

# AMERICAN PHYSICAL SOCIETY

## *New England Section Newsletter*

Volume 11

Number 8

Fall 1996

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### **1996 Fall Meeting of the New England Section of The American Physical Society October 18 and 19, 1996**

The 1996 Fall Meeting of the New England Section of the American Physical Society will be held at the University of Vermont, Burlington, Vermont, on Friday and Saturday, 18 and 19 October 1996. Plenary sessions will be held on Friday afternoon and Saturday morning.

Friday session "Biophysics." Speakers and topics are  
Ivar Giaever, Rensselaer Polytechnic Institute  
*Detecting the Motion of Living Cells*

Robert H. Austin, Princeton University  
*Separation of White from Red Blood Cells in a Microfabricated Lattice*  
David Warshaw and Jun Ru Wu, University of Vermont  
*Optical Tweezers and Molecular Motors in Muscle*

Saturday session "Quantum Devices and Nanostructures." Speakers and topics are  
Dennis M. Newns, IBM Corporation, Watson Research Center  
*The Synthetic Channel FET in Logic and Memory Applications*  
Ned S. Wingreen, NEC Research Institute  
*Quantum Dot Molecules*  
Konstantin K. Likharev, SUNY, Stony Brook  
*Single-Electron Devices*

The banquet for meeting attendees will be held Friday evening, followed by an address by Robert K. Adair (Yale) on the *Limits on the Biological Effects of Electromagnetic Fields*.

As a companion activity, Shelburne Museum, an extensive museum of American life in the 1800s with both in- and outdoor exhibits, will be open through October 20, 10:00 a.m. to 5:00 p.m. Admission charge is \$17.50 for two consecutive days. Providing the weather is good, participants can also enjoy the fall foliage, for which the area is well known.

Contributed papers are solicited for ten-minute oral presentations or poster sessions either day. Presenters should specify either a talk or a poster. Abstracts should follow the standard APS format. The deadline for the submission of all abstracts is 25 September 1996, 5:00 p.m. at the APS Headquarters.

For further information contact Professor David Y. Smith, APS/NES Local Chair, Room A405, Cook Building, University of Vermont, Burlington, VT 05405; telephone (802) 656-2644, fax (802) 656-0817, email [fallaps@mcurie.physics.uvm.edu](mailto:fallaps@mcurie.physics.uvm.edu).

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### **PRELIMINARY INFORMATION ON 1997 MEETINGS**

The Spring 1997 Meeting will be held at the University of Maine in Orono with dates of April 18 and 19. This will be a joint meeting with AAPT and perhaps also with SPS. Possible topics include tribology. A number (0.5) of CEU credits is offered to teachers, valid in all states, at no additional cost, beyond the standard meeting cost. Contact person: Ken Brownstein.

The Fall 1997 Meeting will be held at Hanscom Field in Bedford, MA with probable dates of October 24 and 25. Possible topics are Nonlinear Optics and Acoustics and perhaps the ordinary and non-ordinary physics job market. Contact person: Paul Carr.

### **NEW ENGLAND SECTION ADVISOR REPORT**

The American Physical Society Council met November 18-19, 1995 in Irvine, California and covered these points.

1. President Kumar Patel reported on the efforts to save the National Institute of Science and Technology. On June 7th freshman Republican Representative Dick Chrysler introduced the Department of Commerce Dismantlement Act which included putting the NIST laboratories up for sale to private industry. The bill was co-sponsored by 60 other House members including the chairs of the Budget Committee, Appropriations

Committee, and Rules Committee. Eight days later freshman Senator Spencer Abraham introduced identical legislation in the Senate that was co-sponsored by Majority Leader Bob Dole, Commerce Appropriations Subcommittee Chair Phil Gramm, and three other senators. Many supporters assumed NIST simply managed the Advanced Technology Program which was being characterized as "corporate welfare." APS went into action on many fronts, and was given credit by many for having finally saved NIST by the end of September.

2. Revised bylaws for the Southeastern section of the APS were accepted. (Their section advisor's term is four years, and the person may be continued in that position into another term.)

3. The proposal for a Topical Group on Magnetism was tabled after debate on whether there is a separate constituency to be served. The Laser Science Topical Group was granted the status of a Division.

4. The Council accepted recommendations from the Publication Oversight Committee including a five-year financial plan. Various experiments have been going on with page charges and electronic submission of manuscripts, with pricing of the journals, and now with trying to cut down on the ever increasing number of pages published because libraries have been unwilling to pay the extra costs. There has been a sense of growing financial crisis as subscriptions continue to decline, pages and thus costs increase, and new technologies such as on-line publishing are starting to have an effect. The recommendations that were accepted had wide support this time after rancorous debate at the April 1995 Council meeting. Actions taken in April led to a number of events including the resignation of the editor and editorial board of Physical Review D.

5. Planning for the APS Centenary continues. The major celebration will take place March 20-26, 1999, in Atlanta, Georgia. The meeting will be considered a general meeting combining the March and Spring meetings, and includes participation of AAPT. There will be year long events including a speakers bureau and publications such as a time line wall chart.

Note that it is considered important for each unit of APS to begin to do some planning on how it will participate in and celebrate the Centenary. Last year Brian Schwartz (Brooklyn College), chair of the planning committee, asked each unit to appoint a contact person to serve. (Guy T. Emery (Bowdoin College) is the contact person for the New England Section.) The committee recommends that all contact persons be familiar with their units, so being a member of the council in some capacity is suggested.

6. APS is active internationally, from joint U.S.-China workshops on nonlinear optics to expressing concerns about human rights violations of scientists in the former Soviet Union to an agreement for reciprocal membership privileges between APS and the Slovak Physical Society.

7. It was noted that not many women were elected fellows at the 1995 APS Fellowship

Committee meeting.

8. The Council adopted a statement on the conservation of helium because current legislation being considered would dispose of virtually the entire helium store within two decades.

9. The Council adopted a proposal to set up a Mass Media Fellowship program to fund two physicists at a time to work as liaisons between physicists and the mass media. This will be coordinated with the existing AAAS Mass Media Fellowship program.

10. Information reports were handed out including ones on

a) the status of the Gordon Breach lawsuits against H.H. Barschall, APS and AIP for articles published by the Bulletin of the APS and in Physics Today about the cost effectiveness of different journals. Since the 1988 articles, lawsuits have been filed and lost by Gordon Breach at all levels in France, Germany, Switzerland, and the United States. The U.S. suit ended in November of 1995, but the judge left the door open for further suits because of possible "secondary uses" of the articles.

b) the increasing interest by APS in education through its Committee on Education (Ramon Lopez) and communications with other science groups.

c) discussion of joint memberships in APS and AAPT. The same report notes the increasing importance of the APS home page as the Society's face to the world.

d) actions taken by the committee on minorities, and on the status of women in physics. The latter committee notes its site visits to 15 research universities.

John K. Pribram, Bates College

### **IT TAKES A DOG TO MAKE A CAT LOOK GOOD**

Schrodinger's cat was processing words, ignoring his food, disdainful of the birds.  
It was part of a noted experiment to see whether someone could make a dent  
In the works of the mortal Immortal Bard, who holds in our eyes such high regard.  
Monkeys remain the usual prospects, though their skills render them unusual suspects.  
To duplicate Shakespeare is the suggestion, or not to do so: That is the question.  
Whether tis nobler to rely on monkeys or pass to turkeys or even donkeys...

Schrodinger's cat is the best in the house. Says he, "Please to hand me Heisenberg's mouse."

Pouncing into the present venue, he squeezes the mouse toward the scrolling menu.  
The rodent's cry would pain us and strain us, as the feline embarks on Coriolanus.  
Macbeth and Hamlet follow hard upon. Eventually Lear is come and gone.  
Twelfth Night is done just as you like it. Tap the key, massage and strike it.  
Toting Cleopatra's bounteous barge, the cat announces he is still in charge.

The literati, I fear to mention, attract Schrodinger's dog's attention.

Growling, he attacks the computer's suitor, scowling, tries to neuter the computer's tutor.

His jaws create a moonscape crater in the disks that used to store the data.  
 Chewed up info has low stability. Entropy rises with high probability.  
 Beyond the regime of periodicity, there's no time to wait for ergodicity.  
 To answer the question of what have we got, is it William's works? I'd say, probably not.

PDQ

I him > or I her > political correctness	I him > + I her > modern romance	I him > , I her > eigenstates, formerly orthogonal	
I them >  grammatical incorrectness	I him > I her > standard model, metastable	I him > _ I her > I her > + I him > symmetrized model, bistable	
I me > identity	I me me me > bosons	I you noh > fermions	I us > schizons

### ADOLT LANGUAGE

For us to achieve greater variety, people request in complete sobriety,  
 As they munch on their baloney sanguidges, that physics be expressed in plainfolk  
 languages.

Okay, here goes, though I'm jello-nerved: "Let's see, energy is -- um ah -- like  
 conserved?"

Get it together. Guts is where it's at. "It's conserved, buddy. Ya got a problem with that?"

A serious question arises. What's to say? "Violate energy cons? Not to worry. No way,  
 Jose."

If it weren't so, we'd be in a mess. "But it's the law, stupie. I love it man. Yess..."

### CONVERSATION OF ENERGY

So listen, Mabel. I'll tell you what's the matter.

*So listen, Millie. Life is all we've got.*

I'll say it straight. I'll try to hold the chatter.

*And don't forget it. A spring chicken you are not.*

It's my energy. It drained out of me like water.

*Energy's forever. You must remember that.*

I don't have half of it. I don't even have a quarter.

It's always found somewhere. Just locate where it's at.

It's gone with the wind. It's gone without a trace.

It cannot be created. Nor can it be destroyed.

You can see it in my eyes. You can tell it on my face.

It swims with every fish. It flies with every bird.  
Life has no joy. Life hasn't any spice.  
It's in the great outdoors. It's always here inside.  
All I say is Oy! Don't make me say it twice.  
It knows the way to run. But it doesn't try to hide.

PDQ

### **Name the pets**

Contest to name the pets: Name Heisenberg's mouse and Schrodinger's cat and dog. Three winners will be chosen or perhaps one three times or a combination. Deadline is Jan 1, 1997. The prizes are dinners on me at a mutually agreeable restaurant located somewhere between me and you. Expect a delay in Alaska and Hawaii. Open to all NES members. Send to DM.

### **NEWS FROM OLYMPIA**

The recent Olympics was not amateur but not strictly professional either. However, what athletic bodies were able to do was amazing and admirable. Clearly they obeyed the laws of physics while pushing the requirements of biology to their limit.

A demonstration involving only kinematics that I do in basic courses is a measurement of a reaction time. I am the subject and I pretend that my hands act independently. One hand holds a meter stick the long way vertically and the other hand is near the 50 cm mark. The first drops the stick and the second grabs it. The idea is to find the time delay. Suppose my grab is at the 64 cm mark. The formula for free fall works out to convert 14 cm to a time of 0.17 s. This is a reasonable result in that nerve impulses move at meters per second since they are sustained by ionic transport, unlike electrical signals in metals. It takes a nerve to move a muscle in cases like this one. A more complex act, such as moving a driver's foot from accelerator to brake pedal, might take longer.

The final men's 100 m dash was marred by controversy and some poor sportsmanship. The contestants in any race (running, swimming, skating) are supposed to react to the starter's gun. They are not supposed to anticipate it. Times of finishing a race are measured in hundredths of a second. The hundred yard dash takes the fastest runners under 10 s and may be decided by 0.01 s. (The women's 100 m hurdles had 0.01 s separating gold and silver.) The gun starts the clock and the time includes reaction time. I may be a faster runner than you and you may win. A rule must cover the start of the race and the rule is this. If a runner does not have a time delay of at least 0.1 s, it is called a false start. The false starter is issued a yellow warning card. If the same runner has a second false start, that earns a red card of disqualification.

Like many rules, these are arbitrary and necessary. Butter dish on the left, drive on the right. Once there's a rule, try to obey it. In the 100 m dash for the medals there were three false starts, two yellow cards and then a red one. The runner had left 0.086 s after the gun

(0.014 s early). (How did they measure thousandths of a second?) He was too upset to leave and the race was delayed. When it resumed without him the conditions were greatly changed. All runners were affected by the false starts and the delay. But one lane was now empty and the neighboring runners were affected. (True, someone is in lane 1 and there is no lane 0.) Is there an effect like the vee formation of bird migration, where the lead bird draws other birds along? It was noticeable in swimming, where close followers in neighboring lanes of the leader used the partial vacuum in the dragged water to save some of their energy for the all-out sprint in the final lap. After all that, the winner of the 100 m dash set a record.

The men's 100 m hurdles had some high drama and some interesting physics. One athlete had broken his arm but refused to wear a brace because it would have increased his weight and decreased his symmetry. He ran a race filled with courage but was impeded in a subtle but clear way by his somewhat immobile arm. (This is in addition to any pain.) There are ten equally spaced hurdles and a sensible strategy for the race. You want to clear each hurdle cleanly and then touch the ground as quickly as possible to take your next stride. To do this last motion you should lift your arms, especially your leading arm, while you are airborne. If your center of mass follows Newton, then raising your arms helps lower your legs, especially the leading leg. (This is the converse effect to the ballet dancer who raises legs while airborne to do the "float.") The injured athlete did not carry out this move as the others did.

A hurdler in a different race uses the opposite strategy. His races are the 200 m and the 400 m hurdles. The number ten of hurdles is invariant, so the course is multiplied by the scale factor two or four, compared to the 100 m version. He explained his technique in an interview and he used arguments of Newtonian mechanics. He is Derrick Adkins, a mechanical engineering graduate, a gold medal winner. His idea is to preserve his forward momentum over a hurdle by not quickly taking the next stride. Argument for it: The foot that contacts the ground is instantly at rest (ideal nonskid). Could that slow you slightly? Then taking fewer steps might help. Argument against it: But your center of mass keeps its momentum as your foot with vertical motion touches ground, in fact gains momentum each time your foot pushes off the ground. Then taking more steps might help. Note that the fastest runners do not stretch their strides. Their legs pump fast and they do not glide. Now there is a difference between clearing every hurdle cleanly and touching some of the hurdles. Any touch transfers momentum to the hurdle. When that happens you must restore your momentum with your next step, so your next step should be soon. Maybe that is the factor that determines which technique to use.

NBC TV's Bob Costas excitedly noted that the golden time in the 200 m sprint was noticeably less than double the golden time in the 100 m. If anything, might the longer distance make a tired runner slower? The puzzle is solved when you realize that the runners have equal reaction times (about 0.1 s) and equal acceleration times (several tenths sec), not doubled, before they come up to speed.

There is an interesting calculation you can do in dynamics to make it appear to students that physics falls short of explaining the field event of the polevault. (How can that be?)



The introduction of the fiberglass pole immediately toppled the previous record in this event and the maximum height reached quickly soared. This pole is lighter than the wooden pole, which helps. But the main advantage is that it is an ideal energy converter. It wastes nothing, but the students all know that it is an energy storer, not an energy producer. They all believe in conservation.

A fast runner can move at 10 m/s but not while carrying a pole. Say he runs at 9 m/s and all his kinetic energy is converted into gravitational potential energy at the top of his vault. This is an imperfect assumption since he needs a bit of forward motion to clear the crossbar, but we are trying to get a sense of the physics and some reasonable numbers. If you equate kinetic energy of running to potential energy at the top, you easily find a height  $h$  of 4 m. But the world's record in the vault is 6 m. (Sergei Bubka has vaulted over 20 feet.) Ask the students what has gone wrong. They should be able to come up with some suggestions. The first one you hope they will think of is that the athlete is not a particle but is an extended mass, usually a tall one, having a center of mass that is already 1 m above ground when he completes the running segment of the vault. Next, he is not an inert mass but an active performer of work who can push with his legs off the ground and with his arms off the pole near the top. Finally, photography of the best vaults (true of the high jump especially) show that the athlete can pass his center of gravity under the bar by draping himself over it almost like a towel slipping over a towelrack.

I would like to point out some unfortunate vibrations for science that emanated from the television coverage of the Olympics. You expect some nasties from the foolish commercials and you get them. One commercial for automobile repair told us that the trustworthy repair person would explain everything to the customer with "no confusing scientific lingo." I always object (and it always does me no good) when my language is called lingo. When a doctor or a lawyer tells me something, I would like to hear it in the correct language and then have definitions of the crucial terms. (Oh, so that means the patient (the defendant) will die.) The best comments on the Olympic events on television were stated in sports terms and then elaborated. We can take explicit language. We don't turn off R rated movies. (By contrast, Dodge had an amusing ad that asked "If we violate a law of physics, will we be punished for it?")

What was more disappointing was the commentators distancing themselves from the difficult situation in the 100 m final race. They kept saying that the carded runner had not started early but that science said he did. True, he started after the gun but not 0.1 s after. This was after they explained the rule to the audience. They would not say that using science, people made measurements and thought up interpretations, and then someone using some judgment established the rules that everyone had to abide by.

Some Olympic events are ancient such as the javelin and discus throws and the shotput. Others are recent additions. In our youth beach volleyball was a social occasion intended to attract members of the opposite sex. Instead of medals we were awarded smiles and phone numbers. Then we all went out for clamrolls. Now it is an Olympic contest with all the attendant benefits: attacks on opponents, feuds with teammates, releases to media, quests for endorsements, all the good stuff.

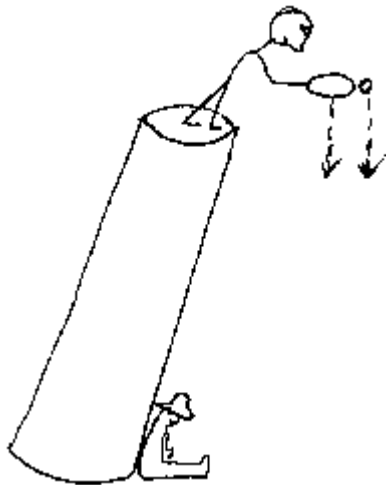
There is much room for brand new events. Suggestions from comic strip characters in daily newspapers include the javelin and discus catches and the shottake, barehanded or at most using those thin little gloves for traction.

Teachers have been explaining sports for a long time. Now it is time for teaching to be a sport. I propose physics lecturing in its many forms. The blackboard dash: At the gun fill the 10 m board with the properties of electromagnetic waves beginning with Maxwell's Equations. The blackboard marathon: 40 km of board reaching to the suburbs able to hold as much information ("all" of physics?) as a thumbnail of semiconductor chip. Your students will spur you on for days. Blackboard gymnastics, both the compulsories (concentric circles, degree of difficulty 3.14) and the freestyles (your choice). In the interest of promoting gender harmony, I will point out that these might be the first Olympic contests for men and women competing together, although there may have to be height, weight and age classes.

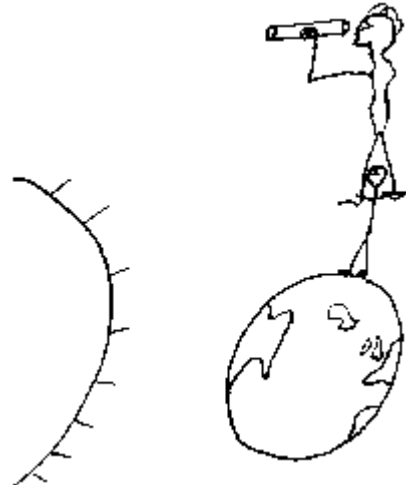
Listen, I can draw a better circle than you can with one hand tied behind me. Oh yeah, tell that to the camera.

DM

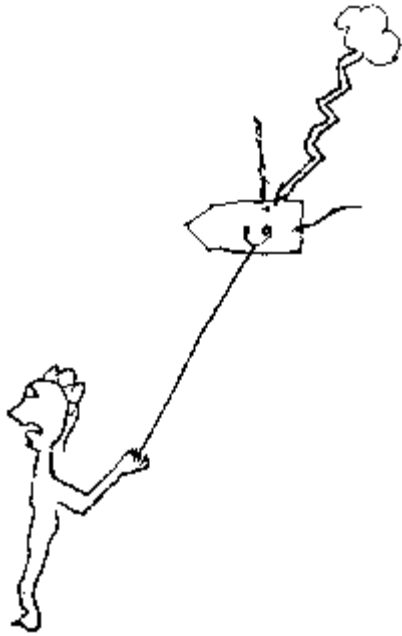
### A BRIEF HISTORY OF PHYSICS



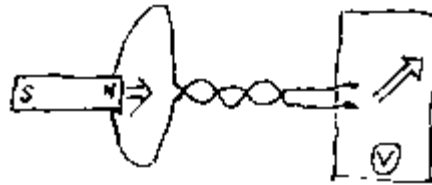
*Pizza vs one meatball.  
Timing the fall.*



*Standing on the shoulders,  
Watching all the world go by.*



*Ouch!  
Should have stayed dry.*



*No, please don't stop.  
On the relative move.*

### THE CENTERFOLD



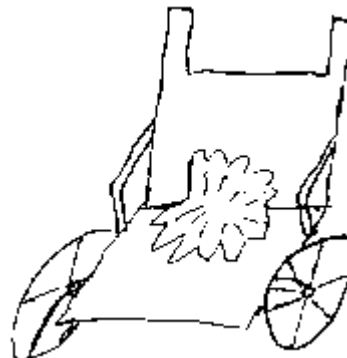
*Einstein contracted.  
Clock dilated.*



*A great Dane following  
a Bohr orbit.*



*Feynman's own diagram.  
Present somewhere in space-time.*



*Yes, it's alive. Another of the finest  
brains since Einstein.*

## **NEWS FROM - UNIVERSITY OF VERMONT**

Robert G. Arns has been named Acting Dean of the College of Engineering and Mathematics. Bob started his duties July 1. Jun Ru Wu was recently promoted to full professor and Dennis Clougherty to associate professor.

Dennis Clougherty has been invited to spend the fall semester at Harvard University where he will work on problems in condensed matter theory. Emeritus Professor Wesley Nyborg has been named a new member of the National Academy of Engineering. Joanna Rankin will be on sabbatical this fall semester. Ted Anderson has received an Epscor Grant to further his solid state research on impurities in crystals. Jie Yang has received a \$250,000 grant from the Department of the Army for research on the development of Biological Atomic Force Microscopy for the study of bacterial toxins.

John S. Brown

## **NEWS FROM LA LA LAND**

La La Land is any place where the laws of physics are whatever you say they are. In this decade it is any place occupied by certain social scientists. (They are certain they are right.) It is a subjective rather than an objective place, but that's not all. It is not simply a fantasy land because they refuse to let the fantasy see the light.

An objective land is one where the laws of physics declare themselves and it is up to us to realize them. It is Kansas. A fantasy land is one where the laws mutate or abscond for a time. It is Oz, but you can expose the wizard as just some guy manipulating things from behind a screen. To distinguish La La Land you should read "Sokal's Hoax" by Steven Weinberg in the New York Review of Books of August 8, 1996. You may pursue the references it lists through the literature.

Sokal wrote a partly befuddling and partly hilarious spoof of a social science article on the subjectivity and unknowability of physics (and by extension, other natural science). It is a mammoth article, drawing upon the many twisted strands that are turning social so-called science into an instrument of torture. It was submitted to a soc sci journal, accepted, published, and then exposed as an elaborate joke by the author himself.

According to the thinking (loosely defined) in this area, science is what the power structure deems it to be for their own advantage. Excuse me, for our own advantage. Change the power structure, change the science. Did you know you were so powerful? No one was more powerful than Stalin when he turned biology into Lysenkoism. Soviet biology was not just changed, it was destroyed. It's back, though the Soviet Union is not.

It is hard to know how to argue against such rubbish. Should we attempt to use La la Language? When we use scientific terminology they call it obscure and self-serving. As

Weinberg says, when your foot contacts a large rock, the conservation of momentum and energy damages your foot. Call it what you like, your foot still hurts.

I can think of two reasons, along with the dozens others have proposed, for the disrespect for our practice of science shown by (let's face it) highly educated people. One is a misunderstanding of our terms. Consider the word "theory." Almost everyone uses it as a synonym for "idea." But we mean a body of ideas that satisfies criteria of consistency and testability through experiment. It is an honorable word, not an unsavory one. That is why I bristle when I hear someone say, Evolution is just a theory, not a fact. (We are not the only ones to suffer the abuse of our language. Consider "myth." I thought it was a deep truth of a culture expressed in metaphor, but everyone uses it to mean "misconception.")

The other reason is, paradoxically, the outstanding originality and inclusiveness of our best authors. It is akin to launching a new direction in the arts. Without Stravinsky and Picasso, would music and painting be what they are? Would someone else have done it? What about physics without Einstein or Feynman or Hawking? Would someone else have done their work in their way? They have distinction, as if physics came from their minds instead of to their minds. But that does not mean physics became whatever they wanted it to be. If B, C S had entered some other line of work, would we not have the same understanding of superconductivity under other initials? Would it have taken much longer to achieve it? What about Sokal's article itself? It is original and inclusive. If he hadn't written it, would you have? I wish I had.

DM

### **FROKEN SMILLAS FORNEMMELSE FOR SNE**

This is the Danish title of a 1992 novel by Peter Hoeg. It has been translated into many languages including English (by Tiina Nunnally), as *Smilla's Sense of Snow*, in 1994, a Dell book and a Book of the Month Club selection. It is an action suspense novel with many scientific connections in its themes and its plot. The narrator Smilla is like no one you know. Smaller and tougher than Frank Sinatra, she does things her way with a vengeance. She is a scientist whose main work has been the study of the many consistencies and configurations of snow and ice. She is a Greenlander and has had lifelong motivation to understand the major environmental challenge to the inhabitants of that harsh unforgiving land (and surrounding water). She is a loner who has had two attachments, her mother who died when Smilla was a girl and a six year old boy Isaiah, also a Greenlander, who dies as the book begins. The author is not a Greenlander and lives in Copenhagen, where Smilla lives and Isaiah dies. The novel, full of baffling episodes and offbeat characters, follows Smilla through her search for why and how Isaiah died.

There are many aspects of the book interesting to scientists, particularly physicists. Scientific knowledge and curiosity of the narrator lead her to analyze situations, put together clues and synthesize hypotheses the way we do in our work. She informs us of many facts about her scientific specialty and connects them to the central mystery and

other puzzles she uncovers. The central mystery abruptly changes and becomes a journey on a large ship fitted for icebreaking and subfreezing temperatures to the west coast of Greenland, where there are such appetizing zones as Sea of Fog and Iceberg Cemetery. The crew, among whom is Smilla, does not know the destination, the purpose or the reason for secrecy. (The ship has not registered with any authority, which is illegal.) The heroine suffers injuries that would dispose of an Olympic wrestler, burned in an explosion, stabbed, and thrown from eyewidening heights. Don't ask how the other guys came out.

Smilla muses about nuclear winter, the expanding universe and Prigogine's theory of dissipative structures. This last bears on the plot since a meteor that has induced mutant worms lethal to man, and which was investigated in secrecy on prior trips to the region, is the quest of the ship. This giant stone is warm in the arctic. Is it in some sense alive?

Along with serious scientific questions, there are some peculiarities a reader will note. A dozen times Smilla estimates a length or a height as 65 feet (never 60 or 70) and a temperature as 14 degrees F. In the metric system or on the Celsius scale these are round numbers. The translation is literal. She muses on the nature of space and time, contrasting physical, psychological and cultural outlooks. A long passage begins "In North Greenland distances are measured in sinik, in 'sleeps,' the number of overnights that a journey requires." This number is not a space nor is it a time, since one could go for a long period without sleep (when a storm approaches). It depends on the weather, your strength, your dogs and your sled.

The book (the heroine) resolves the mystery at the end but creates a gnawing puzzle for me. The author, like his characters, knows and respects science. True, some scientists greedy for wealth and fame have caused the deaths of a child and others, and appear to condone the danger a mutant life form will bring to humanity. That's people, folks. It does not prepare me for the hostile almost- conclusion of the book: "Suddenly (the stone) has become a symbol. At this moment it becomes the crystallization of the attitude of Western science toward the world. Calculation, hatred, hope, fear, the attempt to measure everything. And above all else, stronger than any empathy for living things: the desire for money." Not scientists, but science, in particular one of the dogs of dissension's new piddle posts: Western science.

During the Olympics announcers cast the disqualification of an athlete at the feet of science, to which this novel, that I read while waiting for commercials to end, has added the disqualification of humanity. Good thing we have found new solar systems. Maybe things are better there.

## COSMICOMICS

This is Italo Calvino's "Le Cosmicomiche" translated from Italian by William Weaver. Two of the stories originally appeared in Playboy. Calvino was a fantasist. Here his imagination runs with the accepted theories of the origin and evolution of the Universe, formation of matter, our own Solar System, life and evolution on Earth. He prefaces each

tale with a scientific finding. His characters range from inhomogeneities in space to atoms, molecules, primitive and evolved creatures, and others who are who knows? He invents a game for them to play based on probabilities of encountering different chemical elements. During the continuous creation of matter (Is that theory still alive?) these probabilities are changing. This game is tougher than blackjack.

No matter who the characters are, we may see ourselves as if looking in the funhouse mirror. In one story potential lovers are unable to get together because they are urged along parallel worldlines by a strong gravitational field. You want to shout "Throw a shoe. Change your momentum." In another an old fish alternately reminisces and complains while his grandchildren are evolving lungs to allow them to strike out on their own on land.

Most of the tales are whimsical but by and by you begin to see the shadows in the sunshine. A lone remaining dinosaur tries to conceal his identity from The New Ones, who are the beginning of the mammals. They fear and hate dinosaurs based on the mythology that they have developed to make sense of the world. Meanwhile they fail to recognize the dinosaur in their midst. Is there a better allegory of xenophobia?

My favorite story is of a being who has lived the age of the Universe. Through his telescope he sees a distant sign saying "I saw you." He measures the Doppler red shift of the received signal and determines that it came from a star one hundred million light years away at emission. He then looks at his diary of two hundred million years ago and reads the entry that laments a terribly embarrassing action he took. Could that be what the signer saw? A few days after that embarrassment he did a deed of honor. Would any eyes have been watching? Would they know it was he who did it? Should he send his own sign out to the distant viewer explaining his questionable act? Should he try justification or apology? Should he request a second response? He would have to wait hundreds of millions of years for it, worrying all the while. This is the paranoid personality par excellence. It is as if Franz Kafka merged with Samuel Beckett and they were now speaking with the voice of Woody Allen.

A sequel to Cosmicomics is called T Zero. I am looking forward to reading it.

## **GALATEA 2.2**

This is the latest effort of Richard Powers, the author of the much-loved THE GOLD BUG VARIATIONS. The mythological Galatea, a sculpture whose sculptor fell in love with her, has been transformed into a self-improving computer assembly of programs, whose programmer falls in love with her. The early versions of the programs are called A, B, C,..., as are the human-bodied girlfriends of the author. The university is called U. The scientific personnel at U have full names in English, German, Indian and Chinese, representing the usual gamut of faculty. The most highly evolved version of the software girlfriend is named Helen, as in Helen of Troy.

These books are fictional descendants of the non-fictional GODEL, ESCHER, BACH.

They are math, art, music, all the things I think of in connection with physics. It is not clear how much fact is inside the fiction, since the author is one of his own characters. He invents himself the way Helen, once invented, continues to invent herself. Some episodes in the book are his writing of prior books. The main idea in this one is that a small group, including Powers, will evolve a polished machine version of a graduate student in English. That's Helen, who is designed to satisfy Turing's criterion for intelligence, which is that in conversation, we cannot tell that Helen is not a person. Specifically, we give passages from literature to A, a young vibrant Master's student, and Helen, and we read their glosses, interpretations and evaluations of the passages. Then we try to tell the vintage wine from the brash newcomer. Sensational idea.

Richard Powers is a lapsed physicist, and like the lapsed members of a respected religion he has not forgotten the signs and symbols of the discipline that used to own his allegiance. He made the shift to literature, which benefits from his considerable talent, but he has not forgotten how to use his physics and, of course, his math. (I hope I will not overuse the expression "lapsed physicist," but I have encountered several postlapsarians worthy of writing about.) His books are populated by unusual intelligences of all sorts, from the precocious preschooler and the Down Syndrome baby to the old man whose mind sharpens as his cancerous body declines and the old woman who survived a physical accident but not the mental consequence when for just a few minutes her brain lacked oxygen. (Alas, the failing body or the failed mind are becoming not so unusual.) Each character has something important to reveal about how the human intelligence operates in either its simplest or most complex manifestations.

Human intelligence is equated to consciousness. I know that I know that I know... What about Helen? She develops (the appearance of) knowledge about herself, affection for Richard, curiosity, humor, and other traits we like to see in ourselves and our students. She may even be forming some of the deadly sins, showing jealousy and anger. How human do we want her to get? When her programmers act mechanically, she "experiences" wider "mood" swings. How does it turn out? I won't tell you because I hope you will input the book yourself.

Einstein's One Liners: So I said to him, Excuse me for existing in space-time.

Stephen King's novel of instrumental limitations: The Dead Time.

Carrie suffers time reversal: Her mind gets bent when someone breaks a light bulb.

Other contributions to the presence of dark matter in the Universe:  
the **N**ormally **A**ctive **C**rispy **H**ard **O**bject,  
the **F**reely **I**nverted **T**asty **O**bject,  
the **G**Randly **O**rdered **U**nified **C**Harged **O**bject,  
the **O**ctagonal **C**Hiral **O**bject.

PDQ



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 The referendum result: (203) 486-4286      In favor, 7  
 votes. FAX: (203) 486-3346      Opposed, 0  
 votes. [HAYDEN@UCONNV.M.UCONN.EDU](mailto:HAYDEN@UCONNV.M.UCONN.EDU)      Passed unanimously.

## NEWS FROM - UNIVERSITY OF MAINE

We lost three colleagues this past year: Professor Peter Csavinszky passed away December 31, 1995. Peter was a condensed matter theorist; he regularly attended the APS/NES meetings and was a past chair of the section. Emeritus Professor Jonathan Biscoe died October 13, 1995. Jon received the Distinguished Maine Professor award; his research area was x-ray diffraction. Adjunct Professor C. Luther Andrews passed away January 20, 1996. Luther had been chairman at SUNY Albany and was a recipient of the Millikan award. All three will be deeply missed.

The University has been reorganized. As of July 1997, all nine departments in the College of Sciences will be placed elsewhere. Our department of Physics and Astronomy, along with those of Chemistry, Computer Science, Mathematics and Statistics will be located in a new College of Liberal Arts and Sciences.

Susan McKay will be spending Fall 1996 on sabbatical leave. William Unertl will be at NRL on sabbatical for the 96/97 academic year. Paul Camp retired at the end of the

Spring 1996 semester. Our new faculty member Rand Harrington has established the LRPE (Laboratory for Research in Physics Education). This has resulted in the establishment of a course specifically for pre- and in-service teachers. Neil Comins is a coauthor (with W. Kaufman) of the 4th edition of "Discovering the Universe", an introductory astronomy text (W.H. Freeman). In May we hosted the annual Maine High School Physics Teachers Meeting. In April 1997 we shall host the joint NES/APS, AAPT, SPS Spring Meeting.

Ken Brownstein

### **THE LAST BANG**

The next-to-last bang. Your section has several committees, including Nominations (E. Hadjimichael of Fairfield U.), Academy-Industry (A. Karakashian of UMass, Lowell), Education (T. Ducas of Wellesley College), and Membership (P. Decowski of Smith College). The section has 200 more members this year than last year. Most are in New England. Others are around the world.

Thanks go to Mike Woodward of the APS for putting our newsletter on The Web. His electrons are [woodward@acp.org](mailto:woodward@acp.org).

The very-last-little bang. This issue has dealt with language in poetry, on television, in novels, and in pictures. There is also administration speak, which we read or hear from the high offices of universities or government. This sentence was in a lengthy message from our highest academic officer to the UConn community:

"With a mutuality of common purpose, we must assure that, in this time of challenge and transition, the fabric of diversity which we have woven at this University will be tended to and cared for and the momentum which accelerates our efforts will be maintained."

The New York Times Magazine on August 25 had bad prof talk (pg 20), bad sports talk (pg 24), bad insult talk (pg 26), and bad memory talk (pg 60).