

## AAAS: Hard science or soft issues?

As science has become larger and more specialized, traditional large interdisciplinary conferences such as the annual meeting of the American Association for the Advancement of Science have gone through an identity crisis: Should they concentrate on exchange of scientific data among scientists of different backgrounds, with the public attending primarily for the purpose of keeping up with current trends, or should they offer a forum for free-wheeling discussion of the broad social issues that swirl around the periphery of scientific endeavor? In the last few years, the AAAS has clearly leaned toward the latter option, but in its 141st annual meeting, just concluded in New York City, a rising chorus of voices was heard demanding that future conferences place more emphasis on reporting recent developments in the mainstream of science.

In part the problem stems from an inherent dictotomy between a scientist's need on the one hand to find out what his colleagues are doing and inform the public of his own accomplishments—in order to win further support—and on the other hand, the need to concentrate and specialize, devoting years of single-minded effort toward achieving a relatively modest goal before his competitors. As the struggle for funds increases and the value of information apart from his speciality seems more irrelevant, the scientist becomes less likely to allot valuable time to meetings of peripheral value. In some fields, the frontiers of research are discussed at small, invitational meetings closed to all but established research leaders. At the same time, the public and particularly the science press have become increasingly disillusioned with endless repetition of the same vaguely political viewpoints offered by an increasingly familiar cast of vocal scientists. One veteran reporter has announced to a meeting of science writers that he would not bother to attend next year's AAAS meeting if it doesn't offer more that is new and scientific.

In an interview with SCIENCE NEWS, at the conclusion of the meeting, William D. Carey, the new AAAS executive officer, reflected the growing concern over these criticisms. The shift of emphasis away from reporting science data toward discussing social issues has resulted from explicit intentions of the AAAS Board of Directors, he said, but now the shift has gone "a little too far." Carey said he would prefer to see a half-and-half division of emphasis between scientific exchange "to provide for the ebb and flow of disciplines into

*The following three articles and the notes on p. 89 continue our coverage, begun last week, of the AAAS annual meeting in New York City.*

each other" and a discussion of issues "to provide a little bit of a jolt to the community." What does he intend to do as executive officer to facilitate the change? Carey says he would make it clear that his organization is not run from the top down and would try to help the AAAS gain more "geographic identity" with less "signal calling from Washington." The annual AAAS meeting he said, could still be competitive as a forum for reporting first-rate scientific research by trying to attract scientists who wish to reach a broad scientific audience and the public.

SCIENCE NEWS asked retiring AAAS President Roger Revelle if he agreed that the meeting was becoming too oriented toward social and political issues. He replied succinctly: "Very much so!" Changes will soon be made, he assured, that will add to the annual meeting's "science dimension."

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This year's meeting was held in New York City and appropriately enough one of the principle social issue themes dealt with the quality of urban life. Two speakers referred to Gallup poll findings that the number of Americans wishing to live in small towns or rural areas rose from 49 percent in 1966 to 55 percent in 1972, while the number preferring to live in a city declined from 22 percent to only 13 percent. One catch—though the vast majority of people don't want to live in a city, 46.5 percent want to live within a 15-minute drive from the city limits.

This sentiment, coupled with increased avenues of rapid communication and transportation, may lead to a revival of small towns. Sociologist Paul Meadows of the State University of New York, Albany, summarized the thinking of the "post-industrial" school

that believes the machine-age mentality is being replaced by one oriented more broadly to recent developments in electronics and advanced technology. In the resulting integration and specialization of services, this school expects a "satellization process" of towns and cities, in which workers can be employed in specialized jobs serving the city, while living in a small town. If small communities are to have a voice in planning for these changes, now is the time for them to begin organizing, adds Orville H. Lerch of the Appalachian Regional Commission.

Downtown areas may also undergo a revolution, according to a paper delivered by Pennsylvania State University geographer Peirce F. Lewis. Indeed, he says, the central business district as a locus of urban character may already be drifting into oblivion. He cites Houston as the extreme case, where only eight percent of the city's retail trade takes place "downtown," and quotes the old description of Los Angeles as "fifty suburbs in search of a city." Still, he defends the place of the urban center as a trend-setter of culture: "Reflect, if you please, on the spectacle of Socrates, discoursing on excellence, at the entrance of a shopping center parking lot." Preservation as historical areas may help save some downtown areas from decay, he says, but the model of New Orleans' French Quarter can serve as a warning of what character changes such preservation may entail: Rents there are now double the figure for the rest of the city, and the tourist trade has attracted entrepreneurs who see the French Quarter as just a "Creole Disneyland."

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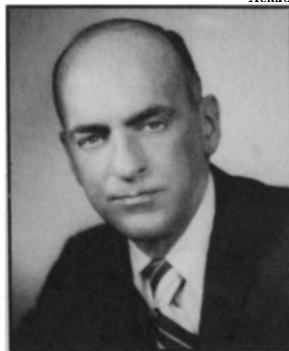
Both those scientists who attend meetings primarily to discuss their trade and those who use them as platforms for expressing opinions on social issues have become increasingly alarmed about the abuse of flagrantly misrepresented scientific data. Not only can doctored or misinterpreted results come from attempts to exploit discoveries for private profit, says Homer J. Hall, who helped organize a AAAS symposium on

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Fabian Bachrach



Roberts: Poor data.



Carey: Half and half.



Revelle: Too political.

the misuse of scientific data; but also some of the most blatant examples of specious "scientific" arguments are advanced "in the public interest."

Participants in the symposium offered a variety of startling examples to illustrate the shakiness of some data. Philip D. LaFleur of the National Bureau of Standards said analyses performed on the contents of various fuels and pollutants by the Environmental Protection Agency and the Bureau of Standards produced a range of results differing by as much as a factor of 10 or more. To make public policy from such data would involve great risks since, for example, the estimated mercury pollution from one coal-fired power plant might, according to the various data, be anywhere from a quarter ton per week to 90 tons. NBS Director Richard W. Roberts offered an even more sweeping indictment, quoting estimates that some 50 percent of information reported in scientific literature may be "unusable" because not enough data is included to assess the credibility of conclusions.

Even with good data, translating the results into public policy involves many risks. Bernard L. Oser, past chairman of the Food and Drug Research Laboratory, New York, offered the following example: "The experimental evidence upon which certain food additives have been branded and proscribed as 'carcinogens' bears no resemblance to the patterns of usage which in many cases have extended over many years without any indication of harm." None of the substances, such as cyclamates and food colors, he says, have ever been shown to be directly related to human cancer.

But an absence of regulations can also, obviously, be hazardous. Darla R. Erhard of the University of California Medical Center, San Francisco, examined a list of cases in which food faddists have perpetrated misleading information in areas not covered by FDA regulations. The "macrobiotic" diet of George Ohsawa, says Erhard, has resulted in malnutrition and death. Adelle Davis and Carleton Fredericks advocate intakes of vitamins A and D many times over the recommended daily allowances, though such overdoses could result in neurologic damage or kidney failure.

Part of the problem, according to Daniel and Vijaya Melnick, who conducted a study among biologists at Oak Ridge National Laboratory, is that biomedical researchers display a self-indulgent "docility" in matters of influencing use of their discoveries or trying to participate in the political decision-making process. Policy problems, these scientists believe, are handled by scientists who are "over the hill." □

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## Scientists sigh over plant 'psi'

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A long-standing theory on psychic phenomena in plants, popular with the public, has been disproven and disposed of in the usual scientific way. If you ask the scientists, that is. The unsinkable Cleve Backster has a different primary perception of the whole affair.

Backster, father of the theory that plants respond "emotionally" to human thoughts and actions, met with a panel of wise and solemn scientists at last week's AAAS meeting in New York. The scientists, two plant physiologists and three animal physiologists, came in the best scientific tradition, to point out the gaping discrepancies in Backster's work. Backster came to do what he's been doing for the past several years—defend his observations of psychic phenomena in plants.

A long-time polygraph operator, Backster developed his theory in 1967 after hooking a plant to a polygraph and observing various blips on the recording chart. The blips seemed to coincide exactly with the timing of certain of his thoughts and actions such as burning leaves and killing brine shrimp. He published three articles about his experiment in parapsychology journals and hasn't repeated the experiment or published related results since.

Backster has become somewhat of a celebrity, particularly since *The Secret Life of Plants* by Peter Tompkins and Christopher Bird appeared in 1972. But growing along with a groundswell of plant owners tuning in to their green roommates is the number of plant scientists who feel his message is nonsense and must be countered. Repeating Backster's experiment seemed to be the best starting place, and a AAAS symposium seemed to be the best forum for presenting the findings, so Backster and his scientific challengers met in New York to compare data.

During a press conference and official working session, physiologists Edgar L. Gasteiger of Cornell and John M. Kmetz of Science Unlimited Research Foundation in San Antonio presented the results of experiments attempting unsuccessfully to replicate Backster's results. They found no evidence of a correlation between bioelectrical activity in plants and human thoughts or actions. In the process of disproving the Backster effect, Kmetz figured out where it came from. Plant psi, he contends, is really only spurious electric signals within Backster's electronic equipment, amplified and recorded by a system not shielded for such spurious signals.

Backster, who calls himself "a stickler for the scientific method," defended his experiment and criticized the others

on several grounds, including small differences in their equipment, "consciousness interlock contamination" of their test plants and brine shrimp and a stressful laboratory environment. Yale plant physiologist Arthur W. Galston countered these criticisms by saying "the hallmark of respectability is repeatability," and a scientific generalization shouldn't depend strictly on the equipment one uses.

The press conference became chaotic after Backster reported psi responses in yogurt cultures and Kmetz reported another failure to replicate such results. An unsinkable Backster afterwards regaled two dozen reporters in the hall with his yogurt experiments while the scientists left in various states of agitation, frustration and embarrassment.

Why did the scientific community take on Backster, anyway? What's wrong with people believing they can communicate with their plants? Galston says scientists have a social responsibility to close the gap between what the public believes about nature and what the scientists believe. Besides this, pseudoscientific thinking has led some to believe they can eradicate insects by irradiating pictures of diseased fields, and so forth. This type of thinking is "pernicious nonsense in a world with a food problem," Galston says.

What did the sessions accomplish? "For the first time," Galston told SCIENCE NEWS, "scientists and reporters heard Backster himself state that he has done only one experiment nine years ago, not repeated it and that he hasn't proven anything." "We have, in the usual manner, cast doubt on the original work."

Backster remains unconvinced of this. "They nowhere near disproved it," he maintains. "This phenomenon is real and it isn't going to go away. It's just as alive as any leaf out there, and I am going to continue studying it and I hope other scientists will too." □

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## Science and law: The odd couple

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Rather than eliminating the conditions in society that lead to crime, delinquency and social deviance, the law enforcement establishment in the United States is relying increasingly on the health care system to control unwanted behavior. This is the position of three participants in a AAAS session on health care and social control.

Child psychiatrist Herbert Schrier and geneticist Jon Beckwith of Harvard Medical School and physiological psy-

chologist Stephan Chorover of the Massachusetts Institute of Technology contend such control measures attempt to invalidate unwanted behavior by calling it "sick." They warn against what they consider a growing belief in the last 10 years that criminal behavior, violence, homosexuality, low I.Q. and other types of so-called social deviance are the result of genetic defects.

The growing interest in researching the physiological bases for deviant behavior is due, in large part, to the eagerness of law enforcement agencies such as the Department of Justice and the Law Enforcement Assistance Administration to fund it. There has been a shift in support to targeted or applied research in the field, Chorover says, and the availability of funds is increasing in a few areas while the support for basic research dwindles. The roots of crime and deviant behavior lie mostly in the structure of society rather than in medical problems, Chorover says. But researchers who shift to the "approved" areas are "legitimized with funds" while other researchers must "go cold turkey," or find other funds.

The panel cited some examples of targeted research aimed at controlling behavior. The theory that extra X or Y chromosomes can cause criminal tendencies has led to proposals that children be screened for the genetic abnormality. A recent review article on extra chromosome research concluded that the frequency of antisocial behavior in persons with extra sex chromosomes is not significantly different from the frequency in persons with the normal number of sex chromosomes. Yet, Beckwith says, chromosome screening programs have been funded and initiated and may be seriously jeopardizing the normal development of children found to have the "defect."

Beckwith cited another example. A center for the study of neuropsychiatric research at the University of California in Los Angeles proposed to study the effects of kwashiorkor (a syndrome produced by severe protein deficiency) on impulse control, following the theory that protein deprivation can be linked to violence. Student protests over the proposed research led the LEAA to retract funding. The controversial theories of Shockley and Jensen on the genetic basis for I.Q. are other examples, Beckwith says. Although over time, the scientific community has totally refused their work, it had done "damage that will never be totally rectified."

What can be done to prevent the funding of such research? Right now, Chorover says, "I see my role as consciousness-raising." The problem is so large and tied to politics and traditional funding methods that the logical place to begin, he says, is by making the problem known. □

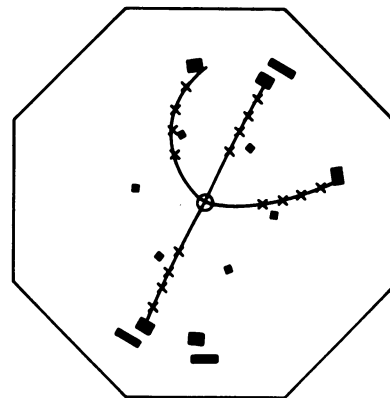
## The new particles: Subtleties mount

As the captions in the old silent movies used to say, "the plot thickens." The situation regarding the odd extra-heavy new particles that physicists have been finding recently gets curiuser and curiuser. Several laboratories are looking at various aspects of the problem, and the latest from five of them was presented at last week's meeting of the American Physical Society in Anaheim, Calif. The five laboratories are the Stanford Linear Accelerator Center (SLAC), Brookhaven National Laboratory (BNL), at Upton N.Y., the Fermi National Accelerator Laboratory (FermiLab), at Batavia, Ill., the Deutsches Elektronen-Synchrotron (DESY) at Hamburg and the Adone Storage Ring at Frascati, Italy.

Meanwhile the count of theorists whose opinions have been delivered to PHYSICAL REVIEW LETTERS has reached 53 (not all yet published). Experiment does not seem to be proceeding any clear-cut congruence with theoretical expectations (themselves quite various). Roy F. Schwitters of SLAC sums up a growing uneasiness: "It may be a far more subtle problem" than the first rush of opinion tended to make it seem.

The first important question is how many new particles are there? Everyone agrees that there is one, called psi or J, with a mass about 3.1 billion electron-volts (3.1 GeV), the existence of which was announced in November. Shortly after the first, SLAC announced a second at 3.7 GeV, but the data are not very pointed, and the SLAC people are not sure it is a particle instead of something else. But not all other experimenters see the 3.7, let alone the 4.1. Meanwhile the Brookhaven experiment, which is done by an MIT-Brookhaven collaboration, is finding evidence for the possible existence of a whole new class of possibly related particles. The Brookhaven experiment basically strikes a proton against a proton to produce the J (as they call it), which then decays into an electron and a positron. The MIT-Brookhaven group are now searching for analogous objects that would decay into proton and anti-proton or negative and positive K mesons. There are various suggestions that such things may exist over a mass range between 2 and 5 GeV, says Samuel C. C. Ting of MIT, but it is "too early to pin down the nature of these particles or if they indeed exist." If they do, they would be an entirely different family from those already found with different spins and parities.

Meanwhile the SLAC-Lawrence Berkeley Laboratory group doing the experiment at SLAC have been studying the properties of the two psi's they see.



Roy F. Schwitters/SLAC

*Computer reconstruction of the paths taken in the SLAC-LBL apparatus by two pions (curved tracks) decaying from the psi3700 and two electrons (straight tracks) that emerged shortly thereafter from the decay of the psi3100. By coincidence the result of the four tracks is in shape of the Greek letter psi.*

They have determined that the psi has one unit of spin and negative parity. Their results also indicate its hadronic nature, that is, that it responds to the strong interaction, the force that holds atomic nuclei together. This is indicated by the finding that it decays radioactively to states that contain only other hadrons. The SLAC work also shows that the psi at 3.7 GeV decays into the 3.1 GeV psi roughly half the time, evidence for a close relationship between the two. The FermiLab work which is a collaboration of Columbia, Cornell, the University of Hawaii, the University of Illinois and FermiLab, also indicates a hadronic nature for psi-J. According to Thomas O'Halloran Jr. of the University of Illinois, the results indicate a hadronic type of cross section for the interactions of the psi-J with other matter. This seems, he says, to rule out one of the early theoretical suggestions, namely that the psi-J is the intermediate vector boson, the particle that is theoretically supposed to embody the forces of the weak interaction.

Many theorists believe that the psi-J may be an example of particles made up of a new kind of elementary building block, a quark with a new property called charm (SN: 1/25/75, p. 58). The DESY results may be bad news for this opinion. As Gunter Wolf puts it, "If the 3.1 consists of charmed quarks, it should decay into a meson with the spin of a pi meson, called eta, and a photon." The DESY experimenters have looked for such events and find none. It is still too early for any definite statements, however. The mystery continues to deepen, and subtlety piles upon subtlety. □