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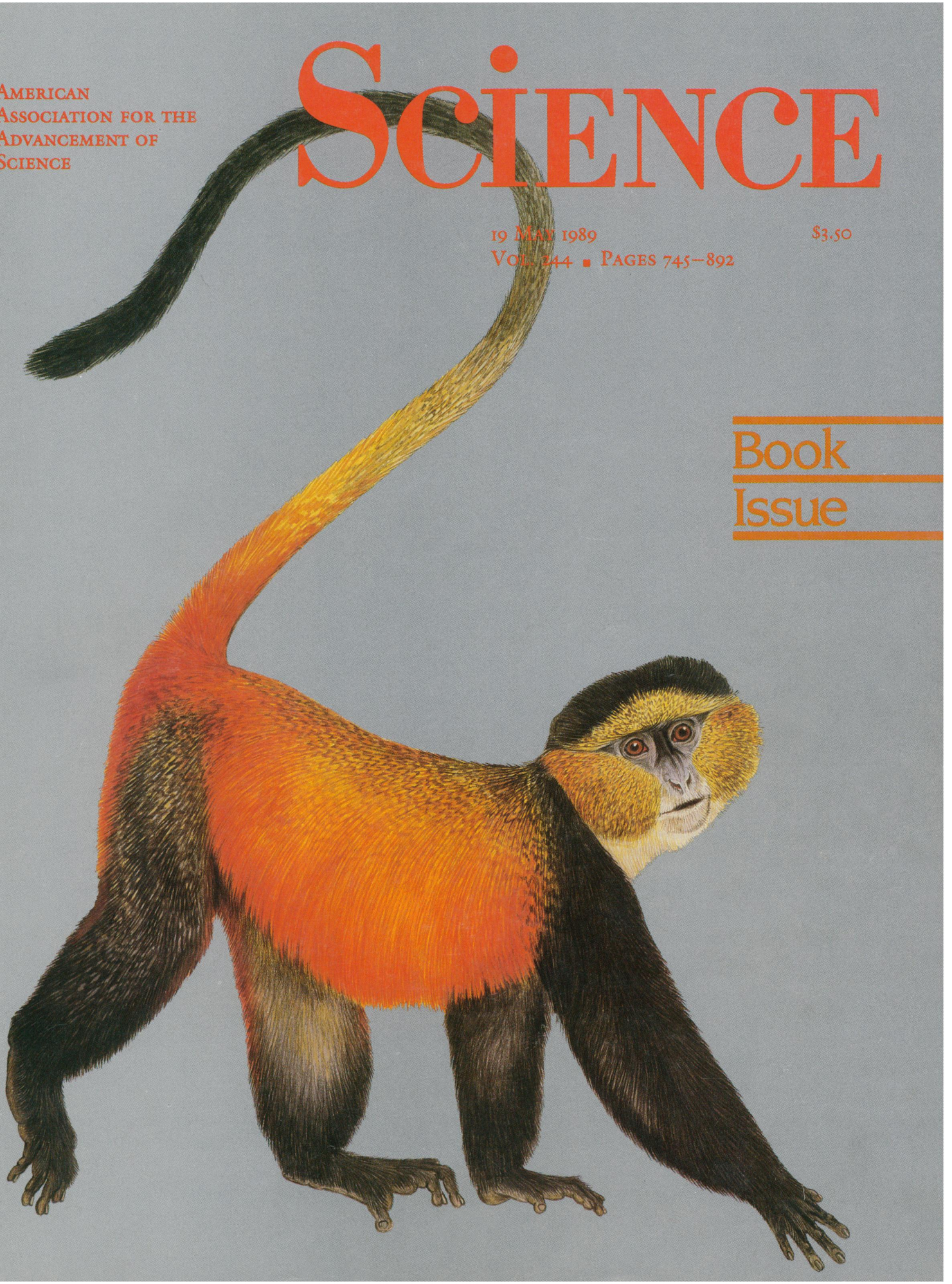

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COVER The golden monkey *Cercopithecus mitis kandti*, a guenon of a rare subspecies that inhabits high-altitude forest in the area around the Virunga volcanoes of east central Africa. Its distribution coincides with that of the endangered mountain gorilla. The survival of both primates depends on the conservation of this relictual habitat. [Jonathan Kingdon; from *A Primate Radiation: Evolutionary Biology of the African Guenons*, reviewed on page 860]

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Ribosomes

RIBOSOMES are structures inside cells that help turn genetic information into proteins; an understanding of how they link genotype to phenotype is thus fundamental for understanding living organisms. Ribosomes have two subunits, each of which consists of RNA and proteins. Details of the three-dimensional structure, the assembly, and the reactivity of the smaller subunit are presented by Stern *et al.* who used chemical and physical data and interactive computer graphics to generate a model of what happens as each of the 21 different ribosomal proteins binds to the complex (page 783). The higher order (tertiary and quaternary) folding of ribosomal RNA is greatly influenced by the first wave of proteins that bind; the late-binding proteins more strongly interact with other proteins rather than with RNA. Conformation changes in RNA appear to be key to the proper functioning of the complex. Because the ribosome is but one of a growing list of complexes of RNA and protein that affect cell functions, insights into the ribosome's structure and function and how they relate should be relevant to structure-function relations of other ribonucleoproteins.

G_{olf}

SMELLING or olfaction is an incredibly sensitive process: some airborne substances—odorants—can be detected by vertebrates at concentrations in the range of parts per trillion. Odorants come in contact with the mucous membrane of the nose and trigger a series of biochemical reactions that culminate in their detection and identification. The molecular mechanisms that ensure olfaction are poorly characterized, but it is known that a G protein and a biochemical cascade involving adenylate cyclase come into play. G proteins are ubiquitous in the body; they relay signals from membrane receptors to membrane channels or to molecules inside cells, and all use their α subunits to couple receptor to effector. Jones and Reed have studied the α subunit of a new G protein named G_{olf} that appears to fit the description of a mediator of olfaction to a tee (page 790). G_{olf} is expressed exclusively and in large amounts in olfactory tissues, specifically in the olfactory nerve cells in mucous membranes where contact with odorants is made. G_{olf} interacts with effectors in a test system, activating the adenylate cyclase cascade; its association with receptors could not be made, however, because the receptors for odorants have not yet been identified. Olfaction appears to be much like vision in requiring a specific G protein for coupling external signals to electrical activities that can be recognized by the brain.

Sea level rise and the greenhouse effect

SEA level has been changing globally since the beginning of the last deglaciation event of the current ice age, but 20th-century records of relative sea level change made with an array of tide gauges show that the changes vary enormously at different geographic locations. Peltier and Tushingham report that if tide gauge data are corrected for adjustments in elevation that are still occurring globally as a result of the melting of the ice sheets, a much more consistent value—2.4 ± 0.90 millimeters per year—is obtained for the rate of global sea level rise since 1920 (page 806). As the glaciers melted, mass on the surface of the earth was redistributed. The earth's shape has continued to deform slowly (the last major ice sheets melted more than 6000 years ago) because the mantle of the earth is extremely viscous. The most rapid uplift has taken place where ice loads were removed, but changes in elevation are also occurring in peripheral areas and in areas far removed from the sites of active deglaciation. Because the "decontaminated" data show a globally consistent value for the rise in sea level, it is plausible that a global phenomenon is responsible for the rise: a possible candidate for such a phenomenon is the increase in greenhouse gases in the atmosphere and associated global warming.

Artificial channels

GRAMICIDIN A channels stretch through cell membranes and carry ions from one side of the membrane to the other. What do such channels look like and how do they work? Stankovic *et al.* used computer simulations to generate and evaluate various possible geometries for such channels (page 813). Structural variations were designed and assessed; synthetic channels were produced and inserted into artificial membranes where their conductance properties (which differed from those of natural channels) were measured and found to be in accord with model predictions. One outcome of this work may be the development of methods for preparing designer channels that can carry needed ions across membranes.

Ergotypes

THE immune system goes awry in autoimmune disease; the types of cells that typically attack bacteria and other foreign materials turn against the "self" and attack and destroy self components instead. In an animal model of multiple sclerosis called experimental autoimmune encephalomyelitis, Lohse *et al.* identified a new type of anti-self response and found that it acts to curtail the development of disease (page 820). Both the anti-self responders and the targets of their responses are T lymphoid cells: the attacking T cells are designated anti-ergotypic T cells (from the Greek word ergon meaning work or action) and the targets are T cells in a state of activation. (In addition to the anti-ergotypic cells, the rats have anti-idiotypic T cells that recognize and act against specific idiosyncratic features of other T cell clones.) Injections of anti-ergotypic T cells prevented the development of autoimmune disease in the rats. Parallels between the experimental disease and certain autoimmune human diseases suggest that some of the human diseases might similarly be quashed by the actions of comparable anti-ergotypic (and anti-idiotypic) T cells.

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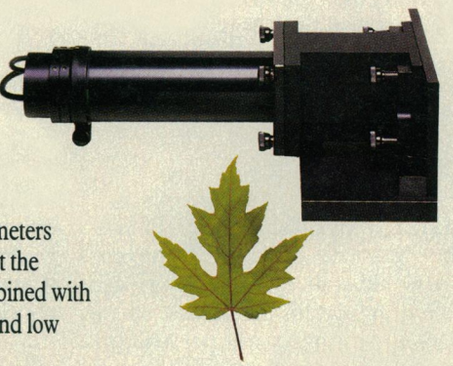

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SCIENCE

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The Confusion Profusion

The exciting prospect of cold fusion seems to be diminishing from a hurricane to an April shower. The results are certainly not all in yet, but the early promise of untold energy is disappearing amid the relentless detail of careful electrochemical experiments and heat balances. The cold fusion incident has been unfortunate in many respects, but it has yielded some valuable lessons that suggest that the dark cloud may have a palladium lining.

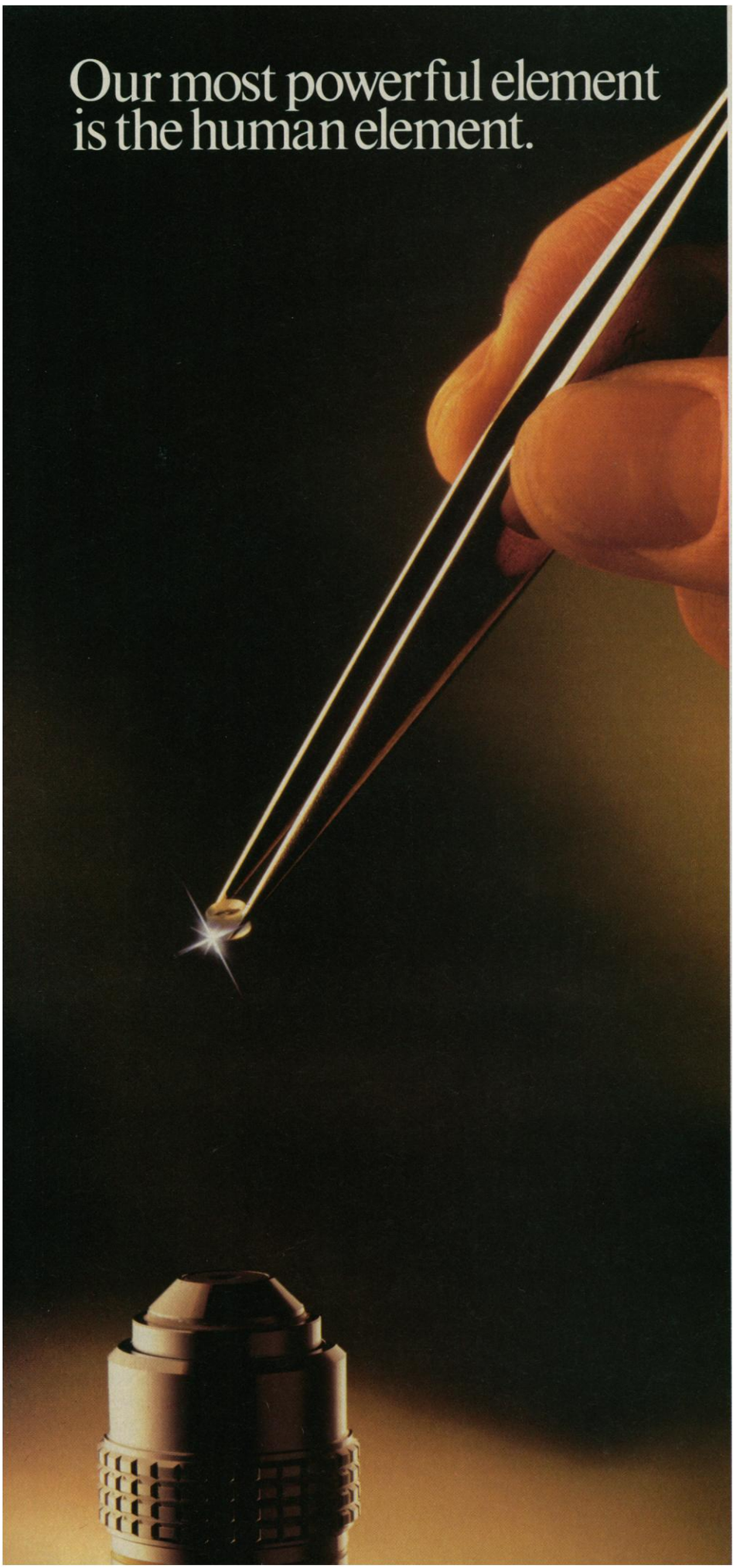
The first lesson is that the merit in the established scientific procedure of exposing one's findings to peer review before publicizing results is reaffirmed. Peer review has merit for authors, who get good feedback; it has merit for other scientists, who get a screening of the research most likely to be valuable to them; and it has merit for the press and the public, who cannot be expected to have complex scientific expertise. The volumes of newsprint devoted to the cold fusion incident and the wasted effort of scientists who tried to duplicate experiments for which there were no details demonstrate why scientists are skeptical of results that first appear in the general press rather than in scholarly journals.

Before scientists become too critical about press coverage, however, it is important to recognize that discoveries with major implications for societal change are difficult to suppress. The open atmosphere of academia inevitably means that graduate students, postdoctoral fellows, colleagues, and visitors will learn of experiments in progress, and if these have important implications, the gossip circuit and the computer network will spread news of the work that the scientists might well prefer to confine temporarily to the laboratory. This does not excuse premature press releases or incomplete experiments, because the more important the conclusion the more careful should be the experiment. But it does explain that leaks occur and that once the genie gets out of the bottle the bottle openers will lose control.

Another lesson from the cold fusion flap should give insight to those embroiled in the controversy between scientists and legislators about scientific fraud. No question of fraud has arisen in the fusion experiments, but the rush of other scientists to duplicate them is illustrative of what happens in any major discovery—correct, incorrect, cutting edge, premature, or fraudulent. The argument of most scientists, that fraud is not widespread in science, represents faith in a law that is illustrated by the fusion confusion. The law might be stated simply as, "The bigger the result the more quickly it is going to be checked." The process of science itself ensures that every major discovery, or claim to a discovery, will be checked in a very short period of time. When scientists oppose the advocacy of large bureaucracies to investigate fraud, they do so not because they are indifferent to fraud or want to suppress bad publicity, but because their experience has engendered trust that there is a correlation between the importance of a finding and the rapidity of its verification or falsification. Some minor incorrect results may escape detection for a time, but major ones will not. The reality of that process is illustrated by the rush to challenge the cold fusion results. The "establishment" cannot suppress a revolutionary concept, and the revolutionaries cannot escape the detailed scrutiny of their colleagues.

Authors have a responsibility to be their own devil's advocates and do appropriate control experiments. Peer review is a screening system to prevent the wasted effort and exaggerated expectations that can be generated by poor scholarship on a seductively important problem. When these procedures are bypassed they lead to delays and wasted effort, but inevitably scientists by instinct and obligation will do the experiments to challenge any new or unexpected finding. And if it turns out that there was great sloppiness and premature publicity, the fallout will and should be severe for those responsible for the unfulfilled expectations.

The high visibility of this event may perhaps enhance public understanding that the procedures of science are designed to hasten arrival at the truth. That truth will eventually emerge from the profusion of stories and opinion on cold fusion in the standard scientific way: it will not come through an edict by an august figure such as the President's science adviser or the presidents of the American Physical Society or of the American Chemical Society. It will not be produced by interminable legal actions leading to the Supreme Court. It will be manifested by scientists all over the world, devising increasingly clever experiments to check the propositions that have been advanced. It is the quality of those experiments that will finally determine whether cold fusion is a reality.—DANIEL E. KOSHLAND, JR.



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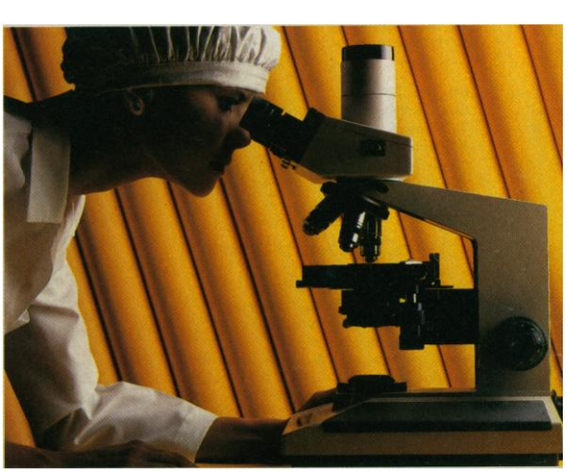

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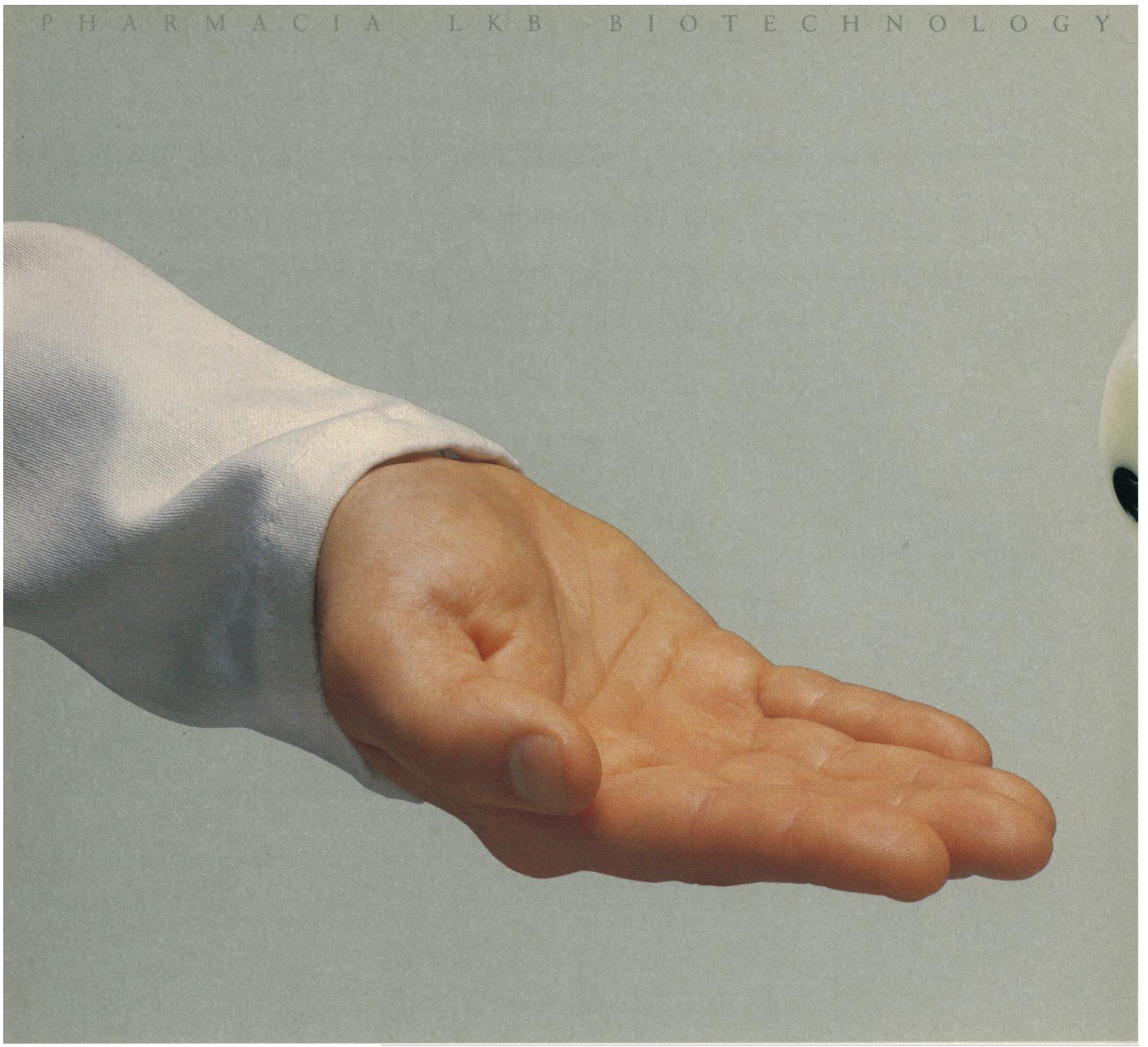

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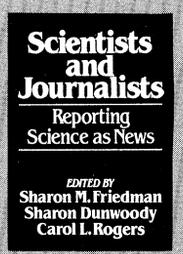

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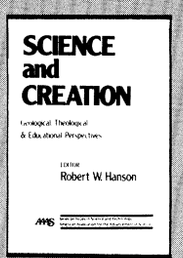
The public is interested in science and depends largely on the mass media for the latest information. But how well do scientists and journalists communicate with each other and to the public? This book examines the links between scientists and journalists as seen through the eyes of both. 1986; 334 pp.; hardcover $24.95 ($19.95 for AAAS members); AAAS Publication #86-20.



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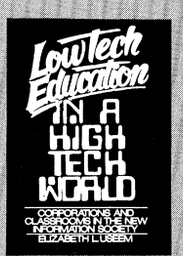

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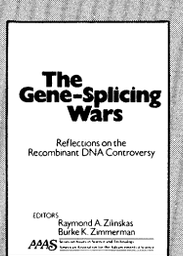

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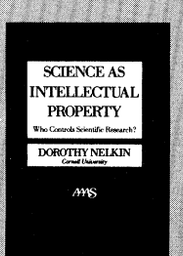

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