Computers '94
Networks and Modeling
THE DAWN OF A NEW ERA IN TRANSFORMATION EFFICIENCIES

THE HIGHEST-EFFICIENCY CHEMICALLY COMPETENT CELLS AVAILABLE

3-5 x 10^9 colonies/µg

Stratagene has broken the 1 x 10^9 barrier for competent E.coli! We did it by genetically modifying our Epicurian Coli® XL1-Blue and XL1-Blue MRF' cells. The result is our new XL2-Blue and XL2-Blue MRF' ultracompetent cells,* which achieve transformation efficiencies as high as 5 x 10^9 transformants/µg of plasmid control DNA. To maintain these ultrahigh efficiencies, we package the cells in convenient single-use aliquots that eliminate freeze/thaw cycles.

The 3- to 5-fold increase in efficiency means more colonies per transformation reaction. The XL2-Blue ultracompetent cells are ideal for plasmid library construction. The highest possible efficiency also may be critical when starting DNA concentration is very low and when performing difficult ligations, as in multifragment, blunt-ended and PCR** cloning. These same advantages apply to our new SURE® 2 supercompetent cells,* which offer efficiency of >1 x 10^9 transformants/µg of plasmid DNA.

* Patent pending
** The Polymerase Chain Reaction (PCR) process is covered by patents owned by Hoffmann-La Roche. Use of the PCR process requires a license.

Transformation Efficiencies (average of three lots)

USA:
Corporate Headquarters
Telephone: (800) 424-5444
Telefax: (619) 535-0034

Germany:
Stratagene GmbH
Telephone: (06221) 400634
Telefax: (06221) 400639

United Kingdom:
Stratagene Ltd.
Telephone: (0223) 420955
Telefax: (0223) 420234

Switzerland:
Stratagene GmbH
Telephone: (01) 3641106
Telefax: (01) 3657707

An Era of Choice

The XL2-Blue and SURE 2 cells join Stratagene's full range of competent cells for many applications. Our popular XL1-Blue cells are now available as economical competent and subcloning-grade cells, for uses that do not require the highest efficiency. Our standard competent cells include those for stabilizing DNA and cloning toxic genes. Plus we offer electroporation-competent cells with efficiencies as high as 10^10 transformants/µg. The choice is yours.

New Custom Service

Stratagene has initiated a Custom Competent Cell Service that will prepare competent cells of any E. coli K-12 strain that is not commercially available. The service will provide a minimum of 50 x 200-µl aliquots of your strain of choice. Contact Stratagene's Technical Services Department for complete details.

Epicurian Coli® XL2-Blue Ultracompetent Cells Catalog # 200150
Epicurian Coli® XL2-Blue MRF' Ultracompetent Cells Catalog # 200151
Epicurian Coli® SURE® 2 Supercompetent Cells Catalog # 200152
Epicurian Coli® XL1-Blue Subcloning-Grade Competent Cells Catalog # 200130

INTERNET MAIL
tech_services@stratagene.com
Get Serious.

Their graphs get the laughs. SigmaPlot® gets your research published.

The graph on the left would get laughed out of any serious journal! The graph on the right, published in a prestigious scientific journal, clearly illustrates the significance of the researcher's data. At Jandel, we know your goal is to get the grant—not giggles. SigmaPlot was designed by scientists, specifically for journal publication and grant preparation. Sure, business graphics programs have lots of "bells and whistles." But when was the last time your research called for bar charts with clip-art ducks, or plaid pie chart slices? SigmaPlot puts the powerful scientific features you need at your fingertips.

60,000 SCIENTISTS USE SIGMAPLOT TO PUBLISH THEIR GRAPHS.

Choose from Windows, DOS and Macintosh versions of SigmaPlot. New SigmaPlot for Windows version 1.02 is packed with powerful scientific features including 2D and 3D plots, technical axis scales, math and Greek symbols, and more. Plus, SigmaPlot's error bars, regression lines, full transform language and curve fitting make creating even complex graphs fast and easy.

ADD EVEN MORE POWER TO SIGMAPLOT WITH THE FAMILY OF JANDEL SCIENTIFIC SOFTWARE.

SigmaPlot gives you the graphing power you need for serious scientific research. And best of all, it's expandable! SigmaPlot works together with two of Jandel's most popular scientific software programs: SigmaStat® for Windows and SigmaScan/Image. You can add SigmaStat's full statistics to SigmaPlot. Or, measure images right on your PC with SigmaScan/Image (use SigmaPlot to graph your measurements). Ask about our new SigmaSuite, a value pack of all three programs!

ORDER SIGMAPLOT TODAY AT NO RISK!

Try SigmaPlot for 90 days—if you're not thrilled with all it can do, we'll refund your money! Jandel has a 12 year history of providing top-of-the-line scientific software tools. Plus, our software comes with FREE professional technical support. Order SigmaPlot today. Call for competitive and customer upgrade pricing, and ask about quantity and academic/student discounts. It's never been this easy for serious scientists to produce publication-quality graphs!

ORDER SIGMAPLOT DIRECT: 1-800-4-JANDEL

(1-800-432-6335)

OTHER JANDEL PRODUCTS:

SigmaSuite: Includes SigmaPlot, SigmaStat and SigmaScan/Image

For more information please call, fax or e-mail:

Jandel Scientific: 2591 Kerner Blvd., San Rafael, CA 94901
415-453-6700 Fax: 415-453-7769
In Europe: Schimnbuschstrasse 25, 40699 Erkrath, Germany
+2104/36098 Fax: +2104/33110
Internet: sales@jandel.com

International Dealers: Australia 2-958-2688 or 3-866-1766, Brazil 11-453-5588, Canada 519-767-1061, Denmark 45-42150544, France 039-03755, India 49-84-1212, Japan 3-3590-2311, Switzerland 41-677-121616, Taiwan 2-788-6777, UK 0800-894982

Graph used with permission from SEPM. Published in PALAIOS, 1990 (volume 5, fig. 2, P. 582).

© 1994, Jandel Corp. All companies and/or product names are trademarks of their respective companies.
THE FIRST SYSTEM FOR Soluble Protein Expression IN E. coli.

The ThioFusion™ Expression System from Invitrogen. Finally there is a way to express soluble recombinant protein in E. coli. Now solubilization and refolding of proteins that form inclusion bodies are a thing of the past. Recombinant proteins expressed in the ThioFusion™ Expression System are soluble, even at high levels.

THE Ideal FUSION PARTNER.

The ThioFusion™ Expression System takes advantage of the unique properties of the E. coli protein thioredoxin. Thioredoxin expresses at levels as high as 40% of the total cell protein, localizes at sites in the E. coli cell called adhesion zones, and is stable at high temperature. These properties make thioredoxin the ideal fusion partner. The plasmid vector, pTrxFus, the key to the ThioFusion™ System, carries the entire thioredoxin gene along with the strong P_L promoter to drive expression. In addition, an enterokinase cleavage site, engineered between thioredoxin and the protein of interest, allows removal of the fusion to restore the native protein.

FAST, SIMPLE PURIFICATION.

The ThioFusion™ System gives you two simple ways to purify your fusion protein. Osmotic shock releases proteins accumulated at adhesion zones into the medium. Heat treatment denatures most native proteins leaving some thioredoxin fusion proteins intact. Both methods are fast and effective.

The ThioFusion™ Expression System (cat. no. K350-01) is the first and only system designed for the expression of soluble recombinant proteins in E. coli. To learn more about the next step in E. coli protein expression, contact Invitrogen today!

1-800-955-6288
Composite of computer screens above a globe roughly corresponding to the location of the data. The screens were created with Mosaic software developed at the National Center for Supercomputing Applications (NCSA) for browsing the World Wide Web. This Internet technology enables scientists to make their information rapidly available to the global community. These and other issues are discussed in this special issue on computing. See the Editorial on page 851 and the News Reports, Perspectives, and Articles beginning on page 879. [Image: I Kallick and B. Schatz at NCSA, using public domain sources on the Internet]

RESEARCH ARTICLE

Kinetic Intermediates in RNA Folding 918
P. P. Zarrinrak and J. R. Williamson

Chemically Anomalous, Preaccomptentially Irradiated Grains in Interplanetary Dust from Comets
J. P. Bradley

Impact Crater Densities on Volcanoes and Coronae on Venus: Implications for Volcanic Resurfacing
N. Namiki and S. C. Solomon

Discovery of Microwave Emission from Four Nearby Solar-Type G Stars
M. Güdel, J. H. M. M. Schmitt, A. O. Benz

On the Probability of Finding a Water Molecule in a Nonpolar Cavity
R. Wolfenden and A. Radzicka

Surface Dating of Dynamic Landforms: Young Boulders on Aging Moraines
B. Hallet and J. Putkonen

Controlling Molecular Order in “Hairy-Rod” Langmuir-Blodgett Films: A Polarization-Modulation Microscopy Study
V. K. Gupta, J. A. Kornfield, A. Ferencz, G. Wegner

Highly Efficient Light-Emitting Diodes with Microcavities

T Cell Receptor–MHC Class I Peptide Interactions: Affinity, Kinetics, and Specificity

Activation of a Cerebellar Output Nucleus During Cognitive Processing
S.-G. Kim, K. Ulbrich, P. L. Strick

Bidirectional Replication from an Internal Origin in a Linear Streptomyces Plasmid
P.-C. Chang and S. N. Cohen

Ribosomal Heterogeneity from Chromatin Diminution in Ascaris lumbricoides
A. Etter, V. Bernard, M. Kenzelmann, H. Tobler, F. Müller

Inhibition of NF-xB by Sodium Salicylate and Aspirin
E. Kopp and S. Ghosh

High-Specificity DNA Cleavage Agent: Design and Application to Kilobase and Megabase DNA Substrates
P. S. Pendergast, Y. W. Ebright, R. H. Ebright

Oscillations of Membrane Current and Excitability Driven by Metabolic Oscillations in Heart Cells
B. O'Rourke, B. M. Ramza, E. Marban

Transformation of Mammalian Cells by Constitutively Active MAP Kinase Kinase

Calcineurin Inhibition of Dynamin I GTPase Activity Coupled to Nerve Terminal Depolarization
J.-P. Liu, A. T. R. Sim, P. J. Robinson

940
A picture of order
For nearly half a century, Sigma Chemical Company has been committed to manufacturing quality biochemicals and organic compounds for researchers around the world. Diversity within our multiple manufacturing sites enables our chemists to produce many of the 33,000 research reagents found in the Sigma general catalog. This diversity allows Sigma to formulate custom blends, to produce specific purities and to fulfill milligram to large-scale production requests for our customers.

In order to support the tradition of quality that you have come to expect from Sigma, our chemists closely monitor every stage of manufacturing, and analytical chemists assay every product we offer. We package experience, service and expertise into every product you receive. But commitment to our customers does not stop here. Sigma continues to provide exceptional service that includes a large inventory of packaged stock, fast delivery and technical assistance.

Weigh all the advantages. Consider Sigma as your single source for research biochemicals.
Computing: Networks and Modeling

Computers and computing have changed the modern world, but the effects on the practice of science have been especially profound. The impacts now extend far beyond simple numerical computation and extend into the realms of complex simulations and knowledge retrieval as well. In this issue of Science we concentrate on computer networks and powerful methods for modeling the natural world.

NCSA Mosaic and the World Wide Web have made access to a marvelous range of information available to Everyperson. Mosaic software can bring the world of linked text, graphics, sound, and video to anyone with a desktop computer and a link to the Internet. It is no longer necessary to be an expert to navigate through the world's available information space and find and retrieve items of interest. Schatz and Hardin present an overview of the important issues by describing the workings of Mosaic. They discuss the protocols and services that make it possible to access and use a global hypermedia system.

This is the future of networking, and still more powerful tools may be on the horizon, as Waldrop discusses in his news story on intelligent agents. These mobile software robots could roam the networks on behalf of the human user, collecting and sorting information themselves. Accompanying these bright prospects are some anxieties, examined in another story by Waldrop. With the explosive growth of the Internet and its increasing commercialization, some users say changes in access and pricing are inevitable, and they are seeking ways to minimize the impact of these changes on research and education.

Computation, however, remains at the heart of much of science. Martino, Johnson, Suh, Trus, and Yup describe applications of parallel computing at the National Institutes of Health. Because of the range of problems that require massive computer resources, biomedical science is an important arena for parallel computing. The tasks include processing electron micrographs for three-dimensional structures of viruses, calculating accessible surface areas of proteins to predict their conformations and searching DNA sequences for homology. Importantly, developments in compiler technology are beginning to make possible the conversion of many programs to parallel computing.

High-performance computation has also opened the way to far more sophisticated simulations and displays. As described in Friedman and Taubes' news stories about computer models of the immune system and the brain's cognitive processes, computer simulation is doing for some biologists what it did in the past for physicists. It is giving them a computational laboratory in which to test ideas that can later be verified in natural systems. In another story, Taubes surveys the computing muscle and technical ingenuity are combining in virtual reality displays that make vast data sets or simulations easier to comprehend and explore.

No matter how fancy the hardware and the software, the mathematics behind computations is critical. Greengard addresses some of the new ways to deal with fundamental problems in physics. Fast summation methods for evaluating pairwise interactions of N particles are described that permit relatively modest resources to be used to study problems such as diffusion, gravitation, and wave propagation.

In his Perspective, Hendler describes some of the advances in artificial intelligence made possible by new hardware and software. Scientists are struggling with the data that gushes from the scientific well, and the flood of information requires new knowledge tools. Very large knowledge databases present an important challenge, and this Perspective examines some of the critical issues in this area.

Grimshaw discusses generalized resources for computing across entire networks. The goal is to provide the user with a single virtual machine encompassing widely networked processors and databases. The enabling factors are the incredible increase in network speed (10^6 bits per second), and the ability to link systems that contain different processors and operating systems. These advances not only make it possible to do much faster computing, they also make it possible to utilize resources much more effectively.

Almost all areas of science are benefiting directly from these advances. In many ways, growth of the global Internet and improvements in computing power are catalyzing completely new ways of doing research. One can only watch with wonder at the speed with which this is happening.

John I. Brauman, David F. Voss, and Tim Appenzeller
Need a quotation for economic large scale oligonucleotide synthesis?

“OligoPilot from Pharmacia Biotech offers the reproducibility and flexibility required to scale-up traditional oligonucleotide synthesis. The synthesizer’s unique flow-through design, in combination with the Pharmacia Biotech solid support, enables a high coupling efficiency to be maintained while minimizing reagent consumption. This potentially opens the way to economical pilot-scale production of highly pure oligonucleotides and their analogs.”

Dr. Tadeusz K. Wyrzykiewicz, Isis Pharmaceuticals Inc., Carlsbad CA, U.S.A.

Leading companies bringing medical applications of oligonucleotide technology closer to market already know how well OligoPilot™ DNA/RNA Synthesizer performs. You can read more of what they have to say in the new brochure. Ask for your copy today.

OligoPilot. It’s the breakthrough in economic, large scale oligonucleotide synthesis.

And you can quote us on that.
Parasitology Issues

The extensive coverage given to parasitology in the issue of 24 June (pp. 1857–1886) was an important, positive gesture, and the articles and news items were informative and well presented. The topics discussed are among those which represent major directions of research and development in this field and are well suited to attract the attention of the wider scientific community. What neither the introductory editorial (p. 1827) nor the rest of the issue makes clear to the non-specialist reader, however, is that parasitology is more than tropical medicine and hygiene, more than the study of molecular biology of pathogens causing tropical diseases. Parasites are also of major public health importance in the temperate zones. Waterborne parasitic infections (giardiasis and cryptosporidiosis, for example) represent significant challenges for municipalities, while toxoplasmosis and microsporidiosis are sadly prevalent in immunocompromised patients with, primarily but not exclusively, acquired immunodeficiency disorder. Research and development in these areas is of critical importance. The significance and economic role of veterinary parasites should also be mentioned. Research on the latter is economically rewarding for the pharmaceutical industry, with spinoffs for human parasitology. The successful fight against African river blindness was made possible by the generous free supply of a drug that has been developed for the veterinary field and has been successfully marketed.

As the special issue makes clear, a formerly unexpected plethora of unusual mechanisms of cellular processes is revealed in parasitic organisms. Study of the biology of parasitic organisms provides an insight into the limits of specialization of eukaryotic cells. While the expression and processing of genetic information in parasitic organisms are of interest, one should be aware that the diversity of many other aspects of their organization is equally pronounced. It remains to be established which of their peculiarities represent adaptive changes elicited by a parasitic mode of life and which are relics of their earlier evolutionary history, necessarily encompassing free living ancestral forms. Some major parasitic protists are probably descendants of the earliest, possibly pre-protistial, branches of the eukaryotic tree. These organisms might harbor clues about what the earliest eukaryotes looked like. Biochemical and cell biological studies clearly show that mitochondria are not obligatory constituents of eukaryotic cells. They also disclose the existence of unusual organelles of metabolism (glycosomes and hydrogenosomes) and unusual metabolic processes in certain groups of parasites. These results demonstrate that the eukaryotic cell mode of life is much less stereotyped than hitherto assumed. Further studies of parasitic organisms thus promise a clearer view of eukaryotic evolution in addition to benefits to human and veterinary medicine.

Miklos Müller
Laboratory of Biochemical Parasitology, Rockefeller University, 1230 York Avenue, New York, NY 10021–6399, USA

“Culture Wars”

Bennett M. Berger’s critique (Book Reviews, 13 May, p. 985) of Higher Superstition: The Academic Left and Its Quarrels with Science by Paul R. Gross and Norman Levitt (Johns Hopkins Univ. Press, Baltimore, MD, 1994) effectively neutralizes the polemic of authors Gross and Levitt. Nevertheless, the review and its reference to “culture wars” can only exacerbate the perceived discord between social scientists and the scientific disciplines they study. To the extent that he portrays the extreme views of Gross and Levitt as representative of mainstream science, Berger offers a caricature that is as inaccurate as the leftist, antiscience bias attacked by the authors. Rational discourse requires mutual respect born of a desire to unite these divergent cultures.

My dual hard-core (wet-dry?) graduate training in chemistry and science and technology studies at Rensselaer Polytechnic Institute has made me painfully conscious of the gap that often divides the social sciences and humanities from the physical and biological sciences. Instead of hostility, the prevailing relationship is benign indifference. Natural scientists, barely aware of the existence or content of science studies, do not bother to question the legitimacy of such scholarship; it is considered irrelevant to the practice of science. If history, philosophy, and sociology are ever to be regarded as fundamental rather than “ornamental,”
Your readers deserve at least a second opinion, preferably several, about Higher Superstition by Gross and Levitt. The review argues against the authors without giving readers an adequate sense, which any review ought to provide, of what is actually in the book: for example, whether there are satisfactory notes and index. In fact, the authors fully document all their criticisms, among them that the authors they criticize do indeed appear to be poorly versed in the science they write about. That would seem to be sufficient grounds for scientists, or for that matter anyone else, to display some outrage and indulge in some polemics.

Among the approaches attacked in the book is extreme relativism. It struck me therefore as more than a little unfair that the book was reviewed by, as the reviewer himself states, a relativist who is the friend of one author criticized in the book and the colleague of another.

The reviewer is careful to remark, quite properly and necessarily, that social constructivism is only "one variety of the relativisms opposing realism." But he himself then lumps together all the disparate varieties of relativisms, of which there at least as many flavors as there are of relativisms. If there is a single notion common to all relativists, it would be that there exists a real physical world that constrains what we can do, and that those constraints enable us to get some unequivocally reliable information about how the real world really works.

Relativists appear to deny that unambiguous knowledge about the real world is available. To social scientists that seems only natural, of course, because their disciplines harbor, as Berger puts it, "plural and diverse" "warranting communities." In plain English, that means equally competent and distinguished sociologists often disagree with one another over how to understand any given social phenomenon. Relativist critics of the natural sciences would have it that the almost universal consensus enjoyed by the natural sciences is a happenstance brought about by social interactions rather than an inevitability imposed by the dictates of Nature as to what works and what doesn't.

The inconsistency, not to say hypocrisy, of the relativists' position lies in their insistence in general and in theory that the natural sciences have no certainty to offer, while in specifics and in practice their actions expose that they too believe that what textbook science (1) says is operationally true.

Henry H. Bauer
Department of Chemistry,
Virginia Polytechnic Institute and
State University,
Blacksburg, VA 24061-0212, USA

References and Notes
1. It is of course necessary to distinguish between frontier science and well-established science; see H. H. Bauer. Scientific Literacy and the Myth of the Scientific Method (Univ. of Illinois Press, Chicago and Urbana, Ill., 1992), especially chapters 3 and 6.

I was appalled to see Bennett M. Berger's negative review of Gross and Levitt's Higher Superstition. This book, written by a scientist and a mathematician, exposes some of the garbage that is presently being manufactured in our universities, in particular the grotesque distortions of science involved in the constructivist-relativist anthropology, sociology, and philosophy of science. The book tells the truth about this fad: that it is produced by people who ignore the ABC's of science and who, moreover, are hostile to it and, in some cases, to reason as well.

The author of the review does not hide his sympathy for this branch of pseudo-science. He even describes Bruno Latour's work as "sober ethnography," when one of Latour's central theses (1) is that doing science is just "making inscriptions," which is of course the only thing a nonscientist can see when visiting a laboratory, for he is not equipped to understand what those "inscriptions" mean or why they are being made. Incidentally, one of the feats of that same "sober" scholar is to have "proved," through text analysis, that Einstein's inaugural paper on special relativity should not have been titled, "On the electrodynamics of moving bodies," but rather "New instructions for bringing back long-distance scientific travelers" (2).

Mario Bunge
Foundations and Philosophy of Science Unit,
McGill University,
Montreal, Québec, Canada H3A 1W7

References

In his review of Higher Superstition, Bennett M. Berger says that he knows "of no scientific method for 'proving' the preferability of [the realist or relativist] view" of the basis of scientific truth. So let me provide him with one; or rather with two—one for relativists, the other for realists.

If I've got this straight, the relativist would ask what the "warranting communities" prefer. No contest here; there isn't a practicing scientist in the world who is not
a naïve realist, philosophically speaking, and getting together into communities (for warranting or any other purposes) only makes them more so.

The “realist” scientific method is to ask which view is more effective. No contest here, either, in my opinion; the realist program never lets you down as a way of increasing knowledge, does it? Whereas history is littered with catastrophic failures to make things true by institutional fiat.

Of course these arguments only apply to science itself. I am quite prepared to believe that thought in sociology is entirely culturally determined. Berger illustrates this rather neatly when he asserts that “trust” and “credit” are financial metaphors. Only in the U.S. of A.!

A. F. W. Coulson
Institute of Cell and Molecular Biology,
Division of Biological Sciences,
University of Edinburgh,
Edinburgh EH9 3JR, Scotland, UK

Response: The letters columns of Science seem hardly the place for extended epistemological debate, so I will try to be brief. To Hagan let me say, first, that my reference to “culture wars” was not to one between natural scientists and social scientists (if there is such a war, there is no good reason for it), but to the one between academic traditionalists and academic avant-gardes, regardless of discipline. Second, I did not say, or even imply, that the extreme views of Gross and Levitt are representative of mainstream science. I have no reason to believe they are and, like Hagan, I hope they are not.

Bauer says that Science’s readers deserve a “second opinion,” which he provides, and there are third and fourth opinions by Bunge and Coulson. None of these, however, does much more than restate what Gross and Levitt have already argued more forcefully. There is no issue of the credibility of scientific findings, only about the foundations of the credibility. The issue is epistemological, and as in Gross and Levitt’s book, no epistemological arguments are made in these several letters. It may surprise, even comfort, Bauer to learn that, like him, I believe that a real world (physical and social) exists out there that “constrains what we can do,” but this “realism” (?) of mine in no way weakens the skeptical relativism that sees in these constraints sources that not only enable but also obstruct our efforts to obtain reliable information about the world. This “relativist critic” sees little or no “happenstance” in the achievements of science; the social world, like the physical one, is real in its constraints.

Nor is the question of hypocrisy, or bad faith (raised explicitly by Bauer and implied by Coulson), relevant here. I thought I explained clearly enough in the review it-
MDL’s new ISIS SAR Table lets you view, correlate, graph, and report chemical structures and their activity data—within a matter of minutes!

That should give you plenty of time to review and analyze your report before submitting it. It should also leave you with a great deal more time to devote to the creative aspects of the discovery and development process.

Structure-activity relationship tables are such a key step in identifying and refining promising compounds, yet the process of creating them has always been time-consuming and labor-intensive. But now the ISIS SAR Table application from MDL Information Systems, Inc., actually reduces SAR Table creation to a simple two-step process carried out on your desktop computer running Macintosh or Windows.

A part of MDL’s ISIS family of chemical information management solutions, ISIS SAR Table combines the best features of two top-notch applications—the information integration expertise of ISIS/Base and the spreadsheet expertise of Microsoft Excel—to bring you a spreadsheet especially suited for scientists.

Just how good is the ISIS SAR Table? According to Dr. Kevin Haraki of American Cyanamid Company: “ISIS SAR Table is the first application that really combines structures and data in a single spreadsheet that can be manipulated. It is an elegant method for organizing structures and related data that allows researchers to visually examine related structures and data in close proximity, helping the researcher to discover trends in the data.”

To discuss your requirements, or to place your order, call or FAX today. Tel: (800) 635-0064 • FAX: (510) 483-4738

ISIS and MDL are trademarks of MDL Information Systems, Inc. All other products are trademarks or registered trademarks of their respective holders.
The logically harmonious thesis contained in this work will revolutionize our current way of thinking about human origins and behavior.

Ernst Mayr, Professor of Zoology, Emeritus, at Harvard University, considered by many to be the greatest evolutionist of the century, has written to the author:

"...I am rather inclined to accept your thesis of the role of graincollecting in the history of mankind, persuaded by your arguments and those of others. Thank you very much for your interesting and closely argued book!"

How did bipedalism, the loss of body hair, and tool use originate? After more than 130 years of scientific research, the origin of these basic human characteristics is still unknown. Bipedalism, the loss of body hair, and tool use originated 14 million years ago, when our very distant ancestors, Ramapithecus, turned graincollectors.Erroneously, we still equate biological evolution with "progress", and therefore, believe humans descend from knuckle-walking, hairy, unskilled tool users who resembled the living great apes, when, in fact these apes descend from bipedal, naked, skilled tool users, who resemble modern man.

The large intestine, humans' largest internal organ, is presently used only to absorb water and electrolytes, although its sacculated nature indicates an evolutionary adaptation to digest cellulose. This intestine's movements are so slow that the first radiologist to observe it said it presented a picture of still life. Much of this inactivity can be attributed to mankind's omnivorous diet. Nonetheless, it follows that, when following an exclusively granivorous, cellulose-digesting diet, our large intestine proves to be much more useful and efficient, since our ancestors up to 50 thousand years ago always used it to digest cellulose fiber. We are presently neglecting a very useful capability that our ancestors adaptively acquired. Humans, as all other primates, were meant to be vegetarian cellulose-digesters and have slim bodies. The size of the human mouth is small for almost any type of omnivorous feeding, making this feature, as well as our powerful teeth, characteristic more of seed-eaters than carnivorous or omnivorous mammals.

It is inconceivable to think that hominids and their protohominid ancestors lived in the savannas for millions of years and never developed the practice of feeding from gramineous seeds until the discovery of agriculture, or until fire was used to cook food. If we take into consideration that early hominids were already bipeds and tool users, and the seeds from grasses would tightly touch their hands as they walked in the long-grass grasslands, it would be illogical to assume that, in spite of the many vicissitudes they suffered during so many million years of living in the savannas, they never tried to feed from these seeds or that they never thought of removing the seeds with their hands. The author argues that when injuring themselves by removing the seeds, they used a natural small stone tool to protect their hands, which achieved an unanticipated advantage: they improved their efficiency in removing and threshing seeds.

We invite you to read this book and explore in it the scientific bases of these arguments, upholding the importance of the role of graincollecting in human evolution and behavior.
The new GeneAmp® XL PCR Kit makes generating long PCR products a routine procedure. In fact, we QC test the kit for 20 kb using lambda DNA.

Our new \( r7 \)th DNA Polymerase, XL, in combination with a novel reaction buffer, creates optimal conditions for generating long PCR products with high reproducibility and specificity.

What's more, the GeneAmp XL PCR Kit is optimized on GeneAmp® PCR Instrument Systems, and backed by our PCR performance guarantee. It's just as convenient as our other PCR kits, and opens up new possibilities for mapping, sequencing and genome analysis.

The integrated resources of our Applied Biosystems Division offer you the most comprehensive range of systems, technologies and support in PCR, nucleic acid synthesis, genetic analysis and protein research.

The GeneAmp XL PCR Kit—a major breakthrough in PCR technology. To order in the U.S., call 1-800-327-3002. For PCR technical support, call 1-800-762-4001. For more information, call 1-800-345-5224. Outside the U.S., contact your local Perkin-Elmer representative.
Powerful security

At the watering hole, even rhinos and lions defer to the African elephant — secure in its extended family group. Unparalleled loyalty and powerful communal defense provide this gentle creature with a peace of mind shared by few inhabitants of the African savannah.

Using Boehringer Mannheim's family of high-performance PCR products will give you a similar peace of mind.

Products designed to work together

For you, function-tested PCR products translate into successful PCR — PCR without failed experiments or time wasted repeating experiments. You'll achieve consistent, reproducible results with PCR products such as:

- **PCR Master Mix** — a ready-to-use amplification premix
- **PCR Optimization Kit** — PCR buffers and reagents for determining the Mg²⁺ concentration and pH value optimal for your primer/template combination
- **PCR Core Kit** — high-yield PCR plus prevention of carry-over contamination
- **1st Strand cDNA Synthesis Kit for RT-PCR (AMV)** — for efficient preparation of PCR templates from RNA.

A full-service focus

Get everything you need for polymerase chain reactions — template preparation to amplification to analysis of amplified DNA — from your single-source PCR supplier.

In addition to quality products, several customer-focused services combine to provide you with this peace of mind:

- **Accurate, complete orders** that are right the first time
- **Next business day delivery**, so you have the products when you need them
- **Highly trained technical representatives** for all your product information needs
- **Field sales representatives** to help you attain your research objectives.

Pursue peace of mind for your lab

Achieve peace of mind by relying on Boehringer Mannheim for all your PCR needs. Contact your representative for more information, or call us at 1-800-428-5433 (514-686-7141 in Canada).

These products are sold under licensing arrangements with Roche Molecular Systems and The Perkin-Elmer Corporation. Purchase of these products is accompanied by a license to use them in the Polymerase Chain Reaction (PCR) process in conjunction with an Authorized Thermal Cycler.

Federal Express trademark used by permission.

© 1994 Boehringer Mannheim. All Rights Reserved.
For Superior RT-PCR, Choose Gibco BRL SUPERSCRIPT™ II RT and Taq DNA Polymerase

Gibco BRL SUPERSCRIPT II RT

SUPERSCRIPT™ II RNase H- Reverse Transcriptase (RT) generates > 50% more full length cDNA and greater yields of first strand cDNA than other RTs. It is uniquely engineered by the introduction of point mutations, which result in a 10^6- to 10^7-fold reduction in RNase H activity without any loss of DNA polymerase activity. You can amplify any region of any message and achieve successful RT-PCR.

SUPERSCRIPT II RT works well on total RNA, eliminating the need to generate poly(A) RNA, which saves you time and reagent costs. It's active up to 50°C to reduce interference by secondary structure in the RNA template.

And now, Gibco BRL Taq DNA Polymerase is both licensed and qualified for PCR.

So for superior RT-PCR, choose high quality Gibco BRL SUPERSCRIPT II RT and Taq DNA Polymerase...only from Life Technologies.

Amplification from 5' end of 6.8-kb mRNA for human DNA pol ε using oligo(dT) primed cDNA from 10, 1, or 0.1 ng HeLa total RNA.

Comparison of Reverse Transcriptases using 1 µg of a 7.5-kb RNA Template.

To Order/TECH-LINE™: (800) 828-6686

<table>
<thead>
<tr>
<th>Product</th>
<th>Cat. No.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPERSCRIPT™ II RNase H-</td>
<td>18064-014</td>
<td>10,000 units</td>
</tr>
<tr>
<td>Reverse Transcriptase &amp; Buffer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taq DNA Polymerase* &amp; Buffer</td>
<td>18038-018</td>
<td>100 units</td>
</tr>
<tr>
<td></td>
<td>18038-042</td>
<td>500 units</td>
</tr>
<tr>
<td></td>
<td>18038-067</td>
<td>1,500 units</td>
</tr>
</tbody>
</table>

*Tag DNA Polymerase is sold under licensing arrangements with Roche Molecular Systems and The Perkin-Elmer Corporation.

Industrial Customers: (800) 874-4226

U.S.A. Patent No. 5, 244, 797. SUPERSCRIPT™, TECH-LINE™, and the Life Technologies logo are marks of Life Technologies, Inc. For research use only. Not intended for human or animal diagnostic or therapeutic use.

*Purchase of this product is accompanied by a license to use it in the Polymerase Chain Reaction (PCR) process in conjunction with an authorized thermal cycler.

Circle No. 12 on Readers' Service Card
32P Kinase Assay is about to dye.

Introducing a Non-Radioactive PKA assay that's sensitive to 0.02 units of enzyme activity—the Pierce SpinZyme™ Non-Radioactive PKA Assay.

**Sensitive.** The Pierce SpinZyme™ Non-Radioactive PKA Assay measures as little as 0.02 units of PKA activity.

**Non-Radioactive.** No more tedious wash procedures...no more radioactive waste disposal...no more waiting for the scintillation counter to see your results. The SpinZyme™ Non-Radioactive PKA Assay gives you the sensitivity you need to measure PKA activity...without the hassles and hazards associated with 32P.

**Specific.** Unlike the 32P assay, the SpinZyme™ Non-Radioactive PKA Assay detects only the phosphorylation of a dye-labeled peptide substrate. There's no interference from the phosphorylation of endogenous protein in physiological samples.

**Fast.** In as little as 20 minutes, you can perform a complete spin-column separation—including all binding and elution steps. The Pierce SpinZyme™ separation unit incorporates a unique affinity membrane, which quickly and efficiently separates the phosphorylated dye-labeled peptide from the non-phosphorylated peptide.

Wash and elution fractions can be measured spectrophotometrically or fluorometrically. Results can be measured both qualitatively and quantitatively.
Peptide Nucleic Acids

Stronger binding. Greater specificity of interaction. Increased enzyme resistance.

These are just a few of the strengths of Peptide Nucleic Acids (PNA), new DNA analogs that combine a unique polypeptide backbone with the four purine and pyrimidine bases.

With the power of PNA behind you, you’re in a position to forge ahead on newly developed applications — applications that are impossible with DNA.

PCR Clamping
PNA oligomers and PCR team up in an assay to detect single point mutations — without DNA sequencing.

Strand Invasion
Homopyrimidine PNA oligomers displace DNA strands to form PNA/DNA/PNA triplexes.

Custom PNA Synthesis Service
Biosearch can synthesize almost any PNA sequence you need, from simple strings of A, C, G, and T to biotin or fluorescein-labeled oligomers.

Call to sign up for our series of “Practical PNA” notes and get the details on our PNA synthesis service.

U.S. and Canada: 1-800-872-0071 • Japan: (03) 3471-8191
Europe: (44) 0923 211107

Biosearch is a trademark of Biosearch, Inc.
The PCR process is covered by U.S. patents owned by Hoffmann-La Roche, Inc. and F. Hoffmann-La Roche Ltd.
Copyright © 1994 Biosearch, Inc., Bedford, MA

A little of your precious sample goes a long way in our osmometer

Many times when you need to measure osmolality you may have only a limited amount of hard-to-come-by sample available. No problem if you’re using the Wescor Vapor Pressure Osmometer. It routinely processes samples of only 10 µL and measures them with 1% accuracy. And it can be calibrated for samples as small as 2 µL.

Extremely simple to use and highly reliable, the Wescor VPO has another key advantage over the older freezing point osmometers. It accepts any biological sample including highly viscous solutions and tissue specimens.

The Wescor VPO has proven to be the ideal instrument for measuring osmolality in all areas of biological research. It’s widely used in marine biology, tissue culture, soil and plant physiology, and laboratory animal studies. And you’ll find it used for Q.C. work in the food, pharmaceutical, beverage, and ophthalmology industries.

Contact us for more details or to arrange a demonstration. Wescor, Inc. 459 South Main Street, Logan, UT 84321 USA. FAX 801-752-4127. Phone 1-800-453-2725.

Circle No. 29 on Readers’ Service Card
For the $^{32}$P Kinase Assay that won't dye...

Try the fastest, easiest radioactive assay available—the Pierce SpinZyme™ PKA Assay Kit, featuring our exclusive Basic Separation Units.

**Fast.** In less than 5 minutes, the SpinZyme™ Basic Separation Units will separate excess [γ-$^{32}$P]ATP from the phosphorylated peptide. These exclusive Pierce units feature a phosphocellulose membrane in a spin column format, which eliminates the tedious wash steps of the standard procedure.

**Low Background.** Researchers who have tested these separation units report significantly lower background levels compared with standard assay methods using phosphocellulose squares.

**Convenient Handling, Easy Disposal.** The sample buckets containing the phosphocellulose membrane and bound phosphorylated peptide are easily transferred to scintillation vials for counting. Radioactive liquid waste is contained in microcentrifuge tubes for easy disposal.

**Reduced Radioactive Waste.** Only 1 ml of radioactive liquid waste is generated per sample.

The SpinZyme™ PKA Assay Kit (Product #29550) contains sufficient materials to perform 100 assays including: Reaction Buffer, Activator Solution, Kemptide (PKA Substrate), PKA Dilution Buffer, 100 SpinZyme™ Basic Separation Units and 100 Additional Receptacles.

The SpinZyme™ Basic Separation Units (Product #29520) includes 100 SpinZyme™ Basic Separation Units and 100 Additional Receptacles. Suitable for use in kinase assay protocols using peptide substrates that will bind to phosphocellulose.
Introducing MEGALON’s ResearchStation, a dynamic workspace for integrating and managing all types of electronic data.

**ResearchStation™ for Windows™**

MEGALON’s ResearchStation for Windows provides a single framework for accessing, combining, examining and exchanging information throughout the research cycle.

Dynamic electronic workspace for consolidating and viewing diverse data sets
- Access, combine, view and organize all data—text, images, graphics, video, voice—in a single window, regardless of source or file format
- Examine information from different perspectives using multiple views (workview, outline) and representations (icon, content)
- Work with all desktop software applications in a single window

Intuitive, flexible tools for accessing and handling data
- Browse internal files and local and remote databases to locate information quickly
- Automate routine, repeated tasks with ResearchStation Minder™
- Information management based on context, context and history
- Organize and view information in a variety of combinations and contexts

* Automatically track document ownership, activities and modifications
* Automatically track relationships between data, e.g. links between raw data, experiments and reports
* Support for collaborative work
* Isolate and exchange relevant information easily with colleagues
* Access new information quickly from multiple, diverse sources
* Create visual representations of work for clarity or formal presentations
* Security and standards compliance
* Control access and editing authorization (optional)
* Use electronic sign-off for approvals
* Freeze information at task completion
* Windows-standard OLE 2.0 architecture
* Access all existing Windows-based data

Widely used Windows interface provides an easy platform for learning or building on existing expertise
- Accessible, affordable platform and product
- Runs on standard IBM-compatible 386/486 PC’s with Windows 3.1 or higher
- Available through MEGALON’s worldwide distribution network for the suggested retail price of

**US$995**
*Distributor prices may vary.

ResearchStation is complemented by a growing line of MEGALON desktop software for scientists, including ChemStructure™ drawing and presentation software, Compounds™ chemical structure and information database, and Unistat® comprehensive statistics package. For more information, contact the MEGALON office nearest you. Via e-mail, send requests for general information to info@megalon.com, and requests for sales and distribution information to sales@megalon.com. MEGALON product demos are available via anonymous FTP from ftp.megalon.com.

MEGALON, S.A., 10, Rue St. Honore, CH-2000 Neuchatel, Switzerland, Phone: +41-38-24-75-24, Fax: +41-38-24-76-16
MEGALON 400 Bel Marin Keys Boulevard, Suite 102, Novato, California 94949 USA, Phone: +1-415-884-3002, Fax: +1-415-884-2279
MEGALON, kk Perie Jingu-mae 4F, 6-19-17, Jingu-mae, Shibuya, Tokyo 150 Japan, Phone: +81-3-3406 7261, Fax: +81-3-3406 7340

MEGALON and the MEGALON logo are trademarks of MEGALON, S.A. Halin Systems, Inc. is the developer and holds the trademark for ResearchStation. All other brand names, product names or trademarks belong to their respective holders. © 1994 MEGALON, S.A. All rights reserved.
Both Chromatography Systems Are About The Same Low Price. But That's Where The Similarity Ends.

Why bog down your work with a traditional chromatography system? You can achieve even better resolution, in a fraction of the time, outside the cold room, with a ConSep LC100™ system from Biosearch.

Whether you are purifying proteins or nucleic acids, the ConSep system delivers high biological activity and purity in just 15 in. of bench space.

And it's so simple to use. The patented Autoblend® four-buffer blending feature lets you alter both the pH and the ionic strength of your buffers with just a few keystrokes, so you can run pH and salt gradients simultaneously.

The ConSep system is compatible with all conventional low-pressure bead-based columns. And for ion exchange chromatography, the “flow through pores” of our MemSep® cartridges speed the transport of biomolecules, for sharper peaks and faster results.

The ConSep LC100 system.

Using anything else just doesn't add up. For information and a free video or demonstration in your lab, call the Biosearch Group in the US and Canada at 1-800-872-0071 (Option 1), in Germany at (49) 040-853267-36, in Japan at (03) 3471-8191, in France at (33) 130127002, and in the UK and the rest of Europe at (44) 0923 211107.

© 1994 Biosearch Inc.

Circle No. 27 on Readers' Service Card
How do you do survival analysis?

Are you analyzing survival data the hard way? Try our way.

Start with StatView...

StatView® is the only Macintosh stats package that combines data management, data analysis, graphing, drawing, and presentation into a single easy-to-use solution. From data entry to finished reports, StatView saves you time and effort.

...now add Survival Tools!

Survival Tools is the latest in a series of drop-in extensions to StatView. Survival Tools incorporates a complete suite of survival analyses into StatView — seamlessly. Survival Tools becomes part of StatView, so you'll enjoy all the benefits of StatView's award-winning interface, full presentation tools, and templates.

It's our way or the hard way

You can analyze the hard way, or the StatView way — the choice is up to you. For more information on StatView, Survival Tools, and other add-on products, call us at 1-800-666-STAT.


Circle No. 44 on Readers’ Service Card

How to make your DNA do Windows.

Hitachi Software's DNASIS® for Windows®, opens up a world of opportunity for people who use IBM-compatible computers.

With DNASIS for Windows, you can perform complex sequence analysis using Windows-based software. DNASIS makes it possible to store, sort, and edit large amounts of research data on a PC. Its speed and accuracy enable you to predict structures, deduce functions, and understand experimental results.

DNASIS for Windows, has the ability to create simulations of secondary structure, fragment assemblies, homologies, and protein expression, so you can validate and refine experimental strategies, all on your PC!

So, if you’re eager to see your DNA in a whole new light, give us a call at: 1-800-624-6176.

DNASIS for Windows
Sequence analysis made simple.

Hitachi Software
Quality Software Solutions.

Hitachi Software Engineering America, Ltd.
1111 Bayhill Drive, Suite 395 • San Bruno, CA 94066 • 415-615-9600 • Fax: 415-615-7699

Circle No. 49 on Readers’ Service Card
Research made simple.

**NoteBuilder** helps you:
- keep neat, accurate notes
- search your data
- spot trends
- create automated bibliographies
- find the facts quickly
- print reports
- spend less time doing research

**NoteBuilder** is the only tool you’ll ever need for research or keeping any collections of text.

Call now for a **NoteBuilder** brochure
Available for DOS or Windows™

**1-800-533-6922**

3790 El Camino Real
Suite 389
Palo Alto, CA 94306
415/323-4083
415/323-0611 (fax)

---

**PERSONAL BIBLIOGRAPHIC DATABASES...**

*These cost more:*
- ENDNOTE
- DMS 4 CITE
- PRO-CITE
- REFERENCE MANAGER
- REF-11

**PAPYRUS™**

*Version 7!

- Manages up to 2 million reference citations. Stores up to 16,000 characters and 100 keywords per reference.
- Dozens of predefined output formats, plus the ability to easily design your own.
- 100% compatible with *WordPerfect*, *Microsoft Word*, *Ami Pro*, *WordStar*, *XyWrite*, *Signature*, *ChiWriter*, TeX.*
- Including Windows™ versions
- Can also be used with virtually all other word processors.
- Fast, powerful search capabilities.
- Able to import references from national databases, CD-ROM files, monthly diskette services, other bibliography programs, or almost any other database or text file.
- Allows an unlimited number of Notecards for each reference.
- Powerful new user interface.
- Fully compatible with Windows™

for IBM-PC and compatibles also available for VAX-VMS

**Complete System $99**

Full money-back guarantee on purchase of Complete System.

**Demo System $25**

Demo price credited toward subsequent Complete System purchase.

Research Software Design
2718 SW Kelly Street, Suite 181
Portland, OR 97201
(503) 796-1368 FAX: 503-241-4260

---

**Introducing JMP® Version 3!**

Statistical Visualization and Design of Experiments Software for the Apple® Macintosh®

*See What You’ve Been Missing*

JMP® Version 3 offers many new statistical features that increase power and flexibility, while maintaining its ease of use.

- In addition to the broad range of statistical tools already offered by JMP, new Version 3 features include survival analysis; stepwise regression, cross-tabulations, nonparametric correlations, and inverse prediction.
- Also offered are dramatic new graphical platforms such as contour plots; ternary plots; outlier box plots; graphical paired T-tests; and UWMA, EWMA, and Cusum control charts.
- Design of Experiments is now an integrated part of JMP. JMP offers six types of designs: 2-level, response surface, mixed-level, mixture, general factorial, and D-optimal.

Call SAS Institute’s JMP Sales Department at 919-677-8000, x5071 for a free demo disk of JMP Version 3.

---

Circle No. 13 on Readers' Service Card
Circle No. 41 on Readers' Service Card
Circle No. 8 on Readers' Service Card
Circle No. 16 on Readers' Service Card
25. Purified dynamin was phosphorylated by protein kinase C and repurified with S-Sepharose cation-exchange chromatography (12). The repurified phospho-dynamin I (0.25 µg) was incubated with calcineurin in a 40-µl mixture containing 10 mM tris buffer, pH 7.4, and various cofactors for 15 min at 30°C and terminated by addition of SDS stop solution (7). Dephosphorylation was then analyzed by SDS-polyacrylamide gel electrophoresis and autoradiography. Phosphopeptide mapping was as described (12). Purified calcineurin (Upstate Biotechnology Incorporated, New York) had a specific activity of 1 µmol mg⁻¹ min⁻¹ [p-nitrophenolphosphate (PNPP)] and was homogenous on Coomassie staining of polyacrylamide gels.

26. Supported by the National Health and Medical Research Council of Australia.


29. Purified dynamin I (0.5 µg) or phospho–dynamin I (0.25 µg) was incubated in 40 µl of 10 mM tris (pH 7.4) containing 10 mM NaCl without or with 18 nM calcineurin, 200 µM Ca²⁺, and 200 nM CaM in the presence of 2 mM Mg²⁺ or 1 mM Mn²⁺ as indicated in Fig. 4 for 15 min. The reaction was then terminated with addition of 2 mM EGTA, and GTPase assay was initiated with the addition of [γ-32P]GTP (0.9 mM GTP and 2 µCi of [γ-32P]GTP) for the further time periods indicated. GTP hydrolysis was determined as described (12).

To Be Awarded for a Report, Research Article, or an Article Published in Science

The AAAS–Newcomb Cleveland Prize is awarded to the author of an outstanding paper published in Science. The value of the prize is $5000; the winner also receives a bronze medal. The current competition period began with the 3 June 1994 issue and ends with the issue of 26 May 1995.

Reports, Research Articles, and Articles that include original research data, theories, or syntheses and are fundamental contributions to basic knowledge or technical achievements of far-reaching consequence are eligible for consideration for the prize. The paper must be a first-time publication of the author’s own work. Reference to pertinent earlier work by the author may be included to give perspective.

Throughout the competition period, readers are invited to nominate papers appearing in the Reports, Research Articles, or Articles sections. Nominations must be typed, and the following information provided: the title of the paper, issue in which it was published, author’s name, and a brief statement of justification for nomination. Nominations should be submitted to the AAAS–Newcomb Cleveland Prize, AAAS, Room 924, 1333 H Street, NW, Washington, DC 20005, and must be received on or before 30 June 1995. Final selection will rest with a panel of distinguished scientists appointed by the editor-in-chief of Science.

The award will be presented at the 1996 AAAS annual meeting. In cases of multiple authorship, the prize will be divided equally between or among the authors.
problems, data, and theories of social psychology on the other. A first group of chapters presents the reader with a general introduction to dynamic systems concepts. They do so in a non-technical but certainly not trivial way. Nowak and Lewenstein, for instance, describe notions such as deterministic chaos, attractors, and catastrophe models and apply them to examples from social behavior. Mandell and Selz introduce the reader to statistical dynamics and provide an overview of statistical properties of nonlinear dynamic systems. Those properties are very unlike the properties that can be found in the average social science statistics handbook. Unfortunately (but inevitably in light of the limited space available), this chapter is little more than an invitation to further reading.

A second group of authors employs dynamic systems concepts in a basically metaphorical way. They try to shed new light on old phenomena by recasting existing problem domains in terms like “cusp catastrophe” and “attractor spaces” (examples are chapters by Tesser and Achee on aggression, love, and conformity and by Eisier on attitude change). One could argue that a metaphorical approach is hardly more than a testimonium pauperis from the side of poor old psychology, but such a claim clearly disavows the function of metaphor for a scientific discipline that has begun to explore a new theoretical universe. Metaphors play an important role in detaching the existing models from connotations they acquired in the fields where they originated (laminar flow in fluids, for instance) and in assimilating them to data and methods from an entirely different world of thought (such as social relations and behavior).

A third group of chapters presents actual dynamic systems modeling of data from sociopsychological experiments. Selz and Mandell, for instance, discuss the application of symbolic dynamics to individual differences in behavioral style. Vallacher and Nowak discuss an experiment on “on-line” tracking of changes in judgment and show how the dynamics of judgment is actually more interesting than the final judgments themselves.

In a summarizing chapter, Nowak, Lewenstein, and Vallacher argue for a social psychology that accounts for change instead of states and for the mutual (instead of asymmetrical) causality that is typical of human social behavior. They argue that dynamic systems modeling does not merely imply the building of quantitative mathematical models but leaves ample room for qualitative approaches that will greatly enrich social psychology. The book, probably the first of its kind, provides a very interesting, accessible and informative introduction to a new and exciting approach to social psychology.

Paul van Geer

Department of Psychology, University of Groningen, 9712 TS Groningen, The Netherlands

Reprints of Books Previously Reviewed


Books Received


978
The 1995 AAAS Annual Meeting & Science Innovation Exposition

Call for Poster Papers
ATLANTA, GEORGIA • 16–21 FEBRUARY 1995

Deadline: 15 November 1994

The poster sessions at the 1995 AAAS Annual Meeting and Science Innovation Exposition are an important and informative way to communicate your research and ideas.

Accepted papers will be assigned a 4' x 8' space on which posters will be displayed. Authors will be required to be present for a designated 2-hour period during the session. Poster sessions will be organized for the following categories: life sciences, physical sciences, social sciences, and education. Please indicate which session you are submitting your poster to when sending it. An individual may be first author on only one poster per category.

Instructions for presenters

Deadline: all abstracts must be received by November 15, 1994. Upon acceptance of your poster, you will be advised of the time and place of your session.

Endorsement: an abstract will be considered only if it is endorsed by a member of AAAS. Members may endorse their own abstracts. All individual Science subscribers are members of AAAS. Librarians or employees of institutions holding subscriptions to Science cannot endorse an abstract unless they also hold an individual membership in AAAS.

Format: refer to the sample for instructions regarding spacing, capitalization, and proper format. At the top of the sheet, type the appropriate session category. The abstract must fit within a 5" x 5" area in the center of an 8.5" x 11" sheet of white paper. Use a typewriter or letter-quality printer with no smaller than 10 points (12 characters per inch). Justify text along the left margin. Do not double-space or underline text. Below and to the left of the square, type the presenter's name, mailing address, and phone and fax numbers. Below and to the right of the square, type the name, institution, and complete membership number (from Science mailing label) of the endorsing AAAS member along with their signature.

Category (Education, Life, Physical, Social Sciences
If eligible, type "Student Award Entry"

Skip 4 lines. Type title in Upper and Lower Case Letters. PRESENTING AUTHOR'S FIRST NAME IN UPPER CASE (Institution Name in Upper and Lower Case Within Parentheses). SECOND AUTHOR (Institution Name in Upper and Lower Case Within Parentheses). If you have several authors at the same institution, list all names and then list the institution once in parentheses.

Skip one line and type abstract. The full width of the typed material must not exceed 5 inches (12.7 cm). Do not draw a box around the abstract. Abstracts wider than this will be returned. The total length of the material, from top of title to bottom of text (including footnotes) must not exceed 5 inches. The entire abstract should be of camera-ready quality; use a letter-quality printer with a typeface no smaller than 10 points (12 characters per inch). The printed abstract will be photographically reduced 1/3 in size for printing. Do not use paragraphs. Special symbols which must be hand lettered should be in black ink. You may use your allocated space to neatly print equations and diagrams.

Name of Presenter
Name of Endorser (Member)
Presenter's Institution
Endorser's Institution
Mailing Address
Endorser's AAAS Member #
City, State, Zip
Endorser's Signature
Presenter's Phone #
Presenter's Fax

Registration: all submitters whose abstracts are sent prior to July 15 will be sent a registration form after their abstracts are accepted. Abstracts received after July 15, 1994 must be accompanied by a completed registration form. In the event an abstract is not accepted, the registration fee will be refunded.

Mailing instructions: mail one original plus five photocopies of the abstract flat (do not bend) to: AAAS, Meetings Office, Contributed Papers, 1333 H Street, NW, Washington, DC 20005. (Telephone 202-326-6450). Facsimiles are unacceptable as the abstracts will be photographically reproduced.

Free Registration for Students
Upper division undergraduates and full-time graduate students are eligible to serve as Session Aides for the meeting. In exchange for assistance with sessions, students can receive a waiver of registration fees and, for additional sessions, a one-year subscription to Science Magazine. Information and application forms can be obtained from the Session Aide Coordinator at the above address.

Student Research Awards
To encourage young scientists, AAAS will have a poster session for research by undergraduate and graduate students. A panel of distinguished scientists will judge student posters. The best presentation in life, physical, and social sciences will be honored, and will receive a cash prize. In addition, top presenters will receive a one-year (51 issues) subscription to Science. Students who wish to be included in this session should type the words "Student Award Entry" above their abstract. A photocopy of a current student identification or enrollment form must be submitted with the abstract. Students are eligible if they are enrolled full-time, or if they are part-time but actively working towards a college-level degree.
CAN YOUR MICROSCOPE DO THIS?

The benefits of seeing your specimens in three dimensions seem obvious. Observe the 3D pair above. Merging them forms a 3D picture containing crucial z-axis information that’s missing when either image is viewed independently. Yet there’s even more here than meets the eyes.

If you can, merge the 3D pair (if you can’t do it without aid, we’ll send you a free image-merging lunette with this brochure). You’ll notice that the resulting 3D picture appears better than the individual 2D pictures in every respect. Resolution, detail, contrast, and – of course – depth. You can thank the Edge Scientific Instruments® R400 microscope. You also can thank the most powerful image processor in existence: Your brain.

While your eyes encounter two flat pictures, your brain forms one 3D image. And this image carries additional spatial information – in highlights, shadows, and details – that lets your brain better understand the specimen as it really exists in three dimensions.

Fortunately, you don’t have to think about this. It happens automatically, and instantly.

But you should think about the only microscope that gives you 3D images for direct observation and recording. The R400 employs Edge’s patented* Multiple Oblique™ illumination to provide high definition 3D images in true color up to the highest magnification available. There are no computers or image-enhancement tools necessary – real-time 3D images are available directly at the eyepieces, although they certainly may be acquired for use in an image-processing system as well.

And whether you observe and record your specimens in three dimensions or in two, you’ll experience significant improvements in resolution, contrast, and depth of field with Multiple Oblique illumination, compared against the finest conventional light microscopes available.

If you’d like to learn more about the most significant new development in light microscopy, please call Edge at (310) 396-9333 and ask for our free brochure. In it you’ll find several examples of the R400’s 3D photomicrographs as well as a handy image-merging lunette.