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Three Li'l Pigs and the Hunt for Blood Substitutes ■ Bumper Transgenic Plant Crop

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Celestial Mechanics on a Microscopic Scale: T. Uzer, D. Farrelly, J. A. Milligan, P. E. Raines, J. P. Skelton

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ATTENTION AAAS MEMBERS
Inside AAAS of 28 June 1991 (p. 1861) contained a preliminary list of candidates for the Association's elections for general and section officers. Additional names may be placed in nomination by petition submitted to the executive officer no later than 12 August 1991. Please refer to the 28 June issue for further details.
COVER  Adélie penguins (Pygoscelis adeliae), shown here at a rookery on Torgersen Island near the U.S. Antarctic science base Palmer Station, are a vital link in the Southern Ocean food web. Respiration of carbon dioxide by Antarctic birds and mammals may represent a significant inefficiency in the storage of fixed carbon in the ocean. This phenomenon may affect current models of the global ocean-atmosphere carbon flux. See page 64. [Photograph by David M. Karl]

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SCIENTIFIC PROGRAM

MONDAY, OCTOBER 21
8:30 am-12:00 pm  SESSION I — INFORMATICS
ELBERT BRANSCOMB: Lawrence Livermore National Laboratory — "Managing Genomic Data for the Research Community's Benefit"
EDWARD UBERBACHER: Oak Ridge National Laboratory — "Intelligent Methods for DNA Sequence Feature Recognition and Interpretation"
MINORU KANEHISA: Kyoto University — "Knowledge Information Processing for Genome Analysis"
CHRIS RAWLINGS: Imperial Cancer Research Fund — "Integrating Genome Information: A Knowledge-based Approach"
ROSS OVERBEEK: Argonne National Laboratory — "Setting up an Effective Query Capability: A Radical Proposal"
JULIO CELIS: Aarhus University — "Human 2-D Gel Protein Databases: Linking Protein and DNA Information"

12:00 pm-4:00 pm  LUNCH/WORKSHOPS/EXHIBITS/POSTERS

4:00 pm-7:15 pm  SESSION II — MODEL ORGANISMS
JOSEPH NADEAU: The Jackson Laboratory — "Encyclopedia of the Mouse Genome and the Database Integration Problem"
ANDRE GOFFEAU: Catholic University of Louvain — "The European Plan to Sequence the Yeast Genome: Progress Report"
KUNIO ISONO: Tohoku University — "Neurogenetics of Taste in Drosophila"
FOTIS C. KAFATOS: Harvard University/IMBB, Crete — "Integrated Maps of the Drosophila Genome"
EUGENE RINCHIK: Oak Ridge National Laboratory — "Fine-structure Functional and Physical Mapping of Germline Deletions in the Mouse"

TUESDAY, OCTOBER 22
8:30 am-12:00 pm  SESSION III — POLITICS
WALTER BODMER: Imperial Cancer Research Fund — "HUGO"
CHARLES R. CANTOR: DOE Human Genome Project — "U.S. Department of Energy"
MARK GUYER: National Institutes of Health — "Index Markers"
KENICHI MATSUBARA: Osaka University — "The Japanese Genome Project as of 1991"
BRONWEN LODER: Commission of the European Communities — "The EC Human Genome Analysis Programme"

12:00 pm-4:00 pm  LUNCH/WORKSHOPS/EXHIBITS/POSTERS

4:00 pm-7:15 pm  SESSION IV — PHYSICAL MAPS: CAN THEY BE COMPLETED?
GLEN EVANS: Salk Institute — "Physical Maps of Human Chromosomes"
HANS LEHRACH: European Molecular Biology Laboratory — "Of Mice and Men: The Global Analysis of the Mammalian Genome"
ANTHONY CARRANO: Lawrence Livermore National Laboratory — "A Chromosome 19 Physical Map"
ROBERT MOYZIS: Los Alamos National Laboratory — "Physical and Functional Mapping of the Human Genome"

WEDNESDAY, OCTOBER 23
8:30 am-12:00 pm  SESSION V — METHOD DEVELOPMENT
RONALD W. DAVIS: Stanford University — "Sequencing the Yeast Genome"
WACLAW SZYBALSKI: McArdle Laboratory, University of Wisconsin — "Sequencing of Eukaryotic Genomes Without Cloning"
PINTER J. DEJONG: Lawrence Livermore National Laboratory — "A New Approach for Completing Contig Maps Using Alu-PCR"
LLOYD M. SMITH: University of Wisconsin — "High-speed DNA Sequencing in Ultrathin Gels"
DAVID WARD: Yale University — "Gene Mapping by Fluorescence In Situ Hybridization"

12:00 pm-4:00 pm  LUNCH/WORKSHOPS/EXHIBITS/POSTERS

4:00 pm-7:15 pm  SESSION VI — HUMAN LANDMARKS
PETER GOODFELLOW: Imperial Cancer Research Fund — "Chromosome Fragmentation Techniques"
ANTHONY MONACO: Imperial Cancer Research Fund/University of Oxford — "Genome Analysis of the Human X Chromosome"
GRANT R. SUTHERLAND: Adelaide Children's Hospital — "The Fragile X: A Novel Genetic Element"
L. L. CAVALII-SFORZA: Stanford University — "Diversity and the Origin of Races"
MARY-CLAIRE KING: University of California, Berkeley — "Genetic Analysis of Breast Cancer in Families"

All speakers listed have been confirmed. Others will be added later.

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The Handling of Leaked Information

To edit a journal that wishes to maintain the highest standards of journalism and science is a challenging and humbling experience. It is challenging because high standards are always challenging and humbling because combining two professions in one journal reveals how difficult it is to develop universal ethical standards.

One example pertains to the use of “leaked” documents. A leaked document is in effect a piece of stolen goods. Our most recent example is the report of the Office of Scientific Integrity of the National Institutes of Health on the Baltimore case (see News and Comment, 29 March, p. 1552). In the scientific world, this report is a privileged report that should not be disseminated further to any unauthorized individual. In the world of journalism, however, leaked information is usually accepted as publishable information. Thus, in the current example, refusal by Science to report the information when it knew that the same report had been leaked to many other news outlets would only have denied the readers of Science information that was fully available elsewhere. Nevertheless, there are troubling aspects of such events that trigger consideration of the proper standards of conduct.

The first journalistic standard that we demand of ourselves in such a case is to characterize the leaked information as completely possible so that the reader is able to discern the degree of potential bias. In this case, the document was the official committee report (and therefore not a preliminary draft that might have been more questionable) containing both majority and minority opinions. It did not, however, contain the responses of the principals accused, a final step that is an essential component of the quasi-judicial process. Science, on receipt of the document, contacted several of the report panel to verify the official character of the report, the accuracy of the released document, and its degree of finality. The individuals contacted were extremely reluctant to comment, because they were bound by confidentiality, an attitude we respected. They were convinced, however, that the minimal verification requested was appropriate once a leak had occurred. With this verification Science could be confident that it was providing its readers an accurate, official report. However, it was as important to emphasize to our readers that the leaked report was incomplete. Thus, the second journalistic standard that we apply is to supply as soon as possible the information missing from the leaked document so that a balanced account is available to the readers. In the rush to deadlines, the first report rarely contains the full story.

This is not the only case, nor the last one, where partial information is leaked. The leak of names from selection committees is another example that is troublesome. Thus, we might ask whether there should be stringent rules against the entire practice of leaking, a cottage industry in Washington, D.C. The answer seems to be that there are both positive outcomes and potential for abuse.

Many organizations, including the U.S. government, sometimes suppress information and reports that the citizens should see. The leak of such documents and the threat of leaks that accelerates release of others that might be concealed are positive benefits to democracy. The negative aspect occurs when premature or one-sided leaks generate judgments that would not have been made if all the facts were known. Leakers in some cases are risking their jobs for a worthy cause but in other cases are distorting information in an unfair way. The leakers may have an axe to grind, and the journal that serves their purpose, even temporarily, has an obligation to correct the record as soon as possible. That is not always easy because it requires sorting out a complicated story.

The handling of leaked information is thus a case in which pure standards would not be beneficial to society. In the long run, fairness and accuracy will be the final arbiter of standards of journalism, which of necessity are a compromise between pure ideals of confidentiality and a desire to provide the reader with full information without censorship. The leaking of the Pentagon papers undoubtedly served democracy well, but the leaking of the saccharin study probably prevented an objective analysis of the risks involved. Because leaks will probably always occur and because they are sometimes valuable, the press has a heavy responsibility to be fair over time and the public should learn to respond to a leak by saying, “There’s going to be more to this story.”

—Daniel E. Koshyland, Jr.
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ical and social decisions because “it turns on the goals of the society and what trade-offs are deemed acceptable.”

The third compilation, Assessing Ecological Risks of Biotechnology, focuses on ecological issues in its 17 chapters. Introductory chapters deal with the effects of biological introductions on communities and planned introductions in the biological control of arthropod and weed pests. I would have preferred the use of microorganisms as examples in these chapters, because the remaining chapters focus on microorganisms. There are five chapters on the ecology and genetics of microbial populations, providing overviews of surface transport of microorganisms by water, soil and groundwater transport of microorganisms, aerial dispersal of bacteria, transfer of genetic information among soil microorganisms, and genetic stability in bacterial populations. There are also chapters on modeling the dynamics of transposable elements, quantifying fitness and gene stability, quantifying risks of invasion of genetically engineered microorganisms, and quantifying the spread of recombinant genes and organisms. Finally, there are four chapters dealing with regulation (by the Environmental Protection Agency, the Department of Agriculture, and in the European Community) and a chapter on risk analysis associated with biotechnology of waste treatment.

The final chapter is a provocative essay “On making nature safe for biotechnology” by Mark Sagoff. In a wide-ranging discussion of ecological restoration, agricultural economics, and history of agriculture, Sagoff presents scenarios for agriculture, forestry, and aquaculture that are revolutionized by biotechnology. He points out that some fear biotechnology not because some genetic monster will be set loose but because “the nation will drown in a sea of surplus agriculture commodities.” He is concerned that “the unparalleled speed and magnitude of the expected productivity gains” will overwhelm saturated world markets and suggests that the issues have nothing to do with the unpredictable risks of biotechnology but concern the profitable, predictable, intentional, and successful effects of biotechnology. Sagoff argues that the major effects of biotechnology will be twofold. First, many ecosystems may be converted to species and processes suitable to large-scale, highly controlled production. Second, as agricultural surpluses begin to be seen as infinite, and as the factory replaces the field as the location where food and fiber are fabricated, many farms will go out of production, which will allow large tracts of land to be restored to their “natural” state. Sagoff argues that esthetic, moral, cultural, and historical arguments for preserving nature are being lost in the intricacies of arcane arguments over speculative risks and that the policy issue is whether increased efficiency of production can be compatible with maintaining the integrity of the global environment.

The introduction into the environment of genetically modified microorganisms and plants is considered by some to be a risky business. In one sense, it is ironic that risk issues have played such a dominant role in agricultural biotechnology despite its history of self-regulation since the Asilomar conference in 1975. By the end of 1989, more than 52 engineered plants and 56 engineered microbes had been released into the environment with no detectable harm.

The debate on the role of biotechnology in agriculture has expanded. Whether the revolution in agriculture that could result from the use of genetically engineered microorganisms and plants can be managed so that cultural, historical, moral, and esthetic values are upheld is the core of the problem.

Marjorie A. Hoy
Department of Entomological Sciences,
University of California,
Berkeley, CA 94720

Reprints of Books Previously Reviewed


Books Received


The Effectiveness of Maintenance Treatment. Patients, Programs, Services, and Outcome. John C. Ball and Alan Ross. Springer-Verlag, New York, 1990. xiv, 283 pp., illus. $59.


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SCIENCE, VOL. 253