome Project*. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 3-36.
- Kevles, D. J. and L. Hood (1992). Reflections. *The Code of Codes: Scientific and Social Issues in the Human Genome Project*. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 300-328.
- Kevles, D. J. and L. E. Hood, Eds. (1992). *The Code of Codes: Scientific and Social Issues in the Human Genome Project*. Cambridge, MA, Harvard University Press.
- Khrapko, K. R., et al. (1989). "An Oligonucleotide Hybridization Approach to DNA Sequencing." *Genomics* **256**(October): 118-122.
- Kido, T. (1982). *The Diary of Kido Takayoshi*. Volume I: 1868-1871; Volume II: 1871-1874; Volume III: 1874-1877. Sidney DeVere Brown and Akiko Hirota. Tokyo, University of Tokyo Press.
- Kikkawa, C. (1925). *The Autobiography of Baron Chokichi Kikkawa*. Tokyo. Kindly contributed to the author by Akiyoshi Wada, Private publisher.
- Kiley, T. D. (1992). "Patents on Random Complementary DNA Fragments?" *Science* **257**(14 August): 915-918.
- King, M.-C. (1991). An Application of DNA Sequencing to a Human Rights Problem. *Molecular Genetic Medicine, Vol. 1*. T. Friedmann. San Diego, CA, Academic Press: 117-131.
- King, M.-C. and A. C. Wilson (1975). "Evolution at Two Levels in Humans and Chimpanzees." *Science* **188**(11 April): 107-116.

King, P. (1987-1992). Conversations at meetings of the ELSI working group, Institute of Medicine activities and other events, Georgetown Law School; King was a commissioner on both the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research and the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research; she then served on the NIH Fetal Tissue Transplantation Research Panel and the NIH-DOE Working Group on Ethical, Legal, and Social Issues, as well as on several Institute of Medicine committees and other panels.

King, P. A. (1991). Commentary. Biomedical Politics. K. E. Hanna. Washington, DC, National Academy Press.

King, P. A. (1991). Ethical and Legal Constraints on Research. Preparing for Science in the 21st Century. D. C. Harrison, M. Osterweis and E. R. Rubin. Washington, DC, Association of Academic Health Centers: 116-125.

Kirschstein, R. L. (1986). Letter to Charles DeLisi, National Institute of General Medical Sciences.

Kirschstein, R. L. (1986). Memo to NIH Director re sequencing the human genome, National Institutes of Health.

Klausner, A. (1988). "Patent Office Reorganizes Biotech Coverage." Bio/Technology **6**(April): 368.

Klausner, A. (1989). An Analysis of Strategic Alliances in Biotechnology between US Firms and Those in Europe and Japan.

Kleene, S. C. (1987). Kurt Gödel: April 28, 1906–January 14, 1978. Biographical Memoirs, Vol. 56. N. A. o. S. o. t. U. S. o. America. Washington, DC, National Academy Press.

Knoppers, B. (1989). Human Genetics, Predisposition, and the New Social Contract. International Conference on Bioethics. The Human Genome Sequencing: Ethical Issues. Brescia, Italy, Clas International.

Knoppers, B. (1991). Comments at ELSI Working Group Meeting, National Institutes of Health and Department of Energy working group meeting, Ramada Inn, Bethesda, MD.

Knoppers, B. M. (1991). Human Dignity and Genetic Heritage, Law Reform Commission of Canada, Ottawa.

Knowlton, R. G., et al. (1985). "A Polymorphic DNA Marker Linked to Cystic Fibrosis is Located on Chromosome 7." Nature **318**(28 November): 381-382.

Knox, R. (1973). "Nobel Winner Calls Nixon's Medical Research Policy 'Lunacy'." Boston Globe(7 March): 67.

Knudson, M. (1991). "Scientists 'Mapping' Genes Urge Ethical Safeguards." Balt. Sun(21 July): A3.

Koenig, M., et al. (1987). "Complete Cloning of the Duchenne Muscular Dystrophy (DMD) cDNA and Preliminary Genomic Organization of the DMD Gene in Normal and Affected Individuals." Cell **50**(July): 509-517.

Koetzle, T. F. (1989). "Benefits of Databases." Nature **342**(9 November): 114.

Kolata, G. (1983). "Huntington's Disease Gene Located." Science **222**(25 November): 913-915.

Kolata, G. (1990). "Beginning Scientists Face A Research Fund Drought." New York Times(5 June): C1.

Kolata, G. (1992). "Biologist's Speedy Gene Method Scares Peers but Gains Backer." NY Times(28 July): C1, C10.

Kolata, G. (1992). "Chief Says Panel Backs Courts' Use of a Genetic Test." New York Times **CXLI**(15 April): A1, A23.

Kolata, G. (1992). "US Panel Seeking Restriction on Use of DNA in Courts." New York Times **CXLI**(14 April): A1, C7.

- Kolata, G. B. (1980). "The 1980 Nobel Prize in Chemistry." Science **210**: 887-889.
- Koniarek, J. P. and K. D. Coleman (1988). "Patents and Patent Office Resources in Biotechnology." BioTechniques **6**(No. 2): 148-153.
- Koppel, T. (1990). Nightline, ABC News.
- Korn, D. E. (1987). "Patent and Trade Secret Protection in University-Industry Research Relationships in Biotechnology." Harvard J Legis **24**(Winter): 191-238.
- Kornberg, A. (1960). "Biologic Synthesis of Deoxyribonucleic Acid." Science **131**: 1503-1508.
- Kornberg, A. (1980). DNA Replication. New York, W. H. Freeman.
- Koshland, D. E. (1989). "The Molecule of the Year." Science **246**(22 December): 1541.
- Koshland, D. E. (1989). "Sequences and Consequences of the Human Genome." Science **246**(13 October): 189.
- Kozak, L. (1990). Letter to Senator William Cohen, Jackson Laboratories, Bar Harbor, Maine.
- Kravitz, K., et al. (1979). "Genetic Linkage between Hereditary Hemochromatosis and HLA." Am J Hum Genet **31**: 601-619.
- Krieger, L. M. (1991). "Cases of Genetic Discrimination on the Rise." San Francisco Examiner(17 March): A1ff.
- Krimsky, S. (1982). Genetic Alchemy: The Social History of the Recombinant DNA Controversy. Cambridge, MA, MIT Press.
- Kuhn, T. S. (1962). The Structure of Scientific Revolutions. Chicago, University of Chicago Press.
- Lambert, R. A. (1992). Petition under 37 CFR 1.103 for Suspension of Action, US Department of Health and Human Services.
- Lander, E. (1992). DNA Fingerprinting: Science, Law, and the Ultimate Identifier. The Code of Codes: Scientific and Social Issues in the Human Genome Project. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 191-210.
- Lander, E. S. (1989). "DNA Fingerprinting on Trial." Nature **339**(15 June): 501-505.
- Lander, E. S. and D. Botstein (1986). "Mapping Complex Genetic Traits in Humans: New Methods Using a Complete RFLP Linkage Map." CSH Symp. on Quant. Biol. **51**(Molecular Biology of *Homo sapiens*): 49-62.
- Lander, E. S. and D. Botstein (1987). "Homozygosity Mapping: A Way to Map Recessive Traits in Humans by Studying the DNA of Inbred Children." Science **236**: 1567-1570.
- Lander, E. S. and M. S. Waterman (1988). "Genomic Mapping by Fingerprinting Random Clones: A Mathematical Analysis." Genomics **2**: 231-239.
- Landy, P. J. and B. J. Bain (1970). "Alzheimer's Disease in Siblings." Med J Austral **2**(#18, 31 October): 832-834.
- Larionov, V. (1989). Interviews and conversations, Leningrad (Institute of Cytology, Moskva Hotel, Neva River Boat and strolls during White Nights).

Larionov, V. (1991). Phone conversation, National Institute for Environmental Health Sciences, Research Triangle Park, NC.

Laurence, W. (1959). Men and Atoms: The Discovery, the Uses, and the Future of Atomic Energy. New York, Simon & Schuster.

Lauter, H. (1961). "Genealogische Erhebungen in einer Familie mit Alzheimerschen Krankheit." Archiv Psychiat Ges **202**: 126-139.

Lawton, J. R., et al. (1989). Overview of the LiMB Database, Los Alamos National Laboratory.

Lazenby, H. C., et al. (1992). "National Health Accounts: Lessons from the US Experience." Health Care Fin Rev **13**(No. 4, Summer): 89ff, see esp. p. 95 and Table 81. Drugs accounted for approximately \$54.86 billion of \$666.662 billion total health expenditures in 1990.

Lee, W.-H., et al. (1987). "Human Retinoblastoma Susceptibility Gene: Cloning, Identification, and Sequence." Science **235**: 1394-1399.

Leppert, M., et al. (1987). "The Gene for Familial Polyposis Coli Maps to the Long Arm of Chromosome 5." Science **238**: 1411-1413.

Levine, C. (1984). Postscript: Is Genetic Engineering a Threat to Future Generations? Taking Sides: Clashing Views o Controversial Bio-Ethical Issues. C. Levine. Guilford, CT, Dushkin.

Levinson, R. (1990). Phone interview, Office of Science and Technology Policy, the White House.

Levinson, R. (1991). Interview, Office of Science and Technology Policy, Old Executive Office Building.

Lewin, R. (1986). "'Computer Genome' Is Full of Junk." Science **232**(2 May): 527-528.

Lewin, R. (1986). "DNA Databases Are Swamped." Science **232**(27 June): 1599.

Lewin, R. (1986). "DNA Sequencing Goes Automatic." Science **233**(4 July): 24.

Lewin, R. (1986). "Molecular Biology of Homo sapiens." Science **233**(11 July): 157-160.

Lewin, R. (1986). "Proposal to Sequence the Human Genome Stirs Debate." Science **232**(27 June): 1598-1600.

Lewin, R. (1986). "Shifting Sentiments Over Sequencing the Human Genome." Science **233**(8 August): 620-621.

Lewin, R. (1988). "Chance and Repetition." Science **240**(29 April): 603.

Lewin, R. (1989). "Genome Planners Fear Avalanche of Red Tape." Science **244**(30 June): 1543.

Lewontin, R. C. (1992). "The Dream of the Human Genome." NY Rev Books(28 May): 31-40.

Lewontin, R. C. and D. L. Hartl (1991). "Population Genetics in Forensic DNA Typing." Science **254**: 1745-1750.

Li, F. P. (1992). Draft Recommendations on Predictive Testing for Germ Line p53 Mutations among Health Individuals, Dana Farber Cancer Institute, Boston, MA.

Life Magazine (1962). "The Take-Over Generation: A Red-Hot Hundred." Life(14 September): 4 and foldout.

Life Magazine (1990). "The 100 Most Important Americans of the 20th Century: James D. Watson." Life(Special Issue, Fall): 83.

Lifton, R. J. (1986). The Nazi Doctors. New York, Basic Books.

Lindee, M. S. (1990). Mutation, Radiation and Species Survival: The Genetics Studies of the Atomic Bomb Casualty Commission in Hiroshima and Nagasaki, Japan, Ph.D. dissertation, Cornell University.

Little, M., et al. (1991). "Dads and Disomy and Disease." Nature **351**(20 June): 609-610.

Little, P. (1992). "Mapping the Way Ahead." Nature **359**(1 October): 367-368.

Lokken, P. (1990). Conversation, National Center for Human Genome Research, National Institutes of Health.

Long, J. (1988). "NSF to Set Up First Science Centers." C&E News(12 December): 6.

Lowenberg, K. and R. W. Waggoner (1934). "Familial Organic Psychosis (Alzheimer's Type)." Arch Neurol Psychiat **31**: 737-754.

Luers, T. (1947). "Über die familiäre juvenile Form der Alzheimerschen Krankheit mit neruologischen Herderscheinungen." Arch Psychiatr Nervenkr **179**: 132-179.

Luria, S. E. (1989). "Human Genome Program (letter)." Science **246**(17 November): 873.

Maddox, J. (1987). "Brenner Homes in on the Human Genome." Nature **326**: 119.

Maddox, J. (1989). "Making Authors Toe the Line." Nature **342**(21/28 December): 855.

Maddox, J. (1989). "Making Good Data-Banks Better." Nature **341**: 277.

Maddox, J. (1991). "The Case for the Human Genome." Nature **352**(4 July): 11-14.

Maddox, J. (1991). "Free Trade in Human Sequence Data?" Nature **354**(21 November): 171-172.

Maddox, J. (1992). "Ever-Longer Sequences in Prospect." Nature **357**(7 May): 13.

Maddox, J. (1992). "Healy in a Hurry." Nature **356**(16 April): 547-548.

Mallove, E. F. (1987). "Databasing DNA: Can Science Meet the Challenge?" Computers in Science **1**(Premiere): 40-51.

Mammalian Genetics Study Section (1990). Summary Statement evaluating grant proposal R01 DK 43425-01, National Institutes of Health.

Mandel, J.-L., et al. (1992). "Genome Analysis and the Human X Chromosome." Science **258**(2 October): 103-109.

Maniatis, T., et al. (1978). "The Isolation of Structural Genes from Libraries of Eucaryotic DNA." Cell **15**(October): 687-701.

Maniatis, T., et al. (1975). "Nucleotide Sequence of the Rightward Operator of Phage Lambda." Proc Nat Acad Sci **72**: 1184-1188.

Mannarino, E. (1991). Phone interview and letters, Science Attache to the Italian Embassy, Washington, DC.

Marchand, L., et al. (1956). "Considerations Pathogeniques sur les Demences Atrophiques." Press Med **64**: 1412-1415.

- Marchuk, D. A., et al. (1991). "cDNA Cloning of the Type 1 Neurofibromatosis Gene: Complete Sequence of the NF1 Gene Product." Genomics **11**(December): 931-940.
- Marshall, E. (1990). "Agencies, Journals Set Some Rules." Science **248**(25 May): 954.
- Marshall, E. (1990). "Data Sharing: A Declining Ethic?" Science **248**(25 May): 952-957.
- Marshall, E. (1990). "Genome Center Grants Chosen." Science **249**(28 September): 1497.
- Marshall, E. (1991). "The Patent Game: Raising the Ante." Science **253**(5 July): 20-24.
- Marshall, E. (1997). "The Mouse That Prompted a Roar." Science **277**(4 July): 24-25.
- Marston, R. Q. (1987). "Dilemmas of Decision-Making." Nature **329**(22 October): 683-685.
- Martin, G. M., et al. (1990). "Dominant Susceptibility Genes." Nature **347**(13 September): 124.
Reviews hx of FAD linkage; mentions "highly suggestive evidence of linkage to chrm 19 for non-21 late onset families; companion editorial to St Geo-Hyslop II (heterogeneity article)
- Martin, R. G. (1990). "We GNOMES Find the PROJECT an Atlas but No Treasure." The New Biologist **2**(May): 385-387.
- Martinell, J. (1992). In re application of J. Craig Venter, et al., Serial No. 07/837, 195 (filed 12 February 1992), Patent and Trademark Office, US Department of Commerce.
- Marwick, C. (1989). "Technology, Cost, Cooperation, Ethics Challenges Face Genome Mapping Plan." J Am Med Assoc **262**(15 December): 3247.
- Marx, J. L. (1985). "Putting the Human Genome on a Map." Science **229**(12 July): 150-151.
- Marx, J. L. (1989). "Bionet Bites the Dust." Science **245**(14 July): 126.
- Mary Jennifer Selznick Mini-Workshop (1983). Clinical Impact of Recombinant DNA Research on Neurogenetic Diseases, Hereditary Disease Foundation.
- Mary Jennifer Selznick Mini-Workshop (1983). Clinical Uses of the DNA Marker for the Huntington's Disease Gene, Hereditary Disease Foundation.
- Mathew, C. G. P., et al. (1987). "A Linked Genetic Marker for Multiple Endocrine Neoplasia Type 2a on Chromosome 10." Nature **328**: 527-528.
- Matsubara, K. (1988). Author's notes from a meeting, Office of Technology Assessment, US Congress, Washington, DC.
- Matsubara, K. (1988). Interview at first meeting on Genome Mapping and Sequencing, Cold Spring Harbor Laboratory, NY.
- Matsubara, K. (1990). Fax to author, Osaka University.
- Matsubara, K. (1990). Interview, Osaka University.
- Matsubara, K. (1991). Monbusho budget figures from fax to author, Osaka University.
- Matsubara, K. and M. Kakunaga (1992). "The Genome Efforts in Japan As of 1991." Genomics **12**: 618-620.

Matsubara, K., et al. (1990). Interviews on trip to Japan.

Matsui, S. (1990). Letter and appendix: Unesco/TWAS Fellowship Programme in the Human Genome, United National Educational, Scientific, and Cultural Organization.

Maxam, A. M. and W. Gilbert (1977). "A New Method for Sequencing DNA." PNAS **74**(February): 560-564.

Mayor (1989). Fellow Spaniard Grisolia was appointed chair, and the committee included representatives from Chile, France, Germany, Japan, Kenya, Thailand, Tunisia, the United States, and the USSR. Organizational representatives were designated by several international scientific organizations in biology, adding observers from Belgium, France, Israel, and Italy., UNESCO Headquarters, Paris.

McAuliffe, K. (1987). "Reading the Human Blueprint." US News and World Report(December 28, 1987 & January 4, 1988): 92-93.

McBride, G. (1991). "Dispute in US Over Gene Patents." BMJ **303**(23 November): 1286.

McConnell, J. (1988). Interviews.

McConnell, J. (1989). Interview.

McConnell, J. (1990). Conversation at Workshop on International Cooperation on the Human Genome Project, II, Ethics, Valencia, Spain.

McConnell, J. (1990). Interview, His home. Hilton Head Island, SC.

McCormack, S. (1998). Among 1980-1993 patents in the DNA Patent Database that have been read and coded, 24% are assigned to universities (15% private and 9% public); 14% to private nonprofit research centers; and 53% to private firms (46% pharmaceutical or biotechnology and 7% other companies or unknown). The DNA Patent Database started from a collection of nonplant DNA-based patents identified by the US Patent and Trademark Office (James Martinell, examiner) and the Office of Technology Assessment (Erica Rose, Kathi Hanna, and Robyn Nishimi, OTA staff) that were given to the Kennedy Institute of Ethics (LeRoy Walters, director) when OTA ceased operations. Stephen McCormack and Robert Cook-Deegan read those patents, eliminating some that are not DNA-based, and developed a coding scheme. The collection has since been expanded through 1997, but patents 1994-1997 have not yet been read and coded. All patents in the collection are available in full text format on the World Wide Web through the Foundation for Genetic Medicine at <http://www.geneticmedicine.org/>. Data analyzed by Stephen McCormack, DNA Patent Database, Foundation for Genetic Medicine and Kennedy Institute of Ethics.

McCormick, R. (1984). Interview, Kennedy Institute of Ethics, Georgetown University.

McGourty, C. (1989). "Dealing with the Data." Nature **342**(9 November): 108.

McGourty, C. (1989). "DuPont Battles with Cetus." Nature **342**(2 November): 9.

McGourty, C. (1989). "Johns Hopkins as International Host." Nature **342**(23 November): 330.

McGourty, C. (1989). "A New Direction for HUGO." Nature **342**(14 December): 724.

McGourty, C. (1989). "Public Debates on Ethics." Nature **342**(7 December): 603.

McKusick, V. A. (1962). "On the X Chromosome of Man." Quart Rev Biol **37**: 69-175.

McKusick, V. A. (1966). Mendelian Inheritance in Man. Baltimore, MD, Johns Hopkins University Press.

- McKusick, V. A. (1986). "The Gene Map of *Homo sapiens*: Status and Prospectus." CSH Symp. Quant. Biol. **51**: 15-27.
- McKusick, V. A. (1988). Memo to Sir Walter Bodmer, Dr. Sydney Brenner, Dr. J. [sic] Thomas Caskey, Prof. Jean Dausset, Dr. Renato Dulbecco, Dr. Leroy Hood, Dr. K. Matsubara, Dr. Frank Ruddle, Dr. John Tooze, Dr. James D. Watson, and Dr. Harold Zur-Hausen, Johns Hopkins University.
- McKusick, V. A. (1988). The Morbid Anatomy of the Human Genome: A Review of Gene Mapping in Clinical Medicine, Howard Hughes Medical Institute, Bethesda, MD.
- McKusick, V. A. (1989). "Historical Perspectives: The Understanding and Management of Genetic Disorders." Maryland Medical Journal **38**(November): 901-908.
- McKusick, V. A. (1989). "The Human Genome Organization: History, Purposes, and Membership." Genomics **5**: 385-387.
- McKusick, V. A. (1990). Foreword to the Ninth Edition. Mendelian Inheritance in Man. V. A. McKusick. Baltimore, MD, Johns Hopkins University Press: xi-xxix.
- McKusick, V. A. (1991). "The Defect in Marfan Syndrome." Nature **352**(25 July): 279-281, incl. box on "Abraham Lincoln and Marfan Syndrome".
- McKusick, V. A. (1992). "First South-North Human Genome Conference." Genomics **14**: 1121-1123.
- McLaren, D. J. (1991). "The Human Genome — UK and International Research Initiatives." MRC Annual Report, April 1990- March 1991: 44-50.
- McLaren, D. J. (1991). Human Genome Research: A Review of European and International Contributions, Medical Research Council, United Kingdom.
- McMenemey, W. H., et al. (1939). "Familial Presenile Dementia." J Neurol Psychiatr **2**: 293-302.
- Medical Research Council (1991). Annual Report, April 1990-March 1991, Medical Research Council, UK.
- Medvedev, Z. A. (1969). The Rise and Fall of T. D. Lysenko. New York, Columbia University Press.
- Mendelsohn (1985). Informal Report of Meeting on DNA Methods for Measuring the Human Heritable Mutation Rate Lawrence Livermore Laboratory.
- Mendelsohn, M. L. (1986). Prospects for DNA Methods to Measure Human Heritable Mutation Rates. Genetic Toxicology of Environmental Chemicals, Part B: Genetic Effects and Applied Mutagenesis. New York, Alan R. Liss: 337-344.
- Mervis, J. (1990). "On Capitol Hill: One Day in the Hard Life of the Genome Project." The Scientist **4**(No. 16, 20 August): 1, 4, 14.
- Mervis, J. (1992). "From Blue-Chip to White Coat." Nature **356**(2 April): 367.
- Mervis, J. (1992). "Healy Attacks US Budgeting System." Nature **356**(16 April): 555.
- Mervis, J. (1992). "NIH Forms Policy Centre to Study Research Ethics." Nature **356**(2 April): 367.
- Merz, B. (1988). "Gene Mappers Form Collaborations." JAMA **260**(#17, 4 November): 2477.

Merz, B. (1988). "National Research Council Endorses Human Gene Mapping Project." J Am Med Assoc **259**(11 March): 1433-1434.

Merz, B. (1991). *In Search of Large Families, Blazing a Genetic Trail*. Howard Hughes Medical Institute.

Metheny, B. (1988). Interview, Monocle Restaurant, Capitol Hill, Washington, DC, Delegation for Basic Biomedical Research.

Metheny, B. (1988). Note to the author, Tricom International and the Delegation for Basic Biomedical Research.

Metheny, B. and S. Haley (1992). "Dr. Watson's Resignation Raises Questions On Future Commitment to HGP." Genetic Engineering News **12**(No. 7, 1 May): 3, 24.

Michaud, C. and C. J. L. Murray (1996). *Resources for Health Research and Development in 1992: A Global Overview*. Geneva, Switzerland, World Health Organization.

Mine, A. (1990). Interview, Japan Biotechnology Association (formerly BIDEC).

Ministère des Affaires Sociales et de la Solidarité (1991). *Protection of Persons Undergoing Biomedical Research*, Government of France.

Ministry of Education Science and Culture (1989). *On Promotion of the Human Genome Program* Government of Japan.

Ministry of Education Science and Culture (1990). *Five-Year Plan for Promotion of the Human Genome Program at Universities*, Bioscience Sectional meeting, Subcommittee for Regional Promotion of Studies Specified by the Academic Deliberative Council, Ministry of Education, Science, and Culture, Government of Japan.

Mirzabekov, A. (1989). Interview, UNESCO-USSR workshop on human genome research, Moscow.

Mirzabekov, A. (1989). Interview, Guest Quarters, Bethesda, MD, in association with a meeting at the National Center for Human Genome Research.

Mirzabekov, A. (1990). Interview, Englehardt Institute for Molecular Biology, Moscow, in conjunction with a meeting to plan an international conference on ethical, legal and social issues in genome research in Bethesda, MD in June 1991.

Mishkin, B. (1983-1991). OTA workshop on impacts of neuroscience (1983), a meeting on prospects for a bioethics commission convened for Elizabeth McClosky, staff to Senator Danforth (1989), and various phone and personal conversations concerning federal bioethics commissions, Hogan & Hartson, Washington, DC; Mishkin was on the staff of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, the Ethics Advisory Board (Department of Health, Education and Welfare), and the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research.

Mittwoch, U. (1973). Genetics of Sex Differentiation. New York, Academic Press.

Miyahara, M. (1987). *R&D on Human Gene Analysis and Mapping Systems Supported by Science and Technology* Agency of Japan Tokyo Office of the US National Science Foundation.

Miyakawa, H. (1990). Dinner at author's home, Derwood, MD.

Mlot, C. (1991). "A Well-Rounded Worm." Science **252**(21 June): 1619-1920.

Modell, B. (1989). Community Genetics Services in Europe, World Health Organization and London School of Hygiene and Tropical Medicine.

Mohr, J. (1951). "Search for Linkage between Lutheran Blood Group and Other Hereditary Characters." Acta Path Microbiol Scand **28**: 207-210.

Molecular Genetics Today (1990). Genesis 2000 Uncovers Cystic Fibrosis Gene, Du Pont.

Monbusho budget Matsubara tried to secure a ¥6.5 billion budget (\$43 million) to support two five-year projects under Monbusho [Matsubara, 1990 #1451; Matsubara, 1990 #1457; Matsubara, 1990 #1455; Ministry of Education Science and Culture, 1990 #198]. The first year's budget was ¥400 million (\$2.7 million) for the biology program. A second, separate but related, program focused on informatics. A new Genome Analysis Center would be established at the University of Tokyo, with a national research group and a five-year commitment (first year budget ¥220 million, or \$1.5 million). This was to be the first installment on a much larger program. The Monbusho plan laid out a strategy for genome research, urging establishment of groups in five areas: 1) physical and genetic mapping, 2) analysis of complementary DNA collections (cDNA, representing those parts of DNA transcribed to RNA and representing the expressed parts of genes), 3) pursuit of new techniques to analyze DNA, 4) informatics, and 5) science and society. The Monbusho proposal set aside funds for international scientific workshops and for training of postdoctoral fellows and other research personnel [Matsubara, 1991 #1456; Ministry of Education Science and Culture, 1990 #198].

Monbusho cuts This was roughly ¥200 million (\$1.5 million) short of Matsubara's aspirations for Monbusho. The five elements remained, led by Matsubara (Osaka University), Mitsuaki Yoshida (Tokyo University), Minoru Kanehisa (Kyoto University), with a smaller program at Kyushu University [Matsubara, 1992 #1086].

Morowitz, H. J. and T. Smith (1987). Report of the Matrix of Biological Knowledge Workshop, Santa Fe Institute.

Moscowitz, J. (1987). Note to Dr. Wyngaarden, attached memo. Also used as briefing material by NIH for congressional staff and at genome meetings., National Institutes of Health.

Mossinghoff, G. J. (1991). Letter to Louis W. Sullivan, Jr., M.D., Secretary of Health and Human Services, Pharmaceutical Manufacturers Association.

Mossinghoff, G. J. (1992). Letter to Bernadine Healy, NIH Director, Pharmaceutical Manufacturers Association.

Mossinghoff, G. J. (1992). Letter to Bernadine Healy, NIH Director, Pharmaceutical Manufacturers Association.

Mowery, D. C. (1989). "Collaborative Ventures between US and Foreign Manufacturing Firms." Research Policy **18**: 19-32.

Muller, H. J. (1946). "Muller, Biologist Wins Nobel Prize." New York Times cited by John Beatty, "**Genetics in the Atomic Age: The Atomic Bomb Casualty Commission, 1947-1956, in *The Expansion of American Biology*, K. Benson, et al. (Eds.), Rutgers University Press (1991)**(1 November): 284-324.

Müller-Hill, B. (1988). Murderous Science. New York, Oxford University Press.

Mullis, K. B. (1990). "The Unusual Origin of the Polymerase Chain Reaction." Sci. Am. **262**(April): 56-65.

Mullis, K. B., et al. (1986). "Specific Enzymatic Amplification of DNA *In Vitro*: The Polymerase Chain Reaction." CSH Symp. Quant. Biol.: 263-273.

Mullis, K. B. and F. A. Faloon (1987). Specific Synthesis of DNA *in vitro* via a Polymerase Catalyzed Chain Reaction. Methods in Enzymology, Vol. 155. R. Wu. San Diego, Academic Press: 335-350.

Mundell, I. and C. Anderson (1992). "Sweeter Offer by Wellcome Keeps Genome Scientist in Britain." Nature **357**(14 May): 99.

Murray, T. H. (1991). "Ethical Issues in Human Genome Research." FASEB J. **5**(January): 55-60.

Murrell, J., et al. (1991). "A Mutation in the Amyloid Precursor Protein Associated with Hereditary Alzheimer's Disease." Science **254**(4 October): 97-99.

Myers, N. (1988). "Gene Study Excites Researchers." Washington Technology(22 September): 29-30.

Narin, R. and J. D. Frame (1989). "The Growth of Japanese Science and Technology." Science **245**(11 August): 600-605.

Nasmyth, K. and J. Sulston (1987). "High-Altitude Walking with YACs." Nature **328**(30 July): 380-381.

Nathans, D. and H. O. Smith (1975). Restriction Endonucleases in the Analysis and Restructuring of DNA Molecules. Annual Reviews of Biochemistry. E. E. Snell. Palo Alto, CA, Annual Reviews, Inc. **44**: 273-293.

National Academy of Sciences (1990). Questions and Answers About the National Academy of Sciences, National Academy of Engineering, Institute of Medicine and the National Research Council, National Academy of Sciences.

National Academy of Sciences (1990). Staff Orientation Booklet, National Academy of Sciences.

National Center for Human Genome Research (1989). "Ethical Legal and Social Implications of the Human Genome Initiative." NIH Guide to Grants and Contracts **19**(#4, 26 January 1990): 1-5.

National Center for Human Genome Research (1991). Ethical, Legal, and Social Implications Program, Grant-Making Status Report.

National Center for Human Genome Research (1992). Genome Report Card, National Institutes of Health.

National Center for Human Genome Research (1996). Policy on availability and patenting of human genomics DNA sequence produced by NHGRI Pilot Projects (funded under RFA HG-95-005). Bethesda, MD, National Human Genome Research Institute.

National Center for Human Genome Research, et al. (1991). "RFA-HG-91-01. Studies of Testing and Counseling for Cystic Fibrosis Mutations." NIH Guide to Grants and Contracts **20**(No. 14, 5 April): 1-9.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1975). Research on the Fetus. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1976). Research Involving Prisoners. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1977). Disclosure of Research Information Under the Freedom of Information Act. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1977). Psychosurgery. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1977). Research Involving Children. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education, and Welfare (1978). The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1978). Ethical Guidelines for the Delivery of Health Services by DHEW. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1978). Institutional Review Boards. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1978). Research Involving Those Institutionalized as Mentally Infirm. Washington, DC, Government Printing Office.

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, U. D. o. H., Education and Welfare (1978). Special Study: Implications of Advances in Biomedical and Behavioral Research. Washington, DC, Government Printing Office.

National Institute of Diabetes Digestive and Kidney Diseases (1991). "Omnibus Solicitation of the Public Health Service for Small Business Innovation Research (SBIR) Grant Applications." **PHS 91-2**(item CC): 56-57.

National Institutes of Health (1987). "Computer-Based Representation and Analysis of Molecular Biology Data." NIH Guide **16**(#18, 29 May): 9-11.

National Institutes of Health (1987). "New Approaches to the Analysis of Complex Genomes." NIH Guide **16**(#18, 29 May): 11-14.

National Institutes of Health (1987). NIH Origins: An Attic Laboratory on Staten Island, National Institutes of Health.

National Institutes of Health (1988). Gene Mapping/Sequencing: Questions and answers prepared by NIH staff for House Appropriations hearings.

National Institutes of Health (1989). NIH Data Book 1989 National Institutes of Health.

National Institutes of Health (1992). Search Committee for Director, National Center for Human Genome Research, National Institutes of Health.

National Research Council (1988). Mapping and Sequencing the Human Genome. Washington, DC, National Academy Press.

National Research Council (1994). Sharing Laboratory Resources: Genetically Altered Mice. Washington, DC, National Academy of Sciences.

National Research Council (1997). Intellectual Property Rights and Research Tools in Molecular Biology. Washington, DC, National Academy of Sciences.

National Science Foundation (1988). The Science and Technology Resources of Japan: A Comparison with the United States, National Science Foundation.

Nature (1992). The editorial might have been more persuasive if it had gotten Healy's name right.

Needleman, S. B. and C. D. Wunch (1970). "A General Method Applicable to the Search for Similarities in the Amino Acid Sequences of Two Proteins." J Molec Biol **48**: 443-453.

Neel, J. V. and W. J. Schull (1991). The Children of Atomic Bomb Survivors: A Genetic Study. Washington, DC, National Academy Press.

Neel, J. W. (1949). "The Inheritance of Sickle Cell Anemia." Science **110**: 64-66.

Negrette, A. (1990). "La Catira." Panorama(April): translated by Hereditary Disease Foundation.

Nelkin, D. (1992). The Social Power of Genetic Information. The Code of Codes: Scientific and Social Issues in the Human Genome Project. D. J. Kevles and L. Hood. Cambridge, MA, Harvard University Press: 179-190.

Nelkin, D. a. and L. Tancredi (1989). Dangerous Diagnostics: The Social Power of Biological Information. New York, Basic Books.

Nelson, J. R. (1984). Phone interview, Baylor College of Medicine.

Nelson, M. (1990). Interview, Subcommittee on Science, Space, and Technology, Committee on Commerce, Science and Transportation, US Senate.

Newman, A. (1988). "The Legacy on Chromosome 4." Johns Hopkins Magazine(April): 30-39.

Newmark, P. (1987). Mapping and Sequencing the Human Genome in Europe, National Technical Information Service, Springfield, VA.

NIH Grant proposal R01 DK 43425-01 (1990). Evaluation of Carrier Screening for Cystic Fibrosis, Grant Application to the National Institutes of Health. Name of the principal investigator withheld on request.

NIH Working Group on the Human Genome (1986). 6 November Meeting Summary, National Institutes of Health.

NIH Working Group on the Human Genome (1986). 16 December Meeting Summary, National Institutes of Health.

NIH/CEPH Collaborative Mapping Group (1992). "A Comprehensive Genetic Linkage Map of the Human Genome." Science **258**(2 October): 67-86.

Nishimi, R. Y. (1992). Electronic mail notes, Office of Technology Assessment, US Congress.

Norman, C. (1990). "How the Soviets Got the H-Bomb." Science **247**(12 January): 151.

Nowak, R. (1991). "Gene Researchers Challenge the Patent Frontier." J.NIH Res. **3**(December): 25-26.

NRC Committee members (1988). Phone and personal interviews, Office of Technology Assessment.

Office of Energy Research (1984). Health and Environmental Research: Summary of Accomplishments Department of Energy.

Office of Health and Environmental Research (1986). Background documents for briefing with the Office of Management and Budget, US Department of Energy.

Office of Human Genome Research (1989). Ethical and Legal Studies Relating to the Program to Map and Sequence the Human Genome, National Institute of General Medical Sciences, NIH.

Office of Program Planning and Evaluation (1987). The Human Genome, 54th Meeting of the Advisory Committee to the Director, National Institutes of Health.

Office of Science and Technology Policy (1992). "Committee on Life Sciences/Federal Coordinating Council for Science, Engineering, and Technology; Federally Funded Genome Research: Science and Technology Transfer Issues." Federal Register **57**(No. 82, 28 April): 17935-17936.

Office of Science and Technology Policy (1994). Federal Register(12 August).

Office of Technology Assessment (1986). Proposal for an OTA Assessment of Mapping the Human Genome, Office of Technology Assessment, US Congress.

Office of Technology Assessment (1987). Costs of Human Genome Projects, US Congress.

Office of Technology Assessment (1987). Issues of Collaboration for Human Genome Projects, US Congress.

Oishi, M. (1990). Interview, Tokyo University (Todai).

Oliver, S. G., et al. (1992). "The Complete DNA Sequence of Yeast Chromosome III." Nature **357**(7 May): 38-46.

Olson, M. (1988). Interview with Leslie Roberts and author at Genome Mapping and Sequencing Symposium, Cold Spring Harbor Laboratory.

Olson, M., et al. (1987). Invited speakers to the Committee on Mapping and Sequencing the Human Genome, Board on Basic Biology, National Academy of Sciences.

Olson, M. V., et al. (1986). "Random-Clone Strategy for Genomic Restriction Mapping in Yeast." Proc. Nat. Acad. Sci. (USA) **83**(October): 7826-7830.

Olson, M. V., et al. (1989). "A Common Language for Physical Mapping of the Human Genome." Science **245**: 1434-1435.

OMB Briefing (1986). The budget briefing documents for the OHER-OMB meetings included budget projections for fiscal years 1987-90 of 5.64, 11.55, 18, and 22 million dollars. The cover sheet for the DOE document to OMB specified a four year project starting October 1, 1987, extending to September 30, 1991, and costing 95 million dollars. By simple arithmetic, the fiscal year 1991 budget must have been projected at 40 to 45 million dollars. Decisions about a Phase II budget were to be made in 1990 and 1991.

Orkin, S. H., et al. (1978). "Application of Endonuclease Mapping to the Analysis and Perinatal Diagnosis of Thalassemias CAused by Globin-Gene Deletion." N Engl J Med **299**(#4, 27 July 1978): 166-172.

Used RFLP to dx delta-beta thalassemia in fetus by amniotic fluid. confirmed fetoscopic blood sample and protein analysis. Also confirmed at birth.

Showed deletion of alpha globin in alpha-thal, using S blot and RFLP analysis (showed missing fragments)

Showed deletion of beta-globin and beta-globin-like sequences in dealta-beta-thal and HPFH (i.e. hybridized to beta-globin probe) sequences by missing restriction fragments.

Kan had already shown alpha-globin del by hybridization in solution. They used S blot, technically easier and also able to pick up more subtle changes, like loss of fragments (rather than complete absence of hybridizing sequences).

Used alpha and beta-hemoglobin probes; enzymes were Eco RI and Hin dIII

Ott, J. (1990). "Cutting A Gordian Knot in the Linkage Analysis of Complex Human Traits." Am J Hum Genet **46**: 219-221.

Owens, C. T. (1989). "Tapping Japanese Science." Issues in Sci and Tech(Summer): 32-34.

- Palca, J. (1986). "More Actors Apply for Parts." Nature **323**(23 October): 660.
- Palca, J. (1987). "Human Genome Sequencing Plan Wins Unanimous Approval in US." Nature **326**(2 April): 429.
- Palca, J. (1988). "Another Report Smiles on Human Genome Sequencing Project." Nature **332**(28 April): 769.
- Palca, J. (1988). "Human Genome Organization is Launched with a Flourish." Nature **335**(22 September): 286.
- Palca, J. (1988). "The Pros and Cons of Freedom of Access to Human Genome Data." Nature **333**(23 June): 692.
- Palca, J. (1989). "Gene Mappers Meet on Strategy." Science **245**: 1036.
- Palca, J. (1989). "Genome Projects Are Growing Like Weeds." Science **245**(14 July): 131.
- Palca, J. (1989). "Hard Times at NIH." Science **246**(24 November): 988-990.
- Palca, J. (1991). "NSF Centers Rise Above the Storm, including box on "New Alliances, New Technology"." Science **251**(4 January): 19-22.
- Palca, J. (1992). "The Genome Project: Life After Watson." Science **256**(15 May): 956-958.
- Palfreman, J. (1989). *The Book of Man* Horizon, BBC; and NOVA, WGBH.
- Parliamentary Assembly of the Council of Europe (1983). "Recommendation 934 (1982) on Genetic Engineering." Biotech Law Rep(January): 17-18.
- Patterson, J. T. (1987). The Dread Disease: Cancer and Modern American Culture. Cambridge, MA, Harvard University.
- Pauling, L., et al. (1949). "Sickle Cell Anemia: A Molecular Disease." Science **110**: 543-548.
- Payne, R. W. (1988). "The Emergence of Trade Secret Protection in Biotechnology." Bio/Technology **6**(February): 130.
- Pearson, P. L. (1991). "The Genome Data Base (GDB) — A Human Gene Mapping Repository." Nuc Acid Res **19 Supplement**: 2237-2239.
- Pearson, P. L., et al. (1991). Databases to Serve the Genome Program and the Medical Genetics Community. Etiology of Human Disease at the DNA Level. J. Lindsten and U. Pettersson. New York, Raven Press.
- Pearson, P. L., et al. (1991). "The Human Genome Initiative — Do Databases Reflect Current Progress?" Science **254**(11 October): 214-215, also Genome Maps 1991 center section.
- Pendrell, E. (1968). *The Scientist, Man and His Universe* (television documentary series), ABC News.
- Pericak-Vance, M. A., et al. (1991). "Linkage Studies in Familial Alzheimer Disease: Evidence for Chromosome 19 Linkage." Am J Hum Genet **48**: 1034-1050.
- Perkin Elmer Cetus (1990). *PCR Bibliography* Perkin Elmer Cetus.
- Petersen, G. M., et al. (1989). "Genetic Counseling for Familial Adenomatous Polyposis (FAP) with Chromosome 5q linkage information." Am J Hum Genet **45**(supplement): A125.
- Peterson, J. (1989). Notes from presentation at Genes and Machines, II (New Hampshire conference on DNA and computers), National Center for Human Genome Research.

- Petes, T. D. and D. Botstein (1977). "Simple Mendelian Inheritance of the Reiterated Ribosomal DNA of Yeast." PNAS **74**(November): 5091-5095.
Used RFL to track inheritance of strains heterozygous for ribosomal DNA variants. Size of Eco RI fragments. Suggested that at least 90 percent of the est 100-140 rDNA genes were on a single chromosome (from others' work, on chrM I). Showed suppression of meiotic recombination in this region. Twelve of 14 variants examined showed no recombination of rDNA regions. 2 of 14 showed mitotic, not meiotic, recombination (distinguished by finding nonreciprocal recomb). \
- Diploid strain from Lee Hartwell cleaved by Eco RI, DNA-DNA hybridization to rDNA probe.
- Petrov, R. V. (1990). "Biology's Future: Blossoming or Catastrophe?" Kommunist Translated(January): 86-93.
- Philipson, L. (1988). "The DNA Data Libraries." Nature **332**(21 April): 676.
- Philipson, L. (1991). "Turmoil in European Biology." Nature **351**(9 May): 91-92.
- Philipson, L. and J. Tooze (1987). "The Human Genome Project — Mapping and DNA Sequence Determination." BioFutur (No. 58): 94-101.
- Phillips, K. (1988). "Biologist Hood Uses Loose Reins to Guide 'Gang of 70'." The Scientist(25 July): 26.
- Philosopher Michael Walzer of Princeton, wrote a classic essay in 1973 about the dilemma of "dirty hands," when pursuit of political power and moral virtue came into conflict.
- Pines, M. (1986). Shall We Grasp the Opportunity to Map and Sequence all Human Genes and Create a 'Human Gene Dictionary'. Prepared for a meeting of the Trustees of the Howard Hughes Medical Institute, Bethesda, MD, Howard Hughes Medical Institute.
- Pines, M. (1987). Mapping the Human Genome Howard Hughes Medical Institute.
- Pines, M. (1988). Interview, Howard Hughes Medical Institute, Bethesda, MD.
- Pines, M. (1988). Letter to the author, Howard Hughes Medical Institute, Bethesda, MD.
- Pines, M., Editor (1991). Blazing a Genetic Trail, Howard Hughes Medical Institute.
- Pines, M. (1991). Introduction and Stalking a Lethal Gene, Blazing a Genetic Trail. Howard Hughes Medical Institute.
- Pohl, F. (1992). "Reality of Sequencing Costs." Nature **357**(14 May): 106.
- Pokorski, R., et al. (1989). The Potential Role of Genetic Testing in Risk Classification, Genetic Testing Committee, Medical Section, American Council of Life Insurance.
- Pollen, D. (1993). Hannah's Heirs: The Quest for the Genetic Origins of Alzheimer's Disease. New York, Oxford University Press.
- Pollen, D. (1995). Hannah's Heirs: The Quest for the Genetic Origins of Alzheimer's Disease, revised paperback edition. New York, Oxford University Press.
- Poste, G. and R. E. Christoffersen (1987). Biotechnology and Human Health Care, Session on the Human Genome, Pharmaceutical Manufacturers' Association meeting, Mayflower Hotel, Washington, DC.
- Powers, M. (1991). Legal Protections of Confidential Information and the Need for Anti-Discrimination Laws. AIDS, Women and the Next Generation. R. R. Faden, G. Geller and M. Powers. New York, Oxford University Press: 221-255.

Powledge, T. M. (1987). "Donald Fredrickson: Spending Hughes' Legacy." The Scientist(26 January): 16-17.

Pratt, R. T. C. (1967). The Presenile and Senile Dementias. The Genetics of Neurological Disorders. London, Oxford University Press: 69-77.

Pratt, R. T. C. (1970). The Genetics of Alzheimer's Disease. Alzheimer's Disease. G. E. W. Wolstenholme. London, Churchill: 137-144.

Presidents Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1982). Splicing Life, President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1981). Defining Death. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1981). Protecting Human Subjects. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1982). Compensating Research Injury. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1982). Making Health Care Decisions (with Vols. 2 and 3 appendices). Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1982). Whistleblowing in Biomedical Research. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1983). Deciding to Forego Life-Sustaining Treatment. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1983). Implementing Human Research Regulations. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1983). Screening and Counseling for Genetic Conditions. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1983). Securing Access to Health Care. Washington, DC, Government Printing Office.

President's Commission, f. t. S. o. E. P. i. M. a. B. a. B. R. (1983). Summing Up. Washington, DC, Government Printing Office.

President's Council on Competitiveness (1991). Report on National Biotechnology Policy, The White House. Ernst & Young Estimated that federal funding was \$3.7 billion in 1991, with \$3.2 billion industrial investment in R&D, as cited in the National Research Council Report by the Committee on Japan. The Japanese corporate contribution was estimated at 276 billion yen (\$2 billion) that same year (see footnote 5 in NRC report), while government funding was ¥89.6 billion (\$665 million) (see table 2 in NRC report). Yen to dollar rates are calculated at 135¥/\$ in 1991, 150 ¥/\$ in 1990, here and throughout the chapter.

Presta, L. G. and G. D. Rose (1988). "Helix Signals in Proteins." Science **240**(17 June): 1632-1641.

Price, J. S. (1989). "PCR Origins." Nature **342**(7 December): 623.

Privacy Commissioner of Canada (1992). Genetic Testing and Privacy.

Prober, J. M., et al. (1987). "A System for Rapid DNA Sequencing with Fluorescent Chain-Terminating Dideoxynucleotides." Science **238**(16 October): 336-341.

Proctor, R. N. (1988). Racial Hygiene: Medicine Under the Nazis. Cambridge, MA, Harvard University Press.

Proctor, R. N. (1992). Nazi Doctors, Racial Medicine, and Human Experimentation. The Nazi Doctors and the Nuremberg Code. G. J. Annas and M. A. Grodin. New York, Oxford University Press: 17-31.

Program Advisory Committee on the Human Genome (1990). Resolution from the NCHGR Program Advisory Committee on the Human Genome, National Institutes of Health.

Pross, C. (1992). Nazi Doctors, German Medicine, and Historical Truth. The Nazi Doctors and the Nuremberg Code: Human Rights in Human Experimentation. G. J. Annas and M. A. Grodin. New York, Oxford University Press: 32-52.

Provine, W. B. (1971). The Origins of Theoretical Population Genetics. Chicago, University of Chicago Press.

Ptashne, M. (1986). A Genetic Switch: Gene Control and Phage λ . Palo Alto, CA, Blackwell.

Public Law 93-348 (1973).

Public Law 96-517 (1980).

Public Law 98-158 (1985).

Public Law 98-620 (1984).

Public Law 99-502 (1986).

Quaid, K. A., et al. (1989). "Knowledge, Attitude, and the Decision to be Tested for Huntington's Disease." Clin Genet **36**: 431-438.

Quine, W. v. O. (1981). Kurt Gödel. Theories and Things. Cambridge, MA, Harvard University Press: 143-147.

Rabinow, P. (1992). letter to the author, Department of Anthropology, University of California, Berkeley.

Rabinow, P. (1992). Much of the information in this paragraph derives from personal communications from Paul Rabinow, who cites a paper by Jean-Paul Gaudillere, "French Strategies in Molecular Biology," presented at a Harvard conference on the Human Genome Project, 15 June 1990, Department of Anthropology, University of California, Berkeley.

Raines, L. (1987). Results of IBA Membership Survey on Mapping the Human Genome, Industrial Biotechnology Association.

Ramsey, P. (1975). The Ethics of Fetal Research. New Haven, CT, Yale University Press.

Raub, W. F. (1991). The Ethical, Legal, and Social Implications of Human Genome Research: Preparing for the Responsible Use of New Genetic Knowledge, National Institutes of Health.

Recer, P. (1988). "Group Proposed Citizens' Committee to Control Use of Genetic Knowledge." AP wire(19 April).

Rechsteiner, M. (1990). Letter to William Raub, Alan Bromley, Senator Albert Gore, Jr., and Senator Edward Kennedy, University of Utah.

Recombinant DNA Advisory Committee (1984). Minutes of meeting and background documents, National Institutes of Health.

Red Latinoamericana de Ciencias Biologicas (1988). Resolution on the Human Genome Approved by RELAB in Quito, Ecuador, 1988.

Red Latinoamericana de Ciencias Biologicas (1990). Resolution on the Human Genome Approved by RELAB in Santiago, Chile, 1990.

Reeders, S. T., et al. (1985). "A Highly Polymorphic DNA Marker Linked to Adult Polycystic Kidney Disease on Chromosome 16." Nature **317**: 542-544.

Reich, R. B. (1989). "The Quiet Path to Technological Preeminence." Sci Am **261**(#4, October): 41-47.

Reich, R. B. (1990). "Who Is Us?" Harv Bus Rev(January-February): 53-64.

Reilly, P. (1977). Genetics, Law, and Social Policy. Cambridge, MA, Harvard University Press.

Report reviewer (1988). Interview with individual who reviewed the NRC committee's report, whose name is withheld to preserve anonymity, Office of Technology Assessment.

Rettig, R. A. (1977). Cancer Crusade: The Story of the National Cancer Act of 1971. Princeton, NJ, Princeton University Press.

Reynolds, R. L. (1963). Commodore Perry in Japan. New York, American Heritage.

Rhodes, R. (1986). The Making of the Atomic Bomb. New York, Basic Books.

Rich, D. P., et al. (1990). "Expression of Cystic Fibrosis Transmembrane Conductance Regulator Corrects Defective Chloride Channel Regulation in Cystic Fibrosis Airway Epithelial Cells." Nature **347**(27 September): 358-363.

Richman, B. S. (1992). Decision on Petition to Suspend Prosecution; Specification of Correspondence Address, Examining Group 180, Patent and Trademark Office, US Department of Commerce.

Rifkin, J. (1983). Algeny. New York, Viking.

Rifkin, J. (1990). Letter to James D. Watson, Foundation on Economic Trends.

Rigby, P. W., et al. (1977). "Labeling Deoxyribonucleic Acid to High Specific Activity *In Vitro* by Nick Translation with DNA Polymerase I." J Molec Biol **113**(15 June): 237-251.

RIKEN (1986). History of RIKEN. Frontiers of Research. Tsukuba Science City, Japan, Institute of Physical and Chemical Research (RIKEN): 13.

Riordan, J. R., et al. (1989). "Identification of the Cystic Fibrosis Gene: Cloning and Characterization of Complementary DNA." Science **245**(8 September): 1066-1072.

Risch, N. (1990). "Linkage Strategies for Genetically Complex Traits. I. Multilocus Models." Am J Hum Genet **46**: 222-228.

Risch, N. (1990). "Linkage Strategies for Genetically Complex Traits. II. The Power of Affected Relative Pairs." Am J Hum Genet **46**: 229-241.

Risch, N. (1990). "Linkage Strategies for Genetically Complex Traits. III. The Effect of Marker Polymorphism on Analysis of Affected Relative Pairs." Am J Hum Genet **46**: 242-253.

Rivers, L. W. (1989). Prioritization of Federal R&D Megaprojects, Industrial Research Institute, Inc.

Roberts, L. (1987). "Agencies Vie Over Human Genome Project." Science **237**(31 July): 486-488.

Roberts, L. (1987). "Flap Arises over Genetic Map." Science **238**(6 November): 750-752.

Roberts, L. (1987). "Human Genome: Questions of Cost." Science **237**(18 September): 1411-1412.

Roberts, L. (1987). "New Sequencers Take on the Genome." Science **238**(16 October): 271-273.

Roberts, L. (1987). "Who Owns the Human Genome?" Science **237**(24 July): 358-361.

Roberts, L. (1988). "Academy Backs Genome Project." Science **239**(12 February): 725-726.

Roberts, L. (1988). "Carving Up the Human Genome." Science **242**(2 December): 1244-1246.

Roberts, L. (1988). "Genome Projects Ready to Go." Science **240**(29 April): 602-604.

Roberts, L. (1988). "Human Genome Goes International." Science **241**(8 July): 165.

Roberts, L. (1988). "The Race for the Cystic Fibrosis Gene." Science **240**(8 April and 15 April): 141-144.

Roberts, L. (1988). "A Sequencing Reality Check." Science **242**(2 December): 1245.

Roberts, L. (1988). "Watson May Head Genome Office." Science **240**(13 May): 878-879.

Roberts, L. (1989). "Ethical Questions Haunt New Genetic Technologies." Science **243**(3 March): 1134-1136.

Roberts, L. (1989). "Genome Mapping Now in Reach." Science **244**(28 April): 424-425.

Roberts, L. (1989). "Genome Project Under Way, at Last." Science **243**(13 January): 167-168.

Roberts, L. (1989). "New Game Plan for Genome Mapping." Science **245**: 1438-1440.

Roberts, L. (1989). "Plan for Genome Centers Sparks a Controversy." Science **246**(13 October): 204-205.

Roberts, L. (1989). "Watson Versus Japan." Science **246**: 576-578.

Roberts, L. (1990). "Cold Spring Harbor Turns 100." Science **250**(26 October): 496-498.

Roberts, L. (1990). "Cystic Fibrosis Pilot Projects Go Begging." Science **250**(23 November): 1076-1077.

Roberts, L. (1990). "DOE to Map Expressed Genes." Science **250**(16 November 1990): 913.

Roberts, L. (1990). "Down to the Wire for the NF Gene." Science **249**(20 July): 236-238.

Roberts, L. (1990). "Genome Backlash Going Full Force." Science **248**: 804.

Roberts, L. (1990). "The Genome Map is Back on Track After Delays." Science **248**(18 May): 805.

Roberts, L. (1990). "Genome Project: An Experiment in Sharing." Science **248**(25 May): 953.

- Roberts, L. (1990). "The Great Clone Giveaway." *Science* **248**(25 May): 956.
- Roberts, L. (1990). "Hopeful News for CF Pilot Studies." *Science* **250**(14 December): 1514-1515.
- Roberts, L. (1990). "Huntington's Gene: So Near, Yet So Far." *Science* **247**(9 February): 624-627.
- Roberts, L. (1990). "Large-Scale Sequencing Trials Begin." *Science* **250**(7 December): 1336-1338.
- Roberts, L. (1990). "A Meeting of the Minds on the Genome Project?" *Science* **250**(9 November): 756-757.
- Roberts, L. (1990). "Tough Times Ahead for the Genome Project." *Science* **248**(June 29): 1600-1601.
- Roberts, L. (1990). "Whatever Happened to the Genetic Map?" *Science* **247**(19 January): 281-282.
- Roberts, L. (1990). "The Worm Project." *Science* **248**(15 June): 1310-1313.
- Roberts, L. (1991). "Finding DNA Sequencing Errors." *Science* **252**(31 May): 1255-1256.
- Roberts, L. (1991). "Gambling on a Shortcut to Genome Sequencing." *Science* **252**(21 June): 1618-1619.
- Roberts, L. (1991). "A Genetic Survey of Vanishing Peoples." *Science* **252**(21 June): 1614-1617.
- Roberts, L. (1991). "Genome Patent Fight Erupts." *Science* **254**(11 October): 184-186.
- Roberts, L. (1991). "HUGO to Get a New Director — And a Mission?" *Science* **254**(4 October): 19.
- Roberts, L. (1991). "MRC Denies Blocking Access to Genome Data." *Science* **254**(13 December): 1583.
- Roberts, L. (1991). "Report Card on the Genome Project." *Science* **253**(26 July): 376.
- Roberts, L. (1991). "The Rush to Publish." *Science* **251**(18 January): 260-263.
- Roberts, L. (1992). "DNA Fingerprinting: Academy Reports." *Science* **256**(17 April): 300-301.
- Roberts, L. (1992). "Friends Say Jim Watson Will Resign Soon." *Science* **256**(10 April): 171.
- Roberts, L. (1992). "Friends Say Watson Will Resign Soon." *Science* **256**(10 April): 171.
- Roberts, L. (1992). "Genetic Survey Plans Move Ahead." *Science* **256**(19 June): 1629.
- Roberts, L. (1992). "The Huntington's Gene Quest Goes On." *Science* **258**(30 October): 740-741.
- Roberts, L. (1992). "NIH Gene Patents, Round Two." *Science* **255**(21 February): 912-913.
- Roberts, L. (1992). "The Perils of Involving Congress in a 'Catfight'." *Science* **257**(10 July): 156-157.
- Roberts, L. (1992). "Rumors Fly Over Rejection of NIH Claim." *Science* **257**(25 September): 1855.
- Roberts, L. (1992). "Science in Court: A Culture Clash." *Science* **257**(7 August): 732-736.
- Roberts, L. (1992). "Sequencing Venture Sparks Alarm." *Science* **255**(7 February): 677-678.
- Roberts, L. (1992). "A Standing Ovation from the Troops." *Science* **256**(15 May): 957.

- Roberts, L. (1992). "Top HHS Lawyer Seeks to Block NIH." Science **258**(9 October): 209-210.
- Roberts, L. (1992). "Two Chromosomes Down, 22 More to Go." Science **258**(2 October): 28-30.
- Roberts, L. (1992). "Why Watson Quit as Project Head." Science **256**(17 April): 301-302.
- Roberts, R. J. (1989). "Benefits of Databases." Nature **342**(9 November): 114.
- Roberts, S. S. (1992). "How Strictly Will Roche Enforce Its *Taq* Sequencing Patent?" J NIH Res **4**(June): 42-46.
- Roesch, W. C. (1987). US-Japan Joint Reassessment of Atomic Bomb Radiation Dosimetry in Hiroshima and Nagasaki, Hiroshima: Radiation Effects Research Foundation.
- Rommens, J. M., et al. (1989). "Identification of the Cystic Fibrosis Gene: Chromosome Walking and Jumping." Science **245**(8 September): 1059-1065.
- Rooman, M. J. and S. J. Wodak (1988). "Identification of Predictive Sequence Motifs Limited by Protein Structure Data Base Size." Nature **335**(1 September): 45-49.
- Rosenblith, W. A. (1989). Unesco Science and U. S. Scientific Interests, Massachusetts Institute of Technology.
- Rosenfeld, S. C. (1988). "Sharing of Research Results in a Federally Sponsored Gene Mapping Project." Rutgers Computer and Tech Law J **14**(No. 2): 311-358.
- Rota, G.-C. (1987). "The Lost Cafe." Los Alamos Science Special Issue.(No. 15): 23-32. Republished in "From Cardinals to Chaos: Reflections on the Life and Legacy of Stanislaw Ulam" (NY: Cambridge University Press, 1989).
- Rothberg, J. M. (1992). "Gene Patents." Nature **356**(30 April): 738.
- Rothman, B. K. (1987). The Tentative Pregnancy: Prenatal Diagnosis and the Future of Motherhood. New York. See especially Chapter 7: Grieving the Genetic Defect, Penguin Books.
- Rothman, B. K. (1992). "All That Glitters is Not Gold." Hastings Center Report Special Supplement(July-August): S11-S15.
- Rothman, D. J. (1991). Chapter 9: Commissioning Ethics. Strangers at the Bedside. New York, Basic Books: 168-189.
- Rothstein, M. A. (1989). Medical Screening and the Employee Health Cost Crisis. Washington, DC, Bureau of National Affairs.
- Rothstein, M. A. (1990). Recommendations for Regulations to Implement the Americans with Disabilities Act, Submitted to the Equal Employment Opportunity Commission, University of Houston Law Center.
- Rothstein, M. A. (1991). Comments on Proposed Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act, Submitted to the Equal Employment Opportunity Commission.
- Rothstein, P. F., Ed. (1979). Federal Rules of Evidence. New York, Clark Boardman.
- Royer, B., et al. (1987). "Cloning the Gene for an Inherited Human Disorder — Chronic Granulomatous Disease — on the Basis of Its Chromosomal Location." Nature **322**: 32-38.
- Ruddle, F., et al. (1987). Physical Mapping Review, Contract report prepared for the Office of Technology Assessment, U. S. Congress.

Ruddle, F. H. (1989). "Tribute to Torbjörn Caspersson." Am J Hum Genet **44**(#4, April): 439-440.

Russell, L. (1987). Phone conversations and meetings in B-33, Rayburn House Office Building, Committee on Energy and Commerce, US House of Representatives.

Saiki, R. K., et al. (1988). "Primer-Directed Enzymatic Amplification of DNA with a Thermostable DNA Polymerase." Science **239**: 487-491.

Saiki, R. K., et al. (1985). "Enzymatic Amplification of Beta-Globin Genomic Sequences and Restriction Site Analysis for Diagnosis of Sickle Cell Anemia." Science **230**(20 December): 1350-1354.

Saint George-Hyslop, P. H., et al. (1990). "Genetic Linkage Studies Suggest That Alzheimer's Disease Is Not A Single Homogeneous Disorder." Nature **347**(13 September): 194-197.

Suggests that at least two types of early-onset FAD exist: Brit-Ital-US forms, and Volga German form. First linked to 21q, others to ?

Saint George-Hyslop, P. H., et al. (1987). "The Genetic Defect Causing Familial Alzheimer's Disease Maps on Chromosome 21." Science **235**(20 February): 885-890.

Saltus, R. (1989). "For One Scientist, Genetic Debate Has Personal Sting." Boston Globe(30 October): Health and Science 29, 31.

Saltus, R. (1989). Notes from Interview with Milton Wexler, Boston Globe.

Saltus, R. (1989). Notes from Interview with Nancy Wexler, Boston Globe.

Sanger, F. (1975). "The Croonian Lecture, 1975: Nucleotide Sequences in DNA." Proc. Roy. Soc. **B 191**: 317-333.

Sanger, F. (1984). Letter to Harry Noller, Laboratory of Molecular Biology, Medical Research Council, Hills Road, Cambridge, UK.

Sanger, F. (1988). "Sequences, Sequences, and Sequences." Ann. Rev. Biochem. **57**: 1-28.

Sanger, F. and A. R. Coulson (1975). "Rapid Method for Determining Sequences in DNA by Primed Synthesis with DNA-Polymerase." J. Molec. Biol. **94**: 441-448.

Sanger, F., et al. (1977). "DNA Sequencing with Chain-Terminating Inhibitors." PNAS **74**: 5463-5468.

Sankaranarayanan, K. (1988). "Invited Review: Prevalence of Genetic and Partially Genetic Diseases in Man and the Estimation of Genetic Risks of Exposure to Ionizing Radiation." Am J Hum Genet **42**: 651-662.

Sarfaty, M. (1990). Phone interview, Subcommittee on Health, Committee on Labor and Human Resources, US Senate.

Saxonhouse, G. (1986). Industrial Policy and Factor Markets in Japan and the United States. Japan's High Technology Industries. H. Patrick. Seattle, University of Washington Press.

Schefter, J. (1987). "Super Searcher." Popular Science(December): 60-61.

Scheidegger, A. (1988). "Biotechnology in Japan, a Lesson in Logistics? Part II: The Research Policy." Trends in Biotechnology **6**(February): 47-53.

Scheidegger, A. (1988). "Biotechnology in Japan: a Lesson in Logistics? Part I: The Political Substrate." Trends in Biotechnology **6**(January): 7-15.

Schellenberg, G. D., et al. (1991). "APP717, APP693, and PRIP Gene Mutations Are Rare in Alzheimer Disease." Am J Hum Genet **49**: 511-517.

Schellenberg, G. D., et al. (1988). "Absence of Linkage of Chromosome 21q21 Markers to Familial Alzheimer's Disease." Science **241**(16 September): 1507-1510.

Volga German families, including Eisenach and Reising, fail to show linkage to chrm 21 markers in 14 kindreds.

Schellenberg, G. D., et al. (1992). "Genetic Linkage Evidence for a Familial Alzheimer's Disease Locus on Chromosome 14." Science **258**(23 October): 668-671.

Schieber, G. J., et al. (1992). "US Health Expenditure Performance: An International Comparison and Data Update." Health Care Fin Rev **13**(No. 4, Summer 1992): 1-15 plus tables.

Schlessinger, D. (1988). *The Start at Harvard: Those Golden Years Cold Spring Harbor Laboratory.*

Schmeck, H. M. (1986). *Rapid Advances Point to the Mapping of All Human Genes. The Science: New Research in Decoding DNA Is Leading to Drugs and Treatments.* New York Times. New York City: Science Times, C1ff.

Schmeck, H. M. (1988). *DNA Pioneer to Tackle Biggest Gene Project Ever.* New York Times. New York: C1, C16.

Schmeck, H. M. (1991). *The Future of Genetic Research, Blazing a Genetic Trail.* Howard Hughes Medical Institute.

Schmidtke, J., et al. (1986). "Human Gene Cloning: The Storm before the Lull?" Nature **322**(10 July): 119.

Schneider, J. (1992). Memorandum to the author, Office of the Director, NIH.

Schneider, J. (1992). "Quoted in "Nobel Prize Biologist Watson Plans to Resign US Position" by David Brown and Malcolm Gladwell." Washington Post(9 April): A3.

Schneider, J. (1993). Interview, Building 1; discussing a February 1991 electronic mail message from Rob Lanham, NIH Counsel, to William Raub, then acting director, NIH, and a letter from William Raub to James Watson, Office of the Director, National Institutes of Health. The February 1991 memo did not assert a conflict of interest, but rather referred to a possible "appearance of conflict," based on stock purchases since Watson's 1990 disclosure statement. The argument of "appearance of conflict," while retaining surface plausibility and potential for public relations mischief, was quite different from the kind of conflict associated with a clinical trial. A clinical trial centered on a drug or device nearing market approval. The results of a trial bore directly on prospects for Food and Drug Administration approval of a new drug, and such approval for a major new drug could make the stock of even a pharmaceutical giant rise dramatically, if successful, or plummet, if unsuccessful. Genome research, in contrast, was in most cases quite distant from commercial application. There were a few exceptions, in the areas of research instrumentation or DNA diagnostics. It was nonetheless difficult to imagine how the results of a grant decision or research initiative on gene mapping could have any substantial impact on the stock of any but the smallest and most targeted genome research company. Conflict might indeed have arisen if a small instrumentation firm or DNA forensics company sought Small Business Innovation Research funding, or a similar scenario. Watson's holdings, however, were not in such companies, but in large pharmaceutical houses whose stock would be almost entirely unaffected by the fate of federal genome research decisions in the short run. They might benefit from the general knowledge emanating from NIH genome research, but this would not fall into the usual definition of conflict of interest. In retrospect, the February 1991 memo appears to be one lawyer's cautious and broad interpretation of the possibility of an "appearance" of conflict, coupled to a narrow definition of permissible behavior, Office of the Director, National Institutes of Health.

Schottky, J. (1932). "Uber Präsenile Verblödungen." Ges. Neurol Psych **140**: 333-397.

Schrage, M. and N. Henderson (1986). Hughes Institute Woos Science's Best and Brightest: Will It Be Patron or Bully in Medical Research? Washington Post. Washington, DC: Washington Business, pp. 1 and 27.

Schrödinger, E. (1967). What Is Life? Cambridge, UK, Cambridge University Press.

Schwartz, D. C. and C. R. Cantor (1984). "Separation of Yeast Chromosome-Sized DNAs by Pulsed Field Gel Electrophoresis." Cell **37**: 67-75.

Scott, J. (1992). "Bernadine Healy: The Head of NIH Defends Medical Research on the Front Lines." LA Times(26 July).

Scriver, C. (1988). Interview, Hyatt Regency Hotel, Bethesda, MD.

Scriver, C. R. (1992). Letter, Institut de Recherche de l'Université McGill-Hôpital de Montréal pour Enfants.

Search committee (1992). Healy appointed a committee to assist in the search for Watson's successor. The committee roster was included in a press packet distributed at a press conference down the hall from the NIH Director's office. The committee was co-chaired by Ruth Kirschstein, Director of the National Institute of General Medical Sciences, and George Vande Woude, a former National Cancer Institute intramural researcher and current investigator at Advanced Bioscience Laboratories. The other members were Raphael Daniel Camerini-Otero, National Institute of Diabetes and Digestive and Kidney Diseases; Daryl A. Chamblee, Senior Policy Advisor and Counselor to the Director, NIH; Gary Felsenfeld, National Institute of Diabetes and Digestive and Kidney Diseases; Martin Gellert, National Institute of Diabetes and Digestive and Kidney Diseases; Jay Moskowitz, Associate Director for Science Policy and Legislation, NIH; Maynard Olson, Washington University; David Rodbard, Division of Computer Research and Technology, NIH; Phillip A. Sharp, Massachusetts Institute of Technology; Maxine Singer, Carnegie Institution of Washington; Shirley M. Tilghman, Princeton University; and Nancy S. Wexler, Hereditary Disease Foundation and Columbia University, National Institutes of Health.

Segurado, O. G. and D. J. Schendel (1991). "Genome Ethics Treaty." Nature **352**(1 August): 368.

Sekimori, G. (1986). Hibakusha. Tokyo, Kosei.

Sellers, P. H. (1974). "On the Theory and Computation of Evolutionary Distances." SIAM J Appl Math **26**: 787.

Selvin, P. (1992). "Science Innovation '92: The San Francisco Sequel." Science **257**(14 August): 885-886.

Shannon, J. A. (1987). "The National Institutes of Health: Some Critical Years, 1955-1957." Science **237**: 865-868.

Simon, M., et al. (1977). "Idiopathic Hemochromatosis. Demonstration of Recessive Transmission and Early Detection by Family HLA Typing." N Engl J Med **297**: 1269-1275.

Simon, M., et al. (1975). "Hemochromatose idiopathique. Maladie Associee a l'Antigene Tissulaire HL-A3?" Nouve. Presse Med. **4**: 1432.

Simon, M., et al. (1976). "Association of HLA-A3 and HLA-B14 Antigens with Idiopathic Hemochromatosis." Gut **17**: 332-334.

Simpson, N. E., et al. (1987). "Assignment of Multiple Endocrine Neoplasia Type 2a to Chromosome 10 by Linkage." Nature **328**: 528-530.

Sinsheimer, R. (1984). Letter, Robert Sinsheimer to David Gardner, University of California at Santa Cruz.

Sinsheimer, R. (1984). Note to Harry Noller, Robert Edgar, and Robert Ludwig, University of California, Santa Cruz.

- Sinsheimer, R. (1985). Letters to Donald Sharp Fredrickson, President, Howard Hughes Medical Institute, University of California, Santa Cruz.
- Sinsheimer, R. (1988). Interview. 20 July. C. I. o. Technology.
- Sinsheimer, R. (1988). Letter to author. 7 September. S. B. University of California.
- Sinsheimer, R. (1989). "The Santa Cruz Workshop, May 1985." Genomics **5**: 954-956.
- Sinsheimer, R. (1990). Interview. 25 July. S. B. Hope Ranch, California.
- Sinsheimer, R. L. (1985). Note to Professors Robert Edgar and Harry Noller, Office of the Chancellor, University of California, Santa Cruz.
- Sjogren, T. (1952). "A Genetic Study of Morbus Alzheimer and Morbus Pick." Acta Psychiat Neurol Scand **Supplement 82**: 9-63.
- Small, W. E. (1992). Letter to Jeffrey Kushan, Legislative and International Affairs, US Patent and Trademark Office, Executive Director, Association of Biotechnology Companies.
- Smith, D. A. (1985). Note to Charles DeLisi, Office of Health and Environmental Research, US Department of Energy.
- Smith, H. O. (1979). "Nucleotide Specificity of Restriction Endonucleases." Science **205**: 455-462.
- Smith, H. O. (1986). Letter to Mark W. Bitensky, Johns Hopkins University.
- Smith, J. D. and K. R. Nelson (1989). The Sterilization of Carrie Buck. Far Hills, NJ, New Horizon Press.
- Smith, J. S. (1990). Patenting the Sun: Polio and the Salk Vaccine. New York, Morrow.
- Smith, L. M., et al. (1985). "The Synthesis of Oligonucleotides Containing an Aliphatic Amino Group at the 5' Terminus: Synthesis of Fluorescent DNA Primers for Use in DNA Sequence Analysis." Nucleic Acids Res. **13**: 2399-2412.
- Smith, L. M. and L. E. Hood (1987). "Mapping and Sequencing the Human Genome: How to Proceed." Bio Technology **5**(September): 933-939.
- Smith, L. M., et al. (1981). "Pattern Photobleaching of Fluorescent Lipid Vesicles Using Polarized Laser Light." Biophys J **33**(January): 139-146.
- Smith, L. M., et al. (1980). "Lateral Diffusion of M-13 Coat Protein in Mixtures of Phosphatidylcholine and Cholesterol." Biochem **19**(25): 5907-5911.
- Smith, L. M., et al. (1986). "Fluorescence Detection in Automated DNA Sequence Analysis." Nature **321**(12 June): 674-679.
- Smith, T. (1988). Interview, Harvard Medical School, the Jimmy Fund Building.
- Smith, T. F. (1990). "The History of the Genetic Sequence Databases." Genomics **6**(April): 701-707.
- Smith, T. F. and C. Burks (1983). "Searching for Sequence Similarities." Nature **301**(20 January): 194.
- Smith, T. F. and M. S. Materman (1981). "Identification of Common Molecular Subsequences." J Mol Biol **147**: 195-197.

Snell, R. (1988-1990). Personal interviews and phone conversations, Office of Senator Lawton Chiles (1988); Office of Technology Assessment, US Congress (1989-1990).

Snell, R. (1991). Phone interview, Chiles for Governor campaign office.

Social, L., and Ethical Issues in Biomedical and Behavioral Research Policy Panel, (1991). Report on Social, Legal, and Ethical Issues in Biomedical and Behavioral Research, National Institutes of Health.

Solomon, E. and W. F. Bodmer (1979). "Evolution of Sickle Cell Variant Gene (letter)." *Lancet* **I for 1979**(April 28): 923.

Southern, E. M. (1975). "Detection of Specific Sequencec Among DNA Fragments Separated by Gel Electrophoresis." *98*: 503-517.

Soyfer, V. N. (1990). "Against Lysenko." *Nature* **344**(1 March): 14.

Special Technology Section (1991). "Methods and Materials. Amplification of Nucleic Acid Sequences: The Choices Multiply." *J NIH Res* **3**(February): 81-94.

Spurgeon, D. (1992). "Canada Commits Money for Human Genome Research." *Nature* **357**(11 June): 428.

Spurr, N. and C. Bates (1991). "G-Nome News." *G-Nome News*(No. 7, Summer).

Spurr, N. K. (1990). "Newsletter of the UK Human Genome Mapping Project." *G-Nome News*(No. 4, Autumn).

Spurr, N. K. (1991). "G-Nome News." *G-Nome News Spring*(No. 6).

Spurr, N. K. (1991). "Newsletter of the UK Human Genome Mapping Project." *G-Nome News*(No. 5, January).

Spurr, N. K. (1991). "UK Human Genome Mapping Project." *G-Nome News*(No. 6, Spring).

Spurr, N. K. and M. J. Bishop (1989). "Newsletter of the UK Human Genome Mapping Project." *G-String*(No. 1, February).

Spurr, N. K. and M. J. Bishop (1989). "Newsletter of the UK Human Genome Mapping Project." *G-String*(No. 2).

Spurr, N. K. and M. J. Bishop (1990). "Newsletter of the UK Human Genome Mapping Project." *G-String*(No. 3, February).

Spurr, N. K. and Ed. (1992). "EC Human Genom Analysis Programme 1990-1992." *G-Nome News*(No. 10, June): 21-23.

Squires, S. (1986). Putting Genes on a Map: World's Scientists Begin Planning a Detailed Description of Human DNA. *Washington Post*. Washington, DC.

State Council for the State Scientific-Technical Program 'Human Genome' (1989). Information Bulletin 'Human Genome' (Infomatsionnyi Biulleten 'Genom Cheloveka'), Government of the United Soviet Socialist Republics, Moscow.

Stegner, W. (1982). *Beyond the Hundredth Meridian*. Lincoln, NE, University of Nebraska Press.

Steinmann, M. (1987). "In the Shadow of Huntington's Disease." *Columbia*(November): 14-19.

Stephens, J. C., et al. (1990). "Mapping the Human Genome: Current Status." *Science* **250**(12 October): 237-244, also The Human Genome Map 1990 center section.

Stephens, M. (1989). Meeting in committee reception area, US Capitol, Committee on Appropriations, US House of Representatives.

Stipp, D. (1990). "Genetic Testing May Mark Some People as Undesirable to Employers, Insurers." Wall Street Journal(9 July): B1, B2.

Stokes, B. (1989). "Multiple Allegiances." National Journal(11 November): 2754-2758.

Stormo, G. D. (1987). Identifying Coding Sequences. Nucleic Acid and Protein Sequence Analysis: A Practical Approach. M. J. Bishop and C. J. Rawlings. Oxford, UK, IRL Press.

Stout, H. (1992). "Gene-Fragment Patent Request Is Turned Down." Wall St. J.(23 September): B1.

Strickland, S. P. (1972). Politics, Science, and Dread Disease: A Short History of United States Medical Research Policy. Cambridge, MA. See esp. Chapter III: The Rise of the Research Lobby, pp. 32-54, Harvard University Press.

Strickland, S. P. (1989). The Story of the NIH Grants Program. Lanham, MD, University Press of America.

Stryker, J. (1984-1993). Conversations, Office of Technology Assessment and the University of California, San Francisco; Stryker was a member of the staff for the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research and subsequently at the Office of Technology Assessment and the National Research Council.

Stubbe, H. (1972). History of Genetics. From Prehistoric Times to the Rediscovery of Mendel's Laws. Cambridge, MA, MIT Press.

Sturtevant, A. (1947). "Social Implications of the Genetics of Man." Science **120**: 407.

Sturtevant, A. H. (1965). A History of Genetics. New York, Harper and Row.

Subcommittee on Privacy Legislation (1992). Genetic Test Information and Insurance: Confidentiality Concerns and Recommendations, Task Force on Genetic Testing, American Council on Life Insurance.

Subcommittee on the Human Genome (1987). Report on the Human Genome Initiative, Health and Environmental Advisory Committee, for the Office of Health and Environmental Research, Department of Energy.

Sullivan, L. W. (1992). Letter to Senator Edward Kennedy, Chairman, Committee on Labor and Human Resources, US Senate, Secretary, US Department of Health and Human Services.

Sulston, J. (1990). Conversation at DNA Sequencing Meeting, II. 3 October. H. H. Hyatt Regency, SC.

Sulston, J. (1992). "Reality of Sequencing Costs." Nature **357**(14 May): 106.

Sulston, J., et al. (1992). "The C. Elegans Genome Sequencing Project: A Beginning." Nature **356**(5 March): 37-41.

Sulston, J. and J. Hodgkin (1991). "The Genetics of C. elegans." MRC News **December 1991**(No. 53).

Sulston, J. E. (1983). "Neuronal Cell Lineages in the Nematode *Caenorhabditis elegans*." Cold Spring Harbor Symp. Quant. Biol. **48**: 443-452.

Sulston, J. E. and S. Brenner (1974). "The DNA of *Caenorhabditis elegans*." Genetics **77**(1): 95-104.

Sulston, J. E. and H. R. Horvitz (1977). "Post-Embryonic Cell Lineages of the Nematode *Caenorhabditis elegans*." Devel. Biol. **56**: 110-156.

Sulston, J. E., et al. (1983). "The Embryonic Cell Lineage of the Nematode *Caenorhabditis elegans*." Dev. Biol. **100**: 64-119.

Sun, M. (1989). "Consensus Elusive on Japan's Genome Plans." Science **243**(31 March): 1656-1657.

Sun, M. (1989). "Japan Faces Big Task in Improving Basic Science." Science **243**(10 March): 1285-1287.

Sundaram, S. C., et al. (1990). UCLA Field Study Project on the Human Genome Project, John E. Anderson Graduate School of Management, University of California, Los Angeles.

Sutton, W. S. (1902). "On the Morphology of the Chromosome Group in *Brachystola magna*." Biological Bulletin **4**(December): 24.

Sutton, W. S. (1903). "The Chromosomes in Heredity." Biological Bulletin **4**(April): 231.

Swinbanks, D. (1989). "Japan Still Seeking A Role." Nature **342**(14 December): 724-725.

Swinbanks, D. (1990). "Japan Gets Its Act Together." Nature **347**(20 September): 220.

Swinbanks, D. (1991). "DNA Research Institute to Open in Japan." Nature **349**(21 February): 640.

Swinbanks, D. (1991). "Good News for Universities." Nature **353**(12 September): 102.

Swinbanks, D. (1991). "Human Genome: Japan's Project Stalls." Nature **349**(31 January): 360.

Swinbanks, D. (1991). "Japan's Human Genome Project Takes Shape." Nature **351**(20 June): 593.

Swinbanks, D. (1991). "Survey Pans University Labs." Nature **350**(18 April): 544.

Swinbanks, D. (1992). "Japanese Researchers Rule Out Gene Patents." Nature **356**(19 March): 181.

Swinbanks, D. (1992). "When Silence Isn't Golden." Nature **356**(2 April): 368.

Syvanen, M. (1990). Letter signed by Chuck Turnbough, University of Alabama; Michael Syvanen, University of California, Davis; Richard Calendar, University of California, Berkeley; Ryland Young, Texas A&M University; Cathy Squires, Columbia University; and Marlene Befort, New York Public Health, BIONET electronic bulletin board.

Syvanen, M. (1991). "Views of the Genome Project." Science **251**(22 February): 855.

Task Force on Genetic Testing (1992). Report of the ACLI-HIAA Task Force on Genetic Testing, 1991, American Council on Life Insurance and Health Insurance Association of America.

That process was complex "That process was complex and contentious in itself, involving not only the National Institute of General Medical Sciences and NLM, but also the NIH genome office, the DOE genome office, the GenBank group at Los Alamos, and the Howard Hughes Medical Institute."

The Blue Sheet (1990). "Human Genome Project Characterized as 'Terrible Science Policy' in Letter-Writing Campaign to NIH." The Blue Sheet(30 May): 8-9.

The critical problem "The critical problem was to create and maintain temperatures high enough to ignite the same reactions that take place in the sun and other stars. In work with C. J. Everett, Ulam pioneered the use of the "Monte Carlo" method to model how Teller's scheme for doing this would play out. The Ulam-Everett calculations showed the reaction would fizzle before generating an explosion. The Monte Carlo technique was a way to simulate complex phenomena mathematically. It was

useful in characterizing an enormous range of applications, and had vast practical implications well beyond the hydrogen bomb simulations. The Ulam-Everett calculations predated the ready availability of computer technology needed to make Monte Carlo models generally practical. The fusion reaction calculations were nonetheless among the earliest and most historically significant demonstrations of the technique. "

The Cystic Fibrosis Genetic Analysis Consortium (1990). "Worldwide Survey of the $\Delta F508$ Mutation — Report from the Cystic Fibrosis Genetic Analysis Consortium." Am. J. Hum. Genet. **47**: 354-359.

The Economist (1988). "The Mapping of Man." Economist(20 February): 91-92.

The Human Genome Committee and The Board of Directors (1991). Position Paper on Patenting of Expressed Sequence Tags, American Society of Human Genetics.

The Scientist (1988). "NAS Report: Full Speed Ahead on Human Gene Sequencing (excerpts from NRC report)." The Scientist(7 March): 12.

Thompson, L. (1987). Buying the Best in Science. Washington Post. Washington, DC: Health Section 12-15.

Thompson, L. (1987). In Gene Mapping, an Opening Gambit. Washington Post. Washington, DC: Health Section, p. 9.

Thompson, L. (1988). Gene Pioneer Will Head Mapping Project. James Watson, Who First Described the Double Helix, Takes on a New Challenge. Washington Post. Washington, DC.

Thompson, L. (1988). Mapping the Human Genes: Is the Megaproject Politically a 'Go'? Washington Post. Washington, DC: Health Section, p. 8.

Thompson, L. (1989). "\$100 Million Sought for Study of Genes." Washington Post Health Section(10 January): 9.

Thompson, L. (1991). "NIH's Rush to Patent Human Genes." Washington Post(28 October).

Thompson, L. (1993). "Healy and Collins Strike a Deal." Science **259**(1 January): 22-23.

Thorn, G. W. (1978). "Howard Hughes Medical Institute." New Engl J Med **299**(23): 1278-1280.

Thorn, G. W. (1987). The State of the Institute, Howard Hughes Medical Institute.

Todd, J. A., et al. (1991). "Genetic Analysis of Autoimmune Type 1 Diabetes Mellitus in Mice." Nature **351**(13 June): 542-547.

Traub, R., et al. (1977). Transmissible Virus Dementia: The Relation of Transmissible Spongiform Encephalopathy to Creutzfeldt-Jakob Disease. Aging and Dementia. M. Kinsbourne and W. L. Smith. New York, Spectrum: 110-114.

Tribe, L. H. (1990). Abortion: The Clash of Absolutes. New York, W. W. Norton.

Tsui, L.-C., et al. (1985). "Cystic Fibrosis Locus Defined by a Genetically Linked Polymorphic DNA Marker." Science **230**(29 November): 1054-1057.

Ubell, E. (1991). "Miracle Medicines Coming Our Way." Parade(10 February): 16-18.

UC Santa Cruz Review (1990). "Sinsheimer Labs dedicated at last." UCSC Rev.(Spring): 3.

Ulam, S. M. (1972). "Some Ideas and Prospects in Biomathematics." Ann Rev Biphysics and Bioeng **1**: 277-291.

Ulam, S. M. (1976). Adventures of a Mathematician. New York, Charles Scribner's Sons.

Ulam, S. M. (1987). "Reflections on the Brain's Attempts to Understand Itself." *Los Alamos Science Special Issue*(No. 15): 283-287. Republished in "From Cardinals to Chaos: Reflections on the Life and Legacy of Stanislaw Ulam" (NY: Cambridge University Press, 1989).

unnamed (1991). Interview with a member of the initial review group (study section) that scrutinized the grant. Name withheld to protect confidentiality., Meeting at Cold Spring Harbor Laboratory.

unsigned (1987). Draft letter to go from the Secretary of Health and Human Services to J. Bennett Johnston, National Institutes of Health.

US Congress (1981). Impacts of Applied Genetics: Micro-Organisms, Plants and Animals, Office of Technology Assessment.

US Congress (1983). The Role of Genetic Testing in the Prevention of Occupational Disease, Office of Technology Assessment.

US Congress (1984). Commercial Biotechnology, An International Analysis, Office of Technology Assessment.

US Congress (1984). Human Gene Therapy — A Background Paper, Office of Technology Assessment.

US Congress (1986). Technologies for Detecting Heritable Mutations in Human Beings, Office of Technology Assessment.

US Congress (1988). Infertility: Medical and Social Choices, Office of Technology Assessment, OTA-BA-358, Washington, DC: Government Printing Office.

US Congress (1988). Mapping Our Genes—Genome Projects: How Big? How Fast?, Office of Technology Assessment, OTA-BA-373, Washington, DC: Government Printing Office; reprinted by Johns Hopkins University Press.

US Congress (1988). New Developments in Biotechnology, 4. US Investment in Biotechnology, Office of Technology Assessment, OTA-BA-360, Washington, DC: Government Printing Office .

US Congress (1989). New Developments in Biotechnology. 5. Patenting Life, Office of Technology Assessment.

US Congress (1990). Genetic Monitoring and Screening in the Workplace, Office of Technology Assessment.

US Congress (1990). Genetic Witness: Forensic Uses of DNA Tests, Office of Technology Assessment.

US Congress (1990). Making Appropriations for the Departments of Labor, Health and Human Services, and Education, and Related Agencies, for the Fiscal Year Ending September 30, 1991, and for Other Purposes, Conference Committee.

US Congress (1990). Project Proposal — Cystic Fibrosis: Implications of Population Screening, Office of Technology Assessment.

US Congress (1991). Biotechnology in a Global Economy, Office of Technology Assessment. Taken from appendix B and chapter 4, yielding an estimate of 20 percent government funding.

US Congress (1993). Government Policy and Pharmaceutical Research and Development, Office of Technology Assessment.

US Congress (1993). *Pharmaceutical R&D: Costs, Risks, and Rewards*, Office of Technology Assessment.

US Congress and Office of Technology Assessment (1988). Medical Testing and Health Insurance. Washington, DC, Government Printing Office.

US Department of Health and Human Services and US Department of Energy (1990). Understanding Our Genetic Inheritance: The First Five Years, FY 1991-1995. DOE/ER-0452P. Springfield, VA, National Technical Information Service.

US Department of State (1990). Biotech-Human Genome: Uncoordinated GOJ Efforts May Result in Private Funding for HUGO, US Embassy, Tokyo.

US Department of State (1991). Diplomatic cables: 91 Paris 13315 and 33581 ; 92 Paris 04248, 05678; 92 London 07705, 04119, 02510, 02118, 01637, US Embassies in London and Paris; US Representative to OECD.

US Department of State (1992). Unclassified cables from US Embassy, Paris 04248 (February), 05678 (February); and from US Embassy London 04119 (March), 07705 (April).

US House of Representatives (1983). Human Genetic Engineering, Hearings before the Subcommittee on Investigations and Oversight, Committee on Science and Technology.

US House of Representatives (1987). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1988 National Institutes of Health.

US House of Representatives (1987). Fiscal Year 1988 DOE Budget Authorization: Environmental Research and Development Subcommittee on Natural Resources, Agriculture Research, and Environment of the Committee on Science, Space and Technology.

US House of Representatives (1988). Coordination of Genome Projects, in Committee report on H.R. 4502 and S. 1966, the Biotechnology Competitiveness Act Subcommittee on Natural Resources, Agriculture Research, and Environment and the Subcommittee on Science, Research, and Technology of the House Committee on Science, Space and Technology.

US House of Representatives (1988). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1989, Committee on Appropriations.

US House of Representatives (1988). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1989 Subcommittee on Labor, Health and Human Services, Education and Related Agencies of the Committee on Appropriations.

US House of Representatives (1988). Legislative Branch Appropriations, Fiscal Year 1990, Subcommittee on Legislative Branch, Committee on Appropriations.

US House of Representatives (1989). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1990, Committee on Appropriations.

US House of Representatives (1989). International Cooperation in Mapping the Human Genome. Hearing before the Subcommittee on International Scientific Cooperation, Committee on Science, Space and Technology, October 19, 1989, 2325 Rayburn House Office Building.

US House of Representatives (1990). "Conference Report on S. 933, Americans with Disabilities Act of 1990." Congressional Record **136**(#88, 12 July): H 4623 (Owens), H 4625 (Edwards), H 4627 (Waxman).

US House of Representatives (1990). Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriation Bill, 1991, Committee on Appropriations.

US House of Representatives (1990). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1991, Committee on Appropriations.

US House of Representatives (1990). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1991 Subcommittee on Labor, Health and Human Services, Education and Related Agencies of the Committee on Appropriations.

US House of Representatives (1991). Conyers Introduces Genetic Privacy Act, Committee on Government Operations.

US House of Representatives (1991). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1992, Committee on Appropriations.

US House of Representatives (1992). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1993, Committee on Appropriations.

US House of Representatives (1992). Designing Genetic Information Policy: The Need for an Independent Policy Review of the Ethical, Legal, and Social Implications of the Human Genome Project, Committee on Government Operations.

US House of Representatives (1992). Domestic and International Data Protection Issues, Subcommittee on Government Information, Justice, and Agriculture, Committee on Government Operations.

US Senate (1973). Quality of Health Care — Human Experimentation, Subcommittee on Health, Committee on Labor and Public Welfare.

US Senate (1982). Nominations, Committee on Labor and Human Resources.

US Senate (1987). Department of Energy National Laboratory Cooperative Research Initiatives Act Subcommittee on Energy Research and Development of the Committee on Energy and Natural Resources.

US Senate (1987). Workshop on Human Gene Mapping Committee on Energy and Natural Resources.

US Senate (1988). Departments of Labor, Health and Human Services, and Education and Related Agencies Appropriation Bill, 1989, Report Senate Committee on Appropriations.

US Senate (1989). Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations, Committee on Appropriations.

US Senate (1989). Human Genome Initiative, Subcommittee on Science, Technology and Space, Committee on Commerce, Science, and Transportation.

US Senate (1990). "Americans with Disabilities Act — Conference Report." Congressional Record **136**(#89, 13 July): S 9687 (Hatch).

US Senate (1990). Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriation Bill, 1991, Committee on Appropriations.

US Senate (1991). Departments of Labor, Health and Human Services, and Related Agencies Appropriations for Fiscal Year 1992, Committee on Appropriations.

Harkin: I think there is more support here than you may think (p. 1150).

US Senate (1992). "Letter from Louis W. Sullivan, Jr., M.D., Secretary of Health and Human Services." Congressional Record **138**(No. 49, 2 April): S4725.

US Senate (1992). "Letters from Senators Frank Lautenberg and Hank Brown, Congressional Biotechnology Caucus; Louis W. Sullivan, Jr., M.D., Secretary of Health and Human Services; Harry P. Manbeck, Jr., Assistant Secretary and Commissioner of Patents and Trademarks. Letter and fact sheet from Stephen A Duzan, Chairman and CEO, Immunex Corp." Congressional Record **138**(No. 49, 2 April): S4724-S4726.

van Heijenoort, J. (1967). From Frege to Gödel: A Source Book in Mathematical Logic, 1987-1931. Cambridge, MA, Harvard University Press.

van Hoek, F. (1991). "European Community Actions." Nature **351**(20 June): 599.

Vanchieri, C. (1991). "Genome Project Puts Ethics First; Moves to Set Guidelines." J Nat Cancer Inst **83**(No. 7, 3 April): 464-465.

Venter, J. C. (1991). Letter to James D. Watson, Director, Cold Spring Harbor Laboratory, National Institute of Neurological Disorders and Stroke.

Venter, J. C. (1992). Interview, Institute for Genomic Research, Gaithersburg, MD.

Venter, J. C. (1992). Statement of J. Craig Venter, President and Director, The Institute for Genomic Research, Before the Subcommittee on Patents, Copyrights, and Trademarks, Senate Judiciary Committee.

Venter, J. C., et al. (1992). "Genome Sequence Analysis: Scientific Objectives and Practical Strategies." Trends in Biotechnology **10**(January-February): 8-11.

Venter, J. C., et al. (1990). "Genome Sequencing Conference I: Summary." Genomics **8**(September): 186-188.

Vigilant, L., et al. (1991). "African Populations and the Evolution of Human Mitochondrial DNA." Science **253**(27 September): 1503-1507.

Vinokurova, S. (1990). "Academician Interview on Career in Genetic Research." Pravda Translation(31 May): 4.

Viskochil, D., et al. (1990). "Deletions and a Translocation Interrupt a Cloned Gene at the Neurofibromatosis Type 1 Locus." Cell **62**(13 July): 187-192.

Vollrath, D., et al. (1992). "The Human Y Chromosome: A 43-Interval Map Based on Naturally Occurring Deletions." Science **258**(2 October): 52-59.

von Braunmuhl, A. (1932). "Kolloidchemische Betrachtungsweise Seniler und Präseniler Gewebsveränderungen." Ges Neurol Psych **142**: 1-54.

Wada, A. (1984). "Automatic DNA Sequencing." Nature **307**(12 January): 193.

Wada, A. (1985). Letter to Professor Paul Doty upon his retirement, University of Tokyo.

Wada, A. (1987). "Automated High-Speed DNA Sequencing." Nature **325**(26 February): 771-772.

Wada, A. (1987). "Japanese Super DNA Sequencer Project." Sci. Tech. Jap. **6**(22): 20-21.

Wada, A. (1987-1990). Interviews at the American Type Culture Collection, Rockville, MD (July 1987); Office of Technology Assessment, Washington, DC (1988); and University Club, Tokyo (August 1990).

Wada, A. (1988). "Future Prospects of Automated and High Speed DNA Sequencing." (10-15 April): 41-52.

Wada, A. (1988). The Practicability of and Necessity for Developing a Large-Scale DNA-Base Sequencing System: Toward the Establishment of International Super Sequencer Centers. Biotechnology and the Human Genome: Innovations and Impact. A. D. Woodhead and B. J. Barnhart. New York, Plenum. **46**: 119-130.

Wada, A. (1990). Interview, University Club, Tokyo.

Wada, A. and E. Soeda (1986). Strategy for Building an Automatic and High Speed DNA-Sequencing System. Proceedings of the 4th Congress of the Federation of Asian and Oceanic Biochemists. London, Cambridge University Press. **30 November-5 December**: 1-16.

Wada, A. and E. Soeda (1987). Strategy for Building an Automated and High Speed DNA-Sequencing System. Integration and Control of Metabolic Processes. O. L. Kon. New York, Cambridge University Press: 517-532.

Wade, N. (1981). "The Complete Index to Man." Science **211**(2 January): 33-35.

Wainwright, B. J., et al. (1985). "Localization of Cystic Fibrosis Locus to Human Chromosome 7cen-q22." Nature **318**(28 November): 384-385.

Waldholz, M. and H. Stout (1992). "A New Debate Rages Over the Patenting of Gene Discoveries." Wall St J(17 April 1992): A1, A6.

Waldrop, M. M. (1990). "Learning to Drink from a Firehose." Science **248**(11 May): 674-675.

Wallace, M. R., et al. (1990). "Type I Neurofibromatosis Gene: Identification of a Large Transcript Disrupted in Three NF1 Patients." Science **249**(13 July): 181-186.

Walsh, J. B. and J. Marks (1986). "Sequencing the Human Genome." Nature **322**(14 August): 590.

Walters, B. (1990). Perfect Babies, ABC News.

Walters, L. (1989). Gene Therapy, Biomedical Ethics Advisory Committee.

Walton, J., Ed. (1977). Brain's Diseases of the Nervous System, 8th Edition. New York, Oxford University Press, p. 1183.

Walzer, M. (1973). "Political Action: The Problem of Dirty Hands." Philosophy and Public Affairs **2**(Winter): 160-180.

Wambaugh, J. (1989). The Blooding. The Leicester investigation is abstracted from this book. New York, William Morrow.

Washington FAX (1992). "ASHG Makes Recommendations About DNA Patenting." Washington FAX Information Service(4 June): 2.

Washington FAX (1992). "ASHG Says Patents on ESTs and Other Nonspecific DNA Fragments Are Likely to Do More Harm Than Good." Washington FAX Information Service(3 June): 1-2.

Washington FAX (1992). "Healy Explains NIH Position on Patenting cDNA." Washington FAX Information Service(1 June): 1-2.

Washington FAX (1992). "Healy Outlines Likely Patent Debate Issues." Washington FAX Information Service(2 June): 1-2.

Waterman, M. (1988). Car ride and interview, Xerox PARC facility, Middleburg, VA.

Waterman, M. S. (1989). International Nucleotide Databases: Advice and Consent, University of Southern California.

Waterman, M. S. (1989). Mathematical Methods for DNA Sequences. Boca Raton, FL, CRC Press.

Waterman, M. S. (1989). Sequence Alignments. Mathematical Methods for DNA Sequences. M. S. Waterman. Boca Raton, FL, CRC Press: 53-92.

Waterman, M. S. (1990). "Genomic Sequence Databases." Genomics **6**(April): 700-701.

Watson sat on the scientific board of two companies (Diagnostic Products Corporation, Pall Corporation), a research institute (Roche Institute of Molecular Biology), consulted for Diagnostic Products Corp., and held stock in Genetics Institute, Oncogene Science, Amgen, Beecham, Smith-Kline, Diagnostic Products Corp., Glaxo, Eli Lilly, Merck, Pall, and other companies.

Watson, J. D. (1965). The Molecular Biology of the Gene, 1st Edition. New York, W. A. Benjamin.

Watson, J. D. (1971). Potential Consequences of Experimentation With Human Eggs, House Committee on Science and Astronautics.

Watson, J. D. (1971). Statement of Dr. James D. Watson, Harvard University, Panel on Science and Technology Twelfth Meeting: International Science Policy. Proceedings before the House Committee on Science and Astronautics, 92nd Congress.

Watson, J. D. (1971). Statement of James D. Watson, Harvard University, Panel on Science and Technology Twelfth Meeting: International Science Policy.

Watson, J. D., Ed. (1980). The Double Helix: A Personal Account of the Discovery of the Structure of DNA. Norton Critical Edition. New York, W. W. Norton.

Watson, J. D. (1981). James D. Watson — Biologist Excellence, the Pursuit, LTV Seminar, Washington.

Watson, J. D. (1986). "Foreword." CSH Symp. Quant. Biol. **51**: xv-xvi.

Watson, J. D. (1987). Interview, Cold Spring Harbor Laboratory, Director's office.

Watson, J. D. (1988). 60th Birthday Videotape. Taken at "James D. Watson: Celebrating 60 Years" symposium, Cold Spring Harbor Laboratory.

Watson, J. D. (1988). Disqualification from Activities that would Affect My Financial Interests, Memo to William F. Raub, Deputy Director, NIH.

Watson, J. D. (1988). The NIH Genome Initiative. The Human Genome Projects: Issues, Goals, and California's Participation, Molecular Biology Institute, University of California, Los Angeles.

Watson, J. D. (1988). NIH Press Conference: Appointment of James D. Watson to Head NIH Office of Human Genome Research, 26 September. Bethesda, MD, National Center for Human Genome Research; also available at the National Reference Center for Bioethics Literature, Georgetown University.

Watson, J. D. (1988). Reflections on My Forty Years in Science. Harvard University, Department of Biochemistry and Molecular Biology.

Watson, J. D. (1989). "At Large with Dennis L. Breo: DNA Discoverer James Watson Now Dreams of Curing Genetic Diseases." JAMA **262**(#23, 15 December): 3340-3344.

Watson, J. D. (1989). Director's Report, Cold Spring Harbor Laboratory.

Watson, J. D. (1989). Disqualification from Activities that Would Affect My Financial Interests, Memo to William Raub, Acting Director, NIH.

Watson, J. D. (1989). Disqualification from Activities that would Affect My Financial Interests, Memo to William F. Raub, Deputy Director, NIH.

Watson, J. D. (1989). Interview, Engelhardt Institute for Molecular Biology, Moscow.

Watson, J. D. (1989). Meeting of the Joint NIH-DOE Subcommittee on Human Genome Research, Wilson Hall, National Institutes of Health.

Watson, J. D. (1990). Conversations about Japan following author's return from a trip there, Cold Spring Harbor Laboratory, NY, and National Center for Human Genome Research, Bethesda, MD.

Watson, J. D. (1990). "The Human Genome Project: Past, Present, and Future." *Science* **248**: 44-49.

Watson, J. D. (1990). Letter to Sir John Kendrew, Cold Spring Harbor Laboratory.

Watson, J. D. (1990). Reply to John Kendrew, Cold Spring Harbor Laboratory.

Watson, J. D. (1992). Annual Report, 1991, Cold Spring Harbor Laboratory.

Watson, J. D. (1992). Interview, Cold Spring Harbor Laboratory.

Watson, J. D. (1992). Interview. Watson recalled receiving a letter from William Raub that sought information about certain stock purchases. He and Raub had then met with Jack Kress in May of 1991, after Healy had become director of NIH and before Raub left NIH to join the White House Office of Science and Technology Policy. Kress had indicated he would follow up if Watson's activities required a response., Cold Spring Harbor Laboratory.

Watson, J. D. (1992). phone conversation.

Watson, J. D. (1992). phone conversation.

Watson, J. D. (1992). phone conversations.

Watson, J. D., et al. (1986). Participants in Woods Hole meeting, National Academy of Sciences.

Watson, J. D. and F. H. C. Crick (1953). "Genetical Implications of the Structure of Deoxyribonucleic Acid." *Nature* **171**(30 May): 737-738.

Watson, J. D., et al. (1987). *Molecular Biology of the Gene*. Menlo Park, Benjamin.

Watts, S. (1990). "Making Sense of the Genome's Secrets." *New Scientist*(4 August): 37-41.

Weart, S. R. (1988). *Nuclear Fear. A History of Images*. Cambridge, MA, Harvard University Press.

Weatherford, M. M. (1981). *Tribes on the Hill*. New York, Rawson, Wade.

Weinberg, R. A. (1987). "The Case Against Gene Sequencing." *The Scientist*(16 November): 11.

Weisbard, A. J. (1987). "The Role of Philosophers in the Public Policy Process: A View from the President's Commission." *Ethics* **97**(July): 776-785.

Weiss, M. and H. Green (1967). "Human-Mouse Hybrid Cell Lines Containing Partial Complements of Human Chromosomes and Functioning Human Genes." **58**: 1104-1111.

Weiss, R. (1988). "Report Adds to Gene Map Momentum." Science News **133**(20 February): 117-118.

Weissenbach, J., et al. (1992). "A Second-Generation Linkage Map of the Human Genome." Nature **359**(29 October): 794-801.

Wertz, D. C. and J. C. Fletcher (1989). Ethics and Human Genetics: A Cross-Cultural Perspective. New York, Springer-Verlag.

Wexler, N. S. (1979). Genetic 'Russian Roulette': The Experience of Being at Risk for Huntington's Disease. Genetic Counseling: Psychological Dimensions. S. Kessler. New York, Academic Press.

Wexler, N. S. (1991). Letter to the ELSI working group, Columbia College of Physicians and Surgeons.

Wexler, N. S. (1991). "Life in the Lab." Los Angeles Times Magazine(10 February): 12-13, 31.

Wexler, N. S., et al. (1985). "A DNA Polymorphism for Huntington's Disease Marks the Future." Arch Neurol **42**(January): 20-24.

Wexler, N. S. and J. S. Wilentz (1978). Report of the Congressional Commission for the Control of Huntington's Disease and Its Consequences, Congressional Commission for the Control of Huntington's Disease and Its Consequences, National Institute of Neurological and Communicative Disorders and Stroke.

Wheelan, L. (1959). "Familial Alzheimer's Disease." Ann Hum Genet **23**: 300-310.

Wheeler, C. (1992). "Women of the Year, '92: Dr. Bernadine Healy." Glamour(December): 116.

While Venter was confident "While Venter was confident of his capacity to attack a genome region of several million base pairs, the longest continuous sequence from his laboratory was in the tens of thousands. It had just been completed as his proposal came up for review. At the time, many scientists were skeptical that a further increase in scale was possible without major technical improvements in the technology, especially in the analytical software. A critical question was how short sequences of 300 to 500 base pairs, whether generated by machines or manual methods, would be pooled into long stretches of sequence millions of bases long. This was a problem that no laboratory had yet solved, and many believed it was premature to try on a massive scale, particularly on the human genome. Human DNA had many regions containing long repeated sequences, and these might prove to be impenetrable barriers to analysis."

White, J. G., et al. (1986). "The Structure of the Nervous System of the Nematode *Caenorhabditis elegans*." Phil. Trans. R. Soc. Lond. Series B, Vol. 314: 1-340.

White, R. (1987). Interview, University of Utah.

White, R. (1988). "Chromosome Mapping with DNA Markers." Sci. Am. **258**(February): 40-48.

White, R., et al. (1985). "A Closely Linked Genetic Marker for Cystic Fibrosis." Nature **318**(28 November): 382-384.

White, R. L. (1979). Human Linkage Mapping with DNA Polymorphism University of Massachusetts, Worcester.

White, T. (1992). Interview with Paul Rabinow, Department of Anthropology, University of California, Berkeley, presentation at Rice University.

White, T. J., et al. (1992). "The Polymerase Chain Reaction: Clinical Applications." Adv. Clin. Chem. **29**: 161-196.

- Whitehead, A. N. and B. Russell (1910). Principia Mathematica. Cambridge, UK, Cambridge University Press.
- Whitehead, A. N. and B. Russell (1912). Principia Mathematica. Cambridge, UK, Cambridge University Press.
- Whitehead, A. N. and B. Russell (1913). Principia Mathematica. Cambridge, UK, Cambridge University Press.
- Wiggins, S., et al. (1992). "The Psychological Consequences of Predictive Testing for Huntington's Disease." N. Engl. J. Med. **327**(12 November): 1401-1405.
- Wikler, D. and E. Palmer (1992). Neo-Eugenics and Disability Rights in Philosophical Perspective. Human Genome Research and Society: Proceedings of the Second International Bioethics Seminar in Fukui, 20-21 March, 1992. N. Fujiki and D. R. J. Macer. Christchurch, NZ, Eubios Ethics Institute: 105-113.
- Wilfond, B. S. and N. Fost (1990). "The Cystic Fibrosis Gene: Medical and Social Implications for Heterozygote Detection." J. Am. Med. Assoc. **263**(May 23/30): 2777-2783.
- Wilfond, B. S. and N. Fost (1990). Cystic Fibrosis Heterozygote Detection: The Introduction of Genetic Testing into Clinical Practice, Program in Medical Ethics, University of Wisconsin.
- Will, G. (1989). "Science Is Making the News." Washington Post(23 April): C7.
- Williamson, R., et al. (1989). "Community Attitudes to Cystic Fibrosis Carrier Testing in England: A Pilot Study." Prenat Diag **9**: 727-734.
- Wills, C. (1991). The Role of Molecular Biology in Human Evolutionary Studies: Current Status and Future Prospects. Molecular Genetic Medicine, Vol. 1. T. Friedmann. San Diego, CA, Academic Press: 169-232.
- Wilson, E. B. (1911). "The Sex Chromosomes." **77**: 249-271.
- Windom, R. E. (1992). Letter to President-elect Bill Clinton, Sarasota Florida.
- Windom, R. E. (1993). Letter to Donna Shalala, Secretary-designate of Health and Human Services, Sarasota, Florida.
- Wingerson, L. (1990). Mapping Our Genes. New York, Dutton.
- Wise, B. (1992). letter, Government Information, Justice, and Agriculture Subcommittee, Committee on Government Operations, US House of Representatives.
- Wolfe, T. (1987). The Bonfire of the Vanities. New York, Farrar, Straus & Giroux; paperback by Bantam, December 1988.
- Working Group on Ethical, L., and Social Issues in Human Genome Research, (1990). Workshop on the Introduction of New Genetic Tests, National Institutes of Health and Department of Energy.
- Working Group on In Vitro Fertilisation, G. A., and Gene Therapy (1985). Report, Federal Ministry of Justice and Federal Ministry for Research and Technology, Federal Republic of Germany.
- Working Group on Research Tools (1998). Report of the National Institutes of Health Working Group on Research Tools. Bethesda, MD, Advisory Committee to the Director, NIH.
- Workshop on Clinical Studies of Cystic Fibrosis Carrier Testing (1991). Meeting Summary, National Institutes of Health.
- Workshop on Population Screening for the Cystic Fibrosis Gene (1990). "Statement from the National Institutes of Health Workshop on Population Screening for the Cystic Fibrosis Gene." N. Engl. J. Med. **323**(July 5): 70-71.

Worton, R. (1992). Memo to author, Hospital for Sick Children, University of Toronto.

Wright, R. (1990). "Achilles' Helix." New Republic(July 9 & 16): 21-31.

Wright, S. (1993). "The Social Warp of Science: Writing the History of Genetic Engineering Policy." Sci, Tech and Hum Val **18**(No. 1, Winter): 79-101.

Wu, R. and E. Taylor (1971). "Nucleotide Sequence Analysis of DNA. II. Complete Nucleotide Sequence of the Cohesive Ends of Bacteriophage Lambda DNA." Mol. Biol. **57**: 491-511.

Wyman, A. R. and R. L. White (1980). "A Highly Polymorphic Locus in Human DNA." Proc. Nat. Acad. Sci. **77**: 6754-6758.

Wyngaarden, J. (1988). Interview, NIH Director's Office, Building 1, National Institutes of Health.

Wyngaarden, J. (1991). The Function of HUGO, American Association for the Advancement of Science.

Wyngaarden, J. (1991). Interview, Office of International Affairs, National Academy of Sciences.

Wyngaarden, J. (1991). Interview and follow-up conversation, Office of International Affairs, National Academy of Sciences.

Wyngaarden, J. B. (1986). Letter to Alvin Trivelpiece, National Institutes of Health.

Wyngaarden, J. B. (1987). "The National Institutes of Health in Its Centennial Year." Science **237**(21 August): 869-874.

Wyngaarden, J. B. (1988). "Trials and Tribulations of Being Director of the NIH." The Scientist(11 July): 13-14.

Yanagida, M. (1990). "The Grant-Getting Game in Japan." Nature **343**(11 January): 111-112.

Yesley, M. S. (1978). "The Use of an Advisory Commission." S. Cal. Law Rev **51**: 1451-1469.

Yesley, M. S. (1988-1992). Interviews and conversations at meetings, Los Alamos National Laboratory, ELSI working group meetings, and elsewhere; Yesley was Executive Director of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, which operated from 1974-1978.

Yoshikawa, A. (1987). In Search of the 'Ultimate Map' of the Human Genome: The Japanese Efforts, Berkeley Roundtable on the International Economy, University of California, Berkeley.

Yoshikawa, A. (1987). The Japanese Challenge in Biotechnology: Industrial Policy, Berkeley Roundtable on the International Economy, University of California, Berkeley.

Yoshikawa, A. (1989). "Japanese Biotechnology: Government, Corporations, and Technology Transfer." Tech Transfer(Winter): 32-39.

Zawuski, G. (1960). "Zur Erbllichkeit der Alzheimerschen Krankheit." Arch. J. Psychiat Ges Neurol **201**: 123-132.

Zharov, V. (1990). Letter and Appendix: Institutions and Key-Persons in the Third World Who May be Involved in the Human Genome Project, United Nations Educational, Scientific, and Cultural Organization.

Zharov, V. (1990). Letter and summary document: Unesco's Programme in the Human Genome, United Nations Educational, Scientific, and Cultural Organization.

Ziman, J. (1976). The Force of Knowledge: The Scientific Dimension of Society. New York, Cambridge University Press.

Zinder, N. (1989-1990). Phone conversations, Rockefeller University.

Zinder, N., et al. (1974). Report of an Ad Hoc Committee to the National Cancer Board, National Cancer Board.

Zinder, N. L. (1990). "The Genome Initiative: How to Spell 'Human'." Sci. Am.(July): 128.

Zuckerland, E. and L. Pauling (1965). "Molecules as Documents of Evolutionary History." J Theoret Biol **8**: 357-358.

Zurer, P. (1988). "Watson to Head NIH's Human Genome Effort." C&E News(3 October): 7.

Zurer, P. S. (1988). "Molecular Biologists Backing Effort to Map Entire Human Genome." Chem and Eng News(14 March): 22-26.