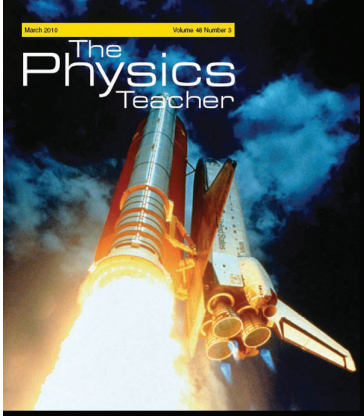
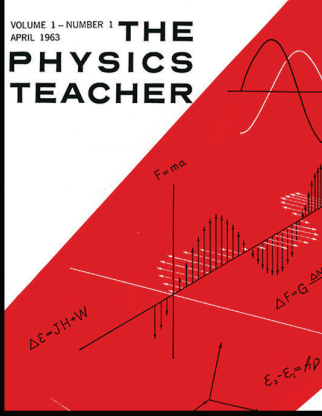
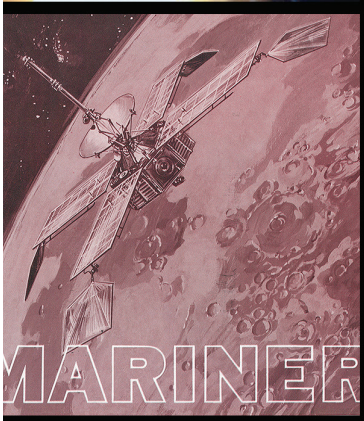
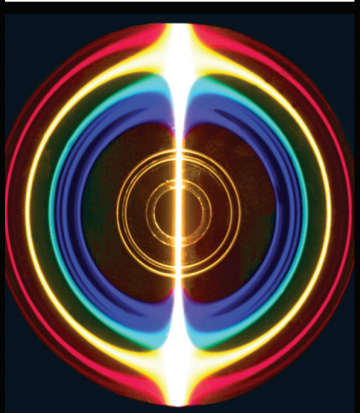


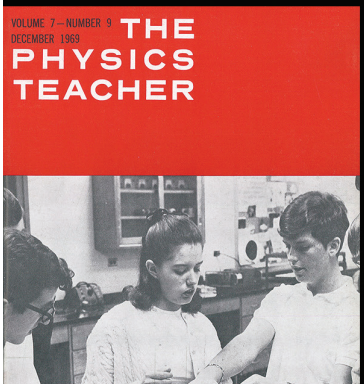
50 Years

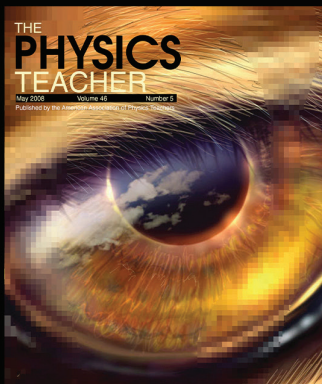






The Physics Teacher





Foreword

Gay Stewart, AAPT President 2013-2014

2013 marks the 50th anniversary of *The Physics Teacher (TPT)*. This booklet contains the reflections of 16 AAPT members regarding how their experiences with the journal have influenced their professional lives, as well as how their contributions have affected the journal. As President of AAPT, I have the honor of providing a brief introduction to the contributors. Each has had a major impact on our Association and its members.

Lila Adair, AAPT's President in 2008, has been a vital force in physics education for over 30 years. She has served in many capacities in the organization, including High School Representative to the Board, *TPT* author, editorial board member, and chair of many AAPT committees. Through his books and articles, former AAPT President and current *TPT* editorial board member **Ken Ford** has helped us make sense of phenomena ranging from the physics of soaring to quantum mechanics. His involvement in science education is diverse. He has taught students at the high school, undergraduate, and graduate school level. **Paul Hewitt**, best-selling author of the ground-breaking *Conceptual Physics*, has made the ideas of physics accessible to students at all levels and of all abilities. His *TPT* "Figuring Physics" column has been a favorite of teachers and students alike for over 30 years. **Eva Haddix** taught college English literature for 11 years before assisting Clifford Swartz in producing *The Physics Teacher* journal. Her attention to detail was apparent in every issue of the journal. A stalwart supporter of the physics teaching profession and former AAPT President, **John Hubisz** has also been president of the Texas and North Carolina Sections. John has served on and chaired numerous AAPT committees. His *TPT* book reviews are where one goes to learn about what's good in science reading. Another former AAPT President, **Harvey Leff** brings a formidable combination of ability, passion, and demonstrated accomplishment—in the classroom, in research, in academic leadership, and on musical stages—to his service to AAPT. Through his articles in *The Physics Teacher* he has demystified entropy and thermodynamics and illuminated the physics of light bulbs. **Martha Lietz** and I have worked together for years on various efforts. It has been a pleasure to share teaching ideas with her, as well as have her representation as chair of the Committee on Physics in High Schools and a section representative to AAPT. **John Mallinckrodt**, professor emeritus of physics at Cal Poly, has served as interim and consulting editor to *TPT's* sister publication, the *American Journal of Physics*, and is currently serving on the *TPT* editorial board. His letters to the editor never fail to help us better understand

physical phenomena. **Mary Beth Monroe**, recently retired physics professor and chair of the department of physical science at Southwest Texas Junior College, is AAPT's current President-Elect. Mary Beth's service to AAPT is extensive. She has served as AAPT Secretary and on numerous AAPT committees at all levels. **Carl Mungan**, physics professor at the U.S. Naval Academy, is a member of *TPT's* editorial board. Go to his "Browsing the Journals" column on the APS Forum on Education website to learn of interesting articles in *TPT* and other journals. **Lester Paldy**, Distinguished Service Professor at the State University of New York, was *TPT* assistant editor with Cliff Swartz for over 10 years. His current interests include international efforts to eliminate nuclear weapons. To this end he serves on U.S. arms control delegations in Geneva and at the United Nations. **Gorazd Planinšič**, chair of the board of the European Physical Society's Education Division, is a frequent contributor to *TPT* and one of AAPT's most active international members. His creativity shines through in his innovative experiments, pedagogy, and captivating presentations to groups of all ages, all over the world. **Diane Riendeau** not only serves AAPT as a committee and Executive Board member, but she has also been recognized by the American Association for the Advancement of Science as a high school teacher who has contributed significantly to the AAAS goal of advancing science education by "developing an innovative and demonstrably effective classroom strategy, activity, or program." **Thomas Rossing**, former AAPT President, has almost single-handedly brought acoustics back to the forefront of science education. Author of over 400 publications, he is currently visiting professor of music at Stanford University. **Chuck Stone** is an active member of AAPT, serving on committees and as section representative. He has received recognition of his efforts to promote diversity on the Colorado School of Mines campus. **Arnold Strassenburg**, retired professor of physics at the State University of New York at Stony Brook, served as AAPT Executive Officer from 1972 to 1982. During his career, he was also director of various programs at the American Institute of Physics, the National Science Foundation, and the National Science Teachers Association.

There is much more to be said about all of these individuals; I just wanted to give you a glimpse. Please enjoy their remarks and remembrances.

The Physics Teacher Editors

J.W. Buchta, 1963-1966
Clifford E. Swartz, 1967-1985
Donald F. Kirwan, 1985-1989
Clifford E. Swartz, 1989-2000
Karl C. Mamola, 2000-2013
Gary D. White, 2013 (effective Aug. 1)

Lila Adair

One of the greatest assets any teacher needs, other than an on-site mentor, is a research resource from which to draw. For science teachers, particularly the teachers of physics, this is fulfilled in *The Physics Teacher*. Fifty years ago, there were scientific journals available for college professors and researchers, but nothing for high school teachers. In 1963, J.W. Buchta had a desire to fill that need and produced the first edition of *TPT*. Over the last 50 years, *TPT* has grown and developed into one of the premier scientific journals available today.

TPT was first designed for high school teachers, but it currently serves teachers of all levels from elementary to college. My first year of teaching high school physics, I floundered because I had no real resource until I found *TPT*. The articles opened up a new world of physics to me and provided many creative teaching ideas for my students to enjoy. Over time I even built up the confidence to submit articles to *TPT* for others to enjoy.

TPT is a highly respected peer-reviewed journal. The editorial board consists of a variety of physics teachers and researchers, each with his/her own special area of expertise. This is necessary because of the diverse nature of the submissions. Currently cutting-edge research and lab-oriented articles can be found alongside papers on modern media like YouTube and iPhone technology, as well as Fermi questions, book reviews, physics challenges, new teacher hints, and many other unique sections. There is also a variety of levels at which the articles are written. Some are acceptable for elementary students, while others are best suited for college. There is something for everybody with an interest in physics, and the highly qualified editorial board takes the job of reviewing potential articles seriously.

Every five years the AAPT journals undergo a comprehensive review. In its recent review *TPT* was thoroughly studied and found to be highly praised by readers, published authors, and even those whose articles had been rejected. The editor and staff received high ratings for their professionalism in dealing with potential authors and advertisers. Readers enjoyed the variety of the articles and the fact that they could easily be adapted for many levels. Overall teachers were pleased with the ease at which they could use the articles in their classrooms. Over the years, more papers have begun to appear from authors from countries outside of the United States. This demonstrates the prestige and acceptability of *TPT* to our physics friends around the world.

Personally I have had the opportunity to serve *TPT* as a contributor and editorial board member, as well as serving on the last Five-Year Review Committee. After reading thousands of interviews, surveys, and comments, I was thrilled to see the level of respect for *TPT* from the physics community. It is being used as a research journal, a physics classroom resource, a reference for pre-service teacher candidates, and even for staff development of veteran teachers of all levels. It is indeed a brilliant jewel in the crown of AAPT.

I was blessed to have worked closely with editors Cliff Swartz, Don Kirwan, and Karl Mamola as they led the development of *TPT* through my career. They and their articles have inspired me, made me a better teacher, and helped those around me to improve their teaching skills. Happy 50th anniversary, *TPT*, and thank you to the editors, staff, authors, and readers of the journal for your contributions to physics.

Lila Adair retired from teaching physics at Central Gwinnett High School in 2002 and currently teaches science methods and supervises student teachers at Piedmont College in Athens, GA. Lila has been an active member of AAPT for nearly 40 years, was highly involved in the early PTRA program, and has served on numerous committees and on the editorial board of TPT *three times. Lila was President of AAPT in 2008.*

Ken Ford

My career as a physics teacher began 64 years ago when I was Eric Rogers' teaching assistant in an optics lab. It continues now as I tutor students online and occasionally get called to sub in a classroom. For almost 50 of those 64 years, *The Physics Teacher* has been important to me.

I have to admit there was a period early in my career when my copy of *TPT* may have been hard to find underneath copies of *PR* or *RMP*. I even let my AAPT membership lapse for a few years and went without *TPT* for that period. But I recovered from that aberration and never again thought that dedication to research and dedication to teaching were at cross purposes or that I need be at all embarrassed about trying to do the best job I possibly could as a teacher. There is joy and satisfaction in research. There is joy and satisfaction in teaching.

> There is joy and satisfaction in teaching.

My first contribution to *TPT* was a 1966 article called "The Key Ideas of Quantum Mechanics." Cliff Swartz, the then-new editor—or maybe he was only an assistant editor at that time—doubted that this article, drawn from a textbook I was working on, could be suitable for the journal. Then he decided it was OK and published it. (Perhaps he was suffering a dearth of submissions. If so, it extended into the next year, when he let me publish two articles "explaining" thermodynamics.) My most recent contribution, a small letter to the editor, was published in 2012. In between there were a few articles, letters, notes, book reviews, and a guest comment or two. One of my favorites was a short piece in 1975 titled "Why is Your Image in a Plane Mirror Inverted Left-to-Right but not Top-to-Bottom?" in which I imagined a mythical world where the inhabitants, who turned around horizontal instead of vertical axes, would wonder at such an odd question. The editor at the time was, of course, Cliff Swartz. That piece elicited an interesting exchange with Philip Morrison, proving that MIT professors read *The Physics Teacher*. Another contribution that I still like was a 2000 article, "The Physics of Soaring," which allowed me to bring together my vocational and avocational passions. On this article I dealt with—who else?—Cliff Swartz. I caught him at the beginning and at the end of his long, illustrious career as *TPT* editor.

Indeed for *TPT*, more than for many journals, the editor not only shepherds but shapes the product. Cliff Swartz did a wonderful job. Karl Mamola has been a superb successor, exceeding even the Swartz standard. What a job! I don't envy Karl, but I admire him tremendously. Imagine keeping authors as well as readers happy. Karl, with the help of his talented assistant, Pam Aycock in North Carolina, and the AAPT elves, Jane Chambers and Matt Payne in Maryland, has done just that (mostly!).

After receiving his PhD degree in 1953, Ken Ford conducted research in theoretical nuclear physics and taught in several universities, including UC Irvine, where he was the founding physicist. After retiring in 1993 from the directorship of AIP, he taught high school physics and continued writing. His books include Basic Physics *(1968),* 101 Quantum Questions *(2011), and a 2007 memoir,* In Love with Flying. *He was President of AAPT in 1972. He cites as his most cherished honor the 2006 Oersted Medal.*

Eva Haddix

Dr. Clifford Swartz was a boss such as I had never known in prior employments. He would come across the hall to talk with me about *TPT* manuscripts, show me a physics handbook he was reviving, or maybe invite me to a play he wrote that was being staged at his church. He never asked me to do his typing, remember phone numbers, or get him coffee (that libation was perpetually on tap in the physics lab downstairs).

The editor's own office reflected the active mind and varied interests of a man of many parts. A peek from the doorway gave a general impression. One shelf held hardbound copies of the several books he had published. Other shelves sagged under loads of books; file cabinet drawers overflowed; boxes of Tinker Toys and bags of gadgets were right at hand on the floor. The desktop held a variety of current projects, including *TPT* manuscripts. It was a man cave to the max. I rarely walked through the doorway.

However, when it came to putting together an issue of *The Physics Teacher*, Dr. Swartz knew just the right words to enhance copy in need of a bit of wordsmithing. He also was a devoted husband, father, grandfather, teacher, mentor, singer, poet, playwright, author, and friend. The many hats he wore enhanced his witty editorials, the technical articles, and even those infamous Famous Physicist All-Star Trading Cards!

When the occasional "bump" in putting an issue together arose, the editor remained calm. He could quickly design a cover, correct a flaw, insert a bit of humor, or elevate a worthwhile submission to acceptance. As a sideline, he had a collection of articles with student appeal, such as "Physics to Do While Waiting for Your Dinner in a Restaurant" and "Homely Experiments." He thrived on challenging students with "Physics Tricks," such as "the waltzing egg shell," "the candle see-saw," and "transporting an olive." I often saw him walking down the hallway on the way to class carrying a briefcase in one hand and clutching a grocery bag of "toys" in the other.

> Clifford Swartz's love of physics and gift for teaching drew me into a world of broadening horizons. And I was happy there.

My coworkers on *TPT* were Linda and Holly. They were located in the College Park office; I was in the physics building at the State University at Stony Brook, New York. Our lines of communication were telex and telephone. When Holly arrived at the *TPT* office in 1989, she operated a composite machine that spit out long pieces of type that were "pasted up" on boards for "shooting" the final text. She vividly remembers *TPT's* venture into the use of color, a major move forward. I agonized over preparing and proofing the annual index, grateful to know that Linda would be watching for slipups.

Holly reminded me of the day we were connected by modems and actually "spoke"

Eva Haddix taught freshman English literature at Judson College (Elgin, IL), earned a master's in Victorian literature (Syracuse University, NY), and for 11 years assisted Dr. Clifford Swartz in producing The Physics Teacher *journal at Stony Brook University (Long Island, NY).*

through our computers, the test trial of an early version of instant messaging. My day at the office might end in a race to the main office of Federal Express to deposit the latest changes in manuscripts, arriving just at closing time. Linda proofed the final copy. We three have particularly warm memories of spending time in the Swartz home, meeting the editor's talented wife, Barbara, and being invited to swim in their indoor pool.

The last note Dr. Swartz wrote me, dated June 28, 2001, was inscribed on the front page of a modern edition of *Bartlett's Familiar Quotations*. He thanked me for 12 years of "productive and pleasant work together." I think he enjoyed the look and sound of the alliteration!

I had one last contribution for *The Physics Teacher*. *TPT* issues and manuscript folders that accumulated during Dr. Swartz's nearly 30-year tenure had to be boxed up. More current submissions, which were stacked in a file tray by my office door, were added. Then a happy thought arose: Why not just take the weighty items to the new editor, Karl Mamola? Husband Jim and I drove off Long Island, the car laden with its cargo of bulky boxes in the trunk and back seat. We were headed for a place we had never been—Boone, NC.

Our welcome to Appalachian State was warmly Southern. Probably the new editorial assistant, Pam Aycock (then Slaydon), worried about the bundles we were leaving her, but she smiled cheerfully. She queried me on how *The Physics Teacher* operation under Dr. Swartz had functioned. Of course his methods were his alone and never put on paper. She was free to develop her own system. She has indeed done that, and excelled at it.

I had no inkling of how quickly the publication would develop into an international journal with colorful ads and spectacular covers, while still offering teachers on many levels noteworthy materials, including new columns.

We three "old timers" look back on our *TPT* days and association with Editor Swartz with smiles and fond memories. I, the one with a master's degree in 19th-century English literature, would seem a misfit in a physics environment. But there was a man named Clifford Swartz whose love of physics and gift for teaching drew me into a world of broadening horizons. And I was happy there.

Eva Sprague Haddix (SUNY 1989-2001)
Holly Rumpler Rahmlow (College Park 1989-1991)
Linda Sigmon Streaker (College Park 1988-1997)

J. W. Buchta, Editor 1963-1966

J. W. Buchta was born near Osceola, NE, in 1895. After graduating from the University of Nebraska in electrical engineering, he took his PhD in physics at the University of Minnesota in 1925. Except for leaves of absence he spent his entire academic career at Minnesota, where he was chairman of the physics department from 1938 to 1953, and served as associate dean until 1962. During 1941-1946 he was acting editor of *Physical Review* and *Reviews of Modern Physics* and the editor of the latter journal from 1948-1957. He was President of the American Association of Physics Teachers in 1947-1948 and was awarded the Oersted Medal in 1957. At retirement he took on more work than ever, becoming Executive Secretary of AAPT and the first editor of *The Physics Teacher*. His contributions to physics education as a teacher, as well as editor and administrator, were noteworthy.

Paul G. Hewitt

There's not enough space to say how much of my life, both professionally and socially, has revolved around AAPT. But I can say what it's meant to me in one sentence. My closest friends over the past 50 years are those I met at AAPT meetings. In the early '80s, Don Kirwin, editor of *The Physics Teacher* (*TPT*), asked me to do a monthly cartoon featuring intriguing physics ideas. Since cartooning and physics are like good wine and fine cheese to me, I readily agreed and submitted a cartoon of a sailor asking a question regarding the relative buoyancies of a ship loaded with iron ore and another with an equal weight of Styrofoam. When the issue came out, I was shocked to see that Don called it "View-It with Hewitt!" It reminded me of an earlier experience at the exhibit hall of an AAPT meeting when my book *Conceptual Physics* was first published. At the Little-Brown booth was a huge portrait of me, reminiscent, I thought, of Chairman Mao or L. Ron Hubbard. This was not for me! To circumvent embarrassment I had the portrait removed immediately, and I similarly asked Don to remove the "View-it with Hewitt!" border accompanying my art. I suggested "Figuring Physics," and Don complied. I've been submitting these physics cartoons ever since. Don placed them monthly, a page for the question with the answer on the back of the page. As I do now, I supplied batches of them, giving Don latitude in complementing the themes of particular issues. When Cliff Swartz returned as editor, he had mixed feelings about their value and published them only occasionally. This changed a few years later at a summer meeting at Brookhaven Labs when Cliff gave a keynote talk. I followed his presentation with a 10-minute talk — Cliff still in attendance. Near the end of my presentation I asked for an audience show of hands for how many read "Figuring Physics" in *TPT*. Nearly all hands rose, and Cliff took notice. After that he published them every month. And I'm happy to say that Karl Mamola has done the same. Karl has them appear at the front of the magazine and has made what I deem a good move. He has placed the answers to each "Figuring Physics" question on the AAPT website. I applaud this, mainly because I've always felt that a significant "wait time" was important before a reader sees the answer. This is vital for students, and also readers of *TPT*. So in posting solutions on the website, Karl produced a "wait time" for *TPT* readers. As in a classroom, there's little value to a question asked if the answer is provided before one thinks about it. My hope for "Figuring Physics" has always been that teachers post it, then wait for a half week or so before posting the solution. With "wait time," students often change their answers upon further thought, and hone their thinking in classmate discussions. Learning is taking place!

AAPT has been central to my striving to inspire students to see the value of learning physics. What I first accomplished in my classrooms, then later via videos taken in my classrooms, has been extended monthly with "Figuring Physics." Now in my 80s, I'm as energized and passionate as ever, not only in keeping *TPT* supplied with batches of "Figuring Physics," but in producing "Hewitt Drew It" screencasts that appear on YouTube, reaching a greater number of students contemplating a life in science and adults looking for enrichment. My wife, Lillian (whom I didn't meet at an AAPT meeting, but who attends meetings with me), converts my drawings and narrations into five- to eight-minute elementary physics lessons, which at this writing are approaching 100 in number. So my life has been one of teaching physics, the core of which has been AAPT. As stated at the outset, I suggest my belief to all—AAPT is where your future friends are.

Paul G. Hewitt had an active life—boxing champion, cartoonist, Army veteran, uranium prospector, and sign painter—before finding his love of science at the age of 25. After education from prep school through graduate school, his mission has been inspiring others to share his love of physics.

John Hubisz

One day in 1963 I found in my university mailbox three copies of the first issue and one of the second of *The Physics Teacher*. The table of contents would have been enough to encourage me to subscribe! For example, there was Francis W. Sears on "Weight and Weightlessness." I used his first editions (three volumes) as a student and was using a later edition in 1963 as the text for my class. Frank Verbrugge (President of the AAPT) had an editorial on the establishment of the journal, its purpose, its hopes, and a few words about its editor, J.W. Buchta, who was to determine its content. I still have my membership card signed by Verbrugge. At this point in its history, *TPT* was designed for the high school teacher, although it was hoped that university teachers of introductory courses would become familiar with its content. Then there was Haym Kruglak, E. Scott Barr (writing a positive review of *Count Rumford* by Sanborn C. Brown, a book that I had enjoyed), Philip Youngner (writing a review of Eric M. Rogers' *Physics for the Inquiring Mind*), and then there was GEORGE (George Freier), famous for his cartoons and simple demonstrations. The editorial board included Mario Iona, William V. Houston, Thomas D. Miner, Melba Phillips, and Richard T. Weidner. Joseph A. Struthers in "Teaching the Dynamics of Uniform Circular Motion" tried hard to straighten us out about the "centrifugal" force. These were all familiar names!

The Teacher Recognition Program of the first issue recognized 28 high school teachers out of over 200 writing an examination, including Thomas D. Miner (later to be associate editor for 13 years and co-author with Clifford E. Swartz of *Teaching Introductory Physics: A Sourcebook*). We have continued this practice of awards for good teaching. A couple of articles on measurements remind us that we still have a "Temporary Committee on SI Units and Metric Education."

All the editors have their own idea as to what function *The Physics Teacher* should have and they make it clear in their introductory editorials. J.W. Buchta (1963-1966) in the first issue made it clear that *TPT* was for high school teachers. I found it more stimulating than most texts for what I wanted to get across to students. His passing led to Robert W. Detenbeck as acting editor and Phil DiLavore as assistant editor for about a year, leaving no particular philosophy, but Phil introduced me to the physics of technology modules that essentially took apart a piece of equipment (toaster, bicycle, etc.), pointing out all the physics in the construction and operation. I bought all the modules, and much of the equipment, or had students find the material required.

Clifford E. Swartz (1967-1985, 1989-2000) was introduced in *TPT* **5** (6), wherein he and Lester G. Paldy recognized that the link between high school and college, especially the two-year colleges, had become blurred to such an extent that we could no longer treat *TPT* as only for high school teachers. In addition, they felt that the small fraction of students taking physics must be increased, so the editors were looking for articles on work being done to increase that percentage. In 1971, I began a 22-year stretch teaching in a two-year school in Texas that brought me into a brand new environment of introductory physics teachers. By 1973 I was teaching over 125 students a semester, including the summer, and female enrollment was over 50%. *The Physics Teacher* was quite readable by my students and I found it a great resource

Semi-retired physics professor John Hubisz is currently an adjunct faculty member of the physics department at North Carolina State University in Raleigh. As an ordained clergyman, he teaches a weekly religion course for those wanting to know more about Catholicism. He continues to be active with the North Carolina Section of AAPT as well as serve on two national committees of the Association. And, of course, he still enjoys editing his "Book Reviews" column in TPT.

for projects to meet my objectives. When Cliff Swartz retired the first time, Al Bartlett wrote an excellent "Remarks of Appreciation for Cliff Swartz, on his Retirement as Editor of *The Physics Teacher*" as an insert in *TPT* **23** (6). This note could just as well have been used when Cliff retired again in 2000!

In the same issue, the new editor, Donald F. Kirwan (1985-1989), called 1985 "The Year of the Pre-College Physics Teacher Summer Programs," categorizing the activities of the previous summer as research, training, curriculum development, and those encouraging teachers to utilize what they had learned to reinvigorate their teaching. He then asked, what now? Answering, he presented notes of encouragement to the participants, the directors and instructors, the funding/sponsoring agencies, and lastly to the physics community, to see to it that the programs were effective. Don's influence on me took on a different direction; I began to successfully write grants for equipment and travel. Grants brought in laboratory equipment, computers, and a 7-inch Questar that attracted not only local interest in astronomy, but also a start on a hands-on science museum especially for children. I was awarded an AAPT Distinguished Service Citation in 1990 and I was elected as the Two-Year College Representative to the AAPT Executive Board.

In September of 1989, we heard a familiar voice: "We're Back, Too!" and it was true. Cliff Swartz was back, fully invigorated, ready to take up his pen once again and giving an overview of what he and his staff had to offer. Cliff's cover, "They're Back!" on the September issue hinted that we teachers were back for his challenging editorials. He had even inserted an article of his own, "Reference Frames and Relativity."

In 1997 Cliff asked if I would be interested in becoming the "Book Reviews" column editor and I asked if A/V material, micro-reviews, and collections of books on a topic would be appropriate, and he agreed. The latter feature has generated the most mail, all positive. I love to read, and putting together this column in *TPT* has kept me stimulated.

In May of 2000 Cliff said "Goodbye" and in September he introduced Karl Mamola ("Apparatus" column editor) as the new editor to take us into the 21st century. Karl had his own editorial wherein he introduced his staff, a few of whom he still has with him in 2013, and his goals. Karl has done a great job! I have found myself reading more of *TPT* for pleasure these last couple of years now that I am not teaching and wishing I had known a lot of this material much earlier.

Two great features of *TPT* are the covers and the editorials. The cover might be a graph, a photograph, a drawing, students in action … one could never guess. A lot of work goes into these covers. The other distinguishing characteristic was how editorials were handled. Some were written by the editor (few or many) and some by invited individuals (mostly handpicked for a particular topic). However, Cliff Swartz wrote an editorial for just about every issue. I particularly looked forward to them, and when he retired after about 250 issues I encouraged him to collect them and get them published. He subsequently published *Cliff's Nodes*, with over 115 of them. It is a valuable collection for any new teacher as I noted in my column in January 2011.

I have been president of the Texas Section and the North Carolina Section, chairman of several AAPT committees, winner of several awards in Texas and North Carolina, and was the first AAPT President for this century, and it all started with some notes in the first *TPTs* and was redirected at several points along the way by notes, articles, and people whom I met through my reading of *TPT*. Has *TPT* had a positive influence on me and my teaching? You'd betta believe it!

Harvey Leff

As a longtime reader of *The Physics Teacher*, I have a deep appreciation of its many readable, highly relevant articles for teachers. Congratulations to Editor Karl Mamola and AAPT on the occasion of *TPT*'s 50th anniversary. We are fortunate to have this great resource, with its full online archive accessible to all AAPT members.

Because a main interest of mine is energy transformations and, more generally, thermodynamics, I have been particularly interested in articles in these areas over the years. I take the opportunity to highlight articles on energy and thermodynamics in *TPT* that I have found particularly useful. My selection is not exhaustive, and I apologize for the many good articles I could not include.

Energy is elusive, and does not even have a solid definition. Energy transformations lead to confusion beginning with the definition of work, and especially at the interface of mechanics and thermodynamics. Arnold Arons carefully addressed logical and conceptual problems associated with the work-kinetic energy theorem (1989). John Jewett's excellent series on subtle aspects of energy clarify many points of common confusion, and emphasize important difference between stored energies, e.g., internal energy, and energy transfers, e.g., work and heat (2008).

One of my favorite thermodynamics articles in *TPT* is a 1970 contribution by Mark Zemansky, "The Use and Misuse of the Word 'Heat' in Physics Teaching." I commiserate with his woeful feeling that many teachers lack understanding of thermodynamics and that this relates in part to difficulties with its terminology—e.g., confusion between the terms *heat*, *internal energy*, *temperature*, and *thermal energy* (for which no definition exists). Zemansky expressed this succinctly:

Teaching thermal physics
Is as easy as a song:
You think you make it simpler
When you make it slightly wrong!

> ***TPT* … is fun, is highly educational, and is likely to help teachers improve their teaching.**

Zemansky's article could help anyone with an uneasy feeling about thermodynamics. Francisco Glover (1969) published a comprehensive article on specific heats of materials and how some elementary quantum concepts can deepen understanding. He illuminates the concept of temperature and its measurement, the kinetic theory of gases, and the basic concepts of the quantum theory.

In 1974, Albert Bartlett began a thoughtful discussion of home heating. He addressed winter fuel savings from shutting off heat to an unused room. He used an equivalent electric circuit model in which thermal resistances are represented by electrical resistances and the

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furnace plays the role of an emf generator. This was followed with related contributions by Bartlett and others in a series of informative letters to the editor, resulting in much good physics in an interesting social context.

Bartlett also began a remarkable series in 1976 featuring photos of thermal patterns in the snow. He milked a good deal of physics out of relatively straightforward, well-described photos. Reading the more than one dozen contributions can provide appreciation for nuances of thermodynamics.

Jill and Jay Huebner showed that visual thermal patterns also provide clues to the sublimation of tungsten filaments in incandescent light bulbs (1981). A simple examination of such a bulb that has been used for a while can reveal whether its operating configuration had the threaded base downward, upward, or sideways. This was one of the fascinating phenomena that piqued my own interest in incandescent lamps (1990). Others have been similarly inspired to write about the physics of light bulbs.

Richard Bartels and Fred Loxsom addressed the question of whether one can get a sunburn through glass (1995). Subsequently, they published a related article on how much sun protection one gets from wet and dry t-shirts (1998). Earlier, Russell and Bartels had studied the energy absorption of roofing shingles of different colors (1989). While color gives information on absorption of visible frequencies, absorption in the invisible infrared is more important for heating. I presented their interesting results to students in courses on energy and the environment and thermodynamics. Along related lines, I recommend the work by Vollmer et al. on aspects of infrared physics (2001).

Applications of thermal physics and global energy usage are discussed nicely by Sean Cordry (2010). This goes well with an earlier article by Herman Erlichson on Robert Julius Mayer's study of energy processes in living systems (2007). Mayer's accomplishments with the first law of thermodynamics are discussed by the late Ronald Newburgh and me (2011), and led to an educational exchange with Andersen (2012).

Finally, I mention my five-part series on thermodynamic entropy, which emphasizes that for real thermodynamic processes, a useful *indicator* of entropy change is the redistribution of internal energy by heat and/or work and/or diffusion processes. I call this the spreading of energy (2012). I believe this metaphor can ease the path toward a qualitative understanding of the seemingly mysterious entropy. In the spirit of Zemansky's jingle, spreading can be summarized in rhyme:

S stands for spreading
It's easy as can be
This mnemonic
Sheds light on entropy

There are many more excellent articles in the treasure trove of *TPT*'s online archive. *The Physics Teacher* has been an important part of my teaching career and, though retired, I still read it monthly, submit manuscripts, and continue to review article submissions, as asked. Why should physics teachers read *TPT*? Succinctly, there are three main reasons: it is fun, it is highly educational, and it is likely to help teachers improve their teaching.

I am grateful to Karl Mamola, who has tirelessly edited *TPT* for the last 13 years. He took a good periodical and made it even better, by exercising excellent editorial judgment to maintain scientific integrity while adding some frills and achieving a modern, attractive look. I wish Karl well in his retirement, and know *TPT* will continue to help physics teachers improve their craft.

Martha Lietz

My first AAPT national meeting was the 1978 Summer Meeting in London, Ontario. I was 13 years old. My dad took the whole family to the meeting with him and we vacationed in Canada. I don't remember much of that meeting, but I still have a fossil that I found while playing near the river during the picnic. It would be another 11 years before I became a member of AAPT myself and received my first issue of *The Physics Teacher* in the mail.

I got my first full-time physics teaching job starting in the fall of 1990 teaching AP Physics and regular physics at Niles West High School. And I have been reading *The Physics Teacher* ever since. I can't claim to be one of those members who grabs it out of the mailbox and reads it cover to cover. Of course, I don't do that with any magazine. Most school days I usually dump the mail on the hall table and head to my office to plan a lesson, write a test, or grade one. I'm embarrassed to admit that it usually collects dust on the magazine rack until I have a few free moments on the weekend, over spring break, or during the summer. But when I do get the chance to flip through an issue, there is always an article that makes me rethink how I am teaching. Then I kick myself for not being more diligent in reading every issue.

I have several "favorite" articles that I have used to develop classroom activities. "The Interrupted Pendulum: A Laboratory Experiment in the Conservation of Energy" by Herbert T. Wood (Oct. 1994) provided the inspiration for a lab that has been a staple in my AP Physics course ever since it was published. It is a great low-tech lab for any budget and it involves combining the multiple concepts of circular motion and conservation of energy. Another article that is a staple in my classroom is "Free-Body Diagrams Revisited – I" by James Court (Oct. 1999). This article shows a simple rock executing various motions and asks the students to draw the forces on the rock. I use this article as a worksheet in all my physics courses, from regular level to honors and calculus-based AP. The rock exhibits a variety of motions from being at rest in equilibrium, to sliding down an incline, to free fall both with and without air resistance. I like how looking at one simple object in different motions allows the students to focus on the forces rather than on less important details. There isn't enough room in this booklet to list all the articles and ideas I have gotten from *The Physics Teacher*. Suffice it to say, it has provided more professional development for me than any education textbook.

One of my proudest moments was when my colleague Richard DeCoster recommended that I write up a lab the two of us developed and submit it to *The Physics Teacher* - "A Potential Gauss's Law Lab" (April 2000). I was published! It was a great moment for me. I was proud (probably not as proud as Dad!), but I was also grateful that I was able to give back to both a journal, and the other authors, who provide so many great ideas for my classroom. Another way that I have been able to give back is as a reviewer of other authors' work. It is a great privilege to read another's work and share ideas with another author, even if it is done anonymously.

TPT has changed and grown in the 23 years I have been teaching. I recently flipped through the October 2012 issue and found some of the same great features that it has always had. The article by Tracy Hood about a demonstration with a balloon and compass will help me clear up a huge misconception between magnetism and electrostatics (p. 398). The article by

Martha Lietz has been a physics teacher at Niles West High School since 1990. She has served as president of the Chicago Section of AAPT and is currently serving as section representative. She has also served as chair of the Committee on Physics in High Schools. In addition to work with AAPT, she also works as a consultant for the College Board, helping to develop their AP Physics courses and exams.

Kathleen Harper about grading problem-solving process skills (p. 424) will help me revamp how I grade AP problem sets. But in addition to the articles about demonstrations and pedagogy that have always graced the pages of *TPT*, there are some great newer features like "WebSights" and "YouTube Physics," which didn't exist (for obvious reasons) when I started teaching in 1990. Dan MacIsaac and Diane Riendeau do a great job of searching the web, polling colleagues, and sharing great ideas from the Internet. And even though I have been teaching longer than my students have been alive, I get great advice from Patricia Blanton's column, "For the New Teacher."

Despite the fact that the entire catalog of articles is available and searchable online, I still love having my paper copies from 1989-2013. They take up an entire shelf in my office, neatly organized by year in clear plastic magazine holders. I recently inherited my dad's collection of *TPT*s from the '70s and '80s. I know it isn't the traditional type of memorabilia from a parent, but I look forward to curling up in the recliner, flipping through his old *TPTs,* and remembering my dad and all the AAPT meetings we shared together, from London, Ontario, to the University of Maryland, Orlando, Orono, Spokane, Chicago, and especially his alma mater, Notre Dame.

Articles and Editorials by Nobel Laureates

Sir Lawrence Bragg

The History of X-Ray Analysis
October 1965 – Volume 3, Issue 7, p. 395

Walter H. Brattain

Genesis of the Transistor
March 1968 – Volume 6, Issue 3, p. 109

Richard P. Feynman

The Relation of Physics to Other Sciences
March 1964 – Volume 2, Issue 3, p. 111

Symmetry in Physical Laws
April 1966 – Volume 4, Issue 4, p. 161

What Is Science?
September 1969 – Volume 7, Issue 6, p. 313

Leon Lederman

Neutrino Physics
January 1968 – Volume 6, Issue 1, p. 13

Unraveling the Mysteries of the Atom
January 1982 – Volume 20, Issue 1, p. 15

Physics First?
January 2005 – Volume 43, Issue 1, p. 6

Robert A. Millikan

Editorial: ***The Opportunity of the Physics Teacher***
September 1965 – Volume 3, Issue 7, p. 295

Glenn T. Seaborg

Editorial: ***The Need for Physics Training in a World of Change***
February 1960 – Volume 7, Issue 2, p. 74

The Expanding Role of the Atom in the Humanities
November 1970 – Volume 8, Issue 8, p. 422

John Mallinckrodt

One of the challenges of any teaching career is retaining the enthusiasm that we initially felt for our subject, the enthusiasm that drew us into that career in the first place. This is particularly true for those of us teaching in high schools, two-year colleges, and many four-year colleges and comprehensive universities, where the teaching loads tend to be heavy and focused primarily, if not exclusively, on introductory course work.

Fortunately, even introductory-level mechanics, thermodynamics, E&M, relativity, and modern physics offer effectively boundless supplies of challenges, surprises, delights, and new insights. Even more fortunately, the physics teaching community has, for 50 years now, enjoyed the support of *The Physics Teacher* as a welcoming and informal place to share our own pedagogically enriching, career-sustaining discoveries with fellow teachers. *TPT*, along with its sister journal, *AJP*, and of course AAPT itself, has been entwined in many different ways with my career and absolutely essential to my professional development. Thus, I greatly appreciate the opportunity to offer here my sincere thanks to AAPT and to the three fine *TPT* editors—Cliff Swartz, Don Kirwan, and my good friend, the gentle-souled Karl Mamola—whom I have had the pleasure to interact with over the last four decades.

As with many, perhaps most, undergraduate physics majors, I chose physics for the perfectly simple reason that it was fun and I was good at it. I thoroughly enjoyed my undergraduate days at Harvey Mudd College, where a career was the furthest thing from my mind. Accordingly, the only conceivable thing to do after graduation in 1973 was to take advantage of the opportunity to continue being a student. I was accepted into the physics PhD program at Berkeley and given a TA assignment in a large enrollment introductory course with about 10 other grad students who shared the responsibility for leading recitation sections and laboratories and grading exams.

Somewhat to my surprise, I quickly discovered that I enjoyed my teaching assignment at least as much as my graduate studies. Indeed, I came for the first time to suspect and fear that I might neither have nor really want to develop the kind of single-minded focus it would likely take for me to succeed as a research physicist. My interests in physics were too broad and I had other interests outside of physics, especially in music, that I wanted to have time to pursue as well.

Berkeley was probably not the best place to make those discoveries. Nevertheless, two attractive options were presented to me:

1) I could switch out of the physics department into a new interdisciplinary group in science and math education (the "SESAME" group) being formed by Robert Karplus, Fred Reif, and Alan Portis and continue my PhD studies in a field that was being called "physics education," or

2) I could undertake traditional thesis work in experimental ionospheric physics under the guidance of Kinsey Anderson and take advantage of his magnificent humanity and patience to indulge my other interests.

Because I had worked for a quarter as a TA in Bob Karplus' self-paced Keller plan course and because of my growing certainty that I wanted to end up as a teacher, I leaned toward the first option, but I was ultimately persuaded that, if I wanted to teach at the college level, I had better obtain a traditional PhD in physics. I often wonder about that choice, but it was certainly the safer one at the time and I can't complain about the results.

John Mallinckrodt is lead guitarist for the "Out-Laws of Physics" and emeritus professor of physics at California State Polytechnic University (Cal Poly Pomona), where he was lucky enough to find extraordinarily supportive, encouraging (and even musical) colleagues despite—or more likely because of—being an out-of-the-closet, pedagogically oriented generalist.

Because of my advisor's aforementioned patience, I found that I was able to work toward my PhD on a relatively relaxed basis compared with graduate students in other research groups, and I found enough "spare time" to teach physics part time both at a local private high school and at Mills College, to work weekends at a professional recording studio in Sausalito, to build and run my own small demo recording studio in the attic bedroom of my communal house, and to perform and record with a few local bands.

It was also during those years that I discovered AAPT, *TPT*, and *AJP*. I read the journals regularly and began attending Northern California Section meetings. It seemed clear that AAPT and its journals would figure prominently in whatever teaching career I might have.

After receiving my doctorate I began a difficult search for a teaching position in a college physics department that I was not at all sure existed, one that would emphasize teaching excellence and that would at least tolerate, if not unequivocally support, my predilections (and attendant lack of traditional "research productivity") as a pedagogically oriented generalist. I was confident, however, that my unusually extensive and varied teaching experience and my already established association with AAPT would give me some advantage in that search.

Indeed, although the search took longer than I would have hoped and included a dispiriting tenure denial along the way, my association with AAPT and its journals were ultimately instrumental in connecting me with my mentor, colleague, BFF, and "Out-Laws of Physics" drummer, Harvey Leff, a recent Past President of AAPT, and plugging me into a nearly perfect position at Cal Poly Pomona. Here, I've had the genuine pleasure of teaching most of the courses in the undergraduate curriculum to unusually large classes of physics majors and of being encouraged in my desire to devote my scholarly energy to the AAPT and its journals. Whatever small service I might have rendered to the organization along the way, however, has more than repaid itself in professional satisfaction.

Clifford Swartz, Editor 1967-1985 and 1990-2000

Clifford E. Swartz was a founding member of the physics department faculty at Stony Brook University (State University of New York at Stony Brook) and editor for almost 30 years of *The Physics Teacher*. He authored or co-authored more than 30 books, most of them physics books and textbooks, including *Teaching Introductory Physics: A Sourcebook*, *Phenomenal Physics*, and *Back-of-the-Envelope Physics*.

Swartz was legendary for his lectures, demonstrations, and enthusiasm for teaching physics. He was a 1945 graduate of the University of Rochester, where he earned his PhD in physics in 1951.

Starting in 1951, Swartz was a scientist at Brookhaven National Laboratory. There he worked on experiments with the Cosmotron, which was then one of the new generation of high energy accelerators. With his newfound interest in teaching physics, he helped start the physics department at the new State University of New York at Stony Brook in 1957. Between 1981 and 1983, Swartz was the first civilian physicist to teach at the Military Academy at West Point. He was awarded the Outstanding Civilian Service Medal by the Department of the Army in 1983 for his efforts to change the physics curriculum at West Point. In 1987, he was awarded the Oersted Medal of the American Association of Physics Teachers – which recognizes "those who have had an outstanding, widespread, and lasting impact on the teaching of physics." In 2007, he was the 10th person to be honored with AAPT's Melba Newell Phillips Medal.

Mary Beth Monroe

I was introduced to *The Physics Teacher* while a sophomore in college, 45 years ago. The physics department at Sam Houston State University had hired me to teach introductory labs for science majors and then, in subsequent years, to additionally teach labs for liberal arts majors. During that first summer of my "lab teaching career," I was assigned as lab assistant for an introductory course that did not have a designated lab manual. The course professor turned the lab completely over to me, merely telling me what topics he was teaching during the week. It was my job to develop activities to match those topics. Needless to say, this was a daunting challenge for a young and inexperienced physics major without formal training as a lab assistant and little experience as a lab student.

To help me meet this challenge, the course professor shared with me his copies of *The Physics Teacher*. Those issues were a blessing! They gave me ideas for lab activities and strategies for lab investigations, and, in some cases, identified areas that may challenge students as they conducted the experiments, analyzed the data, and prepared their conclusions. (Recall these were the days before PER.)

Due to the small enrollment in the labs, I had many opportunities to interact with the students during each three-hour lab. Students often expressed frustration in trying to learn physics (i.e., pass the lecture exams) and not understanding why they had to take physics. Such comments from my students, in concert with my reading of the discussions by *TPT* authors describing their own instructional experiences, caused me to begin questioning the role of the lab in physics education, and also turned my thoughts to possibly choosing physics teaching as a career.

I should not neglect to say that the articles in *TPT* even taught me physics and continue to do so to this day!

TPT continued to be an invaluable resource for me as I graduated from lab assistant to high school teacher to college professor and finally to sole physics faculty member at a rural community college, this position lasting for 35 years. *The Physics Teacher* has provided feature articles and columns that have kept pace with the changing instructional environment and the changing needs of our students enrolled in a diversity of introductory physics courses and programs. *TPT*, together with the *American Journal of Physics*, the Texas Section AAPT meetings, and the AAPT national meetings, provides me with a readily accessible communication channel to two-year college colleagues and to the larger physics education and STEM communities, thereby diminishing the continuous threat of academic isolation.

It is important for readers to realize that as I credit and praise *TPT* for successes I may have had as a physics teacher, I am really praising the work of the journal's editors, Cliff Swartz, Don Kirwan, and Karl Mamola. I relate below a second story to illustrate the editors' unselfish commitment to produce a quality refereed journal that remains attractive and relevant to the readership.

I am a member of the two-year college physics teaching community, a community that only about 25 years ago began to recognize and embrace their successes as physics teachers. Mike Neuschatz, AIP Statistics Division, after analyzing the results of the first-ever two-year college survey (1996), described the two-year college as a "hidden resource." Subsequently, programs such as

Mary Beth Monroe is a professor and chair of the physical science department at Southwest Texas Junior College in Uvalde, TX. She served as Secretary of AAPT (2001-2007) and was also Member-at-Large for Two-Year Colleges for two terms (1979-1982, 1994-1997). She is currently President-Elect. She has received the AAPT Distinguished Service Award as well as the Melba Newell Phillips Medal.

TYC21, the TYC Workshops, and PEPTYC forged the two-year college community. However, in 2007 most four-year college and university physics faculty were still unaware of the successes that two-year college faculty were having in implementing physics education reform and outreach efforts to their local K-12 schools and the general public.

During a one-day invited writing session held in tandem with the AAPT national meeting in Greensboro, NC, Karl Mamola served as special consultant to six invited two-year college faculty, including the session's organizers, Tom O'Kuma, Dwain Desbien, and me. Karl was a daylong participant, joining in the critiquing of first drafts prepared by each of the TYC participants and serving both as a resource and a source of encouragement during the revision of the drafts. He provided tips on what topics were attractive to *TPT* readers, described what aspects the readers would want to learn about, and reviewed the *TPT* criteria for submitted manuscripts. Following the workshop, two TYC faculty submitted three manuscripts for publication to *TPT* and all three were accepted. More *TPT* publications by TYC authors have followed.

Karl spends much time interacting with faculty at professional conferences and informal gatherings to keep abreast of the academic issues facing physics faculty and students. So he knew and understood the TYC community's hesitancy to publish. At the close of the writing session, Karl asked me to convey to the TYC faculty that he and his editorial staff were always available to offer individual assistance to potential authors. As an active physics teacher and *TPT* editor, he offered his time and talent to help TYC leaders convey to their community that through publications they would share their experiences with TYC colleagues and the larger physics/science community, improve the visibility of the two-year college community as an important resource for introductory physics education, and that, most importantly to this community, scholarship (such as publication in *TPT* and other refereed journals) would positively impact their own classrooms.

Through the efforts of Karl, Don, and Cliff, such as the one reported above, *The Physics Teacher* has evolved to a must-have journal for all teachers of introductory physics. *TPT*, thank you and happy 50th birthday!

Donald F. Kirwan, Editor 1986-1990

Don Kirwan received his PhD in 1969 from the University of Missouri-Columbia and worked as professor of physics at Louisiana State University, Baton Rouge. Originally a theoretical nuclear physicist, his primary interest changed to finding ways of helping others to better understand—and become excited about—physics. Most of his work was with elementary classroom teachers, high school physics teachers, and university faculty who teach courses for nonscience majors, with the goal of ultimately impacting the greatest number of learners.

Working closely with colleagues, he developed and directed national professional development programs for teachers, including *Operation Physics* and *Operation Primary Physical Science*. These hands-on, inquiry-based programs were aimed at enhancing teachers' understanding of physical science, as well as providing the teachers with improved strategies and skills for teaching science in their own classrooms. He also collaborated on the development of *Powerful Ideas in Physical Science*, a model university physical science course. Kirwan received the Distinguished Service Citation from AAPT in 1981 and retired from LSU in 1999.

Carl Mungan

I don't remember having heard of AAPT when I was an undergraduate. I was schooled in Canada, so that may be part of the reason for my ignorance. After doing my graduate work at Cornell and a postdoc at Los Alamos, what I most enjoyed was the basics of all areas of physics. So it became clear that a primarily undergraduate university or liberal arts college would be the best fit for me and I interviewed at such places. The University of West Florida, a school in the Florida state system, made me a tenure-track offer, so we packed up for Pensacola in fall 1996. The physics department had four tenured professors. I was replacing Dick Smith, who had started the Listserv PHYS-L (still a great forum for asking about and discussing physics at the college level). There was also Jim Marsh, a quantum theorist.

Jim had the interesting habit of periodically writing up a short handout on whatever topic he happened to be thinking about at the time, such as the quantum measurement problem or converting magnetostatic integrals into their electrostatic analogs. In a matter of months, I was doing the same thing—and have continued writing what I call white papers ever since. (The long list can be accessed at http://usna.edu/Users/physics/mungan/Scholarship/scholarship.html.) Sources of inspiration include issues that arise in class or when I'm preparing to teach a topic (or grading homework), something I read in a journal such as *TPT*, or an item from PHYS-L (motivated by my desire to preserve the ideas in a more settled form than the archived postings offer). Eventually one of these white papers was sufficiently rich that I dared to consider publishing it in 2001, by which time I had moved to the U.S. Naval Academy, which afforded me better research collaborations.

Let me back up to 1996 again. That autumn, I got into the first New Physics Faculty Workshop, held at College Park and sponsored by AAPT. This event was my first exposure to AAPT (not to mention Peer Instruction, as well as an organized physics demo show like those run by the University of Maryland, and many other innovations). I was delighted when they sent me to the subsequent National Summer Meeting in Denver. (My wife and six-month-old son were there, each with their own nametags. We stayed in the dorm and gave our son baths in the kitchen sink.) I joined AAPT and subscribed to *TPT*. Every issue had ideas for a starting physics faculty member like myself, struggling to teach seven courses a year with new preps every semester.

We aren't exposed to *TPT* in typical physics degree programs. At least I was not. We stumble across it one day in our time of need. What a difference compared to reading a research journal: you could open any issue of *TPT* to any page and understand right away what you read there. You didn't need to be a specialist in some sub-sub-sub-field of study!

Around that time, I was analyzing the demonstration of a spool pulled by a ribbon at different angles relative to a table. The spool can either roll forward or backward, much to the delight of introductory physics students, especially if they are first asked to predict which way it will roll. ("All of you are right….") I developed an expression for the maximum acceleration of a symmetric spool that rolls without slipping. I already knew there is a special angle when the ribbon's line of action intersects the contact points of the outer rim of the spool with the table. At that angle, the spool's translational acceleration is zero; if pulled hard enough, the spool slips in place when static

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friction is overcome. What was new was another special angle, with the ribbon unwinding off the top half of the spool rather than the bottom half, at which rolling without slipping happens even in the absence of friction. The maximum acceleration has a cusp in it at that angle, with the limit being reached when the spool is pulled so hard that it lifts off the table.

Since 2001, I have published 15 articles and five letters in *TPT*. Some of the ones that have attracted special attention are the trio dealing with the perennial controversies of work, heat, and energy: "Irreversible Adiabatic Compression of an Ideal Gas" in 2003, "A Primer on Work-Energy Relationships for Introductory Physics" in 2005, and "Thermodynamics of a Block Sliding Across a Frictional Surface" in 2007. Readers who found "Inverse Lawn Sprinkler" in an online summer 2005 issue appreciated its demonstration of how the motion of a reverse sprinkler depends on the bends in the arms. "Rolling the *Black Pearl* Over: Analyzing the Physics of a Movie Clip" in 2011 was adapted from a popular presentation at the 2010 Summer Meeting. In addition, I have avidly solved Boris Korsunsky's "Physics Challenges" ever since he started that column in October 2001 (see page 476 of the October 2005 issue of *TPT* for an award I received in connection with these challenges). Currently I'm on my second three-year stint as a member of the *TPT* editorial board—it's a privilege to give back to the journal in some way.

Spurred by the joy of writing pedagogical articles, I have written such articles at other levels of presentation in many journals. Crafting them clarifies my thinking. All of my publications are online at http://www.usna.edu/Users/physics/mungan/Publications/publications.html. Whether one considers a topic from a first-year undergraduate course for non-majors or an advanced issue in a senior-level theoretical or laboratory class for physics majors, I think it's safe to say that if you can present it at the level of *TPT*, then you really understand the topic. Try it yourself and see!

Karl C. Mamola, Editor 2000-2013

Karl received his BS in physics from Stony Brook University in 1963. He followed that with a master's degree from Florida State in 1965 and a PhD from Dartmouth in 1973. Karl began teaching at Appalachian State University in Boone, NC, in 1965 and has taught all of the standard undergraduate courses, receiving a number of university awards for outstanding teaching. For 21 years he was chair of the Department of Physics and Astronomy. In 1998 he returned to his position as full professor. Karl has long been active in AAPT, having served as section president and section representative.

Karl has published many papers in his research specialties of applied optics and physics pedagogy, including articles in *The Physics Teacher* and the *American Journal of Physics*. For seven years, he served as *TPT's* "Apparatus" column editor; he also prepared the manuscript for a collection of useful and popular apparatus columns, which was published in book form by the American Association of Physics Teachers in 1998 as *Apparatus for Teaching Physics*. Since becoming *TPT* editor in 2000, he has served on the AAPT Publications Committee and Executive Board.

Les Paldy

My first contact with *TPT* took place when I was a graduate physics student at the University of Maryland. I had taken a position at a nearby high school to teach one class of physics and learned that *TPT* and its founding editor, Jay Buchta, had an office in Washington. I spent an informative hour with Buchta, a very gracious and avuncular physicist, and signed on as an AAPT member to receive *TPT*, then being sent without charge to high school teachers, courtesy of NSF. After Buchta's death several years later, Phil DiLavore and Bob Detenbeck filled the breach splendidly on a temporary basis.

In 1966, SUNY-Stony Brook physicist Cliff Swartz became the new editor. I had been Cliff's student and was teaching PSSC Physics at Cold Spring Harbor High School when I was invited to join the faculty at Stony Brook to serve as associate editor, with half of my time devoted to the journal and half to university teaching. The *TPT* files were shipped up to us and we proceeded to set up the Stony Brook office, assisted first by Jane Kahn and later by Helen Johnston. Both were good editorial assistants and whizzes with an IBM Selectric typewriter, a marvel of electromechanical engineering that made very satisfying sounds. The American Institute of Physics (AIP) handled design, layout, and printing arrangements, rendering fine service.

The *TPT* editorial board in those early years consisted of a mix of outstanding high school teachers like Donald Roberts of Oak Park and River Forest High School in Illinois, Jon Vickery from Perrysburg High School in Ohio, and university physicists like John Toll, the physics department chairman at the University of Maryland who would become president of Stony Brook University a few years later, and Melba Phillips of the University of Chicago, a distinguished theoretical physicist who would later become President of AAPT.

Our main responsibility at Stony Brook was to solicit, review, and edit manuscripts before sending accepted pieces to AIP for production and mailing. There was one small problem: we had only a handful of manuscripts to work with, barely enough to fill our first issue. Most high school physics teachers had not majored in the subject, had little time to write, and taught other subjects in addition to physics. It did not take us long to realize that we could not just sit and wait for articles to come flooding in.

> We hoped that by featuring a piece by Feynman, others might consider *TPT* as a good vehicle to highlight their work.

Cliff's solution was to declare, with approval from the AAPT board, that *TPT* would be a journal devoted to the teaching of the first physics course whether in a high school, two-year college, four-year college, or university. With that hunting license, we began to write to persons speaking at AAPT, AAAS, NSTA,

Les Paldy is Distinguished Service Professor at Stony Brook University, where he has taught since 1967. His work focuses on international efforts to eliminate nuclear weapons and includes service on U.S. arms control delegations in Geneva and at the United Nations.

and APS meetings, inviting them to send us manuscripts they thought would interest persons teaching the first course. When we learned that Richard Feynman had given a characteristically inspiring talk at an NSTA meeting and asked if we could publish it, he agreed, and Helen Johnston quickly transcribed it from a noisy audiotape. The Feynman article would be the lead but we didn't have a cover, so we drafted several of our children for a photo that matched Feynman's theme, the virtue of careful observation of the natural world. We hoped that by featuring a piece by Feynman, others might consider *TPT* as a good vehicle to highlight their work. We also cooperated with Bill Aldridge, a leader in the two-year college physics community, and others to solicit manuscripts from potential writers across all levels of physics teaching. Our manuscript backlog slowly increased and *TPT* operations soon became stable, but we often improvised.

We had plenty of assistance in those early years from Stony Brook faculty who volunteered as reviewers, from Herb Gottlieb, an outstanding New York City physics teacher who wrote the *TPT* "Apparatus" column, and from Mario Iona who wrote a column on misconceptions in physics. We were also fortunate to have several graduate and undergraduate students around who would become leaders in the educational community. They included Gerry Wheeler, who would become a physics professor and executive officer of NSTA, Arthur Eisenkraft, who would become a professor of science education and president of NSTA, and Marilyn Decker, later to become Boston's science supervisor. Stony Brook physicist Arnold Strassenburg was serving as AAPT executive officer with an office at Stony Brook, and we had the benefit of his administrative assistance and insights in all matters connected to physics education.

I left *TPT* in 1971 to accept a one-year appointment as an NSF program manager, returning to Stony Brook's faculty in 1972 to serve as Arnold Strassenburg's staff physicist in the AAPT Executive Office, located close to the campus. Thomas Miner, who had retired from his position as one of the nation's finest high school teachers, became *TPT*'s associate editor. (Well before the physics community's push to increase the number of women and girls enrolled in physics courses, Tom had created an optional all-girl section of physics at Garden City High School on Long Island that was remarkably successful, and he brought those insights to *TPT*.) By then, I was full time in the physics department, but my office was next to Cliff's and *TPT's* and I was able to keep in touch with the journal's progress. Cliff had brought the layout and design function back to the Stony Brook office from AIP, where it was managed first by Naida Dewey and later by Arthlyn Ferguson.

The five-year tour as associate editor was a wonderful experience for me. Cliff Swartz was an extraordinary teacher and editor with a mile-wide creative streak. His boundless energy and imagination established *TPT* as a highly regarded journal in the physics community. Not long afterward, I became editor of NSTA's *Journal of College Science Teaching*, where for nearly 30 years I would apply the lessons I learned from Cliff and other AAPT stalwarts. Much of whatever success I had in that position, I owe to them and to that early *TPT* experience.

Gorazd Planinšič

I started to study physics at the Faculty for Mathematics and Physics, University of Ljubljana, Slovenia (at that time Yugoslavia) in 1982. Soon it became clear to me (and I was not the only one) that though the lectures were taught at the highest level and laboratories had contemporary equipment, there was one important thing missing in our study program: the opportunities to design and perform our own experiments, to test ideas that emerged during the lectures, during discussions with colleagues, or simply crazy ideas that came to mind. Later when I became an assistant professor in the same department, I proposed to the senior faculty to create a course that would fill this gap. My proposal was approved and a new course for first-year students was born; it was called the Project Lab. The main idea of the Project Lab was to give students a series of sufficiently simple and engaging experimental tasks but no initial hints on how to solve them. Students, working in groups, had three weeks to complete each task. Here are three examples: 1) Design an experiment to measure rotational inertia of a car tire around each of two perpendicular geometrical axes; try several methods and compare the results. 2) Design an experiment to measure electric charge that forms on a container when sugar (or other granular material) is poured from it; explore different combinations of materials. 3) Measure the vibrating frequency of an electric toothbrush; design and test several (at least three) methods and compare the results of your measurements. In order to create the conditions similar to those met in science research, we set the goal that every group of students work on an original project that had not been done before. We definitely would not be able to meet this goal without *The Physics Teacher*. My love for experiments as a tool for learning physics soon went beyond the walls of the physics department. In 1996 I joined Miha Kos as a co-founder of the first Slovenian hands-on science center. The ideas for new experiments and their innovative use started to flow in both directions: from the Project Lab to the science center and back. In 2000 I published my first paper in *TPT* and from then on it became a habit (overall I have six papers). I will never forget the excitement when the photo of mosquito larvae highly magnified with my water-drop projector appeared on the front cover of *TPT* in 2001. I printed out the cover image, framed it, and put it on the wall in my office. Soon after that the next photo appeared on the front cover – this time the color light mixer made from LEDs and a ping-pong ball (2004). In 2000 I took over the physics education program in the Department of Physics and the University of Ljubljana and the program for continuing education for high school in-service physics teachers. At that time I realized the ability to attract future physics teachers is closely related to how challenging these programs are, whether the people that run the programs are active in research in physics education, and whether publications in journals that focus on physics education are recognized as important at the home university. One of the important achievements in this respect was that in Slovenia (as well as in several other European countries) *TPT* became one of the journals that are regarded as important for the physics education field.

When I look back I see that the initial attraction that connected me to *TPT* - experiments - is still here but is now amplified with new challenges and questions such as what we need to know to integrate experiments even more efficiently into active learning. So, happy birthday, *TPT*, and see you soon.

Gorazd Planinšič is a member of the Faculty for Mathematics and Physics at the University of Ljubljana, Slovenia. He leads the undergraduate and post-graduate physics education program and the continuing education program for in-service secondary school physics teachers. His main interest is in development and didactical use of experiments. He is currently a chair of the Physics Education Division at the European Physical Society and co-founder and collaborator of the Slovenian hands-on science center The House of Experiments.

Diane Riendeau

My relationship with *TPT* can be summed up in three words: *growth*, *knowledge*, and *confidence*.

The Physics Teacher has been invaluable to my professional growth. I am a "crossover" physics teacher. I was trained to be a math teacher. Before I entered my first physics classroom, I had no physics or even science methods classes. I was fortunate to have great physics teachers as mentors. Even with the support of my mentors, I needed help! One place I looked for help was *TPT*.

As a high school teacher, I was particularly drawn to the articles on teaching methods, innovative labs, and cool demos. I remember combing through the issues each month in hopes of gleaning two or three ideas that I could use in my classroom. Articles on physics of toys particularly drew my attention. Other articles encouraged me to add the arts and music to my classroom. I remember reading about "The Haunted Physics Lab" and being inspired to create a "Winter Wonderland" for the day before winter break. As the years passed, my repertoire of ideas, labs, and pedagogy grew.

TPT helped me to hone my physics knowledge. Often, the "Figuring Physics" column would challenge some misconceptions that I still held to. Even in recent years, when you might think I know my physics, I remember the series about "Energy and the Confused Student," written by John Jewett. This series stretched my understanding of the concept and changed the way I teach it today. As a crossover teacher, it was not easy for me to admit that I didn't know my physics well. By reading the articles in *TPT*, I could learn my physics on my own time and without feeling inadequate among my peers.

The articles in *TPT* also gave me confidence. As a new teacher, I was unsure about trying new ideas that were untested. I found that I could trust the ideas in *TPT* because they came from physics and the articles had been peer reviewed. I took baby steps and tried new demos and found them successful. These steps served to further increase my confidence, and I tried larger projects and teaching methods. The ultimate confidence builder came when my first article was accepted for publication. I vividly remember my mentor encouraging me to submit an article. The article was graciously accepted and edited. The staff at *TPT* were so encouraging. I have undertaken other writing projects as a direct result of the confidence I gained through my relationship with *TPT*.

TPT is a fantastic tool for physics teachers at every phase of their career.

Teachers need to be growing continually. They should be increasing their content and pedagogical knowledge during their entire career. They should become confident in their ability to share the beauty and exhilaration of physics with their students and peers. *TPT* is a fantastic tool for physics teachers at every phase of their career. I am certain that my students, colleagues, and even my family have benefitted from my relationship with *TPT*.

Diane Riendeau is a physics teacher at Deerfield High School in Deerfield, IL. She has taught physics for 24 of her 25 years as a teacher. A member of AAPT since 1992, she currently serves as the High School Member-at-Large on the AAPT Executive Board. She is also editor of the TPT *column "YouTube Physics."*

Tom Rossing

The Physics Teacher is my favorite science teaching journal. I read it in my living room, on airplanes, in foreign countries, and more recently I have found a new spot: on a sun-drenched bench along the Packard pathway that winds through the old David and Lucille Packard estate next door to me in Los Altos Hills.

The collection of people who have written for *The Physics Teacher* over the years has included Nobel laureates as well as teachers in middle school. The articles are peer reviewed, have been carefully read by the editors, and contain few scientific errors. The editorials are gems of wisdom and the supplemental materials (posters, trading cards, etc.) are collectors' items, as were the holiday features such as physics carols. For many years columns by Dick Crane, Al Bartlett, and others were not to be missed, and now we have columns such as "Little Gems" by Chris Chiaverina, "Websights" by Dan MacIsaac, "YouTube Physics" by Diane Riendeau, and "Physics Challenges for Teachers and Students" by Boris Korsunsky. And who fails to chuckle, as well as learn, from cartoons by Paul Hewitt? "These are," as the song goes, "a few of my favorite things."

Quite a number of authors write popular versions for *The Physics Teacher* of their more technical papers in scientific journals. I adopted this practice, for example, for articles on such subjects as magnetic levitation (maglev), the acoustics of the glass harmonica (singing wineglasses), and the acoustics of percussion musical instruments. But the most valuable articles, for most readers, are the hints for teaching physics. For several decades now, my students have benefitted from ideas I have "borrowed" from experienced teachers who write for *TPT*. It is amazing the kinds of clever ideas that teachers continually have.

It is amazing the kinds of clever ideas that teachers continually have.

If I could make one suggestion for upgrading *The Physics Teacher,* it would be to greatly expand its circulation. It is a journal of physics for the public as well as for physics teachers. I would like to see it in every public library and certainly in every college library. I would like to see it for sale at magazine counters in airports. It is significantly higher in quality than most magazines that try to pass for general interest science publications. It remains my favorite science teaching journal.

Tom Rossing, Distinguished Physics Professor Emeritus at Northern Illinois University, is currently a visiting professor of music at Stanford University. Since retiring from Northern Illinois he has also been a visiting professor at the University of Edinburgh (Scotland) and Seoul National University (Korea). He is the author of more than 400 publications (including 17 books, 9 U.S. and 11 foreign patents), mainly in acoustics, solid-state physics, magnetism, environmental noise control, and physics education. He is a fellow of ASA, APS, AAAS, and IEEE. His biography appears in the New Grove Dictionary of Music and Musicians *and* Who's Who in America. *He received the Robert A. Millikan Medal (AAPT), Silver Medal in Musical Acoustics (ASA), and Gold Medal in Acoustics (ASA). He is a Past President of AAPT.*

Chuck Stone

Over the past 50 years, four men have served as editors of *The Physics Teacher* (*TPT*): Jay Buchta (1963-1966), Cliff Swartz (1967-1985 and 1989-2000), Don Kirwan (1985-1989), and Karl Mamola (2000-2013). Cliff and Karl have been at the top of the journal's masthead for over 40 years, and I have had the privilege of knowing and working with each, after first meeting them in October 1999 at a North Carolina AAPT Section meeting at Appalachian State University (ASU). Karl hosted the meeting and Cliff was the invited speaker, wooing the audience with his latest enhancements to *TPT* and how its resources could serve a variety of teaching needs. As legend has it, Karl drove Cliff to the airport after the meeting, and during the ride Cliff convinced Karl to think about taking over the editorial reins of *TPT*; within a year, the torch was passed. *TPT* had a new home in Boone, NC, and through a fortuitous set of circumstances, Karl was able to solicit the support of Pam Aycock as managing editor. Over the past 13 years, Karl and Pam's partnership has allowed *TPT* to function as smoothly as a Swiss timepiece as it accommodated a rise in contributed articles, a wider and more diverse readership, a more competitive marketplace, a need for more advertising dollars, and the transition to electronic publishing and dissemination. Karl's cordial manner, Pam's organizational savvy, and ASU's institutional backing have allowed *TPT* to evolve and prosper, enhancing the quality of its product and adding Herculean value to the physics teaching community. Compare today's *TPT* to that of 10 years prior and you will find a wider variety of content, a rich online presence, an easy-to-access database of past articles, a larger number of international subscribers, and more articles from international contributors.

In March 1998, I attended a North Carolina AAPT Section meeting at the University of North Carolina at Greensboro. A gentleman in the guise of Father Christmas collected my $5.00 registration fee, then immediately directed me to a theatre-style classroom where a bearded chap by the name of Paul Hewitt was showing everyone how to sketch simple cartoons of baseball pitchers, horses, light bulbs in an electrical circuit, and a girl swinging a pail of water. A year later, "Father Christmas" revealed himself to be John Hubisz (an insatiable reader, future AAPT President, and a wise man beyond his years), who twisted my arm to buy a copy of *How to Read a Book* and Cliff Swartz's text *Used Math*. The first book was a guide that addressed four levels of reading comprehension (elementary, inspectional, analytical, and syntopical); the second introduced me to the mathematical tools college students use in their engineering and applied science studies. After reading *Used Math*, I sent Cliff a detailed list of notes suggesting minor changes to his text; his enthusiastic acceptance of my remarks enabled us to build a mutual respect for each other's efforts.

John Hubisz taught me the value of reading, while Cliff Swartz conveyed to me the interconnections between math and the physical sciences. But what made me finally relish the splendor of physics, our understanding of the natural world, and our human place within it – that crown belongs to Paul Hewitt. The former boxer, uranium prospector, and sign painter had a natural curiosity for the way things work and a compelling need to explain complex phenomena in simple terms, motivating him to go back to school to study physics. After graduating and securing a teaching post at City College of San Francisco, Paul penned

Chuck Stone is a teaching professor at Colorado School of Mines. He is an active proponent in increasing the numbers of women, underrepresented minorities, and persons with disabilities in Mines' physics and renewable energy programs. As a Lifetime Member of AAPT, he has a genuine interest in enhancing the appreciation and understanding of physics in his local community as well as with his academic and professional colleagues. He balances these efforts with healthy doses of guitar playing, long-distance backpacking, mountain biking, swimming, and trail running.

Conceptual Physics, his tour-de-force text now in its 11th edition. I purchased a copy and began to admire my surroundings through Paul's guidance as not only an artist and physicist, but as a warm, caring, and generous human soul.

At my first national AAPT meeting at the University of Guelph in the summer of 2000, I attended a physics demonstrations workshop where one of the participants bemoaned the fact that he had little time to read *TPT* or include demonstrations in his lectures. Ohio State University physics professor Gordon Aubrecht immediately stood up and announced, "I read every single [*TPT*] issue that comes across my desk!" This testimonial motivated me to make more time for *TPT*. When elected to the AAPT Executive Board in 2003, I discovered how strongly *TPT* supported AAPT's mission. I also learned directly from *TPT* editor (and ex officio board member) Karl Mamola how to delicately provide advice, listen to one's critics, and accept others' suggestions in a positive manner.

In April 2003, AAPT President Charlie Holbrow appointed me to lead an AAPT Committee on the World Year of Physics (WYP) in 2005. Our mission was to develop, organize, and lead a series of yearlong public outreach events that would guide academic programs, industrial firms, national laboratories, and science centers across the nation in meeting the educational outreach goals of the WYP campaign. To launch our intentions and rally the physics community, I published an article in the January 2004 *TPT* that gave me the opportunity to glance inside the inner sanctum of the journal. *TPT* fully supported AAPT's WYP efforts, branding all *TPT* covers in 2004 and 2005 with the WYP logo and incorporating a series of articles during these two years describing a variety of outreach endeavors.

Over the past 16 years I have been able to teach physics, astronomy, and math at a variety of institutions (a two-year college, two historically black colleges and universities, a liberal arts university, and a university with a rigorous focus on engineering and applied science). I have designed and delivered numerous K-12 science education outreach programs; been interviewed on radio and television; and have been an invited speaker at local and national physics meetings. Through all these institutions and their associated endeavors, *TPT* has been a constant companion that has kept me in touch with physics teaching trends, lecture demonstration ideas, apparatus designs, and education outreach initiatives. *TPT* articles have shown me how to entertain elementary school students with pumpkin drops, help middle school students build lava lamps, assist high school students with their design of a haunted physics lab, challenge undergraduate students with "Figuring Physics" exercises, query graduate students with "Physics Challenges," and even suggest "Book Reviews" for my colleagues to consider.

My experience with *TPT* as an author, editor, promoter, reader, and reviewer has been an elixir that has kept me in a physics teaching career. The journal could be renamed *The Physics Student* because most of its readers continue to learn through its pages. *TPT*'s real treasure lies not in its articles and advertisements, but in the manner in which it gently connects all of us to colleagues that enhance our appreciation and understanding of this journey on which we've chosen to embark.

Arnold Strassenburg

It was coincidence that brought two major AAPT offices to the campus of the State University of New York at Stony Brook in the early 1970s. I had been on the faculty there teaching physics since 1966. In 1972 I accepted the honor of serving as AAPT executive officer with the understanding that I would continue to do some teaching and that an expanded version of my university office would become the AAPT Executive Office.

Let me be honest and admit that the biggest part of my new duties was handling money. But I did have responsibility for making sure that our two journals, *The Physics Teacher* and the *American Journal of Physics*, were high quality, were produced on time and within budget, and that the editorial offices had the resources to make this all possible.

It helped that the editor of *TPT* was Clifford Swartz, my Stony Brook colleague with an office one floor below mine. Cliff was a man of enormous creativity and impeccable taste. He successfully solicited the kind of articles that he knew would be of interest to his readers. Soon it was no longer just a journal for high school physics teachers; it became a journal read by many of our college teacher members and purchased by nonmembers interested in teaching.

There were, of course, other people who contributed to the excellence of the journal. My list will not be exhaustive but will include those with whom I had frequent and positive interactions. Lester Paldy, once a Stony Brook undergraduate and later a successful high school physics teacher, was hired by Cliff to be associate editor of *TPT*. That this was a wise choice is confirmed by the other roles that Les was asked to serve on the campus: instructor of physics, dean of continuing education, professor of public policy, and distinguished service professor. His contributions to *TPT* and AAPT are too numerous to recite.

Another important cog in the smooth operation of *TPT* was Art Ferguson. She managed the Stony Brook office and handled negotiations with the publisher, the American Institute of Physics in New York City. Of course, columnists make an important contribution to any journal. Two *TPT* columnists I admired were Herb Gottlieb on "Apparatus" and Mario Iona on "Would You Believe…?"

All the above should not be construed to mean that my interactions with the *TPT* editor and his staff were problem-free. Because our ultimate responsibilities differed, Cliff and I occasionally clashed on some issues. Examples: (1) Did my office assign an adequate amount of booth space for *TPT* exhibits at the next national meeting? (2) Should *TPT* staff members be paid travel expenses to attend out-of-town meetings? (3) Is the Delaware Valley of Pennsylvania a suitable site for a summer meeting? As you can see, these are all resolvable issues.

My years with AAPT were among the best of my life. I owe it all to my good relations with the Stony Brook administration, the AAPT governing board, the *AJP* editorial office, and—not least of all—Clifford Swartz and his *TPT* staff.

Arnold Strassenburg received a BS in physics from Illinois Institute of Technology (1951) and MS and PhD degrees in physics from California Institute of Technology (1953, 1955). He was on the faculty of the University of Kansas and was professor of physics at the State University of New York at Stony Brook from 1966-1998. During this time he served in a variety of other roles, including as the Director of Education and Manpower at the American Institute of Physics (1966-1972) and Executive Officer of AAPT (1972-1982).

Remembrances

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