

electrostatic corona discharge that early on threatened the viability of the program. As Iték's chief engineer for the Corona camera system, I can attest that although the Drell team was made aware of the problem, neither Sidney Drell nor any member of his team ever visited Iték to observe the phenomenon or sent suggested solutions to Iték.

Wheelon states that the Drell team and Iték engineers traced the problem to the rubber rollers that were used to move film through the camera. In fact, there was never any doubt as to the source of the corona discharge; we could see the discharge by looking through the observation window in the wall of the vacuum chamber. Eliminating the discharge was the challenge, and it was the Iték test and quality control personnel who, after scores of tests, finally found a method of cleaning the rollers and thereby bringing the discharge under control. It was Edward Purcell, a Nobel laureate at Harvard University, who visited Iték and validated Iték's solution.

I first sent Wheelon a letter of correction after he made his camera-fixing claim public at the CIA's May 1995 event honoring the Corona program. I did so again in July 1996. His persistence in misstating history is mystifying.

FRANK J. MADDEN
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WHEELON REPLIES: Corona satellite photography was playing a vital role when film darkening was first observed. The problem grew and afflicted more and more film. Having established regular photographic coverage of the USSR and China, President Kennedy and his Cabinet deemed it unacceptable to lose this extraordinary resource. When I became responsible for Corona as the CIA's deputy director for science and technology, Director John McCone made it clear that we must solve the problem—soon.

We turned to Iték, which was responsible for camera design and manufacture. CIA program people met repeatedly with Iték engineers to establish a course of corrective action. Iték's response was not reassuring. So McCone and I established a panel of outside experts to examine the problem—in parallel with Iték's efforts. I believed that the key to the problem lay in physics. I therefore asked Sid Drell to lead the effort. His panel included Dow Smith of Iték.

The Drell panel analyzed all possible sources of trouble, eliminating them one by one. The panel and Iték

arrived at the same solution at roughly the same time. Both received the thanks of a grateful government. (Incidentally, Ed Purcell was present at our request when Drell gave us his report.)

The Corona camera problem in no way diminishes Iték's extraordinary contribution to national security. Such problems do occur in daring technological efforts. Frank Madden played a leading role in the design of the camera and remediation of its only problem. I sorrow that he continues to ignore the contributions of others.

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New Results Are Right on the Quantum Dot

I would like to briefly add some important information to the PHYSICS TODAY story entitled "Experiment Signals a New Phase of Quantum Dot Measurements" that appeared in the January issue (page 19).

Amir Yacoby *et al.*¹ not only proved coherency of electron transport in the quantum dot (as explained in the story) but also pointed out that the phase of the transmission coefficient is periodic—that is, it repeats itself for a large sequence of Coulomb-blockaded peaks. Subsequently, Ralf Schuster *et al.*² (whose work is also covered in the PHYSICS TODAY story) reconfirmed this measurement and measured the actual phase itself—in a four-terminal configuration. In the process, they discovered the unexpected abrupt phase slips that take place between Coulomb blockaded peaks.

The work of both groups was theoretically supported all along by the condensed matter theoretical group at the Weizmann Institute of Science. Alex Kamenev, Yuval Oreg, Yoseph Imry, Yuval Gefen, Yehoshua Levinson and Moshe Shechter pointed out the role of the Onsager symmetry in the two-terminal geometry giving rise to the phase rigidity observed experimentally.³ (The four-terminal measurement is one way to relax this constraint.) Recently, the unexpected periodicity of the measured phase and electron gains in a quantum dot and the abrupt phase slippage have been subjects of theoretical debates. Note in particular the work done by Oreg and Gefen,⁴ who were the first to study systematically the effect of strong electron-electron interactions on the phase slippage in the quantum dot.

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Shtrikman, *Phys. Rev. Lett.* **74**, 4047 (1995).

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4. Y. Oreg, Y. Gefen, *Phys. Rev. B* **55**, 13726 (1997).

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Call for Emission Limits Heats Debate on Global Warming

I would like to follow up on your last major story regarding the controversy about global warming stemming from last summer's publication of the "Second Assessment Report" (SAR) of the Intergovernmental Panel on Climate Change (IPCC) (PHYSICS TODAY, August 1996, page 55). Your story focused on the disputed text changes made in the SAR's chapter 8 ("Detection of Climate Change and Attribution of Causes") and reflected the fact that, until then, the controversy had centered on the changes themselves—their legality, authorship, purpose and importance.

After you went to press, however, a far more serious problem arose when statesmen at the July 1996 conference of parties to the UN Climate Treaty in Geneva accepted as a basis for urgent policy action the IPCC's main conclusion, derived from chapter 8, that the "balance of evidence suggests . . . a discernible human influence on global climate." This innocuous-sounding but ambiguous IPCC phrase—which appears to have been based mainly on two research papers by Benjamin Santer *et al.*¹ (Santer was the convening lead author of chapter 8)—was misinterpreted by the Geneva meeting attendees to mean that a major climate catastrophe is upon us.

A "ministerial declaration" by the US and like-minded nations issued at that meeting called for amendments to the current treaty that would mandate "legally binding targets" for emission limits to carbon dioxide—and in effect constrain the generation of energy. Such global controls on energy use would have serious economic consequences, impacting mainly on the world's poor.

In announcing this drastic shift from the current voluntary policies, US Undersecretary of State Timothy Wirth declared, "The science calls

upon us to take urgent action." He then issued a warning—presumably based on his interpretation of the SAR—about such dire consequences as regional famine, water shortages, flooding of coastal areas, and the spread of malaria and other diseases. Trying to marginalize scientific critics of the SAR, Wirth referred to "dissent from a dwindling band of skeptics," even though about a hundred atmospheric scientists had signed a declaration following a November 1995 conference held in Leipzig to discuss the evidence for global warming. The signatories had declared that they could not support "the so-called 'scientific consensus' that envisages climate catastrophes and advocates hasty actions," that the UN Climate Treaty was "unrealistic" and that any restriction on energy use that inhibits economic growth "should be viewed with caution." (Text is available on the World Wide Web at <http://www.his.com/~sepp>.)

Most scientists would not object strongly to the IPCC phrase about "discernible human influence." We have known for some years that the stratosphere is cooling,² the diurnal temperature range has been decreasing,³ the frequency of hurricanes has been diminishing⁴ and so forth—quite possibly as the result of some human influence. It is unfortunate, however, that the IPCC's Summary for Policy Makers (SPM) juxtaposes that particular phrase with the results of unproven climate models predicting a temperature rise of between 1 °C and 3.5 °C by 2100. In fact, though, the SPM presents the underlying facts selectively, fails to validate climate models and should not be used to deduce anything at all about "climate sensitivity" and future warming.⁵

The ministerial declaration specifically, and improperly, links the IPCC phrase about human influence to a temperature increase of 2 °C by 2100—a serious misinterpretation of the IPCC report and of climate science. It will be a test of the scientific integrity of the IPCC—and of the scientific community as a whole—to make this fact known to the world's policymakers.



How much do you want for this weapons-grade plutonium?

References

1. B. D. Santer *et al.*, *Climate Dynamics* **12**, 77 (1995); B. D. Santer *et al.*, *Nature* **382**, 39 (1996).
2. See, for example, R. W. Spencer, J. R. Christy, *J. Climate* **5**, 847 (1992).
3. See, for example, T. R. Karl *et al.*, *Bull. Am. Met. Soc.* **74**, 1007 (1993).
4. See, for example, C. W. Landsea *et al.*, *Geophys. Res. Lett.* **23**, 1697 (1996).
5. For a discussion of the SPM's flaws, see, for example, S. F. Singer, *Science* **271**, 581 (1996).

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Need for Unity in Physics Prompts Call for Changes in *PT*

I commend the American Physical Society and the American Institute of Physics for recent efforts to reach out to all segments of the physics community. Such initiatives as the Forum on Industrial and Applied Physics and *The Industrial Physicist* are steps in the right direction.

Especially in this time of rapid change in national priorities, it is essential that physicists from industry, academia, government laboratories and other organizations work together to promote physics within society. We can no longer afford professional associations that cater only to research university and Federal government scientists.

To further the cause of unity, I suggest that the subject matter of *The Industrial Physicist* be integrated into PHYSICS TODAY and that, in PHYSICS TODAY itself, the "Washington Reports" and "Physics Community" sections address issues of interest to all segments of the physics community. Focusing on proposed cuts in university science while largely ignoring massive industry layoffs projects a less-than-ecumenical image.

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Fundamental Law of Problems Is Traced to TV Reporter

Pacific Northwest National Laboratory's Gerald Stokes is quoted in Toni Feder's "Physics Community" story on radioactive waste (April, page 56) as saying, "The Hanford site is a series of problems that are previous solutions." This is a specific example of a fundamental law—Sevareid's law—that is largely unknown: "The chief source of problems is solutions."¹

We teachers need to be more aware of this important law, and we need to help our students understand its full implications.

Reference

1. Eric Sevareid, speaking on CBS News, 29 December 1970; quoted in T. L. Martin, *Malice in Blunderland*, McGraw-Hill, New York (1973).

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Corrections

July, page 72—Thermionics Northwest's location (text column two, line 26) should have been given as Port Townsend.

July, page 73—The capacitance design of MKS Instruments' new switches provides an accuracy of 0.5% of full scale, not 5% as stated (text column one, line 8).

June, page 37—In the table in box 2, the listings for nitrate and nitrite stored at Hanford were inadvertently switched. There are, in fact, 106 000 metric tons of nitrate (NO₃) and 9400 metric tons of nitrite (NO₂).

June, page 92—PNPI USA Corp's zip code (text column one, line 12) should have been given as 77036. ■