

Phi
Kappa
Phi

FORUM

A Publication of
The Honor Society of Phi Kappa Phi

Winter/Spring 2006

Is the Sky Falling?

Living in a Globally Warmed World

John Knox

When the Sea Comes Ashore

Thorne Lay

The Risk of Tsunamis in the Northern Caribbean

Paul Mann

**Chicken Little Was Right —
Sometimes the Sky DOES Fall**

Katharine Cashman

**Chicken Little Was Right!
The Risk from an Asteroid or Comet Impact**

Alan W. Harris

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Member Focus**

- Legacy of Literacy •
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Phi Kappa Phi FORUM

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The views expressed in this publication are not necessarily those of the staff of *Phi Kappa Phi Forum* or the Board of Directors of The Honor Society of Phi Kappa Phi.

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The Honor Society of Phi Kappa Phi was founded in 1897 and became a national organization through the efforts of the presidents of three state universities. Its primary objective has been from the first the recognition and encouragement of superior scholarship in all fields of study. Good character is an essential supporting attribute for those elected to membership. The motto of the Society is *philosophia krateitō phōtōn*, which is freely translated as "Let the love of learning rule humanity."



Phi Kappa Phi encourages and recognizes academic excellence through several programs. Through its awards and grants programs, the Society each triennium distributes more than \$1,400,000 to deserving students and faculty to promote academic excellence. These programs include its flagship Graduate Fellowship program for students entering their first year of graduate study, Promotion of Excellence grants for faculty-led projects, Study Abroad grants for undergraduates, and Literacy Initiative service grants. For more information about how to contribute to the Phi Kappa Phi Foundation and support these programs, please write Perry A. Snyder, PhD, Executive Director, The Honor Society of Phi Kappa Phi, Box 16000, Louisiana State University, Baton Rouge, LA 70893 or go to the Phi Kappa Phi Web page at www.PhiKappaPhi.org.

Phi Kappa Phi Forum (ISSN 1538-5914) is published quarterly by The Honor Society of Phi Kappa Phi, Box 16000, Louisiana State University, Baton Rouge, LA 70893. Printed at R.R. Donnelley, 1600 N. Main, Pontiac, IL 61764. ©The Honor Society of Phi Kappa Phi, 2006. All rights reserved. Nonmember subscriptions \$25.00 per year. Single copies \$8.50 each. Periodicals postage paid at Baton Rouge, LA and additional mailing offices. Material intended for publication should be addressed to James P. Kaetz, Editor, *Phi Kappa Phi Forum*, 108 M. White Smith Hall, Mell Street, Auburn University, AL 36849-5306.

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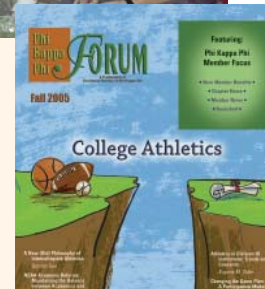
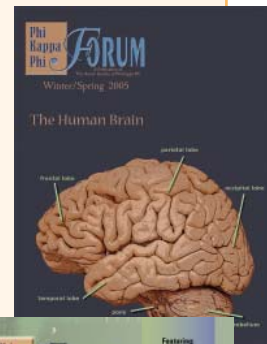
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THE HONOR SOCIETY OF
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Member Focus

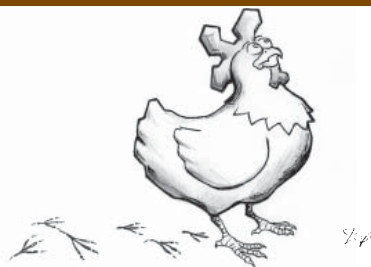
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President's Page

Paul J. Ferlazzo

President of The Honor Society of Phi Kappa Phi



As I meet with chapter officers and Society members, I often find myself discussing the subject of why a student would choose not to accept the invitation to membership in Phi Kappa Phi. Isn't Phi Kappa Phi *the oldest, largest, most selective honor society that recognizes and promotes excellence in all academic fields of the modern university*? Wouldn't every student who had the opportunity readily accept membership into such a prestigious organization?

One might think so. But, in these conversations I have heard numerous reasons why students do not. In general, they reflect how students have changed in their attitudes toward higher education. In pursuit of careers after college, students have lost an appreciation for the recognition of honor and excellence in college. Or, if they decide to join an honor society, consumer awareness has made them bargain hunters seeking a cut-rate opportunity to polish their image with a mere line on their résumé. Below I have attempted to address three popular notions about why students refuse membership.

Usually the first reason I hear offered is that "students don't know about us." Information about Phi Kappa Phi on a particular campus may not be readily available. Is it useful, informative publicity from chapter officers that is lacking, or has the name and function of one society gotten lost on a campus where students are buried under information overload? Many of our campuses already have too many posters, fliers, brochures, e-mails, and individuals

hawking everything from free credit cards to cheap term papers. I often hear Phi Kappa Phi described as "the best-kept secret in higher education," but I am sure that few would want us to risk the Society's good name in the scramble for recognition in a student union mall. Nevertheless, providing information about Phi Kappa Phi through appropriate campus channels is an important and necessary responsibility of chapter officers.

Another category of explanation puts the blame on student behavior: "Students don't read their mail (electronic or postal)." Given the situation described above and all of the useless trivia that is out there, many good students simply turn off. Other students are extremely busy trying to combine going to class with the necessity of having to work for a living. Unfortunately, cutbacks in grants, scholarships, and student aid have occurred at the university, state, and national levels in recent years. When there might be a turnaround in this situation is impossible to know. Revision in national and state priorities as well as in educational-funding policies depends upon many things, including global concerns, the economy, politics, and the election process. Any changes we could hope for are likely to be slow in coming, and in the meantime more students will find themselves having to work to pay for school and to support themselves. If they miss a lone piece of communication from a local chapter, it may be understandable. Chapter officers should know that it probably will take more than a simple form letter to get the attention of very busy students.

Some students have a philosophical reason for not joining: "Students don't believe in such things as honor societies anymore." These students feel that honor societies make unnecessary

distinctions and invidious comparisons that breed feelings of class and status that are inappropriate in a democracy. A reading of one of Thomas Jefferson's letters to John Adams in 1813 might be helpful in this situation. Jefferson wrote, ". . . there is a natural aristocracy among men. The grounds of this are virtue and talents." Jefferson deplored the "artificial aristocracy, founded on wealth and birth, without either virtue or talents." In place of the old world's reliance upon inheritance and family breeding, Jefferson expressed faith in America's men and women who rose in life through ability and hard work. In the initiation ceremony, we echo the qualities of Jefferson's natural aristocracy by referencing the parallel values of "scholarship and good character" that we require for membership. Further, Jefferson writes, "The natural aristocracy I consider as the most precious gift of nature for the instruction, the trusts, and government of society."

As we offer invitations to students, let us always be mindful of the fact that in reflecting Jefferson's faith in America's natural aristocracy, we also are engaged in the important work of helping to identify our nation's future leaders.



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Forum on Education & Academics

Andrea Ickes-Dunbar



Does Spelling Count?

Like most of us born in the good old days, I grew up on an unvarying but satisfying diet of weekly spelling lists and good old Friday spelling tests — satisfying, because I happened to be a good speller. I came from a family of college graduates, all of whom could spell, so I was both socially and genetically predestined to remember the vagaries of English orthography.

When I became a parent in the 1970s, it never occurred to me to question how my own children were being taught to spell. I assumed that they were filling the blanks in their spelling workbooks, as I had, and having traditional Friday spelling tests.

I do remember becoming enlightened somewhere along the line when I realized that spelling ability, or lack of it, did not necessarily correlate to intelligence. My son, though literate and verbally adept, is not an outstanding speller. My best friend, though not an outstanding speller, became a published author.

When I became a teacher in the 1980s, I never wondered how to teach spelling to seventh- and eighth-graders. There were spelling books on hand with familiar lists and fill-in-the-blank exercises. I knew what to do.

However, I soon discovered that what had worked for me did not work for many of my students. The word lists seemed too difficult, the vocabulary too esoteric. Why should students who could not spell words such as “different” in their own writing be memorizing words such as “hygiene” from their spelling books? And it was not only the second-language learners who were struggling.

I attempted to solve the vocabulary problem by juggling several lists simultaneously. These soon proliferated to

accommodate three ability levels for native English speakers, with a fourth illustrated list for English learners. Test-giving became a logistical nightmare as I tried to keep all students on task by rotating through the lists: “List One, number three... List Two, number three....” Even students who suffered from no auditory-processing disabilities became confused and distressed. I tried to reassure students that spelling problems do not indicate level of intelligence, but there was obvious adolescent contempt for those assigned a lower list.

When I further refined the process to include a pre- as well as a post-test, the whole enterprise became unmanageable. The pretest revealed what I had subconsciously known all along, namely that most students were only learning a few new words each week, not a full complement of twenty. Add to this the realization that most students were content with a score of 80 percent on the post-test, and I came to understand that not much was happening to improve anyone’s spelling.

Some students were bored, some were apathetic, some were still engaged in meaningless memorization of enigmatic vocabulary, and some were enjoying, as I had in my youth, the minimal exertion required to learn a couple of new words once in awhile. It was not working! I had to individualize the learning task, but how? Years passed. Innovation, born of frustration, gradually modified the process to my present system which, though not infallible, works reasonably well.

These days, I extract misspelled words from students’ own writing, keeping individual lists as I go. I also have a composite list of progressively more difficult words that I use as a pre-test as we begin each spelling cycle. This list ranges from easy

(“when”) to grade level (“mischief”) to blockbuster (“obseance”). Thus, each student acquires a personal list of ten study words. Ten words are added to each student’s cumulative list with each six-week spelling-study cycle, for a yearly total of sixty words. Students have one week to memorize ten words and must spell these and all previous list words correctly henceforth. Ever-present looms the prospect of a one-word test on which accurate spelling of a single target word will result in fifty points or zero. High stakes, indeed!

It is not difficult to identify students’ personal spelling problems or to instruct students in effective memorization techniques. Those who are motivated by grades respond to the high-point value ascribed to completing spelling-study work and to producing a single correctly spelled word on the test. However, convincing students of the real-world relevance of spelling accuracy is not as easy as one might suppose. Some students are bored, some are still engaged in meaningless memorization of abstruse vocabulary, and a few have actually devised strategies to avoid learning new words altogether. One youngster confided recently that his older brother had made a practice of missing easy words on every pre-test. Thus, my fail-safe system of individual remediation and challenge can still be circumvented.

Time-honored admonitions (“People will not be able to read what you write!”; “It’s part of your education!”; “People will think you’re dumb if you don’t spell correctly!”) do not inspire today’s computer-savvy students. They know better than I do that spell checkers do a pretty good job of standardizing spelling and that, within a few short years, writing by hand will very likely be obsolete. Even the

(continued on page 5)

Larry Chambers

Marketing Strategies for the Extraordinarily Successful

One of the best ways I have found to improve your personal economic picture is to raise your visibility by getting your ideas or thoughts published in the form of a trade-magazine article. A third-party endorsement in a reputable magazine or newspaper lends credibility that is difficult for a paid advertisement to match. The following is my high-value article-writing process for the nonwriter to help raise your visibility.

WHAT SHOULD YOU WRITE ABOUT?

Write articles that educate or solve an industry or customer problem. When you solve a problem or present meaningful information in a new light, you are regarded with high esteem.

When preparing your articles, write them as though you are speaking to a friend. The secret is to create and deliver a consistent message of value. Jot down thoughts about points that you would emphasize to get your friend to order your product or to become a client. Use these points in your article.

Published articles that educate, solve a problem, or convey a successful or advantageous situation can generate higher visibility. Success sells success — and highly educated professionals are always looking for timely information that will make them more money, make their life easier, or save them time. Business readers are much more likely to respond favorably to a solution to a problem from someone who communicates expertise than from someone who is boasting about his or her firm. Write to educate.

Make your article concise and to the point, concentrating on getting all the facts. Trade-magazine editors seek out articles that show readers how to

save money and time and to improve their lives. Trade-journal readers are very busy people. They read not for entertainment, but for information that can help them. Be specific. Introduce a particular problem and describe its solution and results or discuss the latest developments in the industry and reasons for them, and finally, organize the structure so that it is easy for the reader to understand and follow.

Support claims and statements with statistical examples, studies, or explanations. Double-check your facts. If in doubt, leave it out. Be thorough. People who read your articles may make decisions or procedural changes based on what you have written. They require accurate and complete information. Keep your notes and source materials for at least six months after the article has been published.

Be objective. Your article should contain useful, accurate, and unbiased advice, not rewritten corporate bulletins and press releases. If you do a story on money management, talk to several different money managers, not just one. If you are giving a new management perspective, give the pros as well as the cons. One-sidedness does not interest editors. They want the disadvantages spelled out, as well as the advantages. Do not write advertisements. An editor will see through such an obvious ploy, and the article will not get past his or her desk.

Never write about something that will be out of date within a few weeks. Sometimes it takes three, four, or up to six months before your article may appear. Write in a timeless style. That means subjects that do not depend on current events or yesterday's news. A timeless article is as relevant and marketable three years from now as it was the day it was written.

Most importantly, make sure your solution answers the problem or point that you stated at the beginning.

THE CARD GAME

Now you are ready to write your first magazine article. You have never written before? You do not have to be a writer, journalist, or media expert. Not to worry; we have this down to a process!

If you follow the next six steps, you cannot help but produce a complete article. Guaranteed. And it will be your article. There are no hypothetical examples here to copy. You can use this blueprint many times, creating a variety of how-to articles. Work at your own pace and at your own level, and as you improve, challenge yourself. But first you will need a pen and paper. So let's begin!

Number a set of index cards and jot down the following information on the cards. This way, you can spot inconsistencies or change the content before you begin to write.

Card 1. State the title and the premise, the point of the article.

Card 2. Identify problems or concerns that your target readers have in common. In this article the problem is writing.

Card 3. Write a short anecdote at the beginning of the article that can be used to illustrate the problem. Use any relevant discoveries or recent developments that the reader would be unlikely to have yet heard.

Card 4. The middle, or guts, of the article is the part where you deliver on your promise to explain how to solve the problem.

Card 5. Decide how you would solve the problem, and provide steps/

action to correct the problem and do so.

Card 6. Write the conclusion. Create a pathway that leads back to you by writing a short bio that clearly and concisely captures the essence of what differentiates you from the competition.

WRITE THE DRAFT

Determine the most compelling message for your particular market. The message should indicate your ability to solve real problems. It is important to communicate the right message to the right people at the right time through the right channels to be effective.

Identify industry publications that your target market reads. Does your target market receive a specialized newsletter or publication? Would the director or editor of that publication print an article from you addressing the needs of readers? Most likely, he or she would be delighted to do so. Call the publication and get the criteria for articles by outside authors.

Stay consistent with the card steps. Maintain your sequence of cards or

block diagram or both. They should be neatly identified, although the cards will provide more detail. Leaving your cards in some burst of inspiration may send you off course, and you will find yourself writing an entirely different article a few pages down the line. If that happens, and you start rambling, look at the cards and say to yourself, "What's the point of the article?" That will get you back on track.

Finished? This is your first draft; be sure to read it again with this final checklist in mind:

- What is your article about?
- What is your question or problem?
- Does your story focus on your article problem or question?
- How many steps are in your article?
- Does each step lead logically to the next step, and so on?
- Does each step open with a clearly stated or understood goal of that paragraph?
- Did you contrive an ending that leaves readers feeling that they have learned something?

- Does the end answer the question that you posed at the beginning?
- Edit your article for grammar and spelling.
- Send it off. Write down where you sent it and then, forget about it, and go back to work.
- Get reprints made of your article and send them out. They can act as calling cards to reinforce and position you as an effective leader in the community that you want to reach.

Congratulations on your first article!



Larry Chambers is an author, coach-writer, and attraction-marketing expert residing in Ojai, California. He has written more than fifty published books. His business helps build expert-status recognition and visibility. He can be reached at Lchambers@Competitiveforce.com, and his Web site is www.competitiveforce.com.

(Does Spelling Count? continued from page 3)

supposed confusion of homophones is a myth perpetrated by teachers and other adults; context reliably clarifies meaning. I predict that homophone distinctions will probably devolve into a parlor game played by elderly elitists.

Does spelling count? Yes, for the moment, but only as a relic of pre-computer social status. I am only half kidding when I tell my students to expect a phone call from me twenty years from now: "Hello? Jason? This is Mrs. Ickes-Dunbar. Do you remember how to spell 'octogenarian'?" Smiling to himself, Jason will merely voice activate his wrist computer, a personal memory aid, worn as a stylish bracelet, and the word will glow on the miniscreen.

So far, I have convinced no one of the imminent obsolescence of studying spelling in school. It took me two decades of teaching to overcome my own anachronistic acceptance of spelling work as a valid use of instructional time. Even now, though enlightened, I am not at liberty to implement my new conviction. Like every other public school teacher, I am held in thrall by the State Standards, which decree that all students shall learn to spell for themselves.

I distinctly remember the day, fifty years ago, when the ball-point pen was introduced to my fifth-grade class. My teacher sneered as she passed out those ultra-modern yellow-and-black sticks and informed us that we would continue to write with dip

pens and to develop our cursive writing as we always had. How misguided she was! Nowadays, dip pens are only found in special calligraphy sets, and cursive writing is a stylistic feature of everyone's computer. As is spelling.



Andrea Ickes-Dunbar is a former language maven whose return to graduate school on sabbatical leave convinced her that descriptive linguistics was more fun than prescriptive. Her master's project was creating an introductory language-awareness program that has been successfully implemented in her seventh-grade classroom.

Forum on Science & Technology

Devlin M. Gualtieri

The Free Software Alternative

My employer supplies me with an excellent office computer. It has a Microsoft Windows operating system, and the Microsoft Office suite with word processing, spreadsheet, presentation, database, and mail programs. I have added various scientific programs for statistics and graphing and a few programming languages for data analysis. If I were to duplicate this computing environment at home, it would cost me a small fortune. Instead, I have the equivalent functionality at no cost beyond the cost of the computer itself. My home computer uses the free Linux operating system and free application programs.

Computer hardware has become very inexpensive. It is possible to buy an excellent desktop computer system for less than \$500. At the same time, software has become the major cost of computer ownership. Microsoft produces what is arguably the most successful computer software in the world. Microsoft was thirty years old on September 23, 2005, and such longevity is an indicator of the importance of its products. The Windows operating system is bundled with most personal computers sold, and Windows, along with the Microsoft Office suite of word processing, spreadsheet, presentation, database, and e-mail programs, is the standard in the corporate world. A typical corporate desktop computer would contain a combination of Microsoft Windows 2000 Professional and Microsoft Office Professional Edition 2003, for a total software list price of more than \$800. It is rare, however, for large companies to pay this high list price because discount licenses are offered for large quantity purchases. Home users usually buy computers that have a minimal Windows operating system already installed, but if they want the typical suite of office programs, they need to purchase the Microsoft Office Standard Edition 2003 (retail \$399).

Because Windows is already present on nearly every personal computer purchased, most computer users do not realize that there are alternatives to Windows. The UNIX operating system existed long before Windows, and variations of UNIX-compatible operating systems are available for personal computers at no charge. UNIX was developed by programmers at Bell Telephone Laboratory for other programmers, and for a time it was very important intellectual property of AT&T. UNIX was not free. There were posters in the hallways at Bell Telephone Laboratory in the late 1970s that stated UNIX is a Five Letter Word, alluding to the trademark symbol that should follow UNIX. So familiar was UNIX to early programmers that several efforts were made to create a UNIX-compatible operating system for personal computers and to freely distribute these systems to programmers for further development. The fruits of these collective endeavors were intended to benefit everyone.

An important figure in the free-software movement is Richard M. Stallman. Stallman is so well known that programmers typically refer to him just by his initials, RMS. Stallman became a programmer at MIT after receiving a BA in physics from Harvard University in 1971. In the early days of computing, before the establishment of Computer Science as a separate discipline, quite a number of programmers came from math or science backgrounds. Stallman objected to the commercialization of computer software and believed that computer software should be free. As a consequence, he established the Free Software Foundation in 1985. His goal was the development of a free computer-operating system that would be compatible with UNIX, the preeminent operating system of the day. In the typical playful style of computer programmers, he named this operating system GNU, an acronym for GNU is Not UNIX. The GNU project was ambitious, so it was released a piece at a time. Fortunately, one of the first

pieces was GCC, the GNU compiler for the popular C programming language. This compiler enabled Linux, another important development in the free software movement. Stallman was awarded a MacArthur Fellowship, often called a “genius grant,” in 1990. Stallman’s Free Software Foundation now includes several nonprogrammers on its board of directors, including Lawrence Lessig, Professor of Law at Stanford University, an indication that free software is starting to involve more than just programming code.

Stallman was not alone in his attempt to create a UNIX-compatible operating system. In 1985, Andrew Tannenbaum, a professor at Vrije University in Amsterdam, wrote Minix, a UNIX-compatible operating system for personal computers. Minix caught the attention of a Finnish student, Linus Torvalds, who wanted to modify and extend Minix to make it more useful. However, Minix was not free. A small fee was required of each Minix user, so Torvalds decided to develop a UNIX-compatible operating system from scratch. He wrote the essential core of the system, called a kernel, and released the code under Stallman’s General Public License for free software. This code was published on the Internet in 1991 for improvement and extension by other programmers. This operating system soon became known as Linux, in honor of Torvalds, and its logo is Torvalds’ stuffed penguin mascot named Tux. In 1996, Torvalds received his master’s degree from the University of Helsinki for the thesis “Linux: A Portable Operating System.”

In English, the word “free” is ambiguous. Programmers have adapted the convention of referencing free things as either “free as in speech,” or “free as in beer.” Free as in speech, which is “libre” in legalese, means free of restrictions. Users can both use and modify a libre program, and these rights pass down to subsequent modifications. “Free as in beer,” an allusion to a college keg party, refers to “gratis” software — that is, software that

is free of charge. The free software ideal encompasses both of these ideals. Free software is available at no charge, and its code is fully disclosed to allow modification and extension.

The idea that software should be free was not limited to the UNIX crowd. In the very early days of personal computers there was another operating system, CP/M. CP/M was not free (I bought my version for \$100 in 1980). In the days before computer stores, it took a lot of programming skill to get CP/M to work on your essentially home-built computer, and as a consequence many CP/M user groups came into existence. CP/M users would meet to discuss and solve common problems, and, more importantly, to share programs. Eventually, these shared program disks were merged into a huge library and were available by mail for just the cost of the disk copy and postage. A similar user group existed for Digital Equipment Corporation mainframe computers. The advent of the Internet has made program sharing essentially free.

What are the advantages of free software, aside from its very attractive price? The advantages extend beyond the gratis idea of free to the libre idea of free. Many recent security problems have cropped up with the Microsoft Windows operating system, and Microsoft has valiantly tried to plug security holes in its code by issuing frequent updates for its customers. Because the Windows code is held proprietarily by Microsoft, only

Microsoft employees have scanned the code looking for potential avenues of attack by hackers. When Windows is attacked, only Microsoft employees are able to rewrite and distribute the code. Free software, in which the source code is open to all who want it, has the advantage in computer security. Eric S. Raymond, an author and historian of computer culture, stated this point simply when he wrote, "Given enough eyeballs, all bugs are shallow." What he meant is that with open-source software, many experienced programmers have access to the code, and they can spot and correct errors before they become problems in the installed customer base.

A home Linux system looks and functions much like Windows. It has a graphical user interface (either KDE or Gnome) where you can point and click to launch programs. Open Office provides word processing, spreadsheet, presentation, and database programs. Firefox provides a Web browser with integrated features to prevent common annoyances, such as pop-up advertisements. Thunderbird provides an e-mail system with anti-virus and junk-mail prevention features. GIMP, the GNU Image Manipulation Program, lets you resize images, convert image formats, and apply artistic effects to images. Many programs are available for video display and audio, as well as myriad other utility programs, all free on the Internet. You can experience Linux, albeit at a slower speed, by using one of many "Linux Live" CDs. These CDs let you try Linux without modifying your

present computer because Linux runs from the CD without installation.

The primary advantage of using Microsoft Office is the ability to share documents because some file formats are kept proprietary by Microsoft. This practice has essentially kept a stranglehold on its user base. According to Reuters, Microsoft Office products accounted for \$2.7 billion of its \$9.7 billion revenue in the third quarter of 2005 and nearly half of its operating income. Yet Microsoft's advantage here is beginning to erode. Late in 2005, The Commonwealth of Massachusetts endorsed open standards in the storage of office documents by mandating the use of the Open Document Format for its government business. This format is a proposed international standard for text, spreadsheet, and presentation documents. Such an open-file-storage standard promotes an easy sharing of documents across operating systems and application programs. The city of Paris has begun migrating its 46,000 employees and 17,000 computers to Open Office.

Open-file standards are an important step in keeping free software viable, but software patents are emerging as a major problem. Corporations have increasingly pursued software patents to maintain their proprietary positions. Software patents have been granted on extremely simple ideas, and free software advocates believe that this activity is stifling software innovation. Amazon.com, as one

(continued on page 9)

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David Thurmaier

Starting Over from the End

In my end is my beginning.

—T.S. Eliot, “East Coker” from *Four Quartets*

I have been thinking a lot about endings lately. To name two reasons, I recently completed my dissertation, and this is my final column for the *Forum*. Endings let us reflect on what we have done or what came before, and with that knowledge, ponder what will happen in the future. With respect to the arts, the advantage of having history at our disposal allows us to consider an artist’s *oeuvre* in terms of beginnings and endings. Artists often have their works divided into stylistic periods that contain a certain set of characteristics that supposedly develop over time into original expressions. The early music of Igor Stravinsky, for example, owes a great debt to his teacher Nikolai Rimsky-Korsakov and to his own Russian roots. By contrast, the music written at the end of his life fuses techniques developed in the early music with his unique employment of rival Arnold Schoenberg’s twelve-tone method of composition. The epigraph above from T.S. Eliot makes a powerful statement — an artist’s works at the end of a career often represent a new beginning and influence future generations.

Permit me to quote Eliot’s poem further:

...As we grow older
The world becomes stranger, the
pattern more complicated...

Old men ought to be explorers
Here and there does not matter
We must be still and still moving
Into another intensity...

It is in this spirit that I would like to look at endings — in this case, a composer’s final works — and try to identify some general features associ-

ated with them. Contrary to the usual perception that an artist’s output and quality of work diminishes with age, the late compositions by many composers display the opposite. More often, they follow Eliot’s assertion that “old men ought to be explorers.” I would argue that the following traits appear in these pieces: a greater sense of profundity, introspection, and a careful attention to craft. Additionally, these pieces often become the basis on which future generations of composers continue their art. To examine this theory, I shall consider the career and late music of Ludwig van Beethoven.

Beethoven, whose hair clippings and skull fragments have been discussed in the past few years, also has been the subject of several recent books by Lewis Lockwood (*Beethoven: The Music and the Life*), Maynard Solomon (*Late Beethoven: Music, Thought, Imagination*), and Edmund Morris (*Beethoven: The Universal Composer*). All three books consider the circumstances and features of Beethoven’s late music. Representative pieces from this period include the *Missa Solemnis*, the Ninth Symphony, and the last several piano sonatas and string quartets. Solomon points out that Beethoven’s letters from this period (c. 1814–27) reveal a growing awareness of his mortality in which the composer placed life behind furthering his art. Two excerpts from Beethoven’s personal diary allude to this decision: “Sacrifice once and for all the trivialities of social life to your art”; “Only in my divine art do I find the support which enables me to sacrifice the best part of my life to the heavenly Muses.”

What does this late music, conceived as a challenge against the rav-

ages of time and fate, sound like? The classical flourishes and rigorous formal proportions inherited from his predecessors Haydn and Mozart are largely absent. Also missing is the concept of the “Beethoven Hero” (also the title of a fine recent book by Scott Burnham), the larger-than-life figure towering over music history, with the bombastic and exciting sounds of the “Eroica” symphony and the “Emperor” piano concerto. Instead, paralleling his descent into permanent silence, Beethoven’s late music exhibits a profound treatment of sound and silence: introspection, innovation, and a revival of the past — not his own past, but music of earlier masters such as J.S. Bach. Additionally, the music became highly expansive, stretching the limits of the audience and the abilities of the performers. Apart from some notable successes — the Ninth Symphony comes to mind — audiences and critics were left largely baffled by Beethoven’s final works.

Let us delve more deeply into two short examples that epitomize the traits identified thus far. His last six piano sonatas, including the Sonata in B-flat Major, Opus 106 (“Hammerklavier”) and the Sonata in A-flat major, Opus 110, contain innovations that were unprecedented up to that point. In an allusion to Bach, both sonatas feature extended fugues — a procedure that features multiple melodies treated in various ways — as well as other references to earlier musical forms. For instance, the A-flat major sonata contains a *recitative* — best known in operas as speech-like passages that move the plot forward — and two sorrowful sections marked *arioso*, which resemble short, lyrical songs. The “Hammerklavier” is no

less unique; there is a gargantuan fugue that runs well over ten minutes, which was especially unusual for a piano sonata.

In addition to the sonatas, Beethoven also composed several string quartets that pushed boundaries. Each of the quartets, from Opus 127 to Opus 135 (his last quartet), features formal, technical, and expressive innovations that would influence composers of the next generations. These works also confused audiences and led some to wonder if the great composer had lost his talents. Solomon cites a review of a performance in Leipzig in which the reviewer declared that one of the string quartet movements was “incomprehensible, like Chinese,” and another conversation where some of Beethoven’s friends remarked that the audience was “inspired, astonished, or questioning” and failed to find fault with it only because of their ‘awe’ for Beethoven. While the technical inno-

vations provide endless material for music scholars and analysts, the effect of these pieces is very intimate and personal, far removed from the immediate accessibility and impact found in his earlier pieces.

To sum up, Beethoven’s late music challenged his audiences, influenced future generations, demonstrated a shift in aesthetic toward a more introspective expression, and culminated a lifetime of study by alluding to styles and composers of earlier generations. It is important to remember, though, that his music did not suddenly change in this “late” period; in fact, even the most esoteric movements always sound like Beethoven. Instead, as a result of age, experience, and an all-encompassing commitment to his art, Beethoven’s music simultaneously looks to the past and the future.

Endings truly are beginnings. Each artist has the opportunity to reinvent his or her work and to continue to

press forward in search of more modes of expression. The final brush stroke, word, or note represents one type of ending, but it may serve to inspire the beginning of another career. While this column ends my service to the *Forum*, I am grateful for the confidence and support of the editors and hope that this is just the beginning of thoughts and ideas to come.



David Thurmaier is an assistant professor of music theory at Central Missouri State University. His musical interests include Charles Ives, American music of all types, and the Beatles. He is also an active composer and performer on horn and guitar.

(The Free Software Alternative *continued from page 7*)

example, has been especially active in pursuing software patents. It was granted a “one-click” online-shopping patent that forced other online merchants to modify their online stores. Amazon recently was granted patents on consumer reviews of products and recommendations of related items, such as DVD documentaries on the same topic as a selected book. In response to the threat of software patents, the Open Source Development Laboratory, a consortium of companies interested in the future of Linux, has started a patent-commons library. Corporations such as IBM and Intel had pledged collectively more than five hundred patents to the commons library by the end of 2005. Future threats to free software include content-copyright protection standards that may be proprietary to certain operating systems. These standards would force users to adopt a particular operating system to download music, books, or other content.

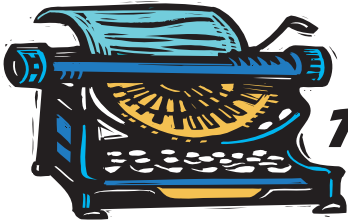
Is Linux ready for all home computer users? At this point it probably is not. Some boxed Linux distributions are now available at low cost that offer easier installation than pulling everything for free from the Internet. However, Linux is best installed only if you have some nontrivial computer or programming experience, or if you have a generous neighbor or relative who does. Not all things that work in Windows will work in Linux. Many manufacturers of printers, scanners, and cameras, for example, write their device software only for Windows. Experienced programmers have written substitute programs for Linux for the most popular devices, but not for all of them. I am able to use my PDA in Linux but not an inexpensive scanner that I purchased. The Internet is full of Linux message boards where users post problems and others post solutions, but most of this information can be understood only by a knowledgeable computer program-

mer. Fortunately, you do not need to use Linux to take advantage of the most important free software. Windows versions of Open Office, GIMP, FireFox, and Thunderbird are available for free on the Internet. I have installed these on my Windows computer at work, and I can verify that they work as well as the Linux versions. Besides, who can argue with free?



Devlin M. Gualtieri received an undergraduate degree in physics and a PhD in solid state science from Syracuse University. He is currently Senior Principal Scientist with Honeywell, Morristown, New Jersey. Dr. Gualtieri is a member of the Electronic Frontier Foundation, an organization concerned with technology’s impact on basic human rights. He has been a member of Phi Kappa Phi for thirty years and can be reached at gualtieri@ieee.org.





A Note from the Editor

James P. Kaetz



IN THIS ISSUE

On occasion, I like to impress people by telling them that I have survived two earthquakes, four hurricanes, a flood, and a tornado. I have missed a major fire of any description and an asteroid strike.

To be fair, the two earthquakes were so laughably small that the first one felt like someone might have fallen out of bed somewhere else in the house and the other I slept through. Only one of the hurricanes was truly dangerous by the time it reached Auburn, Alabama — Hurricane Opal, which came through still packing quite a wallop in 1995. The tornado passed through our back yard and was over in about thirty seconds. Of all of these, the flood was the only one that was potentially life-threatening. I was quite young; my family was trapped in a car when a flash flood hit the road on which we were driving in the Birmingham area. All I remember is perching on top of the back seat as the water rose steadily and then being carried to safety by a group of strangers who were going car to car and helping people out.

As we have seen in the past year or so, natural disasters can leave behind tremendous death and destruction. The horrendous Sumatran-Andaman tsunami that struck the day after Christmas 2004; the series of hurricanes that ravaged the Gulf Coast in 2005, culminating in the almost unimaginable devastation wrought by Katrina and Rita; the huge earthquake that hit Pakistan, killing thousands — we have been morbidly entranced by these events.

In this issue, we look at the chances for future, potentially even more devastating disasters. From the consequences of world climate shifts to objects dropping out of the sky, our authors give us a realistic look at what might be on the horizon.

To lead off, John Knox, a former *Forum* “Science and Technology” columnist, presents what he terms “a baker’s dozen” of possible scenarios for potential disasters that could occur as a result of global warming. Knox sorts out the likelihood of each scenario if global warming continues at the pace it is apparently following now. John and his wife, Pam, both self-professed disaster junkies, also have provided the disaster scenarios that are sprinkled throughout the issue.

Thorne Lay then discusses the event that in many ways was the genesis of this issue: the Sumatra-Andaman earthquake and its resulting tsunami. He details the cause of the quake and its immense size and power, as well as the chances of similar occurrences. Paul Mann also deals with tsunamis, but in our own backyard, as he looks at the possibility of such a disaster occurring in the Caribbean Sea. Mann examines the historical evidence of tsunami-causing events in the geologic record and discusses the stress points that could spawn an earthquake and a tsunami that might spell disaster for the Gulf of Mexico and the eastern coast of the United States.

Then, in the first of our two “Chicken Little” articles, so dubbed because both authors used that reference in their title, Katharine Cashman raises the alarm about the Cascade Range and what would happen if one of its many volcanoes were to become active again (as did Mount St. Helens in 1980). Though the threat from other volcanoes near large population centers does not seem imminent, Cashman points out how unprepared surrounding cities are to cope with the destructive power if one of these volcanoes does erupt.

Finally, Alan Harris deals almost literally with the sky falling as he reveals the possibility of an asteroid wreaking the same sort of havoc on Earth as did one sixty-five million

years ago. Harris discusses the effort to track these Near-Earth Objects that cross the earth’s orbital path, especially the largest ones that have the potential to cause our own extinction were they to hit.

MEMBER FOCUS

Be sure to check out the chapter and member news beginning on page forty-five. In this section we feature a successful Literacy Grant story, new chapter initiations, and of course the individual news that you have sent in.

GOODBYES AND APPRECIATIONS

Has it been three years already? We bid a fond farewell to half of our current group of columnists with this issue: Andrea Ickes-Dunbar, Larry Chambers, Devlin Gualtieri, and David Thurmaier. We appreciate the spirit of volunteerism that made them sign on with us for three years, and we will miss their excellent writing. Thank you all for your help.

In addition, we say goodbye to our two poetry editors, Lois Roma-Deeley and Randy Phillis. For ten years Lois and Randy waded through reams of poetry to find those few gems for us to publish in each issue. We cannot thank them enough for their judgment, their taste, and their service to the *Forum*.

Enjoy the issue!


The *Phi Kappa Phi Forum* is no longer accepting poetry for publication.





John Knox

Living in a Globally Warmed World



How might global warming affect Earth? Just ask Santa. A recent holiday catalog advertised a “global warming mug” festooned with a map of the world on its exterior. When filled with hot liquid, the map transforms to illustrate the results of a 100-meter rise in sea level caused by global warming. “[W]atch as the familiar coastlines and islands of our planet change to new shapes — or disappear altogether. Hand wash. Microwave safe.”

The mug is a great stocking stuffer with a commendably global environmental theme. But as science, it is dead wrong. The sea-level rise depicted on the mug exaggerates official predictions of global-warming sea-level rise during the next century by a factor of 100 to 1,000!

This mendacious mug is but one pop-culture example of “conventional wisdom” regarding global warming that conflicts with the collective wisdom of the world’s climate scientists. Some oft-cited distortions exaggerate the consequences; others dismiss already-observed changes as myths concocted by left-wing conspiracies.

What is global warming, really? Is the globe really warming? If so, what will this do to our environment during the next century? And what should our response be?

GLOBAL WARMING SCIENCE

At its simplest, global warming is equated with human amplification of the “greenhouse effect.” The greenhouse effect is caused by several rare gases in the earth’s atmosphere, including carbon dioxide and water vapor, that are transparent to sunlight but which absorb Earth’s heat. Without this naturally occurring absorption of heat, the average temperature of Earth would be around 0°F and “our American way of life” would take place inside parkas and igloos.

Human industrial and agricultural activities today release billions of tons of so-called greenhouse gases annually into the atmosphere. As a result, so the simple theory goes, Earth is warming beyond the normal greenhouse effect.

This explanation of global warming treats the atmosphere as a static column of clear air. Obviously, this model is too simple to capture the full complexity of our environment, from clouds and storms to the interactions of the atmosphere with the oceans, ice caps, and vegetation. Climate scientists employ intricate computer models known as “global climate models” (GCMs) in an elaborate effort to account for these complexities.

As is often the case in meteorology, however, the initial “back-of-the-envelope” calculation turns out to

be pretty close to the mark. Even when GCM simulations factor in a laundry list of important and obscure climate interactions, the globally averaged result is roughly the same: Increasing amounts of heat-absorbing greenhouse gases will lead to increases in the average global temperature.

IS GLOBAL WARMING HAPPENING?

The Industrial Revolution did not happen yesterday. If the science of global warming is correct, the past 125 years’ worth of greenhouse-gas emissions should have had a measurable effect on world climate, both in terms of atmospheric composition and in temperature changes. Have they?

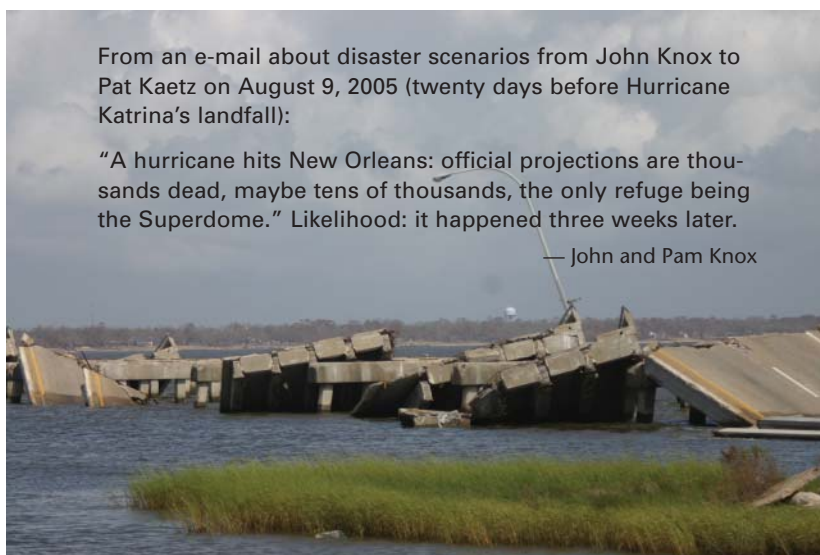
Yes.

Concentrations of greenhouse gases such as carbon dioxide and methane (the main component in natural gas, which you may use to heat your home) have increased substantially, about 33 percent and 100 percent respectively, since the late nineteenth century. Meanwhile,

global-surface temperatures over both land and sea have increased, on average about 1°F over the same period.

Much debate has centered on the details of the warming: exactly how much, where, when, and why. For example, while greenhouse-gas concentrations increased continuously throughout the twentieth century, global temperatures actually declined from about 1940 to 1970. This mid-century cooling has been attributed in part to sulfur pollution created during fossil-fuel burning. According to this hypothesis, sulfates in the atmosphere place a “brake” on global warming by reflecting sunlight. Computer models that incorporate this effect are better able to reproduce observed temperatures.

Other unknowns in the global-warming debate include solar variability and the role of water in regulating the warming of the planet. Despite these and a few other lingering questions, however, virtually universal agreement exists (even among global warm-



From an e-mail about disaster scenarios from John Knox to Pat Kaetz on August 9, 2005 (twenty days before Hurricane Katrina’s landfall):

“A hurricane hits New Orleans: official projections are thousands dead, maybe tens of thousands, the only refuge being the Superdome.” Likelihood: it happened three weeks later.

— John and Pam Knox

ing skeptics) that the lowest layer of the Earth's atmosphere has indeed warmed since 1880.

Before the Industrial Revolution, there was the agricultural revolution. Could the advent of large-scale agriculture and the rise of ancient civilizations have warmed Earth's climate? In his fascinating new book *Plows, Plagues & Petroleum* (Princeton University Press, 2005), paleoclimatologist Bill Ruddiman plausibly argues that preindustrial methane and carbon-dioxide releases during the past 5,000–8,000 years warmed the Earth by nearly 1.5°F — more than the industrial-era warming observed so far.

Ruddiman has determined that the preindustrial warming, just as the industrial warming today, was greatest in the high latitudes — almost 4°F. This sizable warming, in turn, could have staved off the development and advance of new ice sheets in Canada!

So, is global warming that results from the effects of human civilization actually happening? Yes, and it may have been taking place ever since the Bronze Age.

GLOBAL-WARMING CONSEQUENCES

According to Ruddiman's new and still controversial hypothesis, the first consequence of global warming was the delay of a new ice age. What developments are in store for us in the twenty-first century? Below is my personal glimpse into the climatological crystal ball for a baker's dozen of possible consequences, based on a survey of official predictions (see, for example, http://www.grida.no/climate/ipcc_tar/wg2/009.htm#tabspm1) and discussions by both proponents and skeptics of global warming.

1. Increasing Greenhouse-Gas Concentrations?

Virtually certain. Atmospheric concentrations of carbon dioxide continue to increase worldwide about 1.5 parts per million (0.4 percent) every year; nitrous oxide ("laughing gas") is increasing at a 1 part-per-billion (0.3 percent) annual rate. Rises in methane concentrations have, surprisingly, slowed to near zero annual growth in recent years. Chlorofluorocarbons (CFCs) are decreasing in concentration as a result of international treaties protecting the ozone layer.

2. Rising Temperatures?

Virtually certain. The official predictions of the Intergovernmental Panel on Climate Change (IPCC) are that the global average surface temperature will rise 2.5°F to 10.4°F during the next century. The wide range of estimates is a product of a variety of

different models and scenarios regarding the emissions of greenhouse gases.

Climatologists and global-warming skeptics Pat Michaels and Bob Balling, in *The Satanic Gases* (Cato Institute, 2000), argue for a smaller increase of about 2.3°F, which is near the low end of the IPCC range. A counterargument to Michaels and Balling's claim is that the climate system is in disequilibrium and has not yet adjusted to a majority of the industrial-era greenhouse-gas emissions. In other words, because the climate system reacts on time scales of several decades, another 1°F warming is still to come because of the past emissions, not even taking into consideration the twenty-first-century increases in greenhouse gases.

But do not let the arguments and counterarguments obscure the bottom line: Nearly every climate scientist agrees that the next century will be warmer.

3. Melting Ice?

Virtually certain. Already, most of the mountain glaciers of the world are melting, the ice-free periods of the world's higher-latitude lakes are expanding, and the sea ice covering the North Pole is shrinking and thinning at a dramatic rate. In the twenty-first century, Santa's workshop will need pontoons.

However, the great ice sheets of Greenland and Antarctica are unlikely to melt catastrophically. In fact, the central portions of these ice sheets may thicken as warmer, moister air reaches them and leads to heavier snowfalls.

4. Abruptly Changing Ocean Circulations?

Unlikely, at least in the near future. The 2004 film *The Day After Tomorrow* popularized the notion that global warming may, paradoxically, lead to abrupt cooling due to the disruption of the global ocean circulation via melting ice. During the 1990s, paleoclimatological research confirmed that climate is sensitive to the location and strength of sinking ocean water in the North Atlantic and that melting ice can lead to abrupt climate change by affecting the ocean circulation in these regions. Ocean currents across the world could be weakened and/or displaced, creating global-climate effects. But this phenomenon is not expected to occur any time soon, and in any event the results will not resemble the absurd fantasies depicted in the movie.

5. Stressed Ecosystems at High Latitudes and Altitudes?

Likely. In accord with model projections, the high-latitude regions of the Northern Hemisphere have been the epicenter of recent global warming. In the twenty-first century, the warming of these regions



A violent tornado hits a major sporting event, for example the SEC football championship in Atlanta in early December (climatologically a time of severe weather in the Southeast). Hundreds are killed as the Georgia Dome collapses onto the fleeing crowd. Likelihood: very rare but not impossible. In the not-too-distant past, tornadoes have threatened the Indianapolis 500, the Alabama-Auburn “Iron Bowl,” and minor-league baseball games.

— John and Pam Knox

may be as much as four times that observed on average across the globe. Meanwhile, the trapping of heat is also leading to warmer conditions at high elevations. As the ice melts and the permafrost thaws rapidly, the flora and fauna in regions such as Alaska, Siberia, and the world’s mountain ranges will be seriously challenged. Extinctions are a real possibility. If “worst-case” global-warming scenarios are going to come true during the next century, look for them to occur around the land and seas nearest the Arctic Circle and also around the mountain ranges of the continents.

6. Rising Sea Levels?

Very likely, but less than feared. The official IPCC projections are for rises of 3.5 to 34.5 inches during the next century — a wide range, but minuscule compared to the 3,937-inch (100-meter) rise that has been popularized. The latter doomsday scenario assumes that most or all of the earth’s great ice sheets will melt, which, as noted above, is unlikely. Several inches seem nearly inevitable via the thermal expansion of water, however. And a sea-level rise of even a few inches will threaten low-lying regions and islands across the world.

7. Eroding Coastlines?

Very likely. As a result of sea-level rises, coastal regions worldwide will lose barrier islands and beaches, exposing populated areas to the full force of tsunamis and hurricanes. Especially at risk are delta regions such as southern Louisiana, which are already sinking as the sediments compact and levees prevent replenishment of sediment from floods. Any sea-level rises in these regions are a “double whammy” leading to rapid erosion.

8. Strengthening Hurricanes?

The jury is out. There is no question that warmer ocean waters favor the development of stronger hurricanes when other conditions are favorable. One 2005 hurricane after another — Katrina, Rita, and Wilma — exploded over unusually warm ocean waters. Therefore, it is plausible that in a globally warmed world, hurricanes could be more intense. However, hurricane formation and growth are affected by a number of other meteorological variables that could damp out this effect of global warming.

In the summer of 2005, MIT meteorologist Kerry Emanuel published a high-profile article in the journal *Nature* demonstrating a robust multidecadal connection between the warming of the world’s oceans and the duration of intense tropical cyclones worldwide. Some skeptical scientists are now believers in response to Emanuel’s paper; other prominent hurricane experts remain unconvinced.

If the observed warming in the twenty-first century is on the high end of the predictions, some plausible effects on tropical weather would include a lengthened hurricane season with an accompanying expansion of hurricane-prone regions to higher latitudes.

9. Proliferating Tornadoes?

Unlikely. The public and the popular press often wrongly connect the dots between unrelated weather and climate phenomena. Tabloid predictions of rampaging tornado outbreaks resulting from global warming are a case in point. Severe-weather phenomena such as tornadoes spawn only in situations that combine several ingredients, such as warm moist air, strong cold fronts, and howling upper-level jet streams. Global warming may well create warmer and moister air, but the cold air from Canada will not be as cold, and the jet streams probably will be weaker, too. The end result: If anything, violent-tornado activity may be reduced in the twenty-first century as the complex set of ingredients for severe weather come together less often. (However, because of our increased ability to observe tornadoes, reports of weak tornadoes that went undetected in previous decades will continue to increase.)

10. More Paralyzing Blizzards?

Unlikely. Blizzards are caused by intense midlatitude cyclones, which in turn are fueled by strong contrasts in temperature. Global warming, because it is most pronounced in the cold high latitudes, actually should reduce temperature contrasts over much of the planet and shift poleward the locations where they occur. Without the clash of contrasting air masses,

intense blizzards could be less likely in the twenty-first century. Furthermore, blizzards may retreat to higher latitudes, following the regions of maximum temperature contrasts.

11. Intensifying Heat Waves?

Possible. The IPCC rates the chances as “very likely,” based on numerous modeling studies. Furthermore, the killer heat wave of 2003 in Europe, during which tens of thousands died, seems to be a textbook example of “what’s to come.”

In the United States, however, evidence for increasingly extreme summer heat is hard to come by. Much of the warming observed to date in the United States has occurred in the winter season and at nighttime — leading to warmer overnight temperatures and longer growing seasons, but no new spate of record-high temperatures during summer.

Has America just been dodging bullets when it comes to heat waves? Or will our future warming continue to be largely a winter and nighttime phenomenon? No one knows. If the observed warming is on the high end of predictions, heat waves and droughts (see below) are probably much more likely.

12. Worsening Droughts and Floods?

Possible. Drought can occur more often even if average precipitation increases, if the precipitation events are heavier and/or higher temperatures lead to more rapid evaporation. Both conditions could occur during the twenty-first century. To make matters worse, climate models project high heat and drought for the middle of the continents in a globally warmed world.

However, the Great Plains have not turned to dust yet; so far, the devastating 1930s “Dust Bowl” era that set many still-standing all-time record-high temperatures has not recurred. Even so, the IPCC rates the chances of worse droughts as “likely.”

Meanwhile, the warming of the air and oceans will lead to a fired-up water cycle that the IPCC says will make more intense precipitation events “very likely.” But damaging floods occur every year in the United States, with or without global warming. Furthermore, floods are often caused by a combination of precipitation and land-use changes, such as deforestation. So when floods occur during the next century it will be difficult to determine whether or not they are related to global warming.

13. Invading Tropical Diseases?

Possible. In a globally warmed world, diseases formerly associated with the tropics, such as malaria, may be able to migrate poleward. Pests and pestilences normally limited by cold nighttime and winter

temperatures may benefit most, to humans’ detriment.

WHAT IS THE RESPONSE?

If the science of global warming seems complex, consider the conundrums of the response to it. In the United States, which is the single largest contributor to greenhouse-gas emissions, we have reached no clear consensus on what should be done. So much of American life is tied to fossil fuels — transportation, industry, even using the microwave to warm up the coffee in your global-warming mug — that it is hard to contemplate alternatives.

Worse yet, there is no “magic bullet” cure. The international Kyoto Protocol, which the United States has refused to sign, requires that some (but not all) nations limit their carbon dioxide emissions to 1990 levels. This modest step apparently would only take the edge off of twenty-first-century global warming, although it would have greater impact on the twenty-second and twenty-third centuries when the warming would presumably be largest. For this reason, climate-guru and “Gaia”-hypothesis-founder James Lovelock scorns the Kyoto agreement as a senseless distraction from more substantive approaches.

Furthermore, some contend that the most likely consequences of global warming are relatively benign or even beneficial, such as longer growing seasons and warmer winter and nighttime temperatures. Are economically wrenching policy changes needed under such circumstances? The debate rages on; meanwhile, each year, the planet warms.

To return to the crystal ball, Bill Ruddiman’s research suggests a naturally occurring, if morbid, response to global warming in future centuries. His work described in *Plows, Plagues & Petroleum* correlates dips in carbon-dioxide concentrations with the eras of pandemics, such as bubonic plague. Many epidemiologists believe we are overdue for a flu pandemic today. Could a deadly plague, perhaps aided in its spread by global warming, power down our civilization enough to slow the relentless march of greenhouse gas increases? It is a terrible scenario to contemplate, one that Ruddiman himself does not describe, but it is by no means impossible.

So, is the sky falling because of global warming? The doomsday scenarios have not come true, yet. But climate changes are clearly in store during the next century, with much more to come in the twenty-second and twenty-third centuries. We currently have no plan to avert the consequences, regardless of their severity. And as any disaster aficionado knows, the worst consequences are often a combination of

factors. What nasty surprises await us when global warming intersects with air and water pollution, deforestation, profligate groundwater use, and topsoil losses?

In these disconcerting circumstances, it should not take mugs with disappearing continents to arouse our interest in and concern about global warming.



John Knox is an associate research scientist at the University of Georgia. He earned a PhD in atmospheric sciences from the University of Wisconsin-Madison and was a post-doctoral fellow in the Center for Climate Systems Research at Columbia University, where he worked with climate modelers at the NASA/Goddard Institute for Space Studies.

John and his wife, Pam, also contributed the disaster scenario sidebars that appear throughout the issue. Pam Knox is the Assistant State Climatologist for the State of Georgia and is a former president of the American Association of State Climatologists. John and Pam have one son, Evan, who is a transportation-disaster fanatic — it runs in the family.

SUNDAY MORNING IN ANOTHER TOWN

When you were four or five
 your father took you along to another town
 where he was to conduct the Sunday service.
 Never having been away from home,
 you were eager for the world
 yet apprehensive, wondering whether
 each town had its own sky.
 As you rode in the black car, reassured by
 your father's big hands on the wheel,
 the countryside kept changing:
 Fields, then trees — single trees
 and clumps of trees,
 some plump, some slender,
 trees lining the road like guards
 or running across meadows into woods so dark
 a small boy could easily get lost.
 Once houses sprang up again, you were relieved
 that the sky had not torn or even sagged.
 Your father parked by a white church
 whose doors stood invitingly open
 and walked in alone while you
 sat down with the sun on the warm steps.
 The congregation sang in that ponderous way
 in which Hungarians *always* sang hymns,
 so slow it made you impatient,
 but then your father began his sermon
 and his words poured out smoothly
 like a stream flowing along,
 skipping stones and cleaning them
 all at the same time.

MARIANNE POLOSKEY

Marianne Poloskey's poetry appears in *Potomac Review*, *Louisiana Literature*, *Connecticut Review*, *North American Review*, and *Christian Science Monitor*, as well as the anthologies *Red, White, and Blues*, and *American Diaspora*. She has written book reviews for *Valparaiso Poetry Review*, *Smartish Pace*, and *Rattle*. Her first collection is *Climbing the Shadows*.



When the Sea Comes Ashore

Thorne Lay

The initial reports were not all that alarming. It was the day after Christmas in 2004 when a CNN report first caught my attention. A tsunami was reported to have inundated the coastline of Sri Lanka, and there was early word of a wave in Phuket, Thailand; perhaps hundreds of people drowned. Having visited Thailand just a couple of years previously, my initial thought was that I hoped the green Andaman Sea had not caused too much damage to the lovely beaches that I had visited. But then, because my seismological experience provided some familiarity with Indian Ocean geography, I began to puzzle over the origin of this sea wave. Tsunamis are waves generated by abrupt displacements of large volumes of water, typically in ocean basins. While underwater landslides, meteorite impacts, or volcanic eruptions can generate tsunamis, the most common sources are earthquakes in the rocks below ocean basins.

Earthquakes involve abrupt sliding motions on faults as frictional resistance is overcome, with large volumes of strained rock releasing their accumulated elastic deformation. If located under the ocean, the rock motions can deform the ocean floor, pushing it up or pulling it down, thereby generating a wave that spreads out from the source just as a rock splashing into a pond will do. But, an earthquake somewhere between Sri Lanka and Thailand? The seismic activity in that region has not had many large events throughout my career, and it surprised me that any event large enough to cause a damaging tsunami spanning the Bay of Bengal would originate in this area. As I pondered this, CNN updates were reporting extensive damage on Phi Phi Island, where I had

been snorkeling not long before — possibly a thousand deaths. Certainly this was a large tsunami, and the only region in the vicinity with a history of earthquakes large enough to generate such a damaging sea wave was somewhat to the south, along the island of Sumatra. A bad feeling began to grow in the pit of my stomach.

Great earthquakes, with seismic magnitudes from 8.5 to 9.0, had struck along the southern coast of central Sumatra in 1797, 1831, and 1861, and seismologists recognize the area as having the potential for huge earthquakes. But Phuket is shielded from any tsunami generated along central Sumatra by that island itself; only a rupture in northwestern Sumatra where there is no record of a prior great earthquake would expose Thailand to a tsunami. But the absence of a historical record of earthquakes can be misleading. The great 1964 Alaska earthquake, with a seismic magnitude of 9.2, struck a region that had not previously had such a huge event for more than a thousand years. During that long interval, plate-tectonic motions involving relative displacement of the Pacific and North American plates had built up elastic strain in the rocks that then released catastrophically, causing as much as ~20 m (~60 ft) of sudden sliding across a fault 200 km wide and 600 km long that dips down under the coastline. Massive destruction in Anchorage, located on the North American plate, occurred as the Pacific plate thrust under it toward the northwest. Tsunami waves inundated the Alaskan coast and spread throughout the Pacific, causing damage in California and even in Hawaii.

While no one had forecast such an event along northwestern Sumatra, the critical differences would

be that, unlike Alaska in 1964, Sumatra in 2004 has an extremely dense population living along the coastline, and the many population centers around the Bay of Bengal are much more vulnerable to a large tsunami in contrast to the wide-open Pacific Ocean south of Alaska. As my concern intensified, I went online to check the rapid earthquake information posted by the U.S. Geological Survey National Earthquake Information Center (<http://neic.usgs.gov/>). Sure enough, a large earthquake had struck near Aceh province in northwestern Sumatra. An estimated magnitude of 8.5 was posted, and shortly thereafter a revised analysis by the Harvard seismology program gave a more robust estimate of 9.0. I knew then that the CNN damage reports must be falling far short of the true story; the absence of information from Indonesia was not a hopeful sign — it indicated a massive catastrophe.

POWER AND DESTRUCTION

For the next three months I was immersed in analyzing the 2004 Sumatra-Andaman earthquake, working with many colleagues to quantify the nature of the earthquake faulting and the excitation and propagation of the tsunami that ensued. While some details still remain unresolved, the main characteristics of the event are now well understood, and numerous publications present the technical details, including a special section of the May 20, 2005, issue of *Science*, which I coordinated. The numbers that emerged are staggering, especially the human toll: 183,172 fatalities and 40,320 missing, of whom 167,000 are from Indonesia, 35,322 from Sri Lanka, 12,407 from India, and 8,212 from Thailand (<http://www.tsunamispecialenvoy.org/country/humantoll.asp>). The tsunami caused more fatalities than any previously recorded tsunami, and only a couple of earthquakes in China have proved more deadly. The portion of the fault that ruptured is 1,300 km (780 mi) long, making it the longest rupture zone ever recorded. The width of the fault is about 250 km (150 mi) along Aceh province and 150 km (90 mi) along the Nicobar Islands and the Andaman Islands to the north. This fault is the contact surface between the Indian plate and the Andaman (or Burma) microplate, a sliver of the Eurasian Plate.

The earthquake resulted from northward motion of the Indian plate at about 45 millimeters per year (mm/yr) relative to Eurasia, with the Indian Ocean floor thrusting under Sumatra and the islands to the north. Patches along the fault surface experienced shearing slip of up to 15 m (45 ft), with the slip being larger in the southern half of the fault zone and tapering off toward the north. The seismic magnitude obtained from seismology and geodesy is 9.15, making this the largest earthquake in the world

since 1964. The energy released is measured as 1.1×10^{18} J, or about 260 megatons (~18,570 Hiroshima bombs). The slip area expanded with an average rupture velocity of 2.5 km/s (5,400 mi/hr), taking about 10 minutes to spread over the entire rupture zone. The event triggered a magnitude 8.6 aftershock on March 28, 2005, the second largest earthquake since 1964. Even for a seasoned seismologist familiar with the nature of large earthquakes, the numbers associated with this natural event are humbling.

CHARACTERIZING THE EARTHQUAKE

The seismological characterization of the 2004 event was done using hundreds of recordings of ground shaking at global seismic observatories. Sensitive pendulum-based instruments at these observatories detect and digitally record continuous ground motions as a function of time and direction of shaking. The sudden release of strain energy as frictional sliding occurred on the plate-boundary fault generated elastic waves that spread through the surrounding rocks, expanding throughout the interior and along the surface of the planet, eventually shaking the ground at every observatory. The seismic wave signals recorded for the 2004 earthquake were unprecedented; vast technological improvements in seismic recording have been made since 1964, and for the first time seismologists recorded the complete suite of vibrations generated by a magnitude 9+ earthquake. Again, seismologists are humbled by these recordings; the ground in Sri Lanka, about 1,600 km (960 mi)



A major Mississippi River flood breaches the Old River Control Project, diverting the main river current into the Atchafalaya Basin. Morgan City, Louisiana, flooded; Baton Rouge and New Orleans lose their status as Mississippi River ports. Enormous economic consequences. Likelihood: Inevitable. The Mississippi has relocated its delta six times in the past 5,000 years. Furthermore, the Atchafalaya channel is a steeper, more direct route to the Gulf than the current route of the Mississippi.

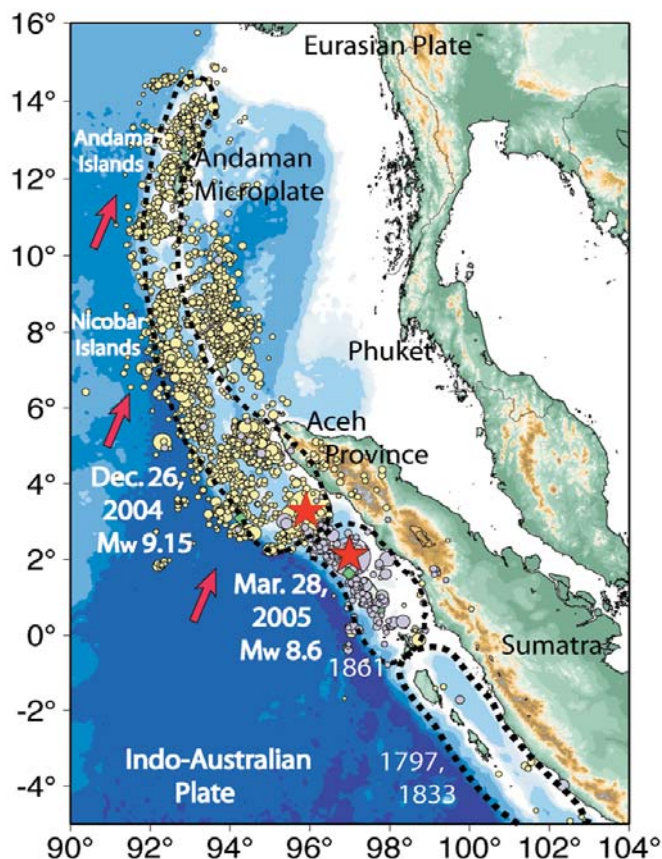
— John and Pam Knox

Figure 1. Map showing the location of the 2004 Sumatra-Andaman earthquake rupture zone, the March 28, 2005 rupture zone, and the 1861, 1797, and 1833 rupture zones (dotted outlines). The 2005 event overlaps the 1861 rupture zone. Locations of aftershocks for the 2004 and 2005 events are shown in gold and purple, respectively.

The stars indicate the epicenters (point of initial sliding motion of the fault) for the 2004 and 2005 events. The 2004 event initiated offshore of Aceh Province, and the region of slip on the plate boundary fault extended northward through the Nicobar Islands and the Andaman Islands, with fault sliding motions taking about 10 minutes total. Aftershocks located eastward of the Nicobar Islands are on shallow vertical faults along the eastern margin of the Andaman microplate, a small sliver broken off of the Eurasian plate. The red arrows indicate the relative motion direction of the Indo-Australian plate complex relative to Eurasia. Note that there is increasingly oblique relative plate motion progressing northward from Sumatra to the Andaman Islands. Phuket, Thailand was badly damaged by the tsunami from the 2004 event but was sheltered by Sumatra from the tsunami for the 2005 event. Sri Lanka lies due westward from the Nicobar Islands about 1,600 km.

from the fault, moved up and down 9 cm (3.5 in) as the seismic waves passed, and every point on Earth's surface vibrated by at least 1 cm (0.4 in). Some standing patterns of Earth vibrations (normal modes) rang on detectably for several months until the March 28 aftershock motions overwhelmed them. Computer modeling of the recorded signals allowed seismologists to determine the geometry of the fault, the spatial distribution of slip on the fault, and the rate at which the rupture spread.

Geophysicists use many other data sources to characterize large earthquakes, and several totally new ones have been brought to bear on quantifying the 2004 Sumatra-Andaman event. Recordings of sound waves trapped in the oceanic SOFAR channel made by hydroacoustic arrays have been used to track the expansion of the rupture front in the first such application. Ground motions measured by GPS sensors reveal the static deformations caused by the event, along with additional slow deformations that took place during the several months after the event (with total slip on the fault from the slow motions being comparable to that released abruptly during the rapid sliding event). Satellite altimeter observations of sea-level captured the ocean-wave heights as the tsunami was spreading through the Bay of Bengal, allowing the first-ever detailed modeling of a tsunami wave field in deep water. Satellite images also revealed uplift and inundation of islands in the Nicobar and Andaman groups, some of which are otherwise inaccessible because of political factors. Without question, the 2004 event is now the best-characterized great earthquake that scientists have ever analyzed.



LESSONS LEARNED

The 2004 earthquake surprised seismologists by occurring in a region with no track record of great earthquakes and by rupturing such a great distance along a plate boundary that has increasingly oblique relative plate motion. While a smaller event localized to northwestern Sumatra would have been less surprising and could have been equally deadly for the local region, this area was not flagged as having potential for a magnitude 9.15 event by anyone. So lesson number one for seismologists is to not neglect the seismic hazard posed by tectonically active regions lacking prior earthquakes. The tsunami disaster was greatly enhanced by the rupture extending northward along the plate boundary to the Nicobar Islands and the Andaman Islands. This region is less evidently a tectonic hazard zone, as the relative plate motions suggest a strongly decreasing component of plate convergence toward the north, combined with increasing horizontal shearing mainly accommodated by less hazardous strike-slip faults in the Andaman Sea.

The second lesson for seismologists is that we must be concerned about induced slippage of weakly coupled regions adjacent to strongly coupled sections of plate boundaries. I believe that much of the fault zone along the Nicobar and Andaman Islands may have frictional properties known as conditional stability that allow it to normally fail aseismically in

slow creep events, but to fail with rapid slip when loaded by the large changes in strain rates resulting from failure of the adjacent Aceh segment. There are several fault zones where areas of prior great earthquake activity about fault sections that have no record of large events (eastern Sumatra and the Sunda trench is an example). The potential for moderate events to grow into great events by driving slip in areas of conditional frictional stability and the associated enhanced tsunami excitation needs to be considered.

OTHER POSSIBLE OCCURRENCES

The terrible destruction wrought by the 2004 tsunami raises the question of where other such catastrophes may occur. For the United States, the answer is a grim one; an event comparable in size to the 2004 Sumatra-Andaman earthquake could strike along the coastline of Oregon and Washington. In this region, there is actually documentation of a prior great event that occurred in 1700, inundating the regional coastline and producing a tsunami as far away as Japan. A small remnant plate called the Juan de Fuca plate is underthrusting the west coast of the Pacific northwest, producing a subduction zone like that along Sumatra. The active volcanoes of the Cascadian Range indicate the ongoing tectonic activity of the region, and geodetic measurements show that the plate boundary fault is locked and accumulating strain.

Geophysicists are working to characterize the seismic potential of this region and to assess whether the fault is close to failure or hundreds of years away from failure. This undertaking is challenging and we have known about this potential hazard for only a decade, so it remains highly uncertain how immediate the threat may be. This uncertainty is true for other regions where there is recognized potential for great earthquakes (for example, near central Sumatra and near southern Peru/northern Chile), so there is also research on rapid tsunami warning systems.

WARNING SYSTEMS

The idea underlying tsunami warning systems is to use technology to detect and to characterize earthquakes as they happen, exploiting the time delay due to water-wave propagation from the region of ocean-bottom deformation to give warning to coastal communities. This problem is more manageable for regions far from the source than for regions close to it. A tsunami in the deep ocean travels about 900 km/hr (540 mi/hr), roughly the speed of a passenger jet. It took about two hours for the tsunami

wave to travel to Sri Lanka and to Phuket. Seismic waves travel much faster, with P waves traversing the entire planet in about twenty minutes. Rapid processing of seismic signals that are telemetered from global seismic observatories to an analysis center can enable scientists to characterize the faulting on time scales of fifteen to sixty minutes — fast enough to warn remote areas that a tsunami may be on the way. Telemetered signals from ocean-bottom pressure sensors can confirm the presence and strength of tsunami signals in the ocean. Such combined seismic and ocean-pressure data analysis are the keystones of the Pacific Tsunami Warning System operated by NOAA to give warnings about tsunamis in the Pacific basin. Unfortunately, no system was in place for the Indian Ocean in 2004, and it is only in the wake of the disaster that an international effort is underway to establish a tsunami-warning system there.

The challenge of warning a nearby coastline of an incipient tsunami is much more daunting; one cannot wait for seismic waves to travel to distant stations. Strategies such as rapid local analysis of regional seismic waves, use of differential GPS measurements to detect sudden crustal motions, and shallow-water tide gauges and water pressure meters, all with continuous telemetry and real-time analysis, are critical technological approaches to nearby tsunami-warning systems. But research on and development of such a system are receiving relatively little investment, even for countries with recognized earthquake/tsunami hazard such as the United States. Of course, any technological approach must be balanced by a societal response capacity to receive the scientific warning, to warn the public, to evacuate, and other activities. One of the major hurdles confronting development of such systems is the low probability of such events; it is very challenging to sustain technological warning systems and societal awareness and preparation for long periods. Perhaps the magnitude of the 2004 Sumatra tsunami disaster will suffice to sustain commitment to implementing global tsunami-warning capabilities that will mitigate future catastrophes. I fear that the lessons learned may too soon be forgotten — until the next disaster.



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Paul Mann

The Risk of Tsunamis in the Northern Caribbean

Many of us enjoy quiet vacations lolling on Caribbean beaches in places such as Jamaica and the Virgin Islands or crisscrossing the Caribbean Sea on cruise ships to these and other exotic ports of call. Because many of these tourist destinations are at sea level, should we be concerned during our next Caribbean vacation about being engulfed by a tsunami, or earthquake-triggered sea wave, similar to the Sumatra earthquake and tsunami that killed more than 280,000 people in the circum-Indian Ocean region on December 26, 2004? In this article, I will review some basic information about the active tectonic setting of the northern Caribbean region, its history of past earthquakes and tsunamis, and its potential for future catastrophes, including whether far-traveled tsunamis originating in the Caribbean could threaten the southern and eastern coast of the United States.

BOUNDARIES OF CONCERN

The North American-Caribbean plate boundary extends more than 3,200 km from northern Central America through the Greater Antilles (Jamaica, southern Cuba, Hispaniola, Puerto Rico, and the Virgin Islands) to the northern end of the Lesser Antilles subduction zone (Figure 1). This immense strike-slip plate boundary ranks with the great seismogenic, strike-slip plate boundaries of the world including the San Andreas fault zone of California (1,500 km in length), the Alpine fault zone of New Zealand (600 km in length), and the North Anatolian fault zone of Turkey (1,000 km). Motion along all of these plate-boundary fault systems is mostly horizontal and conservative, so no large areas of the plate are lost or subducted beneath the neighboring plate — nor is significant space generated by opening gaps between the plates. The plates grind past one another at rates that we humans would consider glacial (20 mm/yr) but are significant in geologic terms.

Localized and sometimes subtle curvatures along all of these large strike-slip faults produce localized areas of topographic uplift that are responsible for some of the spectacularly rugged and scenic coastlines found along these plate boundaries (for example, Northern California, South Island of New Zealand). This tectonically related topographic uplift is good news for the long-term tectonic manufacture of scenic islands in a tropical setting but bad news for generating large earthquakes and accompanying tsunamis. The uneven plate grinding along faults produces earthquakes because the fault slippage in the upper part of the crust becomes frozen or “locked,” sometimes for hundreds of years. Continued interplate slip will break these asperities with a sudden snap and release of seismic energy: Earthquake! When this snapping motion occurs underwater, the seabed can move upwards or downwards to set in motion a tsunami that can travel thousands of kilometers. The earthquake also can trigger a large submarine landslide or slump, usually when an unstable part of the shelf breaks off and slides into deeper water.

During the past fifteen years, GPS-based geodetic studies on the Caribbean islands and mainland areas have shown that the Caribbean plate is moving east-northeastward at a rate of 18 to 20 \pm 3 mm/yr relative to North America (Figure 1). This direction implies that the seg-

ment of the plate boundary from northern Central America to southern Cuba is strike-slip with varying degrees of transtension (strike-slip + opening) and transpression (strike-slip + closure) (Figure 1). Maximum interplate transpression occurs between the island of Hispaniola (Dominican Republic and Haiti) on the Caribbean plate and the thick crust of the Bahama carbonate platform on the adjacent North American plate (Figure 1). For this reason, the earthquake belt is wider in the Hispaniola region than in tectonically simpler parts of the plate boundary to the west.

Transpression between the two plates has produced higher topography in central Hispaniola than in any other area of the northern and eastern Caribbean: Pico Duarte in the Dominican Republic attains a maximum elevation of 3,087 meters, or about the same elevation as some of the lower peaks of the Rocky Mountains in the western United States. Transpressive plate motion is also taken up along onshore strike-slip faults and convergence across a trench-like feature off the north coast, and also along widespread folds and faults in young rocks on the island itself (Figure 1). The tectonic setting of Hispaniola is analogous to the Big Bend region of southern California, where the San Andreas fault curves to produce various mountain ranges and deep intervening valleys.

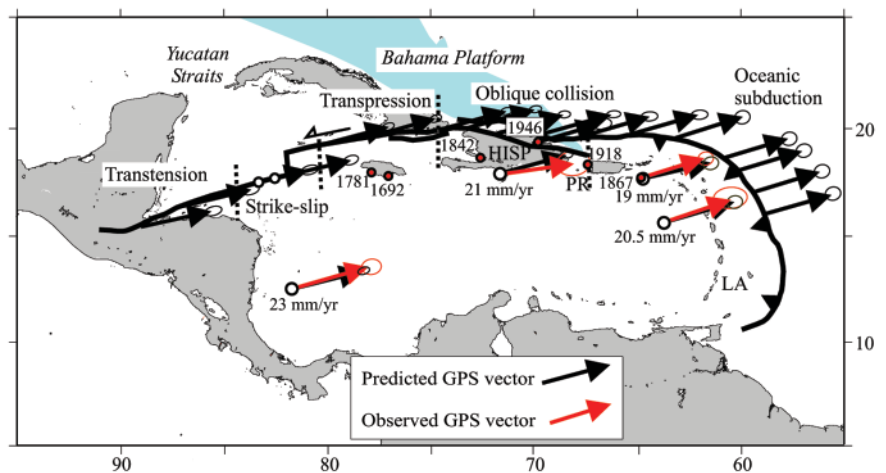


Figure 1. Caribbean-North American plate velocity predictions (black arrows) based on GPS velocities at four sites in the stable interior of the plate (red vectors) and two fault strike measurements in the strike-slip component of the North American-Caribbean plate-boundary zone. The predicted velocities are consistent with the along-strike transition in structural styles from transtension in the northwestern corner of the Caribbean plate to oblique convergence between the Caribbean plate and the Bahama carbonate platform in Hispaniola (Dominican Republic and Haiti) (HISP). Oceanic subduction without collision occurs east of Hispaniola in Puerto Rico (PR) and beneath the Lesser Antilles (LA). Circles show location of five historical tsunamis produced by fault-related earthquakes in the northern Caribbean with documented loss of human life. Huge increases in population across the northern Caribbean mean that these same earthquake-prone areas would see a greater loss of life if similar or larger earthquakes and tsunamis occurred today.

THE HISTORICAL RECORD

The largest earthquakes generated along the North American-Caribbean plate boundary cluster in the collisional zone of Hispaniola, where a magnitude (M) 8.1 thrust-type event and related tsunami occurred in 1946 and resulted in several hundred fatalities. The largest strike-slip event recorded on the western plate boundary was the M7.2 Guatemala event of 1976. This event took the lives of 22,780 Guatemalans and left more than a million homeless in a country with a total population then of about 5.5 million people. The potential for human loss of life in developing countries is staggering because of poor building standards and complacency about the dangers of large earthquakes.

In plate-boundary zones such as Hispaniola, smaller events are commonly felt by the population. The infrequent larger events may come after hundreds of years of strain buildup and quiescence, thus catching the population unprepared. Our fault-trenching studies of the plate-boundary fault that passes through northern Hispaniola show that it last ruptured between A.D. 1040 to A.D. 1230, the early Middle Ages in a European time frame. In the eight-hundred-year interval since the earthquakes, the fault has been quiescent but silently accumulating strain in the upper crust imparted by the steady 20 mm/yr of plate motion at depth. Even at lower estimates of fault motion, the fault has accumulated about 5 meters of stored slip that could be released suddenly to produce an M7 earthquake. Using higher estimates of fault motion yields even more dire predictions about earthquake size.

Only five northern Caribbean tsunamis in the period since the arrival of Europeans in 1492 are associated with a loss of human life. Three of the five events occurred in the area of oblique collisional tectonics and larger historical earthquakes near Hispaniola and Puerto Rico (Figure 1). The earliest recorded tsunami occurred with the 1692 earthquake that destroyed Port Royal, Jamaica. The sea was reported to have withdrawn from 0.27 to up to 1.6 km, exposing the seafloor on the south coast of Jamaica; it returned to inundate the shoreline. Of the 2,000 fatalities related to the earthquake, the exact number killed by tsunamis is unknown. In 1781, along the south coast of Jamaica, a seawave rose to a height of 3 m at a distance of 0.8 km from the shoreline, swept away houses, and killed ten inhabitants. Because the earthquake was reported during a hurricane, the possibility exists that the seawave was not earthquake-related. The most widespread tsunami occurred in 1842 in association with a large strike-slip rupture on the main plate boundary fault in Hispaniola. A tsunami ranging from 3.1 to 5 m was recorded along the northern coast of Hispaniola



A major hurricane hits New York, Connecticut, and Rhode Island at high forward speed. Regions just to the east of the eye experience winds of 150–200 mph and storm surges almost as high as Katrina's. Devastation is widespread from New York City to Cape Cod, with forests flattened hundreds of miles inland. If the eye makes landfall just west of New York City, Manhattan is completely flooded. Thousands are dead because the fast movement of the storm limits evacuation time. Damage is in the hundreds of billions. Likelihood: Possible during this century. It happened in 1938, when a Category 3 hurricane moving at more than 60 mph hit Long Island, flooded Providence, Rhode Island, and blew down forests all the way to Canada.

— John and Pam Knox

and in the Virgin Islands but strangely not on the intervening island of Puerto Rico (Figure 1). Several hundred fatalities were recorded during the earthquake, but the number attributable to the tsunami is unknown.

In 1867, a magnitude 7.5 earthquake in the Anegada trough near Puerto Rico unleashed a tsunami with runup heights ranging from 2.4 meters to 12.1 meters in the U.S. Virgin Islands. Harbor and coastal damage was widespread, but only twelve lives were lost from the tsunami. In 1918, another magnitude 7.5 earthquake affected the Mona Passage between Hispaniola and Puerto Rico and produced a tsunami with a 6-meter-high runup on the west coast of Puerto Rico. Of the 116 fatalities from the earthquake, forty victims were killed as a result of the tsunami. The tsunami was recorded on the Atlantic coast of Florida as a series of several-cm-high waves. In summary, tsunamis in the northern Caribbean are associated with offshore faults and are capable of generating tsunamis up to 12 m high. Their effects extend distances of up to 300 km but are not sufficient to affect the Gulf coast or east coast of the United States.

AREAS TO WATCH

More sobering than the historical record of tsunamis is the presence of large-scale slump features that may have produced immense, prehistoric tsunamis along the northern margin of Puerto Rico.

The two large scarps are up to 55 km across and are carved out of the edge of a north-tilted, Neogene carbonate platform at water depths of about 3 km (Figure 2). Previous workers estimated that a thickness of the upper carbonate platform of 1.6 km was removed by slumping. Our more recent and detailed mapping (with Nancy Grindlay and Meaghan Hearne of the University of North Carolina at Wilmington and James Dolan of the University of Southern California), using both higher resolution bathymetry and closer-spaced seismic lines, shows that the basal slide plane extends to greater depths than previously suspected and therefore could remove a larger volume of material during failure.

Moreover, our mapping also has identified large, 35- to 40-km-long crescentic cracks forming in a shape similar to the dimensions of the slump amphitheatres (Figure 2). Cracking indicates that these areas are close to failure in the same mode as the older slump scars. The estimated total volume of slumped material in one of the slump areas (1,100 km) is similar to the calculated volume of the Storegga slide off Norway that generated a 25- to 30-m-high tsunami along the coast of Scotland and is much larger than the 6 km³ slide that generated the 1998 Papua New Guinea tsunami, which produced a deadly 5-m-high tsunami. The effects of future large

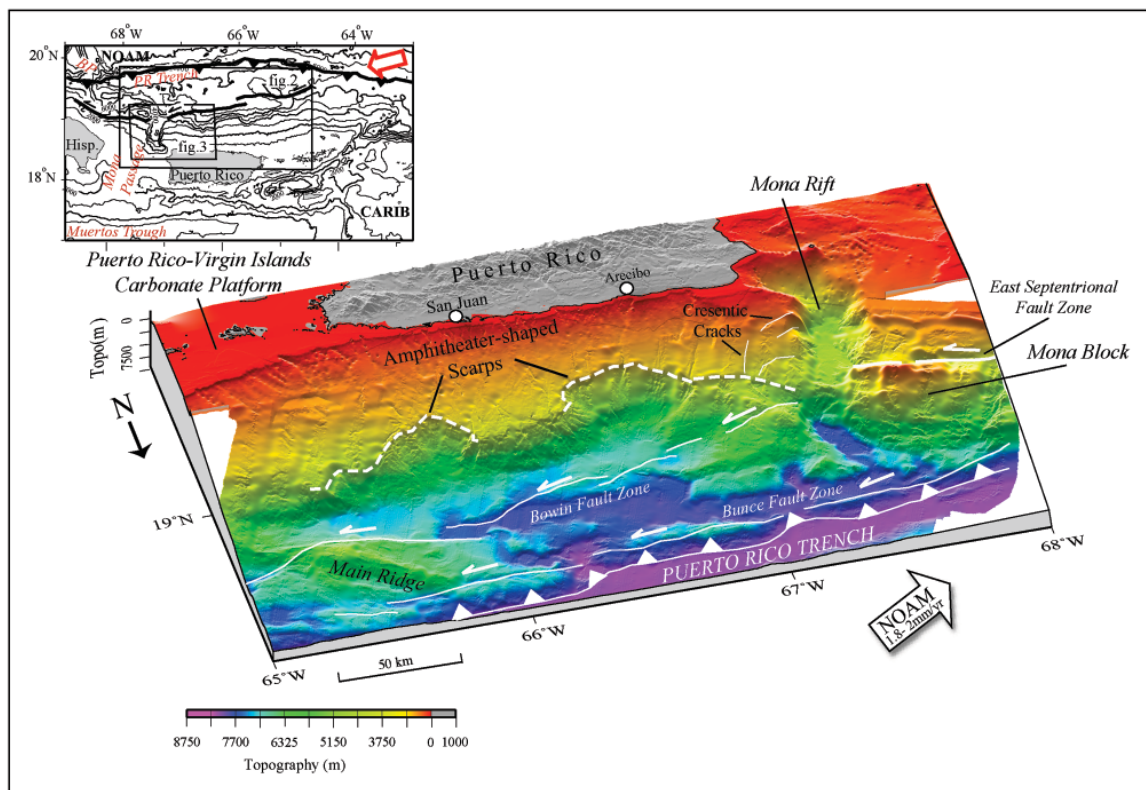
tsunamis on the densely populated coast of Puerto Rico (including the city of San Juan with a population of 434,000 and a significant population of tourists and visitors) would be devastating.

Historical tsunamis in the northern Caribbean indicate the potential for large tsunamis over wide areas (Figure 1). The rapid increase in population in the northern Caribbean plate boundary zone in the twentieth century to its present level of about 54 million people (or about 20 percent of the U.S. population) means that future tsunamis will be much more destructive than the historical ones described above. Slump features described from the north coast of Puerto Rico suggest the possibility of prehistoric tsunamis that are much larger than any of those known from 500 years of historical records.

WHAT TO DO IF IT HAPPENS

Because tourist facilities are concentrated in coastal areas, tourists and visitors should be advised that they are treading in a tectonically active area with a long historic record of infrequent large earthquakes and accompanying tsunamis. Here are two practical and possibly life-saving pieces of advice during an earthquake and tsunami:

Figure 2. Three-dimensional shaded relief map of the northern margin of Puerto Rico and the Virgin Islands showing large amphitheater slump features. The close juxtaposition of faults indicated and the earthquakes that accompany the faults provide a likely mechanism to trigger large slumps of the unstable shelf margin. In addition to earthquake shaking, the catastrophic displacement of large volumes of water by the slump would produce a large tsunami capable of threatening populations and tourist facilities along the coasts of Puerto Rico, the Virgin Islands, and other northern Caribbean islands.



1. Do not run out of a house or hotel when earthquake shaking begins. You are likely to be hit by falling debris, including telephone and electrical wires, poorly attached storefront signs, and building ornaments. Instead, do not panic, stay indoors, and get under a table or bed to protect yourself from falling debris that may include the ceiling fan of your room, wall hangings, and bookcases. After the shaking subsides, make your way outside.
2. Seek higher ground if you are on the coast and you see the water suddenly start to withdraw and expose the shallow seabed. Many lives have been lost during tsunamis (including the Sumatra event of 2004) because uninformed people have blithely walked seaward to investigate the exposed seafloor rather than hurrying landward to seek higher ground. Because the height of some tsunamis is fairly modest (several meters), gaining only a few meters of elevation (including going to a second floor) may be all that is required to remove yourself from the zone of inundation. If you are at sea on a cruise ship, you have nothing to fear, as the tsunami will gain height only as it encounters shallow water.

CONCLUSION

After the Pacific plate margin of North America, the North American-Caribbean plate boundary is the active plate boundary closest (~2,000 km) to coastal areas in the Gulf of Mexico and the Atlantic seaboard. Fortunately, tsunamis generated by northern Caribbean earthquakes are greatly reduced in size before they reach either the Gulf of Mexico or the east coast because they have to travel great distances, around intervening islands, and through restricted passageways.



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For Further Reading:

Geist, E., V. Titov, and C. Synolakis, "Tsunami: Wave of Change," in *Scientific American*, January 2006.

Teachers:

Download a classroom teaching module on tsunamis developed by researchers at the UT Institute for Geophysics: <http://www.ig.utexas.edu/outreach/cataclysms/modules.htm>.

BLACKOUT

It begins with night air
creeping about like death,
and bird song's fading hymnal.
Before a light can be flicked on anywhere,
maples, oaks, form themselves out of dread,
and rain pelts down on mansard roofs,
on quivering traffic signs.


Before bodies can quote blind
confidences to each other,
shadows nudge flesh out of the way,
touch is like a mind
consumed by parting.
Before lovers can come together,
they're pocketed by where they are:
in stalled elevators, black shopping aisles,
in morose parlors
where specks of candles brood.

A letter can't be read
because this evening won't abide
the discipline of words and sentences.
Music can't be listened to,
not with distant thunder
pealing its guerilla percussion,
and lightning jaggling through cloud
with the intensity of skies
not people.

Outside, the world is like
a huge creature with a small brain.
It's rampaging like the other side
come to bully this one.
A cross is pressed against a chest,
a viaticum of silver.
It'll ward off the undead
but the dead's another matter.

JOHN GREY

John Grey is an Australian-born poet, playwright, and musician. He has been a U.S. resident since the late 1970s. His latest book is *What Else Is There* from Main Street Rag. His work recently has been published or is forthcoming in *Agni*, *Drexel Online Review*, *Arkansas Review*, *South Carolina Review*, *Hubbub*, and *Sojourn*.



*Another ash cloud rises high
It grips your soul, down comes the sky*

—Arrow “One Day at a Time,” *Ride de Riddim*

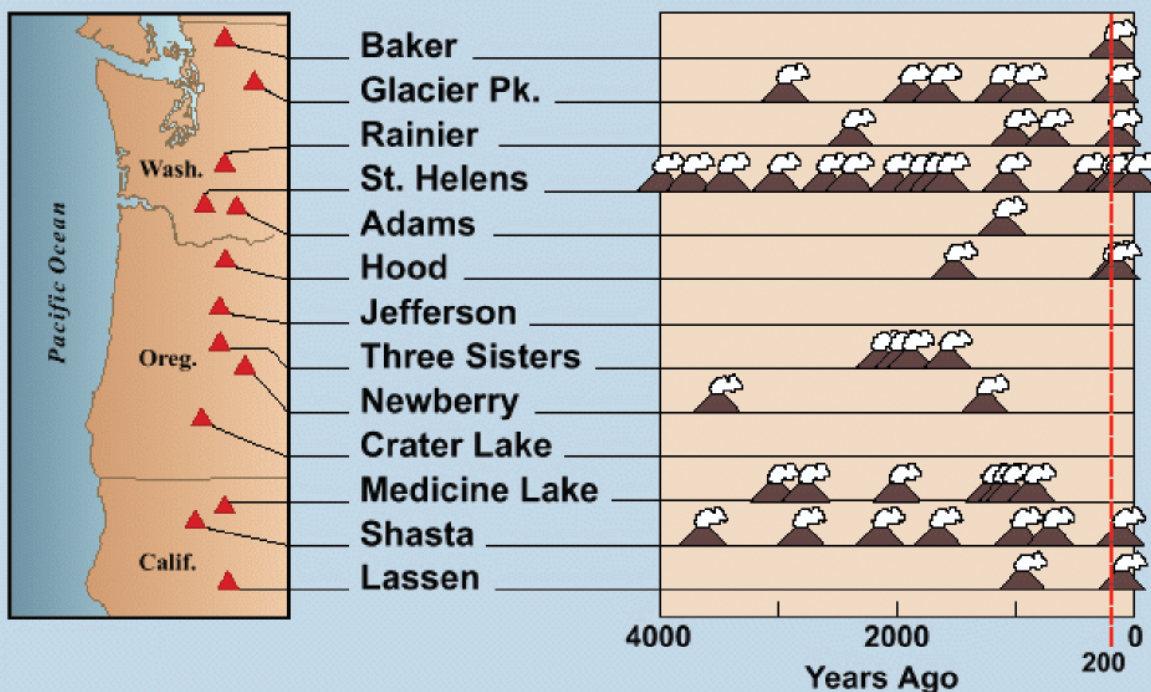
*roiling earth-gut-trash cloud tephra twelve miles high
ash falls like snow on wheatfields and orchards to the east
five hundred Hiroshima bombs
in Yakima, darkness at noon*

—G. Snyder “1980: Letting Go”

Katharine Cashman

**Chicken Little Was Right —
Sometimes the Sky
DOES Fall**

Cascade Eruptions During The Past 4,000 Years



Myers, USGS/CVD, 2000; Modified from: CVD, 1994, USGS Open-File Report 94-585

Figure 1. USGS schematic showing the frequency of volcanic activity at Cascade volcanoes over the past 4,000 years.

From my perch in the Pacific Northwest I see a volcanic landscape — an “in-your-face” volcanic landscape, a British friend of mine once commented after returning from a weekend trip to central Oregon where high Cascade peaks, barren lava flows, and pumice deposits dominate the scenery. It is a landscape that, to greater or lesser degrees, typifies many parts of the western United States, Alaska, and Hawaii. In the past two-thousand years, seven states have seen volcanic activity (Alaska, Arizona, California, Hawaii, Idaho, Oregon, Washington). Go back one-hundred-thousand years, and you can add Wyoming, Nevada, and New Mexico.

Why is the western United States subject to this activity? The reasons are many, but all relate to geologic location. Northern California, Oregon, Washington, and Alaska lie along what is termed an “active plate margin,” meaning that they lie along the boundary between two tectonic plates. The interaction of those plates, specifically the subduction (thrusting) of one plate below another, generates magma that eventually makes its way to the surface and erupts, volcanically. Hawaii owes its existence to a different geologic setting — it lies above a hot spot, a region of enhanced melting that may reflect

a disturbance thousands of kilometers deeper, at the boundary between the earth’s core and mantle. Eruptions in Idaho, Arizona, and New Mexico appear to have a similar origin, except that here the hot spots lie under the continental United States.

Of the volcanically active states, Hawaii and Alaska have the most frequent eruptions. Kilauea volcano, Hawaii, has been erupting almost continuously since January 1983. Alaska has dozens of frequently active volcanoes, one of which — Augustine — is erupting as I write this. But in terms of the hazards that they pose, volcanoes that stretch from northern California to British Columbia, the Cascade Range, are the source of most concern. On average, one or two of these volcanoes erupt every century (Figure 1). For example, Lassen volcano in northern California erupted during World War I, and Mount St. Helens was active throughout much of the 1980s. Both Mount Hood and Mount St. Helens also were active at the beginning of the nineteenth century, a few years before Lewis and Clark reached the Pacific Ocean. Moreover, some of the northwest’s largest cities are located close to these peaks, most notably Seattle and Tacoma, northwest of Mount Rainier, and Portland, northwest of Mount Hood. For this reason, my focus

here is on the recent (last several thousand years) eruptive history of the Cascades to provide perspective on the probability of future eruptive activity in this region.

THE HISTORICAL RECORD

Native American oral traditions from the Pacific Northwest abound with stories of volcanic eruptions, testifying to the frequency with which volcanic activity has punctuated the history of human occupation of this region. Dominant among these stories are those related to the approximately 7,700 years before present (ybp) eruption of Mount Mazama to create Crater Lake, Oregon. There are several versions of the eruption story, from the Klamath and Modoc tribes to the east of the volcano (Clark), as well as the Umpqua to the west (www.cowcreek.com). These stories refer back to “deep time” (Vansina), a time “long ago, before the stars fell” (Clark, p. 63). One story provides a vivid picture of the eruption, framed as a fight between the “Chief of the Below World” and the “Chief of the Above World” in which “[m]ountains shook and crumbled. Red-hot rocks as large as the hills hurtled through the skies. Burning ashes fell like rain. The Chief of the Below World spewed fire from his mouth. Like an ocean of flame it devoured forests on the mountains and in the valleys. On and on the Curse of Fire swept until it reached the homes of the people” (Clark, p. 54). The story then documents a pause in eruptive activity before the subsequent eruption, during which “the top of the mountain fell...the high mountain was gone” (Clark, p. 55). Since this devastating event, the resulting Crater Lake has been off-limits to many local tribes (www.cowcreek.com).

Geological investigations of the eruption do find evidence for two separate eruptions (Diller and Patton, Williams, Bacon). The first produced a high eruption column that deposited pumice and ash to the east. Explosive activity then was followed by more subdued effusion of a large lava flow of obsidian that probably lasted for weeks or even months. A second, and much larger, eruption then followed, its high column spreading pumice and ash over much of the western United States, covering parts of Oregon, Washington, Idaho, and California. As the eruption progressed and the magma reservoir beneath the mountain drained, the vent feeding the eruption widened, and the high column collapsed to form hot ash flows that swept down the flanks of the mountains for several kilometers in all directions. The eruption ended after more than 50 km³ of magma had been evacuated, and the top of the mountain transformed into a hole 8 km across and 1.6 km deep (USGS) (Figure 2).

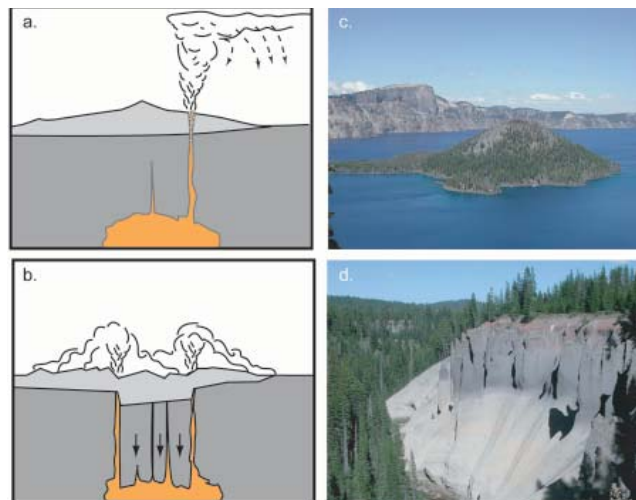


Figure 2. Caldera collapse at Crater Lake, Oregon. (a, b) Cartoons illustrating the plinian column and caldera collapse phases of the eruption (modified from USGS Web site — <http://pubs.usgs.gov/gip/hazards/maps.html>). (c) Crater Lake now, with Wizard Island, the product of the most recent eruption, at its center. (d) Pyroclastic flow deposits from Crater Lake at The Pinnacles, Crater Lake National Park, Oregon.

An eruption of the magnitude of the 7,700 ybp eruption would have disastrous consequences for the United States if it were to happen today. Not only would the area immediately adjacent to such an eruption be completely devastated, but also fine ash would cover several states, interfering with transportation of all types (particularly air traffic), farming, communication, water supplies, and sewage treatment plants. Even finer ash particles and aerosols reaching the stratosphere would affect the global climate for at least a few years, as demonstrated by a Mazama-sized eruption of Tambora volcano, Indonesia, in 1815, which was responsible for the “year without a summer” in New England the following year, as well as for unusually cold and damp weather in Europe (DeBoer and Sanders). Literary responses to the unusually cold and damp European summer include Byron’s poem “Darkness” and Mary Shelley’s horror story *Frankenstein* (DeBoer and Sanders).

CURRENT POSSIBILITIES

Is such an eruption likely in the near future in the Pacific Northwest? The short answer is no. Large eruptions occur infrequently; the larger the eruption, the more infrequent it is. Eruptions that are likely on the time scale of decades to centuries are more likely to be no larger than the recent (1980) eruption of Mount St. Helens. As with Crater Lake, evidence of smaller but more frequent past events can be found in the vivid eruption imagery that permeates local oral traditions. Mt. Hood, which lies southeast of

Portland, Oregon, was believed to be occupied by evil spirits who sometimes “became so angry that they threw out fire and smoke and streams of hot rocks. Rivers of liquid rock ran toward the sea, killing all growing things and forcing the Indians to move far away” (Clark, p. 15). Also revealing are the numerous stories relating to hot floods from Mount Rainier (Takobed) during which “Takobed’s head burst open, the lake on top spilled out, and the water rushed down. It swept the trees from where Orting now is, and left the prairie covered with stone” (Clark, p. 33).

Both stories speak to important past events at these two volcanoes. Mount Hood is the most recently active volcano in Oregon. Eruptions of Mount Hood typically include some combination of lava-dome growth, dome collapse, generation of pyroclastic (hot ash and rock) flows, and, as those flows travel down river valleys, hot volcanic mudflows (lahars). The most recent eruption took place shortly before Lewis and Clark reached the region in 1805 (Gardner, *et al.*), as indicated by their name for the Sandy (or ‘quicksand’) River that drains to the west from Mount Hood, a river that is now a narrow, rocky gorge. ‘Sandy’ is a term that was equally accurate in describing the Toutle River, which drains west from Mount St. Helens, in the years that followed the 1980 activity.

Mount Rainier, at 14,410 feet, is the highest volcano of the Cascade Range. It also lies close to the largest city in the Pacific Northwest, Seattle. The Nisqually story quoted above describes a lahar that traveled down the Puyallup River, draining northwest from Mount Rainier, and past the town of Orting. This mudflow occurred about five-hundred years ago and was probably not directly related to an eruption. In contrast, a much larger lahar about 5,600 years ago was related to eruptive activity. It was initiated by the collapse of about 3 km³ of the volcano’s summit and traveled to Puget Sound, reaching land now occupied by the outskirts of the city of Seattle (Driedger and Scott). Much smaller mudflows have occurred within recorded history, as have small eruptions (in the mid-nineteenth century). When combined with the large population in the Puget Sound Lowlands, this history of lahar generation, with or without associated eruptions, makes Mount Rainier the most hazardous volcano in the Cascade Range.

MOUNT ST. HELENS

The most active volcano in the Cascades, however, is the one volcano that most people can name — Mount St. Helens, the eruption of which on May 18, 1980, has already become part of the lore of the northwest. The eruption was not a surprise. In 1978,



A Canary Island volcanic mountain collapses during eruption and generates a 160-foot-high tsunami that hits the U.S. East Coast from Miami to Cape Cod within ten hours. Millions dead. Likelihood: uncertain.

— John and Pam Knox

USGS geologists R. Crandell and D. Mullineaux published a report stating that Mount St. Helens was the Cascade volcano most likely to erupt before the end of the twentieth century (Crandell and Mullineaux). This forecast was based on careful mapping and dating of pumice and ash layers from previous eruptive events. They found that Mount St. Helens had erupted every 100 to 200 years since about 1480 AD, with the most recent activity ending sometime in the mid-nineteenth century. That activity was recorded in historic accounts, as well as in a set of paintings by the traveling artist Paul Kane. His journal notes that he was warned by local tribes against traveling to the volcano, specifically to Spirit Lake, which lies to the volcano’s north (Colasurdo, p. 104). Again, this suggests ritual land-use prohibition in response to past (hazardous) eruptive activity in the area.

The 1980 eruption of Mount St. Helens did surprise everyone with its initial explosion at 8:32 a.m. on May 18 — a lateral blast to the north resulting from collapse of the volcano’s north flank. The blast flattened almost 600 km² of northwest forests, stripping tall Douglas fir trees of needles and branches and flattening the tall trunks in radial patterns, a graphic record of the transit vagaries of the hot gas cloud. Collapse of the cone produced an avalanche of debris — often intact pieces of the mountain’s flanks — which transformed as it spread down the Toutle River valley. Large mounds (‘hummocks’) were left behind as water and finer sediment mixed with river water to generate fierce mudflows that left the valley with fewer bridges and lined it with a bathtub rim of mud to mark the high water mark. For the rest of the day, the mountain emitted a high column of pumice and ash, most of which traveled



Figure 3. Mount St. Helens as seen from the northeast. Here you can see that the mountain has lost its summit and now has a large amphitheater-shaped hole resulting from the collapse of the north flank in 1980.

east with the prevailing winds to cause “darkness at noon” in Yakima and noticeable ash accumulations as far away as Missoula, Montana. Closer to the volcano, hot dense flows of pumice and ash swept north out of the breach formed by the initial collapse, covering the shores of Spirit Lake in tens of meters of pumice deposits. By the end of the day, fifty-seven people were dead, and many more were left shaken and confused by the abrupt transformation of their once-familiar landscape (Figure 3).

Volcanic activity at Mount St. Helens did not end on May 18. The summer of 1980 saw a series of explosive eruptions, each of shorter duration than the one before. By the end of 1980, explosions had given way to the quieter emergence of a succession of short, thick lava flows that gradually built a lava dome within the volcano’s central crater. By the end of 1986, the lava dome was 1,060 m long and 267 m high (www.vulcan.wr.usgs.gov/Volcanoes/MSH/EruptiveHistory/), and it appeared that the volcano was headed back to sleep. However, between 1986 and 2004 a series of earthquake swarms beneath the volcano suggested that perhaps we had not seen the end of volcanic activity, at least for this eruptive phase. This suggestion was born out in October 2004, when the volcano resumed where it had left off in its rebuilding process. Lava dome growth begun at that time still continues, with the volume of newly erupted lava quickly approaching that of the 1980 to 1986 dome. What does the future hold for Mount

St. Helens? Its last eruptive phase started in 1800 and lasted through 1857. We have no way of predicting how long this phase will last, except to say that based on the past, intermittent activity may continue for years or even decades.

OTHER AREAS OF CONCERN

A final note: Although the imposing volcanic peaks of the Cascade Range are the most conspicuous evidence of volcanic activity in the Pacific Northwest, central Oregon also hosts hundreds of small, isolated cinder cones, many with associated lava flows and many of which have formed during the past ten thousand years.

The youngest cluster of cinder cones and lava flows lies near McKenzie Pass, at the crest of the Cascades to the east of my home in Eugene. These cones — Little Belnap with its fluid

lava flows, Yapoah with its blanket of fine ash and frothy cinder, Four-in-One with its line of craters and associated flows, Collier Cone near North Sister with its lava flow stretching into the forests of the west slopes, Lost Lake Cones to the north, and perhaps even Blue Lake Crater near Santiam Pass — were all active less than two-thousand years ago (Scott, *et al.*). Eruptive activity associated with these volcanoes would have covered the spectrum from Hawaiian-like rivers of molten lava to small (Strombolian) explosions to fire fountains and explosive eruptions that may have sent eruption columns several kilometers into the air, as occurred during the construction of Parícutin in a cornfield in Michoacan, Mexico, from 1943 to 1952 (Figure 4).

The past two-thousand years also have seen volcanic eruptions that produced strong eruption columns followed by thick flows of glassy obsidian, the most recent of which (about 1,300 years old) now occupies part of the central crater of Newberry volcano. Although either type of eruption — cinder cone or obsidian flow — would not be life threatening, protracted output of volcanic ash could substantially disrupt life in central Oregon. When will the next eruption occur in this area? We don’t know, but we do know that since 1997 an area about 20 km in diameter, centered 5 km west of South Sister, has been rising at the modest rate of about 2.5 cm (one inch) per year, reflecting intrusion of magma

about 7 km below the ground surface (www.vulcan.wr.usgs.gov/Volcanoes/Sisters/WestUplift/framework.html). Whether this intrusion will eventually cause an eruption is not known, nor can we say anything about the magma composition (and thus potential eruptive style). However, this swelling was detected using exciting new satellite technologies that are providing us with new windows into the earth's crust. Continued technological improvements of this type will only improve our understanding of volcanic activity as time goes on.

In summary, Chicken Little was right — sometimes the sky does fall, especially in active volcanic regions such as the Pacific Northwest. And while past (and current) activity provides us with a good understanding of the types of volcanic activity that we can expect in the future, the exact timing of future events is impossible to predict.



Figure 4. Typical basaltic cinder cones. (a) Yapoah Crater in central Oregon, formed less than 2,000 years ago; (b) Parícutin volcano, Mexico, formed between 1943 and 1952.



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Want to keep up with the eruption of Augustine in Alaska? Go to the Alaska Volcano Observatory Web page at <http://www.avo.alaska.edu/> for the latest information.

Alan W. Harris

Chicken Little Was Right!

The Risk from an Asteroid or Comet Impact

In a recent interview, Richard Posner, author of the book *Catastrophe: Risk and Response*, opined, “Institutionally, we are incapable of dealing with anything that hasn’t happened before.” The context was in relation to failures of response to Hurricane Katrina, so he should perhaps have qualified that further to say “within a lifetime” and “within the jurisdiction of the institution” because worldwide, disasters on the scale of Hurricane Katrina are actually extremely frequent, and over the long haul of history, vastly worse disasters have happened. In this article I address a class of disaster, the impact of an asteroid or comet on the earth, that is in fact nearly unique in history and has the potential to be far worse than any disaster ever firmly recorded in history. If Posner’s statement has any validity at all in the exaggerated context of “hasn’t happened” in which he used it, then I fear that the world will be ill-prepared, and perhaps cannot be prepared, for the ultimate disaster of such an impact.

Even though not a single well-documented fatality from a cosmic impact has been recorded over all of history, the Earth bears scars of past impacts, and we can see the “bullets” whizzing by in our telescopes and thereby calculate quite accurately how often impacts of a given size should occur. In Arizona, not far from where I live, lies one of the most recent scars, Meteor Crater, a hole in the ground nearly a mile across caused by the impact of an iron meteoroid estimated to have been around 50 meters in diameter, perhaps about fifty-thousand years ago (Figure 1). Only about a century ago, in 1908, a similarly sized stony body entered the atmosphere above the Tunguska region of Siberia, Russia, exploding about 8 km above the ground and flattening an area of forest about equal to the area enclosed by the Beltway surrounding the city of Washington, D.C. (Figure 2). Both of these events had an explosive energy about equal to a modern thermonuclear bomb, around 10 Megatons equivalent TNT (MT).



Figure 1. Meteor Crater in Arizona.



Figure 2. Tunguska, Russia, impact event.

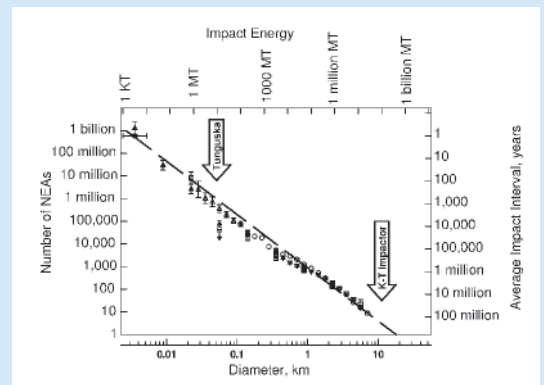


Figure 3. Population of Near-Earth Asteroids.

But nature has much worse to offer, even if less frequent. Sixty-five million years ago, an asteroid or comet perhaps 10 km in diameter slammed into the Earth near the present-day tip of the Yucatan peninsula. The nearly immediate worldwide firestorm and the resulting climatic disaster, resembling “nuclear winter,” led to the extinction of more than half of all animal species on the earth, including the dinosaurs.

It takes a true mass extinction to leave a visible trace in the geologic record in the form of fossil transitions. Far more frequent, smaller cosmic impacts undoubtedly led to the immediate death of large fractions of the worldwide populations of animals (including humans, if they were around) without causing an extinction. Because of the rapid rebound of populations, so long as they do not go extinct, such events leave little trace in the geological record, and crater scars are easily erased by erosion and sedimentation. Thus, the hard evidence for these more frequent catastrophes is hard to find.

We can, however, observe these cosmic bullets in the sky. “But what might be the Consequences of so near an Appulse; or of a Contact; or, lastly, of a Shock of the Coelestial bodies, (which is by no means impossible to come to pass) I leave to be discuss’d by the Studios of Physical Matters.” So wrote Edmund Halley in his *Synopsis of the Astronomy of Comets* in 1705, when he realized that the orbit which he calculated for the famous comet that now bears his name actually crosses the orbit of the earth. In 1932, the first asteroid in an Earth-crossing orbit was discovered and named Apollo. In the years since then, more than two thousand asteroids that cross the orbit of the earth have been discovered.

IMPACT PROBABILITIES

From the numbers discovered, we can estimate the total number that exists and from that number calculate how frequently impacts of a given size occur (Figure 3). The various plot points on the graph are actual estimates of the numbers of asteroids larger than the given size; the straight dashed line is a useful approximation to the population over the entire size range. A single asteroid, given that it is in an orbit that crosses the Earth’s, has a “collision lifetime” of about five-hundred million years. Thus, at a size with only one object that large, the impact frequency is once in five-hundred million years; at a size with a thousand Earth-

crossing asteroids that large or larger, the impact frequency is once in five hundred thousand years, and so forth.

In the 10-km-diameter range, only a few Earth-crossing asteroids are that large (and we believe that we have found them all), so the impact of an asteroid that large occurring sixty-five million years ago is about as recent as we would expect. In the size range of the Tunguska impactor, we have discovered only about one hundred or so, but from these we can estimate that the total population is nearly a million asteroids, and thus, we can estimate that such impacts should occur once or twice in a thousand years. This estimate is slightly at odds with the fact that the last such event happened only one hundred years ago, but we could be wrong by a factor of a few on the population versus size, and an event only one-hundred years ago is not all that improbable. At the very smallest end of the scale, we estimate half a billion or so asteroids down to 3 to 4 m in diameter, a size where approximately one per year enters the atmosphere. Such small rocks explode high in the atmosphere as giant bolides and are observed by military surveillance satellites designed to detect nuclear blasts or rocket launches around the world. Remarkably, airbursts with the energy of the Hiroshima nuclear blast occur somewhere around the world once every few years to a decade yet go essentially unnoticed, except by the military satellites and rarely by fishermen on the sea or hunters in remote areas.

DESTRUCTIVE POWER

What are the consequences of impacts of various sizes? Table 1 is a short summary. As I have already noted, small asteroids up to about 50 m in diameter, with impact energy up to a megaton equivalent, explode high enough in the atmosphere to cause no significant ground damage, other than perhaps a few broken windows and such from the sonic boom. Because most enter over the ocean or remote areas,

Table 1.
Consequences of Impacts of Increasing Size and Decreasing Frequency.

Diameter	Energy	Primary damage	Interval, years	Expected fatalities	Deaths per year
<50 m	<1 MT	none	tens	0	0
60–100m	10–100 MT	air burst	1,000	25,000	25
200–500m	1,000 MT	crater or tsunami	10,000	2 million	200
1–2 km	100,000 MT catastrophe	global climatic	2 million	1-2 billion	1,000
10 km	100 million MT	global extinction	100 million	everyone	65

they may go completely unnoticed by the general population. In the size range of the Tunguska event, 60 to 100 m in diameter, the asteroid still explodes in the air rather than reaching the ground, but the blast wave is capable of causing ground damage, just as if a nuclear bomb of the same size exploded in the atmosphere. The energy of such explosions is comparable to large thermonuclear weapons, so the consequences are well studied, both theoretically and experimentally. We can easily calculate the “mean fatalities per event,” which turns out to be around 25,000, but in fact only a small fraction of events kill even a single individual because most occur over the ocean. Those that do occur over land are mostly in remote areas, as was the Tunguska event. Thus, we do not expect any fatalities at all most of the time; only one in about five events (once in five-thousand years) kills anyone, and even fewer would lead to major catastrophes. Such findings are therefore entirely consistent with the historical record of no such events in the last several thousand years.

Moving up to the next larger event size, beginning at around 150 to 200 m in diameter, an entering asteroid will make it to the surface, creating an impact crater such as the one in Arizona. That particular crater was formed by a considerably smaller iron meteoroid, but such iron bodies are only a small fraction of the asteroid population. If an asteroid of this size struck the sea, it would generate a tsunami that might be even more destructive than a ground hit, depending on location. Impacts of this size carry more energy than the largest nuclear bombs, around 1,000 MT. Such a large blast would actually blow a hole in the atmosphere and send debris flying out into space and falling back on the atmosphere hundreds or even thousands of kilometers away. For a land blast, we can estimate fairly well the range of damage and the resultant mean fatality rate. For an ocean impact that creates a tsunami, there is far more uncertainty. It has been claimed for some time, going back to the time of above-ground nuclear testing, that explosion-generated waves will break, like a giant surf, when they

encounter a continental shelf, still far from shore. If this is the case, then impact-generated tsunamis may be close to harmless. Furthermore, tsunami waves take some time to reach the shore. So with proper warnings the actual death count might be kept quite

Table 2. Risks of Various Causes of Premature Death in the U.S.

Cause of Death	Annual deaths in U.S.	Lifetime odds, One in:
Accidents (all kinds)	100,000	36
Motor vehicle accident	42,000	90
Suicide	30,000	120
Homicide	20,000	185
Falls	15,000	250
Assault by firearm	12,000	325
Fire or smoke	3,400	1,100
Firearms accident	1,500	2,500
Natural forces (storms, etc.)	1,100	3,400
Electrocution	750	5,000
Drowning	420	9,000
Flood	140	27,000
Airplane crash	125	30,000
Lightning strike	90	43,000
Tornado	80	46,000
Legal execution	60	60,000
Hurricane (incl. Katrina)	60	60,000
Asteroid impact (all sizes)	60	60,000
Asteroid impact, global catastrophe	45	80,000
Terrorism (incl. 9/11)	45	80,000
Venomous bite or sting	40	100,000
Tsunami (prorated from worldwide)	40	100,000
Earthquakes	30	130,000
Regional impact (tsunami)	9	400,000
Fireworks accident	6	600,000
Airline terrorist hijacking	5	800,000
Terrorism (excl. 9/11)	3.5	1,100,000
Amusement park rides	3.5	1,100,000
Impact mass extinction	3	1,200,000
Local impact (Tunguska)	1	3,000,000
Food poisoning by botulism	1	3,000,000
Shark attack	0.5	8,000,000
Drinking tap water with EPA limit of contaminants	0.4	10,000,000

low. Thus the “expected deaths” in the table might be more representative of numbers of displaced (wet and angry) individuals, rather than actual fatalities.

At a size between 1 to 2 km in diameter, an impact will loft enough debris to cause a global climatic disaster. Even an impact into the deepest ocean would punch through to the bottom and loft solid material, which would blow out of the atmosphere and rain back down at hypersonic speeds to burn up into micron-sized dust, like so many meteors. The resulting dust cloud would shut off sunlight, and hence plant photosynthesis, for months or years, destroying agriculture for at least one growing season. Thus, even though the zone of prompt destruction from the impact still would be small, the population of the entire planet would feel the consequences through famine and disease; perhaps a quarter of the entire world population might perish.

The final category, “global extinction,” is so infrequent that the risk, in terms of fatalities per year, is hardly significant. Furthermore, we have already discovered all (we think) asteroids that large, and none of those objects has our name on it in the foreseeable future (more than a century). So it seems likely that we are safe from extinction, at least from killer asteroids, for the time being.

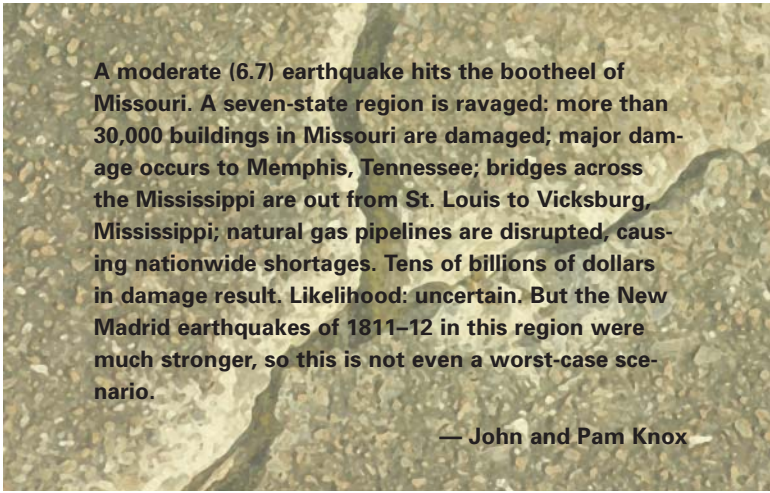
probabilities. But nature in this case is completely deterministic: either there is, or there is not, an asteroid out there on a collision course in the next fifty or hundred years. If we find and track them all, we can have that answer and then either quit worrying about it and move on to other matters, or if there is one, we can deal with it.

In Table 1, I have listed the simple quotient of the previous two columns to give the number that an insurance provider, in this case a government, wants to know to assess how concerned it should be. Both the numbers of fatalities per event and the interval between events are individually hard to conceptualize — there are more folks and more years than we can easily comprehend or that relate to other natural disasters with which we are familiar. But the ratio, fatalities per year, is an easily comprehensible number and in fact is in the range of other natural and unnatural risks that we face all the time.

In Table 2, I have listed a number of risks of premature death that we confront in our lives. By far the greatest risks are from things that we do to ourselves: accidents, suicide, homicide, fires, and so forth.

Natural disasters cumulatively account for only about 1 percent of accidental deaths in the United States. Looking down the table, we see that asteroid impacts of all sizes are a risk comparable to the risk of death from hurricanes, including Katrina. It is also about even with the risk of death by terrorism, in this case including 9/11. We as a society were curiously oblivious to either risk until the events happened. In the case of terrorism, we have transformed our way of living in response to what, in the larger picture, is only a minor risk. It remains to be seen how we as a society will respond to Katrina and the risk from hurricanes. For the impact risk, we remain largely oblivious. But perhaps that is as it should be. After all, we are largely oblivious to the much greater risks of accidents of all sorts; certainly we should not transform our way of living in response to the impact hazard.

We can see that by far the major part of the impact risk comes from the largest remaining undiscovered asteroids. Current surveys have found and tracked more than half of the asteroids that are large enough to cause a global climatic catastrophe, and we are on course to find most of those that remain within the next ten years or so. Thus, the impact hazard is rapidly moving down the chart to become only a minor risk, in the one-in-a-million category along with fireworks accidents and amusement park rides. Until and only if an asteroid is found on a collision course, it seems inappropriate to take any further action, other than perhaps paper studies to



A moderate (6.7) earthquake hits the bootheel of Missouri. A seven-state region is ravaged: more than 30,000 buildings in Missouri are damaged; major damage occurs to Memphis, Tennessee; bridges across the Mississippi are out from St. Louis to Vicksburg, Mississippi; natural gas pipelines are disrupted, causing nationwide shortages. Tens of billions of dollars in damage result. Likelihood: uncertain. But the New Madrid earthquakes of 1811–12 in this region were much stronger, so this is not even a worst-case scenario.

— John and Pam Knox

WHAT WE CAN DO

Finally, I want to address the question, what should we do, or not do, about the impact hazard? The first and most obvious answer, which would have served Chicken Little as well, is “look up, and see what’s in the sky.” Unlike the dinosaurs, with our modern technology of telescopes, CCD cameras, and computers, we can search out the asteroids and compute their paths for decades into the future. In the discussion above, I have dealt in

assure ourselves that we could take defensive action if an impactor were found and perhaps lay plans for civil defense measures to be ready for a small impact if one should occur.

The possibility of a civilization-ending impact catastrophe, although extremely unlikely, is worth worrying about but fortunately involves the largest and hence easiest to find asteroids. Smaller impact events are little different from other natural disasters, such as earthquakes, floods, or tsunamis, and are vastly less frequent. Thus, it is inappropriate to invest much public attention in such impacts that pose an individual risk comparable to shark attacks or taking amusement park rides.



Alan W. Harris has been interested in space science since childhood, even before Sputnik. He received a BS degree from Caltech in 1966 and a PhD from UCLA in 1974, specializing in planetary dynamics. He retired from the research staff of the Jet Propulsion Laboratory

after twenty-eight years but remains active in planetary research affiliated with the Space Science Institute of Boulder, Colorado. During the last decade, he has served on several NASA- and NSF-funded studies of the impact hazard and designs of systems to find and catalog potentially hazardous objects that could collide with the earth.

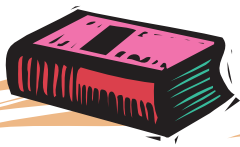
Further reading:

Study to Determine the Feasibility of Extending the Search for Near-Earth Objects to Smaller Limiting Diameters; Report of the Near-Earth Object Science Definition Team, Grant H. Stokes, Team Leader, NASA Office of Space Science, Solar System Exploration Division, August, 2003. Summary and full report available at <http://neo.jpl.nasa.gov/neo/report.html>.

Report of the Task Force on Potentially Hazardous Near Earth Objects, Harry Atkinson, Chair, British National Space Center, August, 2000. Report available at <http://www.nearearthobjects.co.uk>.

Posner, Richard A. *Catastrophe: Risk and Response*. Oxford University Press, 2005.





Book Reviews

Steven D. Levitt and Stephen J. Dubner. *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*. New York: William Morrow, 2005. 242 pages. \$25.95.

Precious few books about economics have ever made it to the top of bestseller lists. *Freakonomics* by economist Steven Levitt (cowritten with journalist Stephen Dubner) is a singular recent exception. In a day when much modern economics ranges from the simply arcane to the unintelligibly irrelevant, Levitt has written a fascinating and brilliant work (“brilliant” is not an adjective I use often). He plumbs — with simple numbers and conclusions drawn from a host of his previous studies — the “hidden causes” of many disparate phenomena. One definite warning: Levitt’s conclusions contain something to offend everyone. Levitt’s defense for the latter is that “Morality . . . represents the way that people would like the world to work — whereas economics represents how it actually does work” (p. 13).

Levitt and his coauthor eschew all technicalities but do use basic economic principles, to wit:

- (1) Incentives matter a lot.
- (2) Information is often not evenly divided between buyers and sellers, and “experts” often serve themselves.
- (3) Dramatic effects often have distant and subtle causes.
- (4) Knowing what and how to measure makes understanding “hidden causes” less complicated.

Levitt then tackles myriad interesting issues and the conventional wisdom concerning them with these simple principles. Consider only three of them: crime rates, cheating, and parenting.

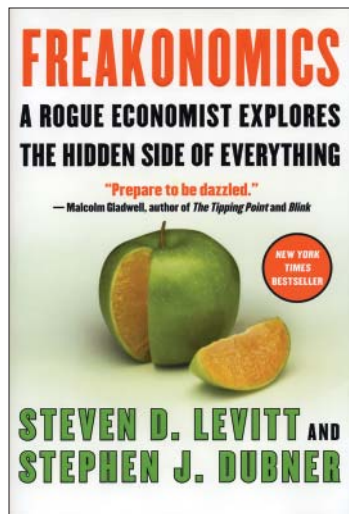
Despite virtually all predictions to the contrary, crime rates *fell* during the 1990s. Why? With numbers and logic, Levitt shows that it was not, as most have argued, the result of more and better policing and more prisons. While these two forces had some positive influence, Levitt finds that another factor in the data — *Roe v. Wade* permitting abortions nationwide in 1974 — had a highly significant effect on reduced crime. The children of low-income, single-parent, teen mothers who would have been born if abortion were illegal would have been exactly the ones most likely to commit serious crime in the United States. Further, those states that permitted abortions before *Roe v. Wade* had significantly lower crime rates than the U.S. average. Incidentally, this effect also helps explain the demise of Nicolae Ceausescu in Romania. Ceausescu outlawed all abortion in 1966 and was overthrown and executed principally by the young in 1989.

Who cheats? Under the right set of circumstances, practically everybody. Students cheat, but so do some teachers, those whose jobs depend on high standardized-test scores. Levitt, using a massive data set, reveals that a good number of teachers were cheating in the Chicago public schools. How about real-estate agents? Agents have an economic incentive to close deals quickly with both buyers and sellers. Their gain to waiting for a better deal is small compared with your potential gain as a buyer or seller for a longer wait. The proof: Levitt shows that on average real-estate agents leave their own properties on the market ten days longer.

“Cheating” is often practiced on the basis of what economists call “asymmetric information” — that is, when one party to an exchange has significantly better information than the other. Bypass and other heart operations are performed far in excess of the statistical benefits from such procedures, and doctors know it. The same goes for cesarean births that are, for example, disproportionately performed on Fridays according to a Canadian study. Then, there are dating Web sites on which women are disproportionately blonde and men are disproportionately high-income earners. And practically everybody lies about weight!

Parenting is yet another of Levitt’s major concerns. Does reading to your children or softly introducing them to Bach or Mozart make a difference? Does giving them ethnic or “low-income” sounding names (Jasmine) or “upper-income” names (Benjamin) make a difference in test scores? It is the old nature versus nurture argument, and from a massive data set Levitt makes a strong case for nature. He carefully argues that for the mass of variables studied, what parents do is far less critical for children’s academic scores than who they are. And, what’s in a name? Nothing! If you think this is controversial, consider that a swimming pool is a hundred times more likely to kill your child than a gun in your house. Parenting matters, of course, but not in the way that most people think.

There is much more to this book. It helps explain, for example, how Superman comics helped to defeat the Klu Klux Klan, how and why Sumo wrestlers cheat, and how the Internet is making some “experts” more honest. It is an amazing and tantalizing tour de force, and I recommend it to all. A final note: Levitt, still in his thirties at the University of Chicago, is one of just a few of contemporary economists who are revolutionizing the profession. If a part of genius (another word to be used sparingly) is the ability to find and analyze the right questions, Levitt and his book fit the bill. This book makes you think, and it is fun, too.



Robert B. Ekelund, Jr. is an Eminent Scholar (Emeritus) in the Department of Economics at Auburn University.

Horowitz, Joseph. *Classical Music in America: A History of Its Rise and Fall*. W. W. Norton, 2005. 606 pages. \$39.95.

In his book, *Classical Music In America: A History of Its Rise and Fall*, Joseph Horowitz introduces the reader to numerous colorful figures in the history of American classical music. All of the familiar names are here, including conductors Arturo Toscanini, Leopold Stokowski, and George Szell; marquee performers Jascha Heifetz, Vladimir Horowitz, and Van Cliburn; composers Aaron Copland, George Gershwin, and Charles Ives; and others who wore many hats, such as Leonard Bernstein. But what makes Horowitz's tour de force so valuable is learning the background behind these legends. He accomplishes this aim by drawing in characters from behind the scenes such as music critics, responsible for influencing public opinion; financiers and promoters, who did some wonderful things while at the same time engaging in shady self-promotion; and the American public, who was taken on a wild and bumpy ride in a continuing struggle to make classical music a legitimate and viable art form in the New World. Horowitz weaves these diverse personalities into a compelling narrative that exposes many of the historical strengths and weaknesses of American classical music and offers cogent interpretations about the state of music today.

Horowitz, a noted writer, teacher, and artistic advisor for a variety of organizations, including the *New York Times* and the Brooklyn Philharmonic Orchestra, is particularly well-suited to approach this challenging subject. He claims that such a book is necessary for three reasons: first, there is a need for an account of classical music in America without concurrently addressing the influence and role of popular and vernacular music; second, he notes that few studies have been written about major orchestras, opera companies, and those in charge of such organizations; and third, the history he tells has "largely run its course." In other words, with the decline of modernism and the rise of postmodernism in the late twentieth century, the traditional identity of classical music as "privileged high culture" has changed as a result of the influence of outside elements, most notably popular music.

In doing so, he divides the topic into what he calls "two books." The first book, "Queen of the Arts: Birth and Growth," examines the musical cultures in Boston and New York in the Gilded Age, which he argues was the "most dynamic phase" of classical music in America. Boston represented the "genteel" tradition wedded to European composers (illustrated by the Boston Handel and Haydn Society), while only reluctantly allowing native composers such as George Chadwick and Amy Beach to have their works performed — yet to wide acclaim, it should be noted. By contrast, New York, with its cultural diversity, offered more opportunities for develop-

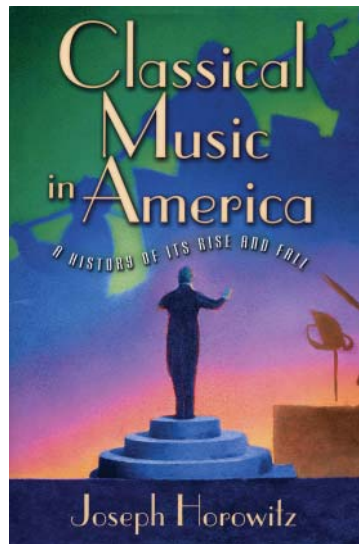
ing a uniquely American music. In Horowitz's words, "While New York embraced a Romantic cultural nationalism rooted in the soil, Boston clung to elite cultural forms purged of folk art." The second "book," "'Great Performances': Decline and Fall," looks at the complicated relationship among composers, conductors, performers, and businesspeople from World War I to the present.

Horowitz stresses three themes that reach across these chronological boundaries. First, in the late nineteenth century, there was a sincere effort to develop American music in conjunction with European music. The influence of Bohemian composer Antonín Dvořák exemplifies this desire. Dvořák, who composed his best-known works in the United States, including the *New World* symphony and the *American* string quartet, was treated like a sage. His advice to young composers was to incorporate indigenous music such as spirituals and American Indian tunes into the traditional classical forms, and he also advocated that music by Americans be programmed regularly. Horowitz designates this period as the heyday of American music, also pointing out that the emphasis was largely on the composers, not conductors or performers. The future emphasis on conductors and performers, he argues, contributed to the fall of American classical music.

Horowitz then exposes how this "culture of performance" engendered an emphasis on star power and image, rather than on fostering a continued interest in American music. For example, while placing Toscanini on the cover of *Time* magazine and informing the public that he "played hide-and-seek with his granddaughter and watched children's shows on TV" provided a nice human-interest story, it took

the focus off of his extreme aversion to programming any musical work that was not part of the European canon. Interestingly, conductors sympathetic to programming contemporary American and European music, such as the New York Philharmonic's Dmitri Mitropoulos, were undermined in the press and consequently in the public image for their attempts.

Horowitz's third theme is how this phenomenon continues into the present day, illustrated by classical "crossover" music and vapid spectacles such as the "Three Tenors." The encroachment of promoters and corporate powers and a decline in public funding have left classical music organizations in a precarious position, dependent on doing most anything to ensure their survival. As a result, contemporary music gets ignored, most American composers are forgotten, and the "sacralization" (his word) of European music of the eighteenth and nineteenth



centuries becomes entrenched in season schedules. Some attempts have been made to reverse this course, but the picture that Horowitz paints is largely one of inertia on the part of performers, managers, and the public.

I have a few minor quibbles with Horowitz's book. He laments the lack of scholarly activity on American music in academic circles but also fails to note that there is an organization specifically dedicated to this topic — the Society for American Music — whose conferences often contain many papers on classical music. In addition, while he considers the careers of several important women, including composers Amy Beach and Ruth Crawford, and the patron Jeannette Thurber, the founder of the American Opera Company and the National Conservatory of Music, he says little about the rise of women composers and performers in the latter part of the century. Finally, Horowitz speculates at some length about the current problems facing classical music, but he does not offer any remedies.

Overall, Horowitz does an exemplary job of tracing the history of American classical music. His thorough analysis and research, accompanied by many photos of the figures described in the book, provide an insightful look at this music, and his book should be required reading for anyone interested in the topic.



David Thurmaier is an assistant professor of music theory at Central Missouri State University. His musical interests include Charles Ives, American music of all types, and the Beatles. He is also an active composer and performer on horn and guitar and a columnist on "The Arts" for *Phi Kappa Phi Forum*.

Rebekah Nathan. *My Freshman Year: What a Professor Learned by Becoming a Student*. Ithaca, NY: Cornell University Press, 2005. 186 pages. \$24.00.

My Freshman Year is a student's-eye view of the college experience at the beginning of the twenty-first century. Rebekah Nathan (all names, including the author's, are pseudonyms) uses participant observation, interviews, and focus groups to take us into the dorms, the group projects, and the 100-seat classrooms to offer a greater understanding of how contemporary social, economic, and political realities shape the current college experience. [The author has since been identified publicly as Professor Cathy Small of Northern Arizona University; see the notice on page 40 – Ed.] Nathan provides practical insights for making the college experience more user-friendly from an administrative perspective and more effective from a faculty perspective.

My Freshman Year offers two somewhat opposed and yet realistically simultaneous realities of student culture. First, the author holds a mirror to older generations by nesting her discussion in prior studies of college life. The focus on youth — fun, freedom, spontaneity, and rebel-

lion — is nothing new. Typologies of students are also consistent across time as the student body is comprised of a largely monolithic student culture with some consistent outsider subcultures always present — goths, granolas, and geeks. These typologies may change in their particularities but represent consistent patterns of in-group and outsider characteristics. At the same time, today's college students experience a distinctive college culture that reflects broader shifts in society. The simultaneity of the democratization of college education and the democratization of consumption means that most college students work for pay. Students contribute to the bills associated with college attendance or work to maintain or acquire a particular material lifestyle.



Colleges constructed around communal spaces for communication, entertainment, and schoolwork seem odd in an age in which many students have cars on campus, carry cell phones, have televisions in their dorm rooms and apartments, own personal computers, and spend their time living and working off campus. Changes in technology and consumption patterns change the functions of social spaces on college campuses and of the college experience itself.

Nathan argues that the contemporary university is "overoptioned" as students have myriad choices for how to spend their time. The "overoptioned" university has two important implications for community: first, there is little shared among people as the result of attending the same university, and second, the social world of the university is always in flux as students drop classes, move out of the dorms, and change majors. "Community" in this context is both "elusive" and "unreliable."

Today's students are subject to a much wider range of significant demands on their time than were the college students of the past. With the majority of students working in the paid-labor force and with students strategically volunteering and participating in campus activities that will boost their résumés, they simply have fewer hours to devote to the academic endeavor.

Nathan's work contributes to current debates on the function of the public university. Some of the changes in college life result from shifting models for how universities raise funds and organize research and teaching. I believe that Nathan is critical of the business model for higher education, but her field work also leads her to a

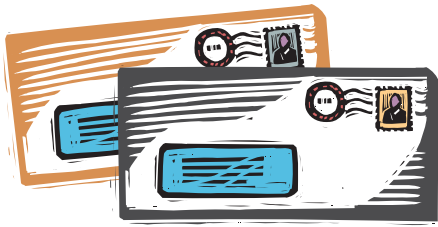
new understanding of the extent to which this shift is a reflection of wider societal changes: it is a response to, not a cause of, the changing student culture. The implications of this model remain problematic as the changes described threaten the intellectual project of the university and, in so doing, also may threaten the role of academicians as critics of the status quo.

While Nathan does not take on the project of examining the differences between public and private institutions, the world she describes is the world of the large public university. Changes in public university culture may contribute to the widening gap in cultural, social, and human capital between those who can access a private education and those who cannot. *My Freshman Year* is an important contribution to the ongoing discussion of the functions and future of higher education and to concerns over higher education's role in the reproduction of social inequality.



Melissa Fry is a Phi Kappa Phi member and assistant professor of sociology in the Department of Sociology, Social Work, and Anthropology at Auburn University. Dr. Fry studies social inequality, organizations, and public policy.

Professor Cathy Small, author of *My Freshman Year: What a Professor Learned by Becoming a Student*, will be the keynote speaker at the 2007 Phi Kappa Phi Triennial Convention in Orlando, Florida, August 9–11.



Letters to the Editor

“COLLEGE ATHLETICS”

On November 27 [2005] the *New York Times* reported that the NCAA allows high school student-athletes to use correspondence courses to meet eligibility requirements. In 2000 the NCAA allowed high school administrators to determine which courses count as core courses. During the past two years, more than twenty high school athletes have sent transcripts to the NCAA from University High School, a correspondence school in Miami that has no classes and that offers open-book exams with no time limits. I was surprised that none of the six articles in the Fall 2005 issue of the *Forum* on “College Athletics” addressed the topic of correspondence courses and high school credentials.

Theodore J. Sheskin
Lakewood, Ohio

We read with interest the articles on “College Athletics” in the Fall issue. In addition to the information and suggestions given in the articles, we also feel strongly about those athletes who accept a scholarship and leave school before graduation to pursue a career in the sport for which they received a scholarship. The purpose of a scholarship to a school of higher education is to educate that individual. These young adults, by agreeing to the terms of a scholarship and then leaving before the end of that agreement, are taking away the scholarship opportunity for another individual who intensely wants to receive an education.

We realize that there are monetary incentives for schools trying to reach the competitive postseason tournaments, a dream wanted by all sports teams. Therefore, the departure of key athletes not only affects any potential financial gains by the institution but also disrupts the pur-

pose of the scholarship, the team's chemistry, and fan support.

If these talented athletes choose to leave their potential alma maters and pursue professional careers before the end of their scholarships, they should have the honor, respect, and responsibility as adults to reimburse the institution the entire monetary amount of the scholarship.

If these athletes choose to pursue a sports career before fulfilling their obligations, they should be cognizant of the fact that they have broken a contract and that there are penalties. The time has come for this minority of athletes to take responsibility for their actions and to honor their commitments.

Linda M. Shecterle
J.A. St.Cyr
Minneapolis, Minnesota



Legacy of Literacy: A Phi Kappa Phi Literacy Grant Double Success Story

**Mary Katherine Waibel-Duncan,
Bloomsburg State University**

A few months ago, I received a Phi Kappa Phi Literacy Initiative Grant to create a children's library and to support the development of a volunteer-based Shelter Reader program at a local battered-women's shelter. I also obtained two supplemental grants to furnish the room and to purchase educational software for a donated computer. In addition to these grants, a bereaved mother of a victim of domestic violence was so impressed with the concept and quality of the project that she requested a copy of my book wish list. In honor of her daughter's memory, she purchased every book on the list.

After consulting with librarians and booksellers to identify other appropriate books that address issues pertaining to individuals who are exposed to intimate partner violence, I spent approximately \$1,300 of the \$2,500 grant. On the advice of Barnes & Noble's store manager (State College, Pennsylvania), I encouraged The Women's Center to complete an Organizational Application that amounted to a 20-percent book discount, tax-exempt status, and our ability to take advantage of a time-limited "buy 3 Dr. Seuss books for the price of 2" promotion. We saved a fortune! Then, Scholastic Books afforded me the opportunity to purchase 250 copies of Eric Carle's *A House for Hermit Crab* at a one-time price of \$0.95 each for a total of \$237. Carle's book is a tale of a hermit crab who ventures across the ocean floor and recruits protection, beauty, and support from other sea creatures. Every child who visits the shelter will receive a copy of this book. For many of these children, Carle's book will be the first contribution to their own personal libraries.

Because of the generosity of the community and my good fortune in identifying booksellers who afforded us significant discounts, I had approximately \$1,000 remaining from the 2005 grant. After requesting and receiving permission from Phi Kappa Phi, we applied these funds to a second literacy campaign. Our second partner organization, the Ronald McDonald House of Danville, Inc., is a nonprofit, volunteer-driven organization that provides temporary, convenient, and compassionate housing for families with seriously ill children who are receiving medical care at area hospitals. Project Welcome Home is establishing a children's library and creating an opportunity for a volunteer-driven House Reader program at the "House that Love Built" in an attempt to bolster children's social support, academic competence, and psychological adjustment despite their exceptional circumstances. Coupled with other grant money and with the same local community and merchant support, the remaining \$1,000 from the Legacy of Literacy project is allowing us to develop a second children's library—this time for a population of pediatric patients and their families.

Through our sincere efforts to fulfill Phi Kappa Phi's mission to engage the community of scholars in service to others, Bloomsburg University's chapter of Phi Kappa Phi has gained recognition on our campus and in the broader community. On October 20, 2005, the efforts of our chapter were recognized at the Women's Center Community Volunteer Award luncheon, and the library has been the topic of a number of press releases in local newspapers and newsletters.

Thank you, Phi Kappa Phi, for helping Chapter 202 to create new opportunities for our students, administrators, and faculty to be useful to others!

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Profiles in Philanthropy

An Interview with Vicki L. and L.D. Bond

In this Profile in Philanthropy, Phi Kappa Phi recognizes and conveys appreciation to Vicki L. Bond and her husband, L.D. The Bonds have included the Phi Kappa Phi Foundation, Inc. in their estate plan. Mrs. Bond is retired from two careers. The first was with Boeing; the second was that of a junior high school teacher. L.D. Bond is retired from Boeing.

Like William J. Wolfe, who was profiled in the Fall 2005 issue, the Bonds have designated their planned gift to the Fellowship Program. This interview with Mrs. Bond was conducted by Phi Kappa Phi's executive director, Dr. Perry A. Snyder.

PAS: Where and when were you initiated into Phi Kappa Phi?

VLB: Wichita State University in March 2002. I was a nontraditional student working on my master's degree.

PAS: What was special about the initiation that March evening at Wichita State?

VLB: My most vivid memory was the solemnity and formality of the ceremony. Though there were hundreds in attendance, every initiate felt a gratifying sense of personal recognition. I sensed that it would be a memorable occasion because I had received earlier a personal congratulatory letter from the dean of the graduate school, Dr. Susan Kovar. It was most gratifying to me and others that all the deans and other university leaders were present and participated in the ceremony.

PAS: What did the honor mean to you then?

VLB: My first thought was: This is wonderful! But then I feared there must be some mistake for I was not a traditional student . . . was I really eligible? Feeling uncertain, I called the Society Headquarters to learn more about Phi Kappa Phi. I talked with Kathy Marcel, whom I learned later was the chapter relations director. She answered my every question, assuring me that Phi Kappa Phi is all-discipline and that I was in fact eligible. Reflecting on the initiation, I remember feeling as honored and as welcomed as any of the twenty- and twenty-one-year olds.

PAS: Why did you choose to designate your planned gift to Phi Kappa Phi's Fellowship program?

VLB: It is important and relevant to promote the love of learning, the hunger for knowledge. It is important to encourage the idea that education is essential and valuable. And what better way to do so than to provide funds for the very best and brightest to continue their educations in graduate and professional schools? Because my special interests are music and the humanities, and L.D.'s are in math and information technology, we have directed that our planned gift help students pursuing advanced degrees in those fields.

PAS: How does it make you feel knowing that your memory will live on in perpetuity as a result of your gift?

VLB: Very humbled knowing that we shall live on throughout eternity through a Fellowship bearing our names, knowing that long after we are gone, we shall be helping people realize their educational and career dreams. We appreciate the opportunities that can be found through Phi Kappa Phi.

PAS: If a Phi Kappa Phi member were to call you tomorrow to ask about your making a leadership gift to Phi Kappa Phi, what would your response be?

VLB: We both would encourage any member of Phi Kappa Phi, or anyone else for that matter, to consider a planned gift because of the values that Phi Kappa Phi promotes . . . because of its noble mission.



A highlight of the 2004 Triennial Convention was the presentation of the Marcus Urann Award by outgoing society president Wendell McKenzie to Vicki and L.D. Bond. Assisting in the presentation was current president Paul Ferlazzo.

PAS: Any comments on the process, that is, the information you received from Society Headquarters and the like?

VLB: After our first visit there, we received very helpful information about Phi Kappa Phi and planned giving. The information was very well thought out and well communicated. We found exactly what we needed to “get the wheels turning” for a gift.

PAS: Any closing thoughts?

VLB: L.D. and I were honored to be invited to the National Convention in Albuquerque and would like everyone to know how appreciative we are for the opportunity to learn more about Phi Kappa Phi. We met really great people there, especially chapter officers who are the heart and soul of Phi Kappa Phi. It was truly a worthwhile experience. For us, the highlight of the meeting was receiving, along with others, the Marcus Urann Award. How fitting it is that Phi Kappa Phi’s board chose to honor its founder with an award for those who provide for the Society’s future through various types of planned gifts.

PASSING THE ISABELLA HOUSE

I wasn’t prepared for the envious glances,
 how I had stopped their conversations,
 like a dead heart: the women of the Isabella House,
 shedding their addictions like winter coats,
 passing hours on the porch swing, front steps,
 or window ledges. Visiting hours for one mother,
 who leaves a string of smoke that her daughter
 breathes and rolls back off her tongue with words.
 Preoccupied with herself, the mother shouts
 for her to shut up, she can’t answer her right now.
 Is she, like the others, torn between getting clean
 for life, and running wildly from this place,
 from their men, jobs, apartments, and children
 into the blue night to clear clinking glasses, odd-shaped
 pills, and sex; whatever the hook that places them now
 like holiday ornaments around the house? And who
 am I but a reminder of their afflictions. They think:
 there’s a woman God made free, look at her
 in bright shorts and tennis shoes, walking
 for health, thoughts open and uncontrolled, she knows
 no hardship, lacks character in her easiness.
 They resume their conversations, the little girl’s
 curious words still linger. In my gratitude,
 I lift my feet in a kind of dance, and go like this
 all the way home.

YVONNE HIGGINS LEACH

Yvonne Higgins Leach lives near Seattle, Washington, with her husband and two daughters and works as a director of communications for The Boeing Company. She has published poetry in various literary magazines and anthologies and has new work forthcoming in *Arnazell*, *a Literary Arts Magazine*, *Carquinez Poetry Review*, *The Distillery*, *Eureka Literary Magazine*, *The Griffin*, *Hazmat Review*, *Nassau Review*, *Owen Wister Review*, *Pearl*, and *Spoon River Poetry Review*.

Partnering for Success Workshops

Phi Kappa Phi Chapter Officer Workshops

Don't miss your chance to help your chapter be more successful by attending one of the Partnering for Success Workshops in 2006.

St. Louis, Missouri
June 3-4, 2006
Marriott Airport Hotel

Portland, Oregon
August 5-6, 2006
Red Lion Hotel

Baton Rouge, Louisiana
October 7-8, 2006
Cook Conference Center

For more information,
go to
PhiKappaPhi.org

Pictured with Chapter Relations Director Molly Stauffer at the recent St. Louis Partnering for Success Workshop are Dr. Ricki Kantrowitz of Westfield State College, Westfield, Massachusetts, and Dr. Taylor Thompson of Georgetown College, Georgetown, Kentucky.



Pictured packing books for Chapter 256's "Books for Baghdad" project are (l to r) Jessica Swee, student vice president; Cherry Steffen, vice president; and Anita VanBrackle, president.

The Student Voice – Updates from Our Student Vice Presidents Jessica Swee, Kennesaw State University (Chapter 256)

In September, we partnered with Volunteer Kennesaw (an on-campus service group) to raise money for the victims of Hurricane Katrina. Our chapter raised \$1,245.25 through on-campus donations. With the combined efforts of various campus organizations, a check was submitted to the American Red Cross for \$6,219.05.

We are also proud to share the success of our "Books for Baghdad" program. Last spring, we began collecting books from students and faculty at Kennesaw State. In October, we finished our collections, packed up the books, and shipped them to dozens of military units in Iraq, Kuwait, and Afghanistan. In total, we sent more than five hundred pounds of books. We have already begun to receive thank you letters, e-mails, and postcards. The books have gone to both service members and to local schools.

Chapter News *continued*

PEG Grant-Funded Conference Held at University of West Alabama

On October 27 and 28, 2005, the University of West Alabama (Chapter 276) hosted the Strategies to Promote Academic Excellence in Alabama's College Students Conference. Support for the conference came from a Phi Kappa Phi Promotion of Excellence Grant (PEG) that was awarded to the UWA Phi Kappa Phi chapter in the spring of 2005. The two-day meeting opened Thursday evening with a welcome dinner. Meg Andrews, Harvard graduate student and 2004 Phi Kappa Phi Graduate Fellowship recipient, was the guest speaker. She spoke on the importance of interdisciplinary studies. Friday's agenda reflected the purpose of the conference: to provide undergraduate student scholars with a forum in which to present current research and to provide students and honors student advisors information on opportunities in Phi Kappa Phi.

Undergraduate students from three Alabama universities — Samford University, Jacksonville State University, and the University of West Alabama — made presentations in the morning sessions. In an afternoon session, Maria Davis, Senior Manager for Strategic Partnerships at Phi Kappa Phi Society Headquarters, spoke on opportunities in Phi Kappa Phi. Additionally, a four-member Study Abroad Panel convened in the afternoon to answer questions on study-abroad program selection and grant-application procedures.

“The most successful aspect of the Conference,” according to Mary Pagliero, chapter public relations officer, “was that undergraduates were given an opportunity to present well-researched topics to a predominantly student audience from their and other institutions. Students were the focus of the conference, not professionals. This venue offered experience to undergraduate presenters, experience that might prepare them to make presentations at professional conferences.”



Armstrong Atlantic State Chapter

The Armstrong Atlantic State University chapter (Savannah, Georgia) will be installed on April 9, 2006. Congratulations to the university on its new chapter.



Student, faculty, administrative, and community members of the new Phi Kappa Phi chapter at TAMIU.

Texas A&M International University Holds First Induction

Texas A&M International University (TAMIU) held its first induction ceremony on November 6, 2005, in the TAMIU Student Center. TAMIU is chapter 296. State Senator Judith Zaffirini was guest speaker, and Dr. Gil Fowler, vice president of the South Central Region of Phi Kappa Phi, officiated. Sixty-three undergraduate and graduate student members were initiated, along with select faculty, professional staff, university alumni, and community members.

Officers installed were: president, Dr. Thomas R. Mitchell; president-elect, Dr. Kathleen Pletsch de García; secretary, Dr. Deborah Blackwell; and treasurer, Dr. Dan Jones. In addition to the officers, charter members included Clayton Baum, Dr. Barbara Greybeck, Dr. Juan Homero Hinojosa, Dr. J. Charles Jennett, Patricia Keck, Dr. Ray Keck, Dr. Archibald Laud-Hammond, John Maxstadt, Dr. James Norris, Dr. Doris Rosenow, Dr. Judith Warner, and Dr. Judith Zaffirini.



Charter members of the TAMIU chapter, along with South Central Region VP Gil Fowler and keynote speaker Judith Zaffirini, from left to right: Dr. Ray Keck, President of TAMIU; Dr. James Norris; Dr. Judith Warner; Dr. Judith Zaffirini, Texas State Senator; Dr. Juan Hinojosa; Dr. Thomas Mitchell, Chapter President; Dr. Gil Fowler, VP of South Central Region; Dr. Kathleen Pletsch de García, Chapter President-Elect; Dr. Barbara Greybeck; Dr. Deborah Blackwell, Chapter Secretary; Mrs. Patricia Keck; Mr. Clayton Baum; Dr. Archibald Laud-Hammon; Mr. John Maxstadt.



Phi Kappa Phi Bookshelf



College Reading 4 *(English for Academic Success Series)* Cheryl Benz and Cynthia M. Schuemann

This textbook for advanced English as a Second Language (ESL) students is part of a twenty-book series published by Houghton Mifflin, College Division. Reading selections are drawn from a variety of Houghton Mifflin sources, across academic disciplines, so that students can be exposed to authentic reading expectations found in freshman-level general-education courses. The reading selections are complemented with practical exercises and activities that enhance the reading-learning process.

Cynthia M. Schuemann was inducted into the Florida International University chapter of Phi Kappa Phi in 1997.

Daimonion Sonata Steven Owen Shields

Daimonion Sonata, the debut work of poetry by Steven Owen Shields, is sectioned into movements, much as a musical sonata might be. In each section, the various poems represent in some way the section's theme; for example, the Scherzo section contains poems that end in a "surprise" or conclude with a note of humor. The poems convey an allegorical world. Many of the poems reflect on mythologies, ancient and modern. Published by Birch Book Press, the book was produced letterpress and contains woodcut artwork by Rose Orcutt.

Steven Owen Shields was inducted into the University of Wisconsin-Whitewater chapter of Phi Kappa Phi in 1998.

Forced Out: The Fate of Polish Jewry in Communist Poland Arthur J. Wolak

In the late 1960s, senior leaders of the Communist Party in Poland initiated a domestic terror campaign that resulted in the unceremonious eviction of thousands of Polish Jews who still resided in the country after the Holocaust. *Forced Out* explores this turbulent era, revealing a true story that offers important lessons about the dangers of political opportunism and the inherent evils of totalitarianism.

Arthur J. Wolak was inducted into the California State University-Dominguez Hills chapter of Phi Kappa Phi in 2000.

Chocolate on Trial: Slavery, Politics, & the Ethics of Business Lowell J. Satre

In 1901, Cadbury Bros., Ltd, a firm known for its fine chocolates and its progressive work policies, discovered that its cocoa beans were grown using slave labor on Portuguese plantations on the island of Sao Tome, West Africa. Accused by London newspapers of dragging its feet and hypocrisy in correcting the problem, Cadbury sued the *Standard* of London for libel. *Chocolate on Trial* probes the issues of globalization, corporate social responsibility, journalistic sensationalism, and devious diplomacy at a time when western industrialized society was beginning to ask whether some cheap goods might have too high a cost.

Lowell J. Satre was inducted into the Youngstown State University chapter of Phi Kappa Phi in 1972.

The Phi Kappa Phi Bookshelf is published as a service to its members. The views expressed in the publications featured are not necessarily those of staff or Board members of The Honor Society of Phi Kappa Phi.

The Critical Budget Role of Membership Dues and Contributions

Fees paid at initiation allow the student to become an active member of the Society for one full year. Of the \$35 paid at initiation, \$20 represents national dues. Dues entitle the member to a one-year subscription to the *Phi Kappa Phi Forum* magazine; E-zines and Web-based seminars addressing educational and career-related topics; up to 30 percent off Dell products; discounts on various test-preparation courses and insurance products; and eligibility for more than \$700,000 in annual scholarships and awards. The national organization annually gives its members more than 150 awards, with stipends ranging from \$500 to \$5,000. The remaining \$15 paid by the initiate covers the cost of an emblem and a Phi Kappa Phi certificate.

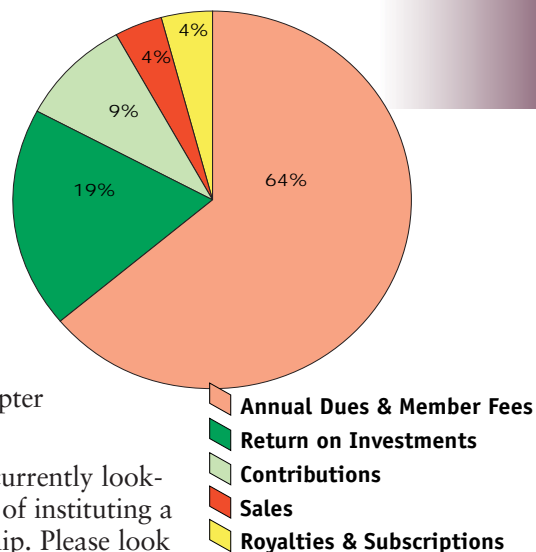
Once the first year of membership expires, Headquarters sends new members a billing statement to give them the opportunity to renew. At that time, the member can pay both national dues (\$25) and chapter dues (varies according to chapter). The \$25 enables members to continue to participate in all the benefits described above. National dues support Society operations including salaries, postage, rent, communications and marketing expenses, chapter support, and so on. Dues also partially fund the Phi Kappa Phi Foundation programs. Dues are the lifeblood of the organization, representing 64 percent of Phi Kappa Phi's revenues. Chapter dues play a similar role at the chapter level.

While dues fund national and chapter operations, contributions to the national Foundation and to the chapter endowments support the Society's scholarship and awards programs. Chapter dues and contributions are remitted by Headquarters to the chapters monthly.

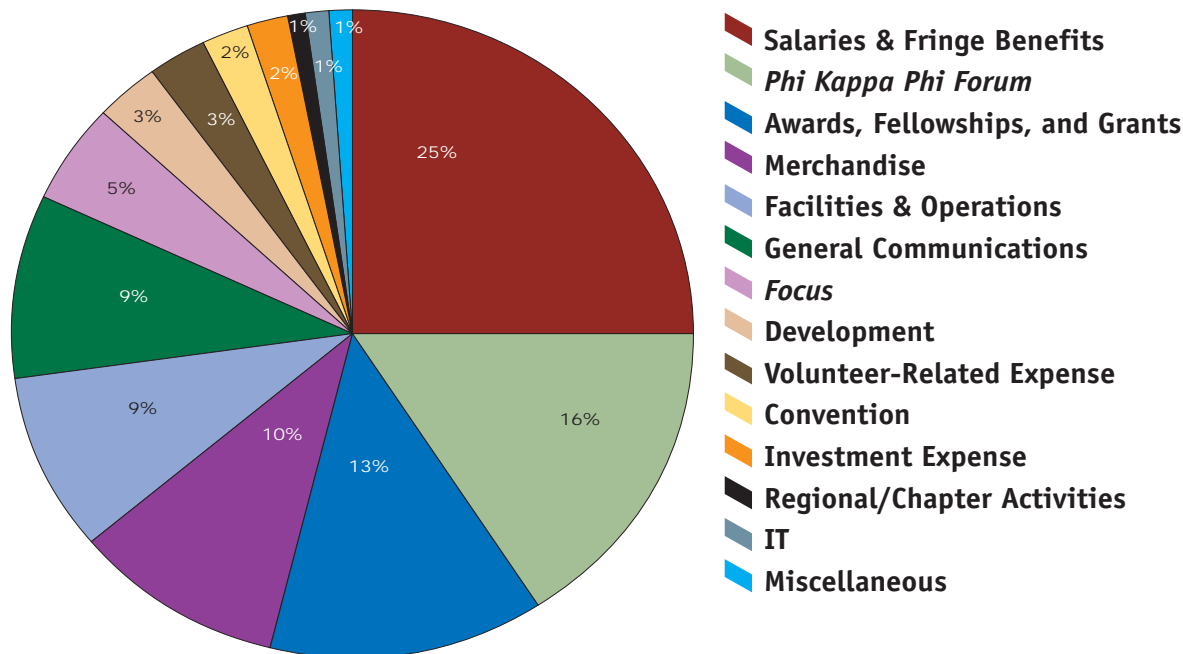
At renewal time, a member may choose to become active-for-life by paying a one-time fee of \$300. Several chapters also have instituted a life membership fee with amounts varying from chapter to chapter. If a chapter has a life membership, the amount is indicated in the billing statement. Billing statements give national life members the opportunity to pay their chapter dues and to contribute to the national and chapter endowment funds.

Headquarters is currently looking at the possibility of instituting a three-year membership. Please look for more information on this subject in future communications.

2004-2007 PROJECTED REVENUES



2004-2007 PROJECTED EXPENSES



Member News

Rhodes Scholars

Paul J. Angelo and **Jacquelyn R. Hanna**, both members initiated at the U.S. Naval Academy, have each been named 2006 Rhodes Scholars. The Rhodes Scholarships provide for two to three years of study at the University of Oxford in England.

Inaugural Wuerffel Award

Rudy Niswanger (Louisiana State University), a three-year starter at center for the Louisiana State University football team, was named the inaugural recipient of the Wuerffel Trophy, named for 1996 Heisman Trophy winner Danny Wuerffel of the University of Florida; the award goes to the college football player who best combines exemplary community service with outstanding academic and athletic achievement. Mr. Niswanger was also a finalist for the Draddy Award, which is presented to college football's top student-athlete. He has been accepted into the LSU Medical School in Shreveport when he completes his athletic career.

James Barksdale (University of Mississippi) headed a privately funded commission appointed by Mississippi Governor Haley Barbour to make recommendations to guide the Mississippi Gulf Coast's recovery from Hurricane Katrina. Mr. Barksdale is the former CEO of Netscape.



David A. Frye, PhD (Indiana State University), who retired in July 2003 as associate superintendent from Monroe County Community School Corporation (Bloomington,

Indiana), is owner of Professional Services for Educators, an educational consulting firm currently providing professional training services for Northwest Evaluation Association, Portland, Oregon.

Kendall M. Hurst (Oklahoma State University) graduated in July 2005 from Oklahoma State University with an MS in Chemical Engineering. His thesis was entitled "Effects of Carbon Monoxide and Yeast Extract on Growth, Hydrogenase Activity, and Product Formation of Clostridium Carboxidivorans P7T." He is currently enrolled in the PhD program at Auburn University.



Sandra Maya Joss, PhD (American University), graduated in May 2004 with a PhD in Anthropology. Her dissertation was titled "Beyond the Dreamings: Identity and

Representation in Australian Aboriginal Urban Art." She continues to promote life-long learning at San Diego State University and San Diego Independent Scholars.



Nancy McBride, PhD (University of Nevada-Reno), was awarded a Doctorate of Philosophy in Counseling and Educational Psychology in December 2005. She is a school

psychologist with the Lyon County School District, Silver Springs, Nevada, as well as an adjunct professor at the University of Nevada-Reno.

Cheryl Mahaffey, EdD (University of Georgia), was honored with the 2005 Shackleford Distinguished Alumnus Award by LaGrange College (LaGrange, Georgia). Mahaffey has taught in the public school system in Georgia for twenty-five years and is currently principal of Barksdale Elementary School in Conyers, Georgia.

Fred H. Rodriguez, MD (University of New Orleans), was installed as president of the American Society for Clinical Pathology at its Seattle meeting in October 2005. A graduate of the LSU School of Medicine, Dr. Rodriguez is the National Director of Pathology and Laboratory Medicine for the Department of Veterans Affairs in Washington, D.C., and a professor of pathology and medical technology at the LSU Health Sciences Center in New Orleans.

Claudine SchWeber, PhD (University of Maryland University College,) received a Fulbright to the Polytechnic of Namibia. Her work focused on integrating technology, especially online/e-learning into the teaching process, and discussing organizational change. She gave presentations, developed a faculty-training program, consulted with varied departments, and trained faculty from many departments at the Polytechnic.

She also met with USAID and the U.S. Cultural Center to discuss U.S. education developments and ideas for Namibia.

Craig Spencer (University of South Florida) was awarded a Juris Doctor from the Florida State University Law School in 2004.

Linda Speranza, PhD (University of South Florida), a professor of nursing at Valencia Community College, was awarded the Associate Administrator Achievement Award by the Bureau of Health Professions, a division of the Health Resources and Services Administration. She was honored for her work with Valencia's Pathways into Nursing program, a unique course of study created for ethnically diverse and disadvantaged students, particularly Hispanic students. The program takes them from high school through the Associate in Nursing degree and RN licensure.

Ramses Toma, PhD (California State University, Long Beach), was selected as recipient of the 2004–2005 Outstanding Professor Award at California State University, Long Beach. Toma, a professor of nutrition and food science whose research focuses on anti-oxidants and their cancer-fighting potential, was nominated by his students, which is not the norm. The Outstanding Professor Award recognizes excellence in instruction and instructionally related activities, scholarly and creative activities, and professional service.

In Memoriam: *Robert Paschal Burns*

Former Phi Kappa Phi National Artist (1998–2001) and former *Forum Arts* columnist **Robert P. Burns** died in a car accident on October 28, 2005. He was seventy-one years of age. Burns, one of North Carolina's most influential architects, was a professor emeritus at North Carolina State University (NCSU), where he served as head of the architecture department from 1967–1974 and from 1983–1991. He received his undergraduate degree at NCSU and his master's degree from Massachusetts Institute of Technology. He served as president of the Association of Collegiate Schools of Architecture and was named a Fellow of the American Institute of Architects in 1979. In 1996, Professor Burns was awarded the Alexander Quarles Holladay Medal for Excellence, the highest honor bestowed on NCSU faculty. Former Phi Kappa Phi National President Wendell McKenzie, who has known Professor Burns during his years at NCSU, sums up the loss this way: "Bob Burns touched so many in so many profound ways. His passing is a great loss for all of us. He was the consummate professional, colleague, gentleman, and friend."

In Memoriam



Joseph Daniel Colanto (New Mexico Highlands University) passed away on November 21, 2005. Mr. Colanto was an intelligence specialist with Concepts and Doctrine for the Intelligence

Center and School, Fort Huachuca, Arizona. While there, he received the prestigious Department of the Army Commander's Award for Civilian Service for his work on the "Intelligence Preparation of the Battleship."

Gerard M. Faeth, PhD (Pennsylvania State University), passed away on January 24, 2005. Dr. Faeth was Arthur B. Modine Distinguished University Professor at the University of Michigan and was internationally recognized for his diverse and lasting contributions to aerospace and mechanical engineering.

Wilbur M. Haas, PhD (Michigan Technical University), passed away on August 18, 2005, at the age of eighty-two. A professor of civil engineering at Michigan Technical University for forty years, his research included the effects of frost and freezing on soils and foundations.

Ben R. Morris (North Carolina State University) passed away in November 2005. Head of a media company that owned newspapers and television stations, and a long-time community activist in Columbia, South Carolina, Morris was inducted into the NCSU chapter as a distinguished alumnus in 1996.

At that time, he generously provided funds of approximately \$10,000 to the NCSU chapter that were used to establish an endowment, which now provides two awards for the chapter's first and second place nominees for the Graduate Fellowships. Mr. Morris gave additional gifts to the endowment later on.

John Powell (University of South Florida), passed away on December 7, 2005, after an eleven-month battle with cancer. After working in marketing and sales for GTE and GTE Management Training Group, he received an education specialist degree from the University of South Florida. He was a teacher in the gifted program at Riviera Middle School and taught economics and world history at St. Petersburg Collegiate High School.

Susan Bailey Richards (University of Maryland) passed away on October 30, 2005. Ms. Richards was a homemaker and loving mother and wife for thirty-eight years.

William F. Schwiesow, PhD (South Dakota State University), passed away on April 24, 2005. A World War II veteran, Dr. Schwiesow was a professor at Texas Tech University for thirteen years and worked in a variety of capacities with the U.S. Department of Agriculture for seventeen years.

Please Note:

If you know of a Phi Kappa Phi member who is recently deceased, please notify us at 800.804.9880 or info@phikappaphi.org so that we may update our records.

SUBMISSIONS

Member News

To submit a recent honor/achievement or career news, e-mail (kaetzjp@auburn.edu) or mail a brief write-up and picture (if available) to:

Member News
Phi Kappa Phi Forum
108 M. White Smith Hall, Mell Street
Auburn University, AL 36849-5306

Please include your name, member number, chapter in which you were initiated, and your e-mail address and/or telephone number. Any items submitted cannot be returned, and all submissions may not be included.

Phi Kappa Phi Bookshelf

If you are an author and would like your work to be considered for inclusion in the "Bookshelf" segment of *Member Focus*, please send a copy of the book along with a one-page synopsis to:

Phi Kappa Phi Bookshelf
Phi Kappa Phi Forum
108 M. White Smith Hall, Mell Street
Auburn University, AL 36849-5306

All submitted books will be added to the Phi Kappa Phi Library, housed at the Society Headquarters, and will be included on the Online Phi Kappa Phi Bookshelf at www.phikappaphi.org/bookshelf.php.

Show your pride of affiliation with

THE HONOR  SOCIETY OF

PHI KAPPA PHI

APPAREL

A. BASEBALL CAP

Made of durable, wheat-colored canvas and embroidered with the Greek letters, this baseball cap makes an ideal present for any Phi Kappa Phi member. (.5 lb.)
Item #ACC11 . . . \$15



SWEATSHIRTS

Two styles available, both in unisex sizes S-1X.
B. Grey crewneck sweatshirt made of 43% cotton/57% polyester features distinctive navy and white appliqué logo. (1 lb.)
Item #APP31 . . . \$42



C. White crewneck sweatshirt made of 50% cotton/50% polyester with embroidered Society name and logo. (1 lb.)
Item #APP30 . . . \$34

D. LONG-SLEEVE T-SHIRT

100% heavyweight cotton T-shirt is pigment dyed and features the Society name and Greek letters in deep navy blue and gold embroidery. Reinforced seams and collar help shirt retain its shape wash after wash. Available in unisex sizes S-XL. (1 lb.)
Item #APP12 . . . \$22



E. FLEECE JACKET

Navy jacket has a full length zipper with hood featuring the embroidered emblem. (2 lbs.)
Item #APP70 . . . \$49



F. FLEECE PULLOVER

Pullover zips from chest to chin featuring the Phi Kappa Phi embroidered logo, sizes S-XL. (2 lbs.)
Item #APP71 . . . \$46

G. BUTTON-DOWN COLLAR TWILL SHIRT

Made of 100% ringspun combed cotton twill with detailed embroidery work, this long-sleeve shirt offers both style and comfort. Perfect for both office and weekend attire. Available in white and navy, and in men's and women's sizes S-XL. (2 lbs.)
(White) Item #APP60 . . . \$29.00
(Navy) Item #APP61 . . . \$29.00

Sale Price \$19.50

H. PINPOINT OXFORD SHIRT

Sure to be an office standard! This white, long-sleeve pinpoint weave shirt features an embroidered Phi Kappa Phi logo and is available in men's sizes: S (14 1/2 x 32/33), M (15 1/2 x 32/33), L (16 1/2 x 34/35), XL (17 1/2 x 34/35) and women's sizes: 4 - 20. (2 lbs.)
(White) Item #APP40 . . . \$27.00
(Blue) Item #APP41 . . . \$27.00

Sale Price \$19.50



ACCESSORIES

*I. HONOR CORD

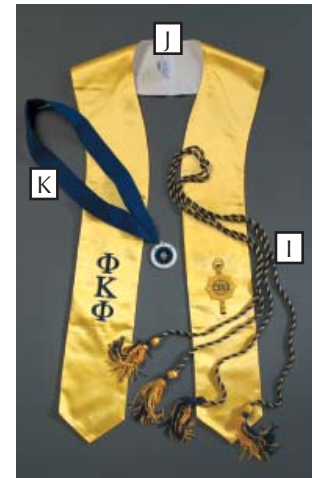
Braided navy and gold cords, ending in fringed tassels. (1 lb.)
Item #REC10 . . . \$10

*J. STOLE

Gold satin stole with the Greek letters and Society key embroidered in a striking navy blue. (1 lb.)
Item #REC20 . . . \$24

K. MEDALLION

Two inch cloisonné medallion hanging from a royal blue ribbon, features a detailed rendering of the Society seal. (1 lb.)
Item #S-5 . . . \$9
Item #S-5a (orders of 50 or more) . . . \$8



PEN SETS

L. Blue marbled pen and letter opener in attractive case is an ideal gift for the new initiate. (.5 lb.)
Item #ACC70 . . . \$20



M. Handsomely engraved black pen, pencil, and letter opener set is sure to become a Phi Kappa Phi keepsake. (.5 lb.)
Item #ACC71 . . . \$25

N. UMBRELLA

Large, royal blue golf umbrella imprinted with "The Honor Society of Phi Kappa Phi" and key. (3 lbs.)
Item #ACC80 . . . \$16



O. COFFEE MUG

Navy blue and white 12 oz. ceramic coffee mug is perfect for everyday use. (1 lb.)
Item #ACC20 . . . \$7



P. LICENSE PLATE FRAME

Die cast metal license plate holder features a chrome frame and the Greek letter monogram on a blue background. 12"x6". (2 lbs.)
Item #ACC21 . . . \$15



Q. BRONZE-PLATED PAPERWEIGHT

Handsome and functional, the Phi Kappa Phi handcrafted paperweight features an antique gold finish and is embossed with the Society seal. Backed with velvet. 3" diameter. (1 lb.)
Item #ACC22 . . . \$10



R. MEN'S SEIKO WATCH

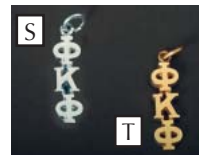
Designed exclusively for Phi Kappa Phi, these Seiko watches feature the Society badge in a variety of designs. All watches come with a 3-year warranty and date function. (2 lbs.)
Item #JE31 . . . \$175



GREEK LETTER CHARMS

Vertical Greek letter charms are crafted in sterling silver and 10K gold. (1 lb.)

S. Sterling Silver Charm — Item #JE24 . . . \$16
T. 10K Gold Charm — Item #JE25 . . . \$32



*Call for quantity discount pricing.