AMERICAN PHYSICAL SOCIETY

New England Section Newsletter

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1997 Joint Spring Meeting of the New England Sections of The American Physical Society, The American Association of Physics Teachers and Zone 1 of The Society of Physics Students April 11 and 12, 1997

The 1997 Joint 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 will be held at the University of Maine, Orono, Maine on Friday and Saturday, April 11 and 12.

Plenary talks will be held Friday aftenoon and Saturday morning. The first session of each day is a joint talk for APS, AAPT and SPS. Friday's session is Tribology - Modern Perspectives on Friction and Related Phenomena. The first joint talk, by Jacqueline Krim of Northeastern, looks at Friction on the Atomic Scale, followed by Theoretical Studies of Friction by Mark Robbins (Johns Hopkins) and a talk by Frank Ogletree (Lawrence Berkeley Laboratory).

A joint social hour (cash bar) and the APS/AAPT/SPS poster session at the Black Bear Inn will precede the banquet. The banquet speaker is Dr. Edward Tenner, the author of the popular book Why Things Bite Back - Technology and the Revenge of Unintended Consequences, who will speak on "The Perils of Technological Security."

Saturday morning commences with contributed papers followed by the Special Joint Plenary Address "Bridging the Gap Between Teaching and Learning" by Lillian McDermott, University of Washington. The joint session continues with a special presentation on Recruiting and Retention of Minority Students by the New England Board of Higher Education.

The final APS session on Recent Developments in Large Scale Structure of the Universe features talks by David Batuski (University of Maine) on the Identification of a New Supercluster and Its Role in Tracing Large Scale Structure and Adrian Melott (University of Kansas) on Computer Simulations of Large Scale Structure and What's Wrong with Them.

Contributed papers and posters are welcome. The deadline for APS submission is 5:00 p.m. EST Thursday, April 3,

1997. Meeting ID is NES97 and full details on submission of abstracts can be found on page M34 of the February issue of the APS Meeting News. Electronic submission instructions may be received by sending E-mail to abs-request@aps.org (put request-NES97 in the body of the message), or visiting the APS home page at /. If you wish your abstract to be published in the APS Bulletin send a check for $35 made out to NES/APS. Abstracts submitted electronically will have the full abstract appear in the Bulletin.

We strongly urge you to encourage students to attend this meeting by offering rides. Discounted admission, banquet prices and dorm rooms (free SPS housing may be possible) are available to high school, undergraduate and graduate students.

FALL 1996 MEETING AT UNIVERSITY OF VERMONT

The 1996 Fall Meeting of the New England Section of the American Physical Society was held at the University of Vermont, on Friday and Saturday, October 18 and 19.

On Friday afternoon plenary session A on biophysics included Microfabricated Silicon Maze Structures for Biological Applications by Robert H. Austin (Princeton University) and Optical Tweezers and Molecular Motors in Muscle by David Warshaw and Junru Wu (University of Vermont). Plenary session B on nanostructures included Quantum-Dot Molecules by Ned S. Wingreen (NEC Research Institute) and Semiconductor Nanocrystallites: Building Blocks for Quantum Dot Structures by Moungi G. Bawendi (MIT).

The banquet for meeting attendees was held Friday evening, followed by an address by Robert K. Adair of Yale University on Limits of the Biological Effects of Electromagnetic Fields.

On Saturday morning plenary session F on biophysics featured Ivar Giaever (Rensselaer Polytechnic Institute), a Nobel Prize winner, on Motion of Cancer and Normal Cells Studied Electrically. Plenary session G on quantum devices featured Konstantin K. Likharev (SUNY, Stony Brook) on Single-Electron Devices and Dennis M. Newns (IBM Corporation, T. J. Watson Research Center) on A Proposed Mott-Transition Field-Effect Transistor.

Thanks go to the Physics Department of the University of Vermont for holding this stimulating meeting. Traveling by car through New England was a distinct pleasure. DM

Results of the Contest to Name The Pets.

It's a tie between Lotta Snow of Polarbare, Alaska, and Scarlet Flo of Lava Comeback, Hawaii. These are the winning names.

Schrodinger's	**Cat**	Psi	Claws
	Dog	Collapser (or Shwarzenegger)	Jaws
	Fish	Schrod (of course)	
Heisenberg's	**Mouse**	Delta	Paws
	Flea	Epsilon	
	Bat	Flying Delta (or Delta With Wings)	

LINKED LIMERICKS

LINEAR EVENT	NONLINEAR EVENT
One day you have a clear path	Another day but not to bore you:
To spend your hour in the bath,	The towel is gone that would restore you.
With arch deities like Archimeides	You're late, you fuss, get hit by a bus.
And the power of physics and math.	Well, there goes chaos for you.

PDQ

SO WHAT DO YOU GET?

THE PINBALL EFFECT
: Journeys Through Knowledge, Audio Renaissance Tapes (abridged), read by the author, James Burke

HOW THINGS WORK
: The Physics of Everyday Life, Louis Bloomfield, Wiley Publishers

WHY THINGS BITE BACK
: Technology and the Revenge of Unintended Consequences, Edward Tenner, Knopf Publishers

AT HOME IN THE UNIVERSE
: The Search for the Laws of Self-Organization and Complexity, Stuart Kauffman, Oxford Press

PEER INSTRUCTION
: A User's Manual, Eric Mazur, Prentice Hall

RISK
: Where Do Real Dangers Lie?, John Ross, Smithsonian Magazine, first part November 1995, continued in December 1995 Smithsonian

What do all these interesting and, perhaps, important discussions of scientific and technological connections to human learning and life have in common with a classic song by The Rolling Stones? The answer is YOU CAN'T ALWAYS GET WHAT YOU WANT. Sometimes you get much more, sometimes you get much less, sometimes what you get is just the opposite of what you want.

My daughter Carol gave me some "books on tape", a popular way to "read" while doing something else, such as driving to and from work. These two tapes, totaling three action-packed hours, are by James Burke, author, TV producer, host of PBS and BBC series, Royal Television Society medalist for broadcasting, and columnist for Scientific American. He invented the expression "the pinball effect" to dramatize the idea that progress bounces around in surprising directions until the origin of a breakthrough is lost to view. Thus, current racing cars are linked to distant developments in photography, and advances in weaponry, transportation and medical technology are so interdependent that none would exist in the absence of the others. What do Royal Doulton and George Westinghouse owe to the discovery of the vacuum? How did Galvani's frog muscle and Volta's battery disperse and focus rays of knowledge and technique towards the atomic bomb? Why is Hubble's model of the Universe indebted to the primary relation in psychophysics, the Weber-Fechner law? The tone of Burke's readings suggests that every step is a forward step. His motto must be that Tech Is Good. Indeed, he ends his narrative with the suggestion that education be grounded in the effect he has named and in the most current advances he has identified. Learning is to be computer-based and should emphasize the devious and intricate paths to its attainment. He offers a new definition of intelligence, which you can now try to guess. You're smart. You'll do it.

There are many books for distinct courses aimed at distinct audiences with special needs or backgrounds in physics. Thus, there are the genres of "physics for poets", which unfortunately attracts almost no poets and almost all of the students who are scientifically insecure and must pass a physical science course with a lab and the use of math

before they are allowed to graduate; "physics for education", which is "discovery-based" so that eventual elementary school teachers can take the material and the techniques into their own classrooms; "physics for handypeople", which brings the principles and basic problem-solving to tinkerers who can build things that work without in a sense "knowing why" and who will form the technical support crew for the industrial segment of our society, the segment that actually does the work to make the money for the hordes of manipulators and hangers-on who reap the profits and file the reports. Well, that's a few mouthsful. Louis Bloomfield's book cuts across genres to appeal to students and teachers who would like to have in mind a particular system while seeking the Laws and how they are applied. You may care about the battle between the pitcher and the batter and how a bat meets a ball. You may play the violin or the clarinet and wonder how your bowing or blowing, plus fingering, sends music rather than noise into the room. You may be a long-distance bicyclist unschooled in the various mechanical advantages and efficient transfers of energy that you automatically rely upon. The author built this book on his considerable expertise and experience in developing the course at the University of Virginia. It is a masterpiece and monumentally interesting and helpful to students and teachers who work hard. To establish this course if you don't have one, be prepared to spend a lot of time, money and effort. The rewards will be enormous for the right people. My department has some of the right people. I do not consider myself to be one of them. I have taken apart a malfunctioning bicycle and then required the high- priced services of the cycle repair shop to put it together the right way. I don't know how to diagnose a faulty fuel pump in my car or how to replace it if that is the trouble. My wife does rudimentary plumbing in the home or I phone a licensed plumber, whichever occurs to me first. But you may be different from me.

Edward Tenner's book, also a vastly interesting and informative one, is on the general subject of "the reverse pinball effect" (my phrase, not his), meaning how the reversals of fortune conspire to bounce the ball into technological retreats rather than advances in ways nobody wanted or considered. This book might have been called HOW THINGS DON'T WORK. While there are many areas of life which are equally susceptible to the author's penetrating scrutiny, he selects four which include a great deal that we all rely on or work at ourselves. These are medicine, the environment, the computerized office, and sports and fitness. Tenner will speak at the April NES/APS meeting. I don't wish to undercut what he will say, and I do hope that readers of this column will make the journey to the beautiful wilds of Maine. So all I will tell you is that this book is an eye-opener which will focus your eye-brain combination in ways not done previously.

About 25 years ago I attended some of the Gordon Conferences on Theoretical Biology. These were peopled by engineers, physicists, mathematicians, physicians, computer devotees, and philosophers, along with those you might expect to find there, such as traditional biologists and chemists. While soaking in summer in New Hampshire, I also absorbed the wild and crazy notions of practitioners in a field that hardly existed at the time. Many of the attendees were gifted with imagination and brilliance. Hardly any of them does one hear from or read about any more. A few of them you do, maybe because they were wilder and crazier than the others, but not too crazy, just crazy enough. Stuart Kauffman devoted himself to random boolean logic networks of a size large enough that they had available to them an unimaginably astronomical number of different states. He asked his computer to begin in a randomly chosen state and then just follow the simple rules for changing from one state to another. In this manner he discovered cycles of manageably finite numbers of steps. The sensible response to this outcome might have been, "Interesting, perhaps surprising, and so?" The actual response has been, not overnight of course, a MacArthur Fellowship and recognition of Kauffman as a pioneer in a "science of complexity." AT HOME IN THE UNIVERSE is a clearly written account of the computer models and the thoughts behind them. Its chief answers are to the question "Models of what?" They are models first of all of gene expression and repression in a cell. The normal functioning of a cell requires genes to be turned on and off according to a set of rules that govern the production and destruction of chemicals that in turn act back on the operation of the genes. These same models can be applied to ecological systems, social organizations, and economic structures. What the various realizations in physical, biological and social science have in common are the degree of complexity and the type of feedback that appear to have similar general rules. The central feature of complexity is a "fitness landscape"; a physicist should think of a free energy hypersurface in a multidimensional space. (I'm thinking.) Whereas free energy is minimized, fitness is maximized, so the landscape is like free energy upside-down. Now maximization is often impeded in favor of optimization: a local maximum achieved in a finite time. But so is free energy minimization: kinetics at low temperature is mighty slow. The most important outcome of the computer analysis is organization, spatial or temporal or both, of the system behavior that requires no organizational input. Apparently "any" set of rules

governing the random network with initial state randomly chosen has a good chance of leading to this outcome. Kauffman calls this "order for free." If order for free actually takes place in this world without contradicting its opposite, the Second Law, then a number of vexing puzzles may be settled. For example, how did the first replicable cell become established for evolution to act upon? After life gained a foothold on this planet, what mechanisms for evolution have acted? Biologists have identified a number of tendencies grouped under the headings of natural selection (increasing fitness) and genetic drift (unchanging fitness). Is there a set of changes corresponding to order for free, wherein a temporary decrease in fitness is tolerated in conjunction with a giant step to a distant part of the fitness landscape which has taller mountains to climb? Perhaps this is how speciation works. The leap in understanding that Kuhn called a paradigm shift in one of his uses of the term is a reordering of data to achieve a new organization, the revolutionary theory. You need to tolerate a decrease in agreement between theory and experiment before you can climb the hill to greater agreement. This is what Bohr did when he allowed an accelerating electron not to radiate, formerly an unallowed situation. It is becoming increasingly clear that natural selection does not explain all that happens in the bioworld. Sensible people, among whom I will include you if you will include me, are perfectly ready to entertain additional scientific principles to fill the glaring gaps. The other kind, pre- disposed to abhor evolution altogether, will seize upon the discrepancy to promote religious "explanations" found in Genesis. Anything that will squelch the "my great-uncle was not an ape" attitude in the Evolutionary War is welcome to me. Before leaving this topic, note that Gell- Mann's THE QUARK AND THE JAGUAR makes a number of the same points Kauffman (Kauf- Mann?) does, is delightful reading, and at the same time is much different from this newer book.

Eric Mazur's PEER INSTRUCTION recognizes that teachers do not get what they want from students and students do not get what they want from teachers. So do students get what they want from students? To me that too is doubtful. What is wrong with traditional courses? How can physics courses be made "right"? The first answer is easy to state. What is wrong is the students do not learn what the teachers teach as the real physics. The students fall short in observation when, for example, they state that a thrown ball reaches some height and from there falls almost straight down. (Haven't they watched a baseball or football game?) They fall short in explanation when they confuse velocity and acceleration, call them zero at the maximum height, or commit other atrocities. They repeat Newton's Laws in the words of the text or the teacher. If that were the question they would receive full credit. What is sadder than that is that often they receive full credit for working out an F = ma problem correctly on a test. If you probed their knowledge of physics, the observation and the explanation rather than the formula, the algebra, the plugged-in numbers and don't ask them what it means, they would earn very little credit. A physics course that is "right" induces the students to grasp and apply principles. It emphasizes qualitative physics. I realize that many of us have been trying to do just that for many years. But the students don't want that from their teachers. By their own admission, they prefer to grasp and apply formulas. Mazur's solution to the dilemma is to invoke "peer instruction". This is a technique in which students work together in small teams to answer questions about presented physical situations. Understanding, rather than algebra, is probed. Only after reasoning out some answers can the team proceed to the next stage. Then only after demonstrating understanding can the team go on to solve a numerical problem. Fine. I would point out a number of shortcomings or outright objections. Again we teachers, like the students, have a history. Many of us have included team solving in class, in lab and on homework, with partly encouraging results. I dislike greatly Mazur's use of multiple choice questions. When I ask students what principle(s) they would apply to the collision of two hockey players on smooth ice, they have to run through what they know and think hard for an answer. When I give them a choice which includes some version of inelastic collision, such as mom is conserved but KE not, it somehow jogs their random access memories into the right answer. But I told it to them. They didn't think of it. My other objection to multi choice questions is that they get so involved when you need to fill an a, b, c, d, e. (Okay, e is none of the above.) Thus, you find choices that Abbott and Costello would chortle over, like Al moves forward while Ben moves sideways while Chad moves backward while... New point: From the videos of Mazur and others using the peer technique, you can tell that they have half a dozen teaching assistants or other aides helping out. In my course I am all the aid I get (except in the lab, of course; I can't be trusted with equipment). They have a fortune of computer equipment devoted to instruction. We keep applying for more so that we hope to match them. Need I point out that Mazur does his testing and teaching at Harvard, whose student body is made up largely of Harvard students? Not every school can say that. (Okay, it's time for THE QUESTION MAN. The answer is: Because Harvard matriculates so many great students. What is the question? I'll tell you. Why does Harvard graduate so many great students?) The biggest problem with a course

using peer instruction is the absence of a helpful textbook. It is not helpful to require ten topical books although that works in a literature course. Mazur has written a sourcebook. It is not a text any more than a fieldguide to reptiles, birds and mammals is a text in zoology. So we are left to rely upon traditional texts, which uniformly undermine the attempt to emphasize principles over plug- ins. I won't criticize one text we happen to use; they all fail the same way. They have pages of problem-solving strategies along with pitfalls to avoid. Most worked examples contain intricate trig-algebra combinations. A thousand homework problems are of this variety: A force of 45.0 N acts at an angle of 25 degrees above horizontal on a mass of 7.00 kg... (I'm too ill to continue.) Texts, teachers and peer instruction have a long way to go.

Risk management means different things to different people. It plays a major role in politics, economics, insurance, financial planning, health and safety. There are at least two aspects to risk: evaluation of the actual risk involved in a situation or course of action, and perception (which may be way off the mark) of the risk involved. Scientists are mostly concerned with the first aspect, which is often a very hard problem with incomplete data and unproven analyses. For example, the big bally-hoo over the threats to health of high-voltage lines seems to have far less physics behind it than abnormal psychology. If you don't mind living in a house near the confluence of the lines, feeling that the fields are small and a house contains some natural shielding, you will mind it when you try to sell, even at a loss, and find no prospective purchasers. In my occasional role as "physics resource person" I receive calls from news- papers or concerned citizens about harmful fields from popular appliances. One caller asked about her electric blanket. It turned out that several cats slept on the blanket she was under. I told her the greater danger was of an electrical malfunction due to cat clawing and perhaps a fire. She hadn't considered that. When you overblow one danger, you lay yourself open to others that are worse. Our state, like most others, has radioactive wastes to bury, hide or ignore. What we do is political rather than scientific. The legislature decides to store wastes in an up-scale neighborhood of an influential town, which creates the kind of uproar that a politico can make use of. Eventually, our town comes under consideration. What happened was behind doors closed to me, but I can guess. At about the same time, the state was also looking for a location for a minimum-security prison. They talked us into accepting it through the strength of several arguments. The town had empty buildings because a facility for retarded people was being closed. Most of the prison inmates were to be those convicted of driving or other dangerous activities while under the influence of drugs or alcohol, not basic threats to society when not under the influence. Our university has a drug and alcohol study and rehab program combining health, psychology, family studies and other departments. Foremost, we could not be stuck with a wastes site if we were to accept a prison. Min-security sounds nonthreatening. Guess again. Frequent departures of prisoners takes place because they don't feel like staying and it is easy to leave. Along with alcohol offenders, we now harbor sex offenders, a few miles from thousands of young women in dormitories. Nice.

DM

P.S. SCHRODINGER'S CAT'S NOT DEAD

Schrodinger's cat resists the belief that one can find joy emerge from one's grief, That one can climb high while feeling so lowly, that one can race past a scene passing slowly.

He finds it too hard to be forgiving of any who wronged him still probably living, Of any whose birth is about to arrive, of any who act as if mostly alive.

Perhaps he relates to a far place like Thailand or an out-of-this-world space like Fantasy Island, To fictional folks like The Beatles' Blue Meanies or relative ghosts like Harry Houdini's.

He has the gravest trouble seeing how being merges with nonbeing, And how to reveal the figural knife that parts the quick from very still life.

Someone should know. He'll bother his father. But if he requires another, there's Mother. A moment before he slides into bed Schrodinger's cat communes with the dead.

Are you merely gone? Are you here with me? Day hits night at dawn in the pause that's wee. There are times of calm. Other times he panics in the worlds permitted by quantum mechanics.

How do I learn what to believe in, which Riemann sheet we'll assuredly live in? You pays your money. You takes your chances. You does the experiment or else no answers.

PHYSICS TOM SWIFTIES

"When push comes to shove, I pull my weight," he said forcefully. "I do plenty of work here myself," she said energetically. "What's more, I do it very fast," she said powerfully. "Friction is developing between us," he said heatedly. "Let's try to cool off," she said temperately.

Variations on email: eh?mail: a message you need to be repeated

er--mail: a message when you don't know how to say it

oy!mail: complaint department

PDQ

HE AIN'T HALF HEAVY, HE'S MY HALF BRO

Schrodinger's cat awakes from his nap just in time to jump from a lap. He rately look before his leap to wakeful action straight from sleep.

Dreaming of mice is not at all bad and not the worst dream he's ever had. Schrodinger's cat communes with the dead every time he hops into bed.

He interacts with his conjugate cat, whose name of Psi Star is worn on his hat. The dog The Collapser rears up on his feet. In dreams he releases a hell-haze of heat.

Schrodinger's cat can hardly wait to enter into an impure state. Not purely asleep, not purely awake, he keeps and also eats his cake.

He follows as the system unfurls and sees the future in many worlds. The function spreads as shadows fall. A complex character comes to call.

Heisenberg's mouse Delta is partly there, or Delta Em, if you think you care. All at once H's flea Epsilon is simultaneously come and gone.

By and by waves find the farthest reaches, or so the theory about them teaches. You will approve if you have a thirst to be anywhere in the Universe.

Schrodinger's cat travels parallel worlds. In some he has whiskers. In some he has curls. In some he is ill. In some we've a cure. In some he is living. In sum, we're not sure.

Have you a complaint or at least a suggestion? If you'll risk an answer, then I'll pose a question. If Psi swallows poison while crashing his car, then what can we say of evolving Psi Star?

Faster than a parallel processor. More powerful than an optimal algorithm. Able to perform fast Fourier transforms. It's a spherical cow. It's a rotating plane. It's Superpositionman.

PDQ

ANECDOTAL EVIDENCE:

While in grad school at University of Illinois downstate, lo those many years ago, I received postcards requesting my article on "Dirty Superconductors." The post office saw fit to stamp those reprint request cards with a note warning against sending pornography through the mail. I now realize that "dirty, doped, impure,..." are not proper terms and are offensive to materials. I hereby offer PC PHYSICS. We are now to call them "constitu- tionally challenged solids." Similarly, "amorphous, disordered,..." must give way to "configura-tionally challenged solids." As undergrads in Cambridge Mass, we thoughtlessly called Charles Munch a superconductor and Arthur Fiedler a semiconductor. Tastefully tasteless.

PHYSIBONICS: It's what we use to write Physirevi articles. Not street language, it's tower language. The most remote language in print is Socscibonics, which has little to express in its obscure way. The only thing they have to be obscure about is obscurity itself. We all have our native tongues.

DM

NEW ENGLAND SECTION ADVISOR REPORT

The American Physical Society Council met May 5 - 6 1996 in Indianapolis Indiana, with about fifty people in attendance, and covered these points.

1. President Schrieffer reported that two searches were in progress: to replace Benjamin Bederson, editor-in-chief of The Physical Review, and Harry Lustig as Secretary-Treasurer. He also noted the fiftieth anniversary of the Japanese Physics Society.
2. a. Executive Officer Judy Franz reported on the success of the joint APS-AAPT general meeting just concluded in Indianapolis. Attendance was 1300, higher than when held in the DC area. She also noted that attendees were younger and that sessions were better attended.
   b. The March meeting in St. Louis was down very slightly in attendance.
   c. There are at present 40,000 members of APS, the third straight year of mild declines.
   d. The APS is now registered as a lobbying organization.
   e. The goal for the Campaign for Physics is $5 M. So far, $3.6 M which includes $430 K from individuals has been raised. Use of money collected has gone toward K-12 education. (A comment by Jim Dolan informed us that we are hoping for $4 M from NSF for education.)
   f. Two new prizes were approved: The Joseph F. Kiethly Award for advances in measurement science, and the Hans A. Bethe Prize for outstanding work in theory, experiment or observation in the areas of astrophysics, nuclear physics, nuclear astrophysics or closely related fields.
   g. Two new topical groups were approved: Nonlinear and Statistical Physics, and Magnetism and Its Applications.

   h. Editor-in-Chief Bederson reported that he will prepare an NSF proposal to develop an archive of past issues of The Physical Review, with full searching and linking capabilities. This is a joint enterprise with the Naval Research Laboratory and the Los Alamos National Laboratory. The aim is to join this archive eventually with current online APS journals.

      In 1996 there were at least three e-journals actually or committed for the APS: Phys Rev Letters on-line, Phys Rev B - Rapid Communications, and Phys Rev C. Be it noted that the Society's income is derived 80% from publications and 20% from dues. Further note that the infamous Gordon & Breach suit lost with every attempt in Europe and with one major effort in the United States. A US judge ruled that electronic files can be searched.

      An experiment has been newly approved for the High Energy Physics Group and is to be sponsored by the APS, after lawyers have been consulted. For now articles will be distributed free on the internet;

there will be no paper; preprints will be available on xxx@Los Alamos; then the articles will be peer reviewed and marked as such. Right now the editor is working for free. This present expedient may eventually become part of Phys Rev D.

i. A statement of concern about long-term proposed cuts, favored by certain Democrats and Republicans, in the budget of the Office of Energy Research was passed.

j. 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 traditional March and Spring meetings and will include participation of the AAPT. There will also be year-long events, including a speaker's bureau and publications such as a timeline wall chart. Saturday of the meetings will be an International Program. Sunday will feature Nobel Prize winners, in physics and in physics-related advances from chemistry and medicine, revealing their moments of discovery. Guy Emery is the New England Section liaison to the Centenary Committee. In this connection, there is a centenary web page; see the APS home page.

k. A report on the Teacher-Scientist Alliance Institute was presented by Ramon Lopez, who is spending half his time at the University of Maryland and the other half at APS. This is a national initiative of APS and AAPT to systematically mobilize interested scientists and engineers to assist local school districts as they implement systemic reform of elementary science education.

l. Mike Lubell updated the Council on the continuing survival of the NSF in Congressional actions for the 1996 fiscal year. Congress debated within the range of 90 - 103% of President Clinton's request.

m. Robert Park, author of What's New? (in DC), reported on the continuing debate on the Smithsonian exhibit on the history of science and technology, partly sponsored by the American Chemical Society. An APS committee met with Michael Heyman, Secretary (Executive Officer?) of the Smithsonian. Negotiations between an ACS committee and Heyman broke down.

John K. Pribram, Bates College
(Article includes comments from NES Executive Committee at the fall meeting.)

Humor

Speaking of language, what do the names Kirchhoff and Kierkegaard have in common, besides the inability of Americans to pronounce?

Bilingual pun: One man's fish is another man's Poisson.

Wheel of Jeopardy: A chemist with clean hands. What is a _ _ y _ i _ i _ _ ?
A cure for love. What is _ a _ _ i a _ e ?
Dog stories. What is _ u _ _ i _ _ i o _ ?

Affectionate names for beloved ideas: Newt's Laws
Archie's Principle
Bernie's Principle

PDQ

NEWS FROM - NOWHERE

None. This space could have had your news from somewhere.

NEW ENGLAND SECTION
EXECUTIVE COMMITTEE MEMBERSHIP 1997

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THE LAST BANG

This isn't much of a bang, more like a bump. Cynthia Peterson spotted a flaw in my article on the Olympics. I claimed that a physics competition whose object is to beat everyone else in filling a blackboard would be the first to pit men against women, instead of segregating them as in gymnastics or basketball. She rightly pointed to boating and equestrianism in mixing the sexes. But I have a comeback. I intend an event in which the people do all the exertion, not the wind or the horses. Aha!

DM

More bang for the Bump: At any department meeting, oral exam, or other occasion where someone else speaks at length, I stay awake by writing a poem or a story. Sometimes I place Schrodinger's cat in the situation of the talker or the listener. Here is an example.

DO I STAY OR DO I GO?

Schrodinger's cat was taking a test, strained in proportion to how he was stressed By external forces duly impressed, perturbed wave function unable to rest.

With zero to one setting the scale, what result might this trial entail? Before the news is old and quite stale, is there a pass or is there a fail?

Well hey hey, who woulda thunk it? An exact result without any truncate. One over root two, so let's slam dunk it, plus e to the i spy, and now you flunk it.

So what in the U did you expect? Don't transmit before you reflect. It agrees with data you can collect. For wave functions this result is correct.

A single outcome is beyond ambition. It's a law and not just a weak tradition. Amplitudes combine by direct addition and waves by superduperposition.

I tell students in an elementary course that the amount of material we will have is half what I would like and twice what they can stand. Then they know the nature of the compromise. One of the important ideas they have trouble with is the halflife for a random event in a large population of identical systems. Radioactive decay of unstable nuclei is the prototype. But the students find the system so strange that the basic idea is obscured. So here is my helpful metaphor. I point out that the class is very large and the student patience fairly uniform. During a dull class suppose each student independently decides after ten minutes to flip a coin, not paying attention to any other student. Heads means the student leaves and tails means the student stays. Roughly half the students will leave. The more students you start with, the closer to half will be the leavers. The students who stay wait ten more minutes and then go through the coin flipping procedure again. So half of them will then leave. And so on. Ten minutes is called the halflife for this process, just as it is for the departure of free neutrons in the guise of protons and electrons (also antineutrinos). Finally I tell them that each independent coin flip can take place any time, also at random, during the ten minute interval, so that students leaving will more closely match the random timing of neutron decay. Students like it.

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