

# New England Section Newsletter

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## **1999 Spring Meeting of the New England Sections of the American Physical Society, American Association of Physics Teachers, and Zone 1 of the Society of Physics Students**

**Yale University, New Haven CT, April 9 and 10, 1999**

A preview of the 1999 Spring Meeting was placed on the homepage of the Physics Department of Yale University. The following is a summary of the information available on Friday, January 22. Further information will be added to the homepage by the host institution as it becomes known. In particular, the invited speakers and the after-banquet presenter will be announced after this newsletter is sent to the printer. (Click on Links; then click on the meeting.)

Registration for the meeting will be at the Sloane Physics Laboratory beginning at 1 pm on Friday, April 9. Friday afternoon will be on The History of Physics, perhaps commencing 2 pm. Saturday morning will be on Recent Advances in Astrophysics, expected to start at 9 am.

Directions to Yale University from anywhere are given on the homepage. Browse it until you find your best route. Every route ends at the Gibbs parking lot, 260 Whitney Avenue. From there, directions to venues of the meeting are given. For example, Sloane Physics Lab is a walk west from the lot. The other important example is to the site of the Friday evening banquet, which will be from 6:30 pm to 9:30 pm at the New Haven Lawn Club. This is one block east of the lot.

Lodging information is given on the homepage. Hotel costs range from about \$65 at the Grand Chalet Inn to roughly \$100 at an assortment of other hotels. These are special rates you will get if you mention Physics at Yale for APS. The hotels will give you directions, and you can decide which will be convenient to your route and to the campus.

The contact persons are [peter.parker@yale.edu](mailto:peter.parker@yale.edu) and [diane.altshuler@yale.edu](mailto:diane.altshuler@yale.edu) and [salbert@mail.hotchkiss.pvt.k12.ct.us](mailto:salbert@mail.hotchkiss.pvt.k12.ct.us). The local committee welcomes contributed and poster papers. Electronic submission instructions may be received by sending e-mail to [APS-request@aps.org](mailto:APS-request@aps.org) or by visiting the APS homepage at [www.aps.org/](http://www.aps.org/). The AAPT homepage is at [www.aapt.org/](http://www.aapt.org/). Further instructions are given on the respective homepages.

## Fall 1998 Meeting at the University of New Hampshire

The 1998 Fall Meeting of the New England Section of the American Physical Society was held at the University of New Hampshire in Durham NH on October 23 and 24. Focusing on advances in condensed matter and nuclear physics along with issues in undergraduate education, the conference was held jointly with the NE Section of SPS and the Seacoast Physics Teachers. Friday afternoon opened with condensed matter studies of nanostructures and ultrafast dynamics of metal quantum dots. There followed a presentation and a panel discussion on active learning and overcoming student misconceptions in physics. Daniel Kleppner, the Lester Wolfe Professor of Physics and Associate Director of the Research Laboratory of Electronics at MIT, was the featured speaker at Friday evening's banquet. His topic, Bose-Einstein condensation, owes much of its experimental success in this decade to him and his students and post-docs. The meeting continued Saturday morning with advances in nuclear physics in measurements using polarized neutrons, spin studies of strong interactions, and relations of parity violation to nucleon structure and to fundamental electroweak physics.

Only part of the fun of a section meeting is advancing our knowledge of physics and our techniques of teaching. A good deal of the enjoyment for my wife and me is the travel itself and the exploration of an interesting place. Schools have very varied attractions. Yale is a center for culture and intellectual history. UNH is in a region of natural beauty and social history. We stayed in the New England Center, a serene scene in the woods, also the site of the fine banquet. It is a short walk to UNH buildings. Durham is a lot like Storrs, but UConn has nothing like the New England Center. Puzzle: Why was gasoline 10% cheaper in NH than in CT?

Ten miles from Durham we found a compelling reason to extend our stay by a day, the fascinating Strawberry Banke, the old area and the old name of the coastal city of Portsmouth. The idea behind it, the restoration and exhibition of buildings, furniture and ways of life of former times, is similar to the larger example of Old Sturbridge Village. Whereas Sturbridge is a celebration of working the land, Strawberry turns its eyes to the sea. The latter spans a wider era in American history, reaching well into our century by showing the effects of the two world wars on life in the area. The present larger city of Portsmouth is full of good things, including parks, shops for old or rare books and for art and antiques, and restaurants. Park anywhere and walk.

Anywhere new to us, my wife and I like to buy books by local authors, particularly ones teaching us about the history or the natural history of the region. We love college bookstores and, bypassing the sweatshirt and coffeemug aisles, we make for the shelves that feature the authors celebrated there and perhaps ignored in Storrs. We have our special needs, my wife for gardening and me for math, but we agree on other interests. Here are two books labeled UNH AUTHOR you might like. Paul J. Nahin, Professor of Electrical Engineering, wrote "Time Machines; Time Travel in Physics, Metaphysics, and Science Fiction." This deals with chronomotion (a wonderful word) and its implications for

science, philosophy and religion. It includes an extensive survey of books and comic books, and of cinema and TV programs. Do we have time travelers in our midst? If we did, how would we recognize them? They would claim to know outlandish things and fail to know ordinary ones. Well, they are all around us. Is the simplest explanation always the best one? Namely, these guys are nuts. Lynne Wissink, with several connections to UNH, wrote "The Marlinspike", a charming and informative historical novel of shipping and industry along Dover's Coheco River. A thriving port over a hundred years ago, it was overtaken by railroads and then by automobiles. It is hard to know whether to lament the passing of a stage that failed to compete with developments or to applaud progress. DM

## **New England Section Advisor Report**

The APS Council met April 17, 1998 in Columbus Ohio. The interim observer, George Rawitscher of UConn, reported in detail on subjects summarized below. As a result of the recent election, the new APS Council observer for NES is K. Jagannathan (Jagu) of Amherst.

**Centennial Activities** Reported by staff members F. Kennedy and B. Schwartz. Financial support from APS is available to visit local high schools and distribute information of the Centennial. Local institutions are encouraged to organize reunions with alumni who do not attend the meeting in Atlanta. Preparations are proceeding admirably, aided by the addition of Eugen Merzbacher as senior advisor on the APS staff. Two levels of activities are planned, one for the public and another for physicist participants. Public relations and fundraising are of high priority. In fall 1997 APS selected Edelman as its public relations firm, to facilitate contact with the media and draw attention to Centennial events. They have created a video for the public, which was shown at the Council meeting but was not yet aired on public TV, its intended target. A network of physicist spokespeople was being recruited to promote the PR effort. Topics to attract the public might include the physics of traffic, nano-technology and laser applications. A major PR draw is the Nobel Exhibit, to be positioned at the entrance of the Georgia World Congress Center. There is a large banner with photos of physicists at work, below which displays show the history of APS and illustrate physical principles. There will be a luncheon expected to include more than forty nobelists. A wall chart will be available for distribution, an electronic version will be made, and a teacher's guide will help to maximize the benefits. A booklet details the Centennial Speakers Program.

**Third International Mathematics and Science (high school) Study (TIMSS)** This study showed that US physics students ranked lowest among sixteen participating countries. Reasons for this engendered spirited discussion. Suggestions included the nature of the test, the sampling of the students, their ages, the sequencing of the US science curriculum that has physics taught last, the lack of a national science curriculum, and the mobility of the US population. Poor curriculum standards in some states, notably California, was brought up. The APS staff member for education, R. Lopez, called the California standard "a

disaster," with burdensome detail in some areas and no clarifying detail in others, and with widely disparate textbook quality. Bromley proposed that "elite" universities in each state involve themselves in text selection. Schwartz cautioned that this was a complex problem which did not admit of a single solution. He felt that the high school teachers are generally good and their opinions should be counted. Lopez ([lopez@aps.org](mailto:lopez@aps.org)) called attention to the Teacher-Scientist Alliance, which brings together teachers and scientists for the purpose of science curricular reform at district levels in grades K-8. AAPT, by contrast, is traditionally involved with high schools. Lopez stated that memorization of facts is emphasized in US high schools, whereas concepts and applications receive their due in classes of other countries. In this connection, the names Jose Mestre and Roy Cooke, of UMass Amherst, and John Russel, of UMass Dartmouth, were brought up. A motion was approved unanimously to constitute an APS committee to come up with an APS response to the recent science curriculum document.

**Publishing** McIlrath, the APS Treasurer, informed us that all APS journals are now on line, including Phys Rev Abstracts, PRD e-first (this puts it on the Web before the printed copy comes out) and PROLA (Phys Rev On Line Archives), which has Phys Revs from 1985 to 1995 available and searchable since July 1. Two new e-journals have been launched, PR Focus and PR Special Topics: Accelerators and Beams. Marty Blume said that implementing these e-capabilities was a lot of hard work and involved essentially a re-engineering of the publication process. McIlrath showed vugraphs detailing rising expenses in journal publishing, arising from set-up costs of e-publishing and not from print publishing. The former now amounts to \$3 M/year while revenue from e-publishing is \$0.2 M/year. The key question he raised is "What is the role of publications in APS financing?" Who should pay the main costs, the authors, the institutions or the members? At present the institutions (libraries) do so, but their budgets are in stress. According to a business plan approved last March, journal prices for institutions will nevertheless rise 7% and PROLA will be bundled into the journal prices for an extra \$350/y. Marty Blume, the Editor in Chief, pointed out that the participation of foreign scientists in number of articles published by APS has surpassed US contributions since 1993. More now come from western Europe than from the US, and another 20% come from Pacific Rim countries. There is competition as well in landing articles. For example, Zeitung fur Physik and Journal de Physique are jointly publishing the European Physical Journal, which accepts papers in English, French and German. Agreements on mutual linking with the APS were recently reached. Britain's IoP and the German physical society plan to publish jointly on line, free of charge (costs recovered from page charges), and Japan shows interest in joining them.

**Political Activities in Washington** Fall 1997's Unified Statement, signed by more than one hundred scientific and engineering societies, led to the drafting of Senate Bill S1305, The National Research Investment Act, sponsored by Senators Gramm, Lieberman, Bingham and Domenici. The bill calls for doubling of research funding over the next ten years. The goals of the legislation, told to us by Mike Lubell, were to communicate the Senate's interest in research to the Administration, to provide a

unifying theme, and to enhance Congressional dialog over research. (This last motivation responds to House priorities aimed at highways and water.) About the same time, a delegation from APS went to the White House to urge the President to support the bill. It also met with budget committees in the Senate and the House.

**APS Involvement with Physicists of Other Countries** Four international advisors to APS, from Canada, Mexico, Brazil and Korea, gave invited short presentations of the physics status in their countries. Carmen Cisneros is president of the Sociedad Mexicana de Fisica and also of an association of fourteen Latin American physics societies. Eric Svenssen of the Canadian Association of Physicists described lobbying activities and public relations efforts on behalf of research in physics, chemistry and biology. Duk-in-Choi described the Korean Physical Society, which has Korean and English journals, eleven divisions, seven sections, two meetings a year and 5,600 members. KPS has produced a terminology translation manual, a bulletin board for editorial matters, and an automated author inquiry system. Humberto Brandi, president of the Sociedade Brasileira de Fisica, reported that Brazil has 850 universities and colleges, 1,600 physics grad students (double the number of twenty years ago), and 2,400 PhD physicists, half of whom do condensed matter. That society publishes three journals, one of which is electronic. The Committee on International and Scientific Affairs (I. Lerch) reported that a number of US universities will conduct exchanges of scientists with institutions in African and Latin American countries. Lerch also described the increasing international component of APS membership. Some 400 new foreign members join each year, Japan now having 8,000 APS members out of a total APS membership of 41,000. This large number of foreign subscribers presents thorny currency exchange problems in payments for membership and services.

**Other Items of Interest** follow on the next page. In the Treasurer's report, the APS is in good financial shape, with an operating budget of \$32 M for FY 99 and expenses of \$34.5 M this year. The discrepancy is the huge cost of the Centennial celebration. The difference will be made up from capital assets. A current problem is making budgetary ends meet in the transition to e-publishing. The establishment of the Northwest Section of APS, to include northwestern states and western provinces, was approved, but the by-laws need revision. APS units are permitted to make pertinent changes in by-laws to allow electronic balloting. The motion carried unanimously to convert the Committee on Applications to the Committee on Careers and Professional Development. Memorial resolutions were passed for Gertrude Goldhaber and David Schramm. "What is Science?" is a document prepared by the Panel on Public Affairs to combat pseudo-science. The wording of the text elicited much discussion, and the statement was returned to the committee for re-drafting in conjunction with efforts of other scientific organizations. Members of the Society of Physics Students can become members of APS at no extra cost. Thesis awards can now be selected by individual APS units, with supervision of APS. (Units can give prizes for "best thesis".)

## **Galileo, by Bert Brecht, translated by Charles Laughton**

The Yale Repertory Theater is a living treasure located, as it happens, a short walk from where we will hold our section's spring meeting. It has premiered works that moved to Broadway and it always puts a fresh face on an older work, like its fall 1998 production of Galileo.

Brecht's reason for writing this play was not his love for astronomy or the Renaissance. His interest lay in pitting the individual against repressive society. He had both fondness for and suspicion of revolution. He was a communist but never held a passport of a communist country. He preferred working in the US to working elsewhere, but was one of only two foreigners called to testify to the House Committee on Un-American Activities. (The other was Charlie Chaplin.) When he was asked the standard "Are you now or have you ever been a member of the Communist Party?", he was one of the few to answer truthfully "No." He was one shrewd guy, never officially joining the Party of any country. But he left the US soon after.

I don't know the historic Galileo very well but I do know the theatrical Galileo in detail. He is one of my favorite characters, a devoted lover of wine, women and physics. When left alone to enjoy these loves, he could agree with the beer ad that claims "It just doesn't get any better than this." We know he wasn't left alone. Secular authorities supported him but were less powerful than the religious authorities who hounded him. These hounds might have tolerated his disdain for them personally, but they could not abide his contradiction of Church (yes, That Church) teachings. He was forced to recant physics, both his experimental findings and his theoretical interpretations. This he did publicly, after which he spent advanced age under house arrest.

The play has some of the most quoted lines in theater. After the monks insist that Galileo did not see moons orbiting Jupiter, and by inference planets orbiting the sun, he says "Things once seen cannot be unseen." This continues to hold true. Civilization's discontents may wish that nuclear energy or DNA manipulation were not within human knowledge, but, outside of time travel in science fiction, wishing does not undo what is done. In a grim scene the clerics decide that they will forgo torture of Galileo in favor of the threat of torture. That proves sufficient. After his recantation, a supporter laments "Pity the land that has no hero." Galileo counters with "Pity the land that needs a hero." It is clear that Brecht wishes the times he lived in had more heroes. DM

### **News from the the University of Vermont**

Dr. **Robert Arns**, Professor of Physics and Interim Dean of the College of Engineering and Mathematics, was awarded the Institute of Electrical and Electronics Engineers' 1998 Life-Members' Prize for the year's "best paper ... on the history of electrical technologies." Arns's paper, "The High-Vacuum X-Ray Tube: Technological Change in Social Context," appeared in the October 1997 issue of *Technology and Culture*. It

chronicles the divergent fortunes of two inventors -- Julius Lilienfeld of Leipzig, Germany and William Coolidge, of General Electric's Research Laboratory in the United States -- who independently developed a new technology for producing X-rays that eventually established the practical use of X-rays in medicine. Both men applied for and received US patents. Although their methods differed little, their ultimate fortunes diverged greatly. Arns details the distinct technological cultures and social factors that led one scientist to success and the other to a fall.

Dr. **Kelvin Chu** joined the Physics Department as Assistant Professor in September after serving as a Director's Postdoctoral Fellow at Los Alamos National Lab. He received his PhD from the University of Illinois in 1995 under the direction of Hans Frauenfelder. Dr. Chu studies protein dynamics, specifically to determine the physics of protein function. (There are many cases where the biology is known far better than the physics.) He uses a combination of spectroscopic and crystallographic techniques to determine the three-dimensional structure of proteins as they perform their roles of catalysis and molecular recognition. Dr. Chu may be reached at [chu@physics.uvm.edu](mailto:chu@physics.uvm.edu) or (802) 656-0064 (the old-fashioned way) or accessed at <http://www.uvm.edu/?kchu>.

The University of Vermont has open a **Temporary Faculty Position** to replace a faculty member on leave in AY 1999- 2000. Principal duties include lectures, recitations and supervision of TAs in introductory physics. Initial appointment will be for nine months starting fall '99 with possible renewal in AY 00-01. Candidates are preferred with a PhD in Physics or a closely related field, but those with a "PhD-ABD" (all but dissertation) will be considered. Experience teaching intro college physics is highly desired. Send a CV, a statement of teaching and research experience, and names/addresses of three references (but no unsolicited reference letters, please) to David Y. Smith, Chair Search Committee; Department of Physics, A 405 Cook; University of Vermont; Burlington VT 05405-0125. (802) 656-0058 or [dysmith@zoo.uvm.edu](mailto:dysmith@zoo.uvm.edu).

### **I Wonder -- Gulp -- Did Albert Have Help?**

Schrodinger's cat attends certain events. You must know that to assist making sense.

It's out of left field where he comes from, in order to yield a strange outcome.

It will be ample, to show his effect, to give an example that's quite direct. When Yankees beat RedSox, he can't be found. When Sox give 'em knocks, he's on the mound.

When Chicago Bulls come out in front, the cool cat strolls on a different hunt.

But when their plays are below all pardon, the hot cat stays glued to Michael Jordan.

He tags along to see what's cooking where women are strong and men goodlooking,

Patrols the nation casting hexes towards capitulation of the sexes.

Suppose your labor is worse than poor, and yet your neighbor has grasp that's sure.

Establish a role for the cat who is true and give him the goal to profit you. He'll find the sunshine in darkness hid. You won't become Einstein, but somebody did. PDQ

## More About Books

On page 2 I was abrupt in describing a book I enjoyed, but page 3 got in the way. I can't undo what's done, but I can do it over. (That's what flowers and candy are for, guys.) *Time Machines* by Paul J. Nahin (AIP Press) is a wonderfully provocative book that goes into the physics and the fantasy of time travel. Various authors have invoked general relativity, quantum mechanics or a combination to try to find conditions which will allow something (a signal, a piece of information, a bit of matter) to go from the future to the past. Going from the past into the future is no great trick; we do it all the time, whether we like it or not, and we can't help it. Feynman and Wheeler, among many others, took the advanced wave in electromagnetism as seriously as they took the (more standard) retarded wave. You may be happy to ignore the advanced wave as unphysical, but unfortunate physical consequences come from rejecting the mathematical result.

Nahin gives as much attention to philosophical difficulties with travel to the past as to physical ones. There is the good old "grandfather problem". Somebody goes to the past and kills his grandpa before the father (son) is conceived who would have spawned the grandchild. So who is it who does the killing? Or is the killing a logical impossibility? Note that contemporary sensibilities are never offended by having the kid kill his father and marry his mother. That would be too much. Arnold Schwarzenegger's rip-roaring film *Terminator* is predicated on the idea that he travels from the future to the past to kill the woman who is destined (!?) to bear the future hero who will battle Arnold's future forces. The future hero also travels back to thwart Arnold's mission to the past. This hero introduces a man to the targeted but rescued woman, the man who becomes the father of the baby who matures into the hero. These worldlines are as entangled as anything in quantum mechanics. The film is very crafty. We expect that future clothing and accessories will mark a man from the next millennium as being an outsider. So how will any of these guys blend in to do their assigned jobs? Simple; they arrive naked. If Arnold's great line "I'll be back" doesn't sound great to you, you must have missed the movie.

The most persuasive evidence that noone has come back from the future (some hyper-advanced civilization, let's say) is: Where are they all? They would have turned up in droves at the most significant events in human history (presumably). Not that they were perceived as such significant events at the time. What is one crucifixion out of thousands? (On the other hand, one homerun might turn out to be Bobby Thomson's.) But centuries later The Crucifixion is realized to be the bang heard round the world. So where were the crowds from the future seeking to view this highlight of the past? I dunno.

Apparently the crucial theological problem with reversing future and past



is that of human free will in relation to God's perfect knowledge. Not only does God know the past, so do we, though imperfectly. But aside from reasonable expectations (you will follow your teaching schedule for the rest of this term, God willing), we know little about the future. (We didn't know where the Patriots would land while they were up in the air.) Presumably God knows the future in detail. So how can I exercise free will to decide something that is already decided? Now we are presented with the ability to change the past, which certainly puts the future up for grabs. We don't know the outcome, but does God know it all the time?

In fact, most people display belief in changing the past, when they indulge in "reverse prayer". The only requirement is that you not know a bit of information. You hear that a student has been arrested and immediately intone "Please, God, let it not be one of my students." When God chose a student, did He know you would pray? Then suppose you exercise your will and don't pray. Hmmm. More later. DM

### **STRICFICS or YOK or What Would Morty Do?**

The rabbi was very proud of Morty. In a school where all the kids, God bless them, were above average, Morty was the most above. Now he was shining in the ritual followed by thirteen year old boys since almost before time was measured. How apt it was that in this year 5999, when worldwide records are meticulously maintained, it should pass that Morty's was the one billionth Bar Mitzvah of the century. This did not count all those men who took advantage of the new practice of holding a second Bar Mitzvah on their one hundred thirteenth birthday. That bit of unorthodoxy was being debated by the Earth/Moon Jewish Council.

To celebrate the unique event, Morty's parents, Golda and Bernard, had promised him any single gift that would not, if implemented, violate a Law of Physics. The boy immediately chose chronomotion. Puzzled, they consulted their two hundredth edition of Merriam-Webster. "Oh, time travel. Why didn't you say so?" Among other talents, Morty was supremely gifted in applied physics. His family felt sure he would handle time travel just fine.

So where/when did he wish to go? His choice was a little-known town in what used to be called the Middle East in a time period of ferment and cruelty of two thousand, two hundred and some-odd years earlier than Morty's present time. This was a surprise to his parents, since the era was unpleasant and regarded as a time when nothing happened. Still, they could not deny their beloved boy anything. Do times ever change? So they arranged a comfortable high-speed, high-acceleration, low-jerk transport, and before he knew it, and especially well before his parents knew it, there he was among the rocks and pools of a primitive land hearing primitive languages spoken.

Young men were dressed in the kind of robes that Morty had seen only at fraternity parties, and something struck him as being wrong with the gatherings, though it took him a few minutes to identify the anomaly. No young women. Maybe this was one of the unenlightened ages he had read

about, unisex and noone nearly as young as him in the crowds. He realized that his Gap Miraclethreads were inappropriate for the scene. And what was he to do with his unexplainable Laserphaser? Motioning to a straggler of his height and build, he managed to get across the idea of a trade of clothing. Being fashion conscious, the other man was reluctant until Morty offered to throw in his laser. The promise of magic has been appealing in all ages. It bothered Morty to violate the ancient Star Trek injunction not to interfere with any alien culture, but he figured that on his next trip he could undo what he did on this one.

Wonder of wonders, as soon as he donned the official uniform of that region at that time, he became aware that he could converse in their languages. Some soldiers shouted "There he is. Arrest him," and he understood it. As he recoiled from their weapons, they grabbed the other man, who was now wearing Morty's outfit. This man seemed unable to object verbally or to defend himself with his newly obtained laser. Immediately, the soldiers whisked the unfortunate fellow away, and Morty was left free to join any of the assemblies he wished.

An old man with bushy hair and sparkling knowing eyes was leading a troupe along a stony path. He looked to Morty like the succession of great scientists of recent centuries, recent that is to the century he had left, who became known as Einstein, Zweistein and Dreistein, nicknames of abundant affection. But this man apparently knew no physics at all. He kept stubbing his bare toes on rocks and shouting "Ouch! Thank you, Lord." Emphasizing the oneness with the earth that these mishaps produced, this man posed no attraction for Morty. His adherents kept showing their dedication by kicking and blessing each time the old man did. Someone from another group motioned to Morty and won him over. "You don't belong with those guys," he said, "Join a modern crew. That rabbi is from the last century. Our rabbi is so new that we are dating a calendar from the year of his first great sermon. This is the year twenty something, regardless of what you heard from anyone else." Morty was confused. Can you start a new calendar whenever you want to? What would the Earth/Moon Jewish Congress say about that? Or those soldiers, come to think of it? They didn't look receptive to anything innovative. And what's a sermon? Is it like a lecture, that old style of teaching science from a bygone era? Of course, that's far in the future for these guys but far in the past for him.

"Take me to your leader," Morty said. "That's a good way to put it," answered his newfound friend. They caught up to a young man regaling many disciples. He welcomed Morty and continued a speech that might have been a sermon. "Build your house on a rock foundation and not on the sand." Morty felt that at last he had found someone with a solid backing of physical principles. "I have to warn my faithful friends," the man said, "The authorities are opposed to my teachings, and they will send their soldiers to arrest me. You are in danger as well." Various confederates assured him of their allegiance. They told him they would not abandon him. Morty almost joined the chorus but felt it was premature.

The aggregation partook of a wonderful vegetarian meal. Morty was amazed that you could find such food without benefit of irradiation and

genetic engineering. Then the soldiers did come for the charismatic leader and led him away while his followers, who had sworn allegiance, did not raise a strenuous objection. "What will they do to him?" Morty asked. A follower pointed. "You see those poor guys waving in the distance? They are being crucified. The soldiers may do that to our leader." Morty was dumbfounded. The men appeared to be suffering, perhaps dying. There was no attempt at rehab or retraining for a socially useful purpose.

The crowd of men showed up on a hillside where punishments were being administered. Several thieves were twisting in the wind. The disciples called them common criminals. Morty didn't know what to object to first. "We have a plan," said one of the young men, "The soldiers let friends of the cruciffee take him down before he expires. But they put him in a cave that's sealed up by a large boulder and they figure that he will die there. The thieves do die there because they don't have devoted followers. But we will rescue our beloved leader and make it known to one and all that he did not die. That way his message will continue to live, perhaps for centuries. Stay close to us. You'll see how we do it."

The soldiers were lamentably careless. They put a thief into the cave and pushed a boulder to block the opening. But the ground fronting the cave sloped away from the opening, and the boulder rolled a few sandallengths away. Someone entered the cave and removed the thief. The soldiers did the same with a second thief, and again the boulder rolled. Someone dragged this thief out too. "Our leader requested a private cave," whispered a young man. The soldiers then put the beloved leader in the cave and replaced the boulder, but Morty could stand it no longer. His sense of static equilibrium was so offended, he could not refrain from intervening. "Wait a minute," he shouted at the soldiers, who turned back to the cave, "I see what your problem is. Help me out here." Together Morty and the soldiers built up the terrain around the cave so that the boulder rolled firmly into place and became as immovable an object as anyone remembered bruising a shoulder on. "That will do it," said Morty. "Thanks," agreed the soldiers.

Soon Morty found himself on his way back to the year 5999 and his destination on the other side of the earth. He wordprocessed a few notes into his diary. (Luckily it was small enough to hide in any change of clothes.) He realized he would be teased for wearing fraternity hazing togs, but it was too late to undo that. He scanned his optical mail. One message warned him about the Y6K parasite. A second came from his best friend and baseball enthusiast, Ephraim. It read "On your way back to the future, can you please stop off anywhen in the last few hundred years and give the RedSox a World Series victory?" Unfortunately, Morty's roundtrip economy ticket did not allow him to make a detour. The best he could do was to o-mail a pledge that the next time the RedSox play the Cubs, he would personally intervene to give the Sox the victory.

It's true that he had in a sense wasted a chronotrip to an era in which nothing much happened, but the travel expanded him. Lives in 5999 centered about trivialities, he was convinced. Who will win the game? Will the Natives purchase the one remaining tract in what was once Connecticut? Will the Moon build a stadium for the Patriots, one with a

field of 300 yards to accommodate reduced gravity? The Laws were still worth pursuing, particularly the one yet in doubt: Perpetuation of Subquarks. But Morty had much bigger plans than that. He was going to become a beloved leader, one who would command the allegiance of droves of adherents. He was disillusioned with the Judeo-Physics Tradition. His goal, with God's help, would be the Judeo-Morty Tradition. He couldn't wait to start. DM

### **Still More About Books**

Paul Nahin's Time Machines has clearly bent my mind. The title "Stricfics" means strictly fictions, which any overt tampering with the past is. The first millennium on the A. D. calendar begins with Y0K. The central events in human history are probably the foundings of new technologies, new political systems and new religions, in summary, new worldviews or new ways of living. This is for better or for worse. Once seen, they are not unseen, although they may have greater or lesser impact. Nahin devotes attention to Jesus plus aftermath. What would have ensued had Jesus not lived or not been crucified or not been resurrected (let us stipulate)? Perhaps everything unrecognizable. Can't say. Many authors do try to say. One clever version cited by Nahin has a time traveler discover that there is no Jesus, and so he becomes Jesus, with the aftermath we all know. You see, the future was changed to what we now know it has been.

My trifle of the last few pages is not a story but it could be made one. Flesh must be made the word. That is, Morty and other characters must be fleshed out. We all know a Morty, the most above average kid there is, the one who shows the greatest promise of leading the world down a new path. Luckily, most Morties do not succeed. Otherwise, God help us. If you have a view, send it to me. Like Melville's narrator, call me s-mail. I read writing, especially good writing. DM

### **Peer Instruction: What Works**

Eric Mazur's page in last fall's newsletter, which brought up-to-date the dialog on interactive techniques in basic physics courses, drew an enthusiastically positive response from Bernard Hoop, PhD and Associate Professor of Medicine (Physics), Harvard Medical School (Mass General Hospital) in Boston ([bhoop@helix.mgh.harvard.edu](mailto:bhoop@helix.mgh.harvard.edu)), that your editor (DM) summarizes. Dr. Hoop used the interactive-engagement method, for his first time and without vast preparation or teaching experience, at the Department of Physics of the University of Otago, Dunedin, New Zealand, a 16000 student campus. About 1000 are in intro physics. Student performance and response to him were overwhelmingly favorable. He received praise while he was there and later, by mail to him in the US. His fellow teacher in NZ was also strongly thankful. Dr. Hoop gives lavish credit to Eric Mazur's Peer Instruction. For a copy of his e-mail to me, contact me.

### **NEW ENGLAND SECTION EXECUTIVE COMMITTEE MEMBERSHIP 1998**

**John Calarco**, Chair  
Physics Department  
University of New Hampshire  
Durham, NH 03824  
(603) 862-2088  
FAX (603) 862-2998  
[CALARCO@UNH.EDU](mailto:CALARCO@UNH.EDU)

**June Matthews**, Vice Chair  
Physics Department  
MIT  
Cambridge, MA 02139  
(617) 253-4238  
FAX (617) 253-5440  
[MATTHEWS@MITLNS.MIT.EDU](mailto:MATTHEWS@MITLNS.MIT.EDU)

**William Donnelly**, Immediate Past Chair  
Physics Department  
MIT  
Cambridge, MA 02139  
(617) 253-4847  
[DONNELLY@MITLNS.MIT.EDU](mailto:DONNELLY@MITLNS.MIT.EDU)

**Kannan Jagannathan**, Section Advisor-1997  
Department of Physics  
Amherst College  
Amherst, MA 01002  
(413) 542-2346  
[KJAGANNATHAN@AMHERST.EDU](mailto:KJAGANNATHAN@AMHERST.EDU)

**Laurence I. Gould**, Secretary/Treasurer  
Physics Department  
University of Hartford  
West Hartford, CT 06117  
(203)768-4307  
FAX: (203) 768-5244  
[LGOULD@UHAVAX.HARTFORD.EDU](mailto:LGOULD@UHAVAX.HARTFORD.EDU)

**David Markowitz**, Newsletter Editor  
Physics Department U46  
University of Connecticut, Emeritus  
Storrs, CT 06269-3046  
(203) 486-4286  
FAX: (203) 486-3346  
[HAYDEN@UCONNVM.UCONN.EDU](mailto:HAYDEN@UCONNVM.UCONN.EDU)

## **EXECUTIVE COMMITTEE MEMBERSHIP 1999**

**John Brown**, Member-at-Large 1996-99  
Physics Department, Cook Hall  
University of Vermont  
Burlington, VT 05405  
(802) 656-2644

**Steven Davis**, Member-at-Large 1996-99  
Physical Sciences Inc.  
20 New England Business Center  
Andover, MA 01810  
(508) 689-0003  
[DAVIS@PSICORP.COM](mailto:DAVIS@PSICORP.COM)

**Peter K. Lemaire**, Member-at-Large 97-00  
Department of Physics  
Central Connecticut State University  
New Britain, CT 06050  
(203) 827-7341  
FAX (203) 827-7877  
[LEMAIRE@CCSU.CTSTATEU.EDU](mailto:LEMAIRE@CCSU.CTSTATEU.EDU)

**George Rawitscher**, Member-at-Large 97-00  
Physics Department  
University of Connecticut  
Storrs, CT 06269  
(203) 486-4377  
FAX (203) 486-3346  
[RAWITSCH@UCONNVM.UCONN.EDU](mailto:RAWITSCH@UCONNVM.UCONN.EDU)

**Jefferson Strait**, Member-at-Large 1997-2000  
Department of Physics  
Williams College  
Williamstown, MA 01267  
(413) 597-2008  
[JSTRAIT@WILLIAMS.EDU](mailto:JSTRAIT@WILLIAMS.EDU)

**Nalini Easwar**, Member-at-Large 1998-2000  
Department of Physics  
Smith College  
Northampton, MA 01063  
(413) 585-3887  
[NEASWAR@SOPHIA.SMITH.EDU](mailto:NEASWAR@SOPHIA.SMITH.EDU)

## THE LAST BANG

The September 98 Physics Today ran the article "The Sokal Hoax: At Whom Are We Laughing?" by Mara Beller, the Barbara Druss Dibner Professor in History and Philosophy of Science at the Hebrew University of Jerusalem. The essence of her argument is in the subheading: "The philosophical pronouncements of Bohr, Born, Heisenberg and Pauli deserve some of the blame for the excesses of the postmodern critique of science." The text clearly points the rest of the blame at you and me. We physicists uncritically idolize the best minds of our past, four of whom are named just above. I don't know about all that fingerpointing. We already know that complete fools can pretend to be great thinkers; Sokal disposed of their overweening pretenses. Beller succeeds in showing that great thinkers can pretend to be complete fools. The foolishness indulged in by the Fearsome Foursome of her article is the unwarranted transfer of

perfectly good quantum mechanics to the realms of religion and other philosophies.

Now I don't want to get off on a rant here, but it seems to me that science and religion belong together about as well as blintzes and bacon. Where's the fat, Ms Beller? We don't lionize Bohr and buddies for their worst thoughts. We barely put up with them for those sillinesses. No, we esteem the rock-solid scientific inferences and extensions, not the ethereal wisp of God's wavefunction. There is no more depth to this guesswork than there is in philosophy for pedestrians: I walk, therefore I am. I realize there are some baffling similarities between conceptions of different modes of thought. Augustine said "If you understand it, it is not God." Feynman, Pauli and others as much as said "If you understand it, it is not quantum mechanics." But do two ununderstandings make one conjunction?

Modern physics is taking hits from the jawbones of all sorts of people lately. Some newthink on the subject is passed along to us by "feminist scholars"; is there one playing hide-and-seek inside the mind of Mara Beller? Feminist scholars are to thought what gourmet pizzas are to food. One out of a thousand pizzas qualifies as gourmet; you consume pizza because it goes great with beer. Do I make myself clear? Feminism and postmodernism are the restless bedmates that demand the socialization and politicization of science. Rather than possessing any objective reality, science (read "physics" because biology could be helpful to medicine) is a collection of conventions that could just as well have been chosen otherwise if some other "scientists" had done the choosing.

All sorts of groups promote the identification of science with religion. I was sent a free copy of a zine called Science & Spirit, with articles on "Faith and Medicine" in the particular issue. It's true that a good disposition and a confident attitude help the sick to get better, as they help an athlete to do well against a stronger opponent. Sometimes. It pays to take your medicine in the one case and to practice your game in the other. There are some "intangibles" which kids in my neighborhood noted when we were eight years old: a competent ballplayer became a star as soon as he was traded to the Yankees. Must have been the pinstripes.

In the weird case of Brian Josephson, we honor his creative work in physics, not the guruhood he found on top of a mountain. The past fall he was an "Honored Presenter" at a symposium, Home and the World, "Rabindranath Tagore at the end of the Millennium," presented by the Asian American Studies Institute at UConn. The humanistic values, arts and literature were admirable. They made a stab at science but managed a flesh wound. Tagore's part of the world has given us an abuser of science, the infamous Deepak Chopra, who claims to use quantum mechanics in attitudinal health, while public TV collects pledges. They should have stuck to Leo Buscaglia, who hugged people. Of course, that's just my opinion. I could be wrong. DM

