Becoming a Consummate Debater: Interview with Rebecca Justice

Eileen Ptak, Rebecca Justice

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ImaGiNe...

Opportunities and Resources for Academically Talented Youth

January/February 1998

SPOTLIGHT ON PUBLIC SERVICE AND POLITICS

Reinventing Robots

Building Skills with Debate

Cool Summer Programs

Students Review University of Virginia

Published by the Johns Hopkins University Press for the JHU Institute for the Academic Advancement of Youth

From the Editor

Dear Reader,

If you've ever been a member of a club or a team, you know that membership includes not only privileges but also responsibilities. You might have to attend meetings or practices, for example, or participate in fundraisers to help finance a group trip. At the very least, you must invest some of your time, energy, and talent.

The same is true for you as a member of a community. Like a chess club or soccer team, your community requires the active involvement of its members to thrive. You can serve your community, just as you can choose your extracurricular activities, based on your interests. Perhaps you would like to help a specific group of people or to address a particular challenge; you might decide to participate in charitable activities that benefit the needy or the elderly, or environmental activities such as cleaning up a local park. The benefits of your work, both for you as an individual and for others, will more than repay your time and dedication.

You can also take part in the processes that shape your community by playing an active role in local, state, or federal government. Many students think that their role in government is limited to student government, but even if you're not old enough to vote, you can help influence the political forces that affect your life. You can organize a letter-writing campaign to your elected officials to urge them to devote more funds to gifted education, public libraries, or youth programs; you can attend city council meetings. You can even help put a candidate in office who is committed to issues you believe in by volunteering on his or her campaign.

As you read this issue of *Imagine*, you'll see a few of the many ways you can make a difference in the world around you through public service and politics. Two of our student writers describe the fundraising efforts they organized to address a need in their communities, while another explains how a leadership program led to her involvement in local politics. You'll hear from two young adults whose current interests in politics began with early experiences volunteering on campaigns, and from a high school senior who organizes political events and publishes a political newsletter at his school. And to show you what it's like to work in government as a high schooler, another student reflects on her work as a page. As our writers' range of experience demonstrates, you can get involved in many ways, at any age.

We round out the issue with our regular features and our annual listing of academic summer programs. By exploring both academic and volunteer opportunities, you'll create an education that prepares you to meet the challenges of college, career, and community.

Melissa Hartman

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Focus On: Public Service and Politics

NO MATTER HOW YOU see yourself—as a future biochemist, a Web master, a polyglot, or an ecologist—you are also a citizen. If you are an American, you are a member of a complex participatory democracy, with all the privileges and obligations that this implies. How will you meet the challenges of citizenship, both now and in the future?

The following articles were written by two young adults who have pondered the questions of citizenship since childhood, and who have found a variety of ways to participate in and contribute to American political life.

Erica Gum and Simeon Brodsky grew up in politically active families and became activists in their own right by middle school. Both chose volunteer campaign work as a way to support candidates they believed in while also educating themselves about political realities and gaining contacts and experience.

Erica and Simeon both studied politics as undergraduates and graduate students, but selected different career paths: As Erica explains, she has chosen to develop a career on or around Capitol Hill; Simeon, however, is a professional educator who pursues his political interests off the clock.

These writers present different possibilities for engaging in politics. They also offer exciting glimpses of the political world, thoughtful reflections on the workings of that world, and compelling reasons for each of us to listen to the call to public service.

A LIFE OF POLITICS, A LIFE OF SERVICE

by Erica Gum

After eight years in politics and public service, I've seen the good, the bad, and the ugly. I've also decided that I am enough of an optimist to dedicate myself to this demanding field.

Early Experiences: Campaigns . . .

The seeds of careers in politics and public service are often sown early. I remember accompanying my mother as she knocked on doors and gave away campaign literature before the presidential election of 1972. I was three years old. I started volunteering for political campaigns on my own in junior high and high school. Passing out fliers at parades and setting up for events was fun and, well, politic, helping me to get more responsible positions in other campaigns. I advanced from running errands to driving the candidate from place to place (and getting him/her there on time!), and from doing research to briefing candidates for meetings, drafting speeches, and writing campaign literature.

While campaign work is almost always unpaid, the rewards of participation are significant: a tremendous learning experience, the opportunity to serve the democratic process, and something valuable to add to your college or grad school applications or your résumé. Furthermore, if you do good work for a candidate running for a relatively high office, and if your candidate wins (a big if), you may be offered a job. After working on a mayoral campaign while completing graduate school, I was delighted when my candidate won the position of Mayor of Raleigh, North Carolina, by a margin of 900 votes and then offered me a few months' work as a policy analyst, researching ways to make the Raleigh city government more efficient. However, even if your candidate loses, jumping onto a campaign is the best way to find out whether you like the nitty-gritty of the political process.

. . . and Internships

In addition to working on campaigns, you may decide to apply for a more structured opportunity, such as a local, state, or federal government internship. Some high schools and most colleges and universities have established internship programs. Also, some states have competitive internship programs run through the Governor's Office. Most internships pay very little or are offered for college credit. But if you work hard and keep your eyes and ears open, they can be great learning experiences as well as stepping stones to greater opportunities.

In 1989, I was selected for the Maryland Governor's Internship Program. After my sophomore year at Johns Hopkins, I spent a summer in Annapolis at the Department of Budget and Fiscal Planning. One of my assignments was to translate part of the tax code into plain English. Through completing this task, I learned how politics affects economics—how, for example, some business interests, such as Maryland's crab and fishing industry, are awarded special tax breaks. These industries can exercise a great deal of political clout and can influence both state spending and state taxation.

The Rewards of Early Service: A Fellowship and a Scholarship . . .

Volunteering and interning helped me to gain extraordinary opportunities. As an

undergraduate at Hopkins, I majored in political science and decided that I wanted to continue my studies at the graduate level. My sophomore year, I applied for and won a Harry S. Truman Scholarship, a highly competitive award available to undergraduates dedicated to careers in public service. The Truman helped pay for the last two years of my undergraduate studies and for two years of graduate school.

I pursued my master's degree in public policy at Duke in part because I had also won a Jacob K. Javits Fellowship, a graduate fellowship offered only at Duke University, Columbia University, and the University of California at Berkeley, which funded the tuition for my master's degree as well as a subsequent year of employment with the United States Senate. Winning both the Javits and the Truman made me feel tremendously honored and further strengthened my commitment to the life I had chosen.

. . . and the Launching of a Career

A great highlight in my life so far came in 1994, during the second part of the Javits fellowship. After a series of interviews, I became a legislative assistant to U.S. Senator Pete Domenici of New Mexico and made the coveted move to life as a professional on Capitol Hill. In Senator Domenici's office, working on telecommunications, transportation, and commerce issues, I met with constituents and lobbyists, wrote letters and speeches, and advised the senator on upcoming legislation.

At the same time, I witnessed the senator's efforts to ensure that insurance companies could no longer discriminate against people with severe mental illnesses. Domenici's hard work on this then-unpopular issue demonstrated to me that people with integrity can succeed in politics. Later, I felt great satisfaction working on his 1996 re-election campaign.

Constant change, which makes politics interesting, also means that the field has little job security. I experienced this firsthand in the middle of the 1996 campaign, when, after I completed my assigned tasks for Senator Domenici's campaign, my contract expired. I needed to switch quickly to another candidate's team. Through working for moderate Republican organizations, I was fortunate to find Mike Mahaffey, a congressional candidate from Iowa whose commitment to balancing the federal budget and reforming Social Security and Medicare reflected views similar to my own. Mahaffey took the principled stand that he would not run negative ads, a position that may have cost him the election. When he lost, I was disheartened, not only for Iowa and the country, but also for myself: out of a job, I remained unemployed for four months.

Since then I have rebounded, obtaining a position as a research associate with the Welfare to Work Partnership. The Partnership coordinates a nonpartisan, nationwide effort to encourage companies to hire people on public assistance and to provide them with support and resources when they do so. My job is to research welfare reform efforts in several states, while connecting businesses with community resources such as job training programs and day-care programs.

I believe that my efforts make a difference, helping to bridge the gap between the working world and those who currently rely on public assistance. And even though I am not working on Capitol Hill, I sometimes still feel the excitement of being at the center of the political world. For example, President Clinton recently visited a job training facility in Wichita, Kansas, that is run by the Cessna Aircraft Corporation, a business partner in the Welfare to Work Partnership. I helped coordinate the event and conducted research for a speech given by my boss. So, I helped write a message that was actually heard by the President of the United States!

Despite these positive experiences in my chosen field, I sometimes feel quite disillusioned and cynical. Politics should always be guided by the ideal of public service. But unfortunately, many politicians and other players in the political arena corrupt political discourse by running negative and misleading ads which confuse voters, discourage voting, and generate cynicism. Furthermore, elected and unelected officials sometimes work together to make bad laws. One of my most distasteful experiences came when I watched a well-organized lobby use its influence to push an unconstitutional law—the Communications Decency Act—through the Congress. (The U.S. Supreme Court eventually struck down this piece of legislation.)

Yet while disappointments are part of daily life in politics and government, this area of public service fascinates me and gives me a sense of purpose. In the right job, I support someone or something I believe in, and my actions help make other people's lives better. For example, assisting Senator Domenici, I helped make sure that laws governing the spending of federal transportation funds would not unfairly take away monies needed for roads in Navajo communities. Months later, I still feel proud of this single accomplishment.

Reflections from the Field

Even when one achieves distinction in government and politics, salaries can remain low and a nagging feeling that good work may not have lasting effects can remain. However, I confront my own occasional doubts with the words of President Harry Truman: "If you can't stand the heat, get out of the kitchen."

I agree with President Truman that people who are uncomfortable with politics should not commit themselves to political work. However, I also know that just as the kitchen is not the only room in a house, politics and government are not the only areas of public service. Anyone inspired by the ideal of public service should at least consider teaching, scientific research, social work, or the many other areas in which dedicated individuals can truly make a difference. I am convinced that many fields offer the satisfaction that I have found in politics: the feeling of accomplishment that comes with working for something you believe in, the wonderful sense that you have served the public good.

Creating Candidates: Reflections of a Campaign Volunteer

by Simeon Brodsky

At seven years old, attending a political rally with my parents, I met Henry "Scoop" Jackson, a 1972 candidate for the Democratic presidential nomination. A newspaper picture capturing our encounter is still tucked away in one of my mother's scrapbooks. Amidst the fanfare, I felt a strong impulse to reach out to Jackson in a private way, and so gave him an owl-shaped eraser for his kids, who I knew were my age. Now, I look back on my gesture as a first attempt to create personal meaning in the public arena of politics.

At ten, I joined Jimmy Carter's "peanut brigade," inspired by his commitment to all Americans, including those with fewer privileges. I enthusiastically rang doorbells, handed out flyers, and hung out with the women in the phone bank in campaign headquarters in Chattanooga, Tennessee, while adult volunteers I knew made the long bus trip to Iowa so that they could help Carter win the first primary. Although I was very young, I knew that, for me, Carter's grassroots campaign embodied the idea of democracy.

Creating a Presidential Image

In 1983, at 18, as one of presidential candidate Gary Hart's "hart-beats," I handed out flyers, made phone calls, and recruited volunteers. One memorable day, I even got to drive in an official motorcade and meet Hart as he prepared to board a plane for his next stop. In the moment of our meeting, inches from his face, I felt that Hart, the dynamic, impassioned speaker I had just watched mesmerize a crowd, now seemed peculiarly vacant up close, a hollow shell operating on autopilot. Seeing Hart look startlingly empty made me realize the degree to which his campaign was a performance. I gave up my innocent appreciation of American politics, realizing that campaigns not only promote candidates, but also create them.

The campaign had re-created Hart in an image that was designed to be viewed from a distance. This re-creation, I understood, required the participation not only of Hart's advisors, but also of all his supporters, the media, and, to an extent, the American people.

For a former soldier in the peanut brigade, the discovery that candidates are partly manufactured was somewhat disillusioning. But ultimately I was more intrigued than disappointed. After all, if candidates are the products of many influences, working on a campaign offers an opportunity to be a lot more than a cheerleader. My new sense of the radically collaborative nature of campaigns made me even more fascinated with politics and even more confident that I could have an impact in the political arena. I decided to major in political science as an undergraduate and to seek my Ph.D. in American Politics.

While I was in graduate school, the urge to work on a campaign arose again. Remembering the lessons of the Hart campaign, I thought my contribution to the "production" of a candidate would be more significant and rewarding if I worked on a local campaign, where there is greater access to candidates and where the implications of a candidate's position on the community are clearer and easier to communicate. I chose an exciting city council candidate in Pittsburgh, Pennsylvania; he was young, educated, attractive, and had plenty of money to spend.

Struggling with Consultants

However, this campaign, while more grassroots than a national campaign, was not as homespun as I had expected. Unlike many local election efforts, this one was marked by big spending, and I found myself handing out slickly produced materials designed by professionals—materials that trumpeted the candidate that consultants had decided everybody wanted to see. The lead consultant even came from "inside the beltway" of Washington, D.C., which at the time was considered evidence of professionalism. The expert used his polling results to target key areas of demographic support and then employed negative campaign tactics, based largely on George Bush's successful strategy of attacking the record of Michael Dukakis rather than focusing on his own.

I soon suspected that this negative approach was a strategic error. Taking advantage of our easy access to the candidate, my fellow activists and I tried to convince him to change strategies. Soon a battle ensued between the consultant-—highly paid and armed with polling numbers—and a bunch of volunteers who were spending hours each day trudging door-to-door in the summer sun. Ringing doorbells and talking to voters gave us a very different perspective than that of either the consultant or the candidate. Our primary opponent was a longtime member of the community and a fast food executive. As I talked to voters, I was routinely chastised for our negative mailings and personal attacks. Everyone in the neighborhood had at least one family member who had gotten a job in his restaurants, or through his intervention. It seems fast food restaurants are always hiring.

We heard complaints. We heard stories. We were even yelled at. In short, we knew the strategy was wrong. Rather than producing an effective candidate, one sensitive to our opponent's stature and influence in the community, the consultant implemented a strategy out of context—the negative campaigning that he had exported from Washington.

My candidate finished a disappointing third in the primary. Although my experience was exasperating, I was heartened by the community's ability to detect the disjuncture between what they wanted and the candidate we produced. My candidate truly cared about the voters in a way that, unfortunately, never came across; if elected, he would have been good for the community.

Since that frustrating summer, I have bided my time, waiting for a political candidate I felt excited to support. I have worked a little on national campaigns, but know that another local candidate will catch my attention one day soon. Perhaps then I will try my hand again at creating a winning campaign.

Simeon Brodsky, a Program Coordinator at IAAY, is working toward his Ph.D. in political science at the University of Pittsburgh.

Exploring Government at the National Young Leaders Conference

by Cynthia Soderblom

I've always perceived politics and government as somehow unconnected to most of the American population, including me. This perception changed last winter, when I visited Washington, D.C., to attend the National Young Leaders Conference. After spending a week in our nation's capital learning about the process of government, I realized that government is really the work of many people, including ordinary citizens.

Each day the conference focused on a different topic, such as "America and the World" or "The Executive Branch and the Media." In our Presidential Groups (about 20 students with a leader), we participated in simulations that enacted the day's theme. In the Presidential Crisis simulation, for example, I acted as the Senate Foreign Relations Committee Chairwoman. As the simulation progressed, I learned that the president must consider his advisors' comments when making decisions, and I gained a deeper appreciation of the powerful role these advisors play in determining policy.

We also learned about government from elected officials. On the day we explored "The Legislative and Judicial Branches of National Government," we spent about an hour on the floor of the House speaking with James Clyburn, who described the path that led him to Congress. Later, after we toured the Library of Congress and the Supreme Court, some students were able to meet their senators and representatives in the House and Senate office buildings. We also saw how much work goes on in the office buildings, where aides for every senator and representative were busily preparing and organizing materials. I had never realized how much public figures must rely on their behind-the-scenes workers.

The next day, which focused on "The Executive Branch and the Media," began with a breakfast at the National Press Club. We listened as four seasoned Washington reporters, including Helen Thomas, who has covered the executive office since the Nixon administration, discussed their profession. I could tell that the reporters knew the government and its leaders very well from following their activities and reporting them to the public. Later, when James Hall, Chairman of the National Transportation Safety Board, spoke to us about how the government must work with the press, I realized that political leaders must also be public relations people: They have to make a good impression on the press because the press will convey this image to the public. After this breakfast, I could see how and why the government and the press are so tightly intertwined.

We spent the rest of that day preparing for the central event of the conference—the Mock Congress. Each Presidential Group was part of leadership, a committee, or a caucus; each group was given a stand to support. My caucus stood for a "moratorium on immigration to absorb the recent increases in both legal and illegal immigration." We campaigned by deciding which caucuses to support in exchange for their backing. Since there were many more opposing caucuses than potentially supportive ones, we had to decide what to trade off—more votes for a small revision in our amendment, or fewer votes for our radical stand. We also appeared before the "House" and "Judicial" committees, who reviewed our amendments. I couldn't believe how much work is involved in the formation of a single amendment. Unfortunately, since our stand was so radical, only one other caucus agreed to vote for it, and our amendment failed.

Although we spent most of our time learning about government, there was time for socializing, too. During evening socials, students could gather to talk and eat ice cream. We toured the capital in buses and shopped together in D.C.'s malls, which provided opportunities for interesting conversations with people from all over the world. The conference also arranged for entertainment, such as a performance by "The Capitol Steps," a political satire theater group. And on the last night of the program, we celebrated at a Farewell Dinner Dance at the Omni Shoreham Hotel.

Probably one of the most important things I learned at the National Young Leaders Conference is how much power an ordinary person has to make a difference. Even though I am not old enough to vote, I have found ways to make my voice heard in government since attending the conference. I joined the Marin County Youth Commission, a group dedicated to representing youth and youth issues to the county government. We recently completed the Youth Files, a summary of local city council candidates' positions on youth issues. Each of us interviewed different candidates, asking about their views on such topics as curfews and youth-adult relations. We then made presentations at our schools and other teen gathering places.

Through the Youth Commission, I have been able to present issues to people I normally would not have approached—a county supervisor, for example. I have also been able to make my peers aware of issues they might not have known or cared about; I have encouraged students who are old enough to vote to do so. All of this is a direct result of the Young Leaders Conference, which not only made me interested in finding a forum for my views and those of my peers, but also gave me the leadership skills to do it.

Cynthia Soderblom is a senior at San Rafael High School, where she runs on the varsity track and cross country teams and participates in student government. She plans to major and pursue a career in biology.

The Congressional Youth Leadership Council sponsors sixteen sessions of the National Young Leaders Conference during the school year and four sessions during the summer. High school juniors and seniors may either be nominated for selection by teachers, administrators, or NYLC alumni, or apply directly to the NYLC for an achievement nomination. For more information, contact the Congressional Youth Leadership Council, 1511 K Street, N.W., Suite 842, Washington, D.C. 20005; (202) 638-0009.

A Passion for Politics

by Dror Yuravlivker

Do you remember the Persian Gulf War? I do. I was in fifth grade at the time, and I remember coming to school on the war's first day, full of patriotism and "Go Bush!" enthusiasm. That night I watched the PBS show *Frontline*, which happened to feature an exposé on the Iran-Contra affair. The very next day, I walked into class and said that George Bush should be impeached. From then on, I took an active interest in politics and world affairs. I was hooked.

From Interest to Involvement

By the time I reached middle school, my interest in politics was growing rapidly. I worked for my school newspaper, often writing about politics (the 1992 elections, for example) and world events. My social life, I admit, was less than remarkable. But perhaps for that very reason politics excited me so much: I could enjoy it, take part in it, aspire to it, no matter how popular I was. At the end of middle school, my classmates voted me "Most Likely to Be President."

After middle school, I came to Sidwell Friends, a school in Washington, D.C. Here, many students shared my enthusiasm for politics. Immediately, a few new friends and I formed a Young Democrats club. Since the 1994 elections were coming up, we called several campaigns for literature, buttons, and stickers, and we organized a trip to a Maryland gubernatorial debate. The last major event the club sponsored was a school-wide assembly featuring Massachusetts Congressman Barney Frank. Mr. Frank was well received, and his speech about America's role in the world went over extremely well with the students.

Putting Politics in Print

Soon after I began attending Sidwell, the founder and editor-in-chief of the school's political magazine, *Political Onslaught*, asked me to write an op-ed piece. A month later, explaining that he was a senior and ready to turn the publication over to someone else, he offered me the editorship. And a few months after that, I put out my first issue—three articles.

Since then, *Political Onslaught* has not only survived—it has thrived. Once just a

few pages of satire, the most recent issue filled 22 pages with student drawings and writing, both serious and satirical. Contributors come not only from Sidwell, but also from three other area high schools. Issues we've covered during my editorship have included American, Israeli, British, French, and Canadian elections; relations between the U.S. and Cuba; affirmative action; Middle East politics; campaign finance reforms; free trade; films and culture; and, most recently, the death penalty. We've also added a section called "Humor & Culture," for which several of my funnier classmates write hilarious articles that often have nothing to do with politics.

Sidwell Friends is an overwhelmingly liberal school. The Sidwell writing reflects this progressive bent, and this is one of the reasons I chose to expand to other high schools—to increase the amount of conservative writing. I feel that the only way to make informed choices is by hearing many sides of an issue. Now, though Sidwell's liberal leaning still comes through, the content of *Political Onslaught* is much more balanced.

The staff consists of two people, including me. We publish an issue of *Political Onslaught* roughly every month. My work includes persuading people to write articles, laying out the magazine, and everything in between. When we have a deadline, I'm often up past midnight three nights a week to get everything done. But it's worth it.

Bringing Government to School

In addition to publishing *Political Onslaught*, I have tried to generate political awareness among the student body through Political Day. Based on earlier events at Sidwell at which speakers delivered seminars, Political Day involved students for a full day in a variety of activities.

I led the team of students and faculty who put Political Day together. I wrote letters to and called the 30 speakers to secure their appearances, delegated the jobs of hosting the speakers to 30 classmates, and motivated students to decorate the school and theater with political banners and posters. Most importantly, I coordinated all of these efforts to ensure that the day ran as smoothly as possible.

Political Day took place a few weeks before the 1996 elections. At a morning assembly, Bill Kristol, Editor of *The Weekly Standard*, and Ann Lewis, Deputy Campaign Manager and Director of Communications for the Clinton-Gore re-election effort, debated on stage before the entire school. CNN anchor Judy Woodruff moderated the debate, which students found exciting and informative.

Dror speaks with Mickey Kantor after a lecture on Political Day 1996

After the debate, students headed to seminars. Twenty-five men and women active in the Washington political arena spoke to groups of 15–20 students on topics ranging from abortion to the economy to national health care reform to relations between politicians and journalists. Most memorable for me was a lecture delivered by Mickey Kantor about the changing role of government in today's global economy. Then Secretary of Commerce, Mr. Kantor made a strong pitch for free trade.

After lunch, the entire school heard a pollster from Hart Research compare results from an NBC/*Wall Street Journal* poll and a similar poll of the Sidwell student body. Finally, our keynote speaker, Kathy Whitmire, the former mayor of Houston and President of the National Council of Mayors and currently the only woman on the board of the New York Stock Exchange, spoke about how we could get involved in politics.

Political Day was a complete success in intensifying the students' interest in politics and the elections. Political Day earned a two-page spread in the yearbook, which noted the organizers and the distinguished guests who came to speak. But even more memorable than the day itself was the work behind it—the time and energy, the teamwork, and the pure will all of us invested to make Political Day such an achievement.

Politics: For Our Future

It saddens me that so many people remain ignorant of politics and government. The American political experiment of democracy can succeed only if people take an active role, if citizens keep themselves informed of the world around them, and if everybody is willing to work for what they believe in.

I want to make a difference in this world—that is why I am so passionate about politics. I try to engender that same passion in those around me by every means possible, such as *Political Onslaught* and Political Day. I try to make politics relevant to my classmates because we are the next generation: in ten, twenty, thirty years, we will be the political leaders, the teachers, the parents. If today's youth feel empowered and optimistic about the future, tomorrow's world will reflect that.

Dror Yuravlivker never sleeps: aside from engaging in political activities, he plays piano, acts in school plays, and plays and referees soccer. He has also worked at the Center for Political Leadership and Participation (U-MD) and volunteered at the Holocaust Museum. He hopes someday to be a teacher and/or a member of Congress.

Contact Dror at dyurav@sidwell.edu to receive a copy of Political Onslaught *(or to subscribe). You can also see some issues on the Web at www.sidwell.edu/sidwell.resources/clubs/onslaught*

Two Months at the State House: My Experience as a Page

by Becky Ray

Imagine reading the results of a vote before anyone else. Imagine working on a daily basis with your state's elected officials. Imagine leaving high school for two to four months to work full-time, while keeping up with your regular class work. My junior year in high school, as a page in the Iowa House of Representatives, I experienced all this and more.

The process of becoming a page is highly competitive—of the approximately 200 students who apply to the Iowa House of Representatives each year, about 40 will become pages. Weeks after sending in my application, I learned that I qualified for an interview at the capitol. I met with two representatives, one Republican and one Democrat, who asked me about my experience and why I wanted to be a page. One day the Chief Clerk of the House called me at school and told me that I had been selected.

About two weeks before the session began, all the pages attended an orientation and learned the basic rules of protocol for dealing with politicians and lobbyists. Mostly the guidelines were based on common sense: we shouldn't step between two debating representatives, for example. The Sergeants-At-Arms explained lunch hour, breaks, paychecks, and the other ordinary aspects of work. We also received our uniforms—slacks or a skirt and the official navy blue blazer. That blazer, along with my page nametag, meant I could go anywhere in the capitol complex on official errands. It was fun to visit the different offices inside the State House and the offices elsewhere on the grounds, which required a walk through a maze of underground tunnels.

At orientation, I also learned that I had qualified for a special post in the *House Journal* office. The *House Journal* is a daily newsletter that lists current items of business and voting records. The *Journal* is distributed throughout the capitol complex and to area businesses and lobbyists with relevant interests. My duties began with proofreading amendments aloud and making copies. As the session progressed, I began performing other tasks, such as downloading amendments and other documents from the capitol mainframe, typing the text of the *Journal*, and delivering bundles of the *Journal* throughout the capitol complex.

> ***At times I felt as if I was only a gofer, but I realized that by helping the politicians to complete their work more efficiently, I was playing a very important role.***

A Day in the Life

Work began in early January and lasted two months. Because I liked to get a head start on my duties in the *Journal* office, I would usually arrive at 7:30 a.m. Around 8:00 a.m., I began to download bills and amendments and proof them. The text of the bill would be published in that day's issue of the *Journal*.

At 9:00 a.m., the House convened. After the Pledge of Allegiance, an invocation by a religious leader, and an announcement of the day's schedule of meetings, it was time for debate. Since I was in the *Journal* office in the morning, my job was to listen to debate on the loudspeaker and type items for the next day's edition. I also double-checked the results of votes, which usually led me right up to my lunch break.

The second half of the day was, for me at least, much different from the first half. Instead of working in an office, I was now in the center of the action. The House floor has 100 seats, two press benches, two page benches, the phone room, the bill room, and the "well" where the Chief Clerk and Speaker sit. Behind the well are offices and the rooms where the two parties caucus. "Working the floor" involves traveling among all of these places, sometimes within an hour.

Pages sit on the benches in the back of the room until they are called. When representatives or clerks need a page, they press a button on their desk, which is connected to a board in the back of the room by the page benches. The board lights up a number corresponding to the number of the desk, and a bell rings. Then one of the pages (we usually took turns, but we all had our favorite representatives) goes to the desk to receive his or her assignment. For example, reps asked us to get copies of legislation, deliver messages to a colleague in the Senate, get them a snack, or talk to a lobbyist they didn't have time to see.

During debate, we had to move particularly fast so that the reps didn't have to stop debating to wait for us to bring the text they needed. Debate was exciting and stressful, especially when we couldn't get to the desk because of the rules about not walking between two debating representatives. But when debate was over, and work slower, sometimes the representatives would talk to us for a few minutes about college plans, our political leanings, or even popular music. So working the floor is really quite a

diverse activity, and one that made our afternoons quite exciting.

Once every couple weeks, the Sergeants-At-Arms would assign us to work in the phone room. Two people run the House switchboard, and they employ two pages each day to wait for phone messages. When they accumulate five or so messages, the pages take them to the representatives. It was good to learn that representatives really get phone messages from their constituents. I know that if I ever call about a bill that's important to me, the representative will get a written message about my call. And even better, if the representative is at his or her desk at the time, I can talk on the phone with him or her about my concerns. Witnessing the interactions of representatives and ordinary constituents improved my faith in state government quite a bit.

The late afternoon was a time for committee and subcommittee meetings. From 2:30 on, I might find myself sitting in a committee meeting, listening to discussions about finance, ethics, ways and means, transportation, or other topics. I always had to be ready to run to get bills, books from the law library, or food for the representatives. At times I felt as if I was only a gofer, but I realized that by helping the politicians to complete their work more efficiently, I was playing a very important role.

At 4:30, we would be dismissed from work, unless debate was particularly long that day, in which case we would stay anywhere from a half-hour to five hours longer. I drove home to my aunt's house in a suburb of Des Moines, which is where I lived for those two months. Most nights I spent doing my homework, but on Wednesday nights, all the pages got together. Not everyone lived with family; some pages rented apartments or college dorm rooms.

Becky (second row, third from left) with all of the pages and the Sergeants-At-Arms in front of the well on the House floor

We sometimes went to those places to watch movies, or to the mall or restaurants around Des Moines. Getting to know each other made a big difference in our teamwork, I think.

Becky and Iowa Governor Terry Branstad

Work at the State House allowed me to meet some very interesting people. Different associations from around the state would come to talk to the House or Senate, so I got to speak with people from the American Cancer Society, Iowa Association of Counties, Big Brothers/Big Sisters, and other groups. The capitol also attracted some famous people: I met Phil Gramm, Troy Davis (Heisman runner-up from Iowa State University who visited the House to give a speech), and I even heard that George Stephanopoulos stopped by.

Balancing Roles

How did I juggle schoolwork, a full-time job, a social life, and extracurriculars, all while living 60 miles from home? Well, I had to give up certain things. Speech and drama went, as did some pep band appearances. I neglected some things, like Mock Trial and Quiz Bowl. But there was time to do homework at night and during the day when work was slow. I also got help from my teachers, who faxed tests, assignments, and study sheets to me at the State House.

Although it is difficult to keep up with the demands of being a page, most students thrive on the challenge, and the benefits make all the hard work worthwhile. For example, I learned office skills, such as working with computer software, proofreading, and filing, and new interpersonal skills from dealing with a wide range of people. And I can get letters of recommendation from representatives if I ever need them for a scholarship or job application. I even got some leads on potential jobs if I decide to work as a clerk between college and law school.

Since the House session lasts for about four or five months, pages have the opportunity to stay for the whole session instead of just for two months. Pages with special assignments, like mine in the *Journal* office, can truly benefit from staying on. But with my courseload and extracurricular activities, I decided that it would be too much for me. Still, I'm grateful for the time I spent at the state capitol. It was a tremendous two months, and I carry with me experiences and relationships that I will always remember, and skills I will use all my life.

Becky Ray is a freshman at Kenyon College in Gambier, Ohio, where she enjoys being a founding member of Vertical Hootenanny. She grew up in Iowa and loves corn, music, foreign languages, and Quiz Bowl.

Becoming a Consummate Debater

Interview with Rebecca Justice

by Eileen Ptak

As a senior in high school, Rebecca Justice was ranked one of the top ten high school debaters since the 1920s by the National Forensic League. She recently won the 1997 American Parliamentary Debate National Tournament as a senior at The Johns Hopkins University.

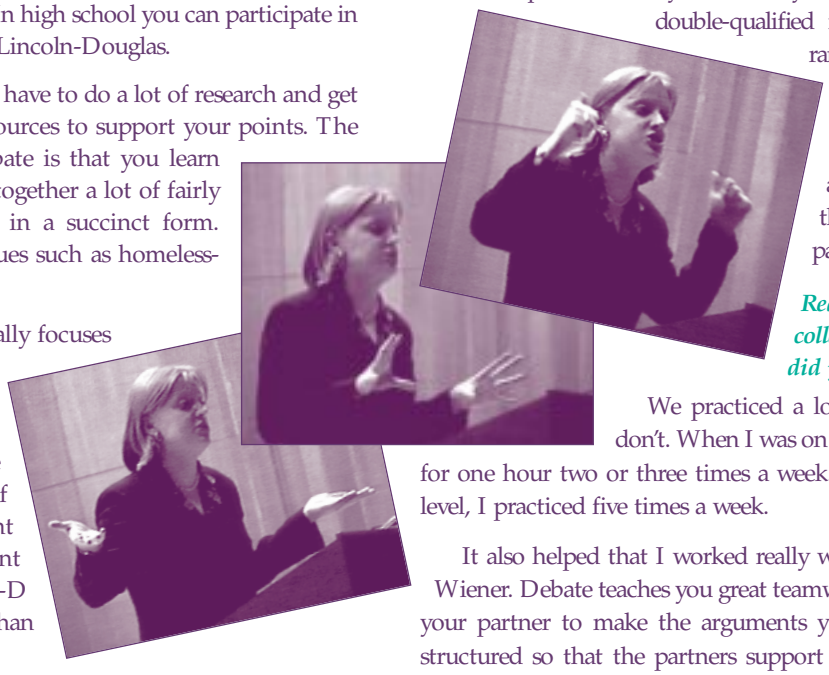
How did you become interested in debate?

My family has always been involved in debate. In fact, my grandfather started my high school debate team. My father, all my aunts and uncles, and my grandmother were excellent debaters.

That's quite a precedent to follow. What kind of debate did you compete in as a high school student?

I competed in policy debate. In high school you can participate in two kinds of debate: policy and Lincoln-Douglas.

Policy is evidence-based. You have to do a lot of research and get information from a variety of sources to support your points. The educational value of policy debate is that you learn how to research very well, pull together a lot of fairly heavy material, and present it in a succinct form. Policy focuses on real-world issues such as homelessness and the environment.



Lincoln-Douglas debate usually focuses on philosophical questions, such as the letter of the law versus the spirit of the law. Arguments in L-D debate are based on moral values instead of evidence. L-D debaters might argue about capital punishment or physician-assisted suicide. L-D debate stresses rhetoric more than policy debate does.

What type of debate did you participate in at Hopkins?

I competed in parliamentary debate. Usually a college-level activity, parliamentary debate combines elements of both policy and Lincoln-Douglas. You use a lot of philosophy because parliamentary debate doesn't use evidence. But you also tend to debate real-world issues. The topics are usually taken from the newspaper or major magazines such as *Time*, *U.S. News & World Report*, *The Economist*, and *Christian Science Monitor*.

Parliamentary debate is modeled on the style used in the British House of Commons. A two-member Government team presents a case, and a two-member Opposition team attacks it. Parliamentary debate incorporates conventions specific to the British parliament: members of the audience rap on tables to applaud, and there is no formal cross-examination period. Instead, debaters may interrupt by standing up and saying, "point of information." The speaker has the option to either take the question or decline. It is bad form to decline questions, so everyone has to learn how to work with the interruptions.

It is quite impressive that you rank among the top ten of all time in the National Forensic League. How did you earn that rank?

Well, my ranking may be a little lower than that now—it changes every year. The National Forensic League (NFL), the largest high school speech and debate organization in the country, assigns point values for winning tournaments and for qualifying for national competitions. At the end of a student's high school career, the NFL tabulates the points debaters earned and ranks the students.

I qualified for Nationals three years in a row, in my sophomore, junior, and senior years. Most people qualify only once, so I earned a lot of points that way. Also, in my last two years of high school, I double-qualified in both Foreign Extemporaneous Speaking and debate, thus doubling my points. And because I competed in several different events, I accumulated more points than students who participated in only one.

Reaching the Nationals in college is also impressive. How did you accomplish that?

We practiced a lot, and many college teams don't. When I was on the varsity team, I practiced for one hour two or three times a week. When I was at the novice level, I practiced five times a week.

It also helped that I worked really well with my partner, David Wiener. Debate teaches you great teamwork skills. You have to trust your partner to make the arguments you need—the speeches are structured so that the partners support each other. Teams without this kind of close working relationship do not win.

To compete in the Nationals, you have to win at least one tournament during the year. David and I won several tournaments, qualifying for the American Parliamentary Nationals along with 75 other teams. In the final round, we faced off against the team from Princeton. We flipped a coin before the round began to determine which team would be Government and which would be Opposition. Because Princeton won the coin toss, they chose to be the Government team—a distinct advantage because Government chooses the debate topic, and they have ten minutes to prepare. David and I didn't know the topic until they began to argue their case.

They chose to defend affirmative action, contending that it had been good for America in the past, was good in the present, and will continue to be good in the future.

We countered by arguing that affirmative action was the government's excuse mechanism: The government *could* have responded to the problems of inequality by enforcing government rulings such as

Brown versus the Board of Education and the Civil Rights Act. Instead, the government chose an easier route with fewer political risks.

We argued that not only is affirmative action *not* beneficial to minorities, but it has also impaired their struggle for equality. Affirmative action has actually reinforced in the bigot's mind that minorities are not capable of advancing based solely on their merits. Because we won that round, we won the tournament.

Niall O'Murdhada raises a point against Rebecca in the 1997 National Tournament

What skills have you developed over the years in debate?

Debate forces you to think on your feet. Each time you debate, the other team spends the whole hour attacking the construction of your arguments. Although this is a humbling experience, it allows you to continuously improve the organization and logic of your thought processes.

You also develop the confidence to speak in front of large groups of both peers and adults. This kind of confidence, which is rare in a society where so many fear public speaking, gives you composure in many different situations.

Debate also expands your vocabulary. The more you speak and read to prepare, practice, and compete, the more vocabulary you learn. The best way to remember new concepts and words is to use them, and debate forces you to do exactly that.

It sounds as though these skills would be useful to many people, not just aspiring lawyers and politicians.

Absolutely. A number of the debaters on the Hopkins team aren't interested in a legal career—many are pre-meds and engineers. The skills you develop—thinking quickly and logically, speaking confidently, and expressing your thoughts succinctly—are helpful for job interviews and in the workplace, whether it's in law, medicine, or academia.

What is the most memorable part of your debate experience?

Without a doubt, the people I have met. Whether or not you're a good public speaker or are interested in developing better skills, you will meet a lot of amazing people through debate. Even though I went to a very small rural high school in Indiana, I met people through debate from all over the state and nation who were among the nation's best and brightest. In college, the parliamentary debate circuit has produced a number of impressive individuals as well: A former national champion is now a professor at Columbia Law School; another national champion is Justice Rhenquist's clerk at the Supreme Court; both members of the University of Pennsylvania team that won the American Parliamentary Nationals in 1996 are first-year students at Harvard Law School; and my partner, David, is a Fulbright scholar! It's no accident that these people are so accomplished. Debate brings interesting, sharp people together—it's a great way to broaden your horizons.

The Three Faces of Debate

Modeled on the famous 1858 debate between Abraham Lincoln and Stephen Douglas on the issue of slavery, **Lincoln-Douglas** debates are one-on-one and usually focus on a moral issue, such as gender equality or capital punishment. Each year two debate topics are chosen by the National Forensic League, and students have several months to prepare their opening speeches. Debaters have a chance to cross-examine the opposition and rebut the arguments, but these speeches are reactive, not prepared. As a result, students need to anticipate arguments from the other team and must research both sides of the topic. Because it is more philosophical than other types of high school debate and does not require evidence, L-D debate focuses more on rhetoric. Scoring is based on speaking style, persuasiveness, organization, and responses to cross-examination.

Policy debate centers on one topic each year, chosen by the National Forensic League, related to a hypothetical national policy. For example, last year's resolution asked students to argue whether or not "the federal government should establish a program to substantially reduce juvenile crime in the United States." The affirmative teams must support the resolution, and the negative teams must argue against it. Debaters work in teams of two to gather supportive evidence, such as scientific data and previous or current political policies, and must construct briefs (similar to legal briefs). As in L-D debate, the opening speech is prepared, but cross-examination speeches are reactive. In addition to speaking ability, effectiveness, and organization, scoring is based on quality and quantity of evidence.

Patterned after the procedures used in the British Parliament, **parliamentary** debate combines policy and philosophy. Debaters argue about topics as diverse as whether humans are the only creatures who consume without producing and whether dress codes should be mandated in public schools. Two two-member teams—the Government team and the Opposition team—each deliver two statements and one rebuttal. Since parliamentary debate is extemporaneous, students must prepare for any possible topic. At a tournament, the Government has ten minutes before the round to prepare their arguments. The Opposition team learns of the debate topic only when the Government team begins their speech and must construct their arguments while they listen. Scoring for parliamentary debate is based on rhetoric, analysis, organization, and knowledge of the subject.

Winning Arguments, Round by Round

by Robert Warren

I became interested in debate in my sophomore year of high school. I'd had some experience in public speaking, and I've always been interested in the social sciences, so when the debate coach at my school invited me to watch a practice round, I accepted his invitation.

I walked into the debate room expecting to hear carefully reasoned speeches articulated with practiced precision. Instead, I saw four speakers frantically taking notes, grabbing evidence out of folders, and giving speeches that conveyed volumes of information at an insanely fast pace. I managed to catch a word here and there, such as "nuclear war," one of the few concepts I understood. These people, I thought, weren't debaters; these people were fast-talking salesmen trying to sell a backyard bomb shelter. This was my introduction to the world of policy debate.

But novice debaters shouldn't be intimidated by this scenario. Many of the skills necessary in debate, such as speaking quickly and constructing effective counterarguments, can be developed in practice rounds and in the novice-level rounds offered at many tournaments.

Learning the Skills

Although my partner and I had received a lot of advice from our debate coach and other members of the team, neither of us was really prepared for our first tournament. The first couple of rounds were horribly muddled, and few of our arguments made sense. Of course, the other novice teams were in the same position. But after each round, the judge gave us advice on how to improve our strategy, and by the end of the tournament, we were making more coherent arguments.

We did not develop the ability to speak quickly until many tournaments later. Speed is important in policy debate because it allows you to establish more evidence within the limited time frame. But as we learned in our early tournaments, speed is not as important as the ability to deliver clear, coherent, concise, and convincing arguments. Debaters who understand, synthesize, and present their arguments clearly are the ones who win the round.

Background Research

Preparing for debate involves weeks of research—searching books, magazines, newspapers, debate handbooks, and even the Web for information. A new topic, or resolution, is determined each year by the National Forensic League. This year's resolution is that "the federal government should establish a policy to substantially increase the use of renewable energy in the United States."

To be successful in policy debate, you have to research both sides of an issue. At tournaments, a panel decides which team will affirm the resolution and which will refute it for each round, so you must be prepared to argue either side. And because all rounds will center on this one topic, you will eventually debate both sides. Finally, by preparing both sides, you can anticipate your opponents' main points and deliver a more effective argument.

As an Affirmative debater, that is, a debater who supports the resolution, I might argue that promoting renewable energy sources will slow global warming. In my "aff" folders I would place articles proving that global warming is dangerous and that renewable energy sources could reduce global warming by eliminating emissions from fossil fuels. But as a Negative debater, I would have to adopt a completely different set of arguments. In my "neg" folders I would file evidence that global warming is a scientific hoax or that warming helps plants grow by lengthening the growing season. I would take all of my folders to every round.

The Competition

After a few weeks of preparation comes the chance to compete with teams from across the state, or in some cases, the nation. A typical tournament spans two days with five rounds each. Once the season gets into full swing, several tournaments will be held around the state each weekend.

Rounds generally last a little over an hour, a short span when you consider everything that happens in a round. Each team presents its case in an eight-minute "constructive speech," after which the opposing team has three minutes to cross-examine. Each team then gives a second constructive speech with another opportunity for cross-examination. Then the rebuttals begin: in five-minute speeches, each team responds to the other's argument and summarizes its own position.

While the order of speeches and cross-exams is fixed, many variables influence their content. So even if you're on the same side for two consecutive rounds, there's no guarantee that what worked in the last round will work in the next. You'll rely on the same folders for evidence, but you must always be prepared to adapt your strategy.

The Rewards

Most tournaments end with an awards ceremony, at which the top teams and most persuasive speakers receive trophies, gavels, or certificates for their accomplishments. But the rewards of participating in debate extend far beyond the tournaments.

Debate teaches a number of invaluable skills, such as how to think and speak quickly and how to defend a position with coherent arguments. Debate helps you develop poise and confidence in your speaking, which can translate into success in the classroom and in college or job interviews. Finally, debate encourages you to think about many sides of an issue, which is necessary to make informed decisions both as a citizen and as a human being.

Robert Warren is the captain of the Northside High School debate team. He is also actively involved in theater, singing, Beta Club, and the NHS Online community. His other interests include strategy games, reading, and political and philosophical discussions with friends.

Organizing a benefit concert allowed Danielle Kalish to use her love of music in an innovative way: to raise money to help prevent child abuse. Here, she reflects on the project that turned into a public—and personal—success.

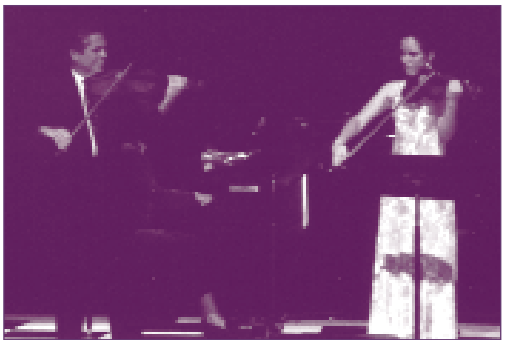
IMAGINE: STOP THE PAIN, START THE MUSIC

by Danielle Kalish

In the winter of my junior year, after twelve years of playing the violin, I wanted to use my love of music for something more than solitary practicing. My desire to use music to help people in my community led to the idea to organize a benefit concert. From participating as a performer in other benefit concerts, I knew that such a concert was an effective way to raise money. And from playing violin for so many years, I recognized music's power to evoke emotional responses, to make people care.

Many people warned me that this would be a difficult undertaking and that even some adults have failed to put together successful events like this. Some even suggested that I give up on the project. But I kept in mind that this concert would give me an opportunity to use my musical experience to help an organization about which I care a great deal. I chose a children's charity from the myriad possibilities because children require others to take care of them. Child abuse in particular demonstrates their vulnerability, and its prevention ranks among the most essential efforts in our society. More specifically, I chose the Child Abuse Prevention Center of Maryland because its programs educate both the mothers and the fathers in abusive situations to help entire families survive. To strengthen the concert's connection to this charity, I decided that I would include not only adult but also student performers in the program.

In the fall of my senior year I formally requested permission from my school to use Centennial Hall for the concert date of June 1, 1997. I then formed a committee to help oversee the details of the concert. I quickly learned the necessary behind-the-scenes skills, from the basics of lining up performers and printing programs to the demanding tasks of budgeting and fund raising. I contacted adults with various areas of expertise for advice on the details. Each new piece of information proved to be essential, whether it helped me find a restaurant that would donate food for intermission or a student willing to control the curtains and lighting for the concert.



Danielle performs with BSO Concertmaster Herbert Greenberg

Throughout the organizational process, I had to overcome constant stumbling blocks, both with the logistics of the concert (from simply getting people involved to arranging the program to accommodate the performers) and with the constraints of my hectic schedule. But in resolving the time conflicts between this concert and my other pursuits, such as my senior-year schoolwork and solo violin practicing, I thought of the concert as an integral part of, rather than an obstacle in, my life. The enormous time commitment in organizing this event—including writing grant proposals, making telephone calls to strangers, and calling meetings—only strengthened my dedication.

The concert, which took place more than a year after I started its planning, included a juxtaposition of musical genres. The program featured three vocal performances: two sopranos, Alison Calhoun and Tameika Lunn; and Dayseye, The Bryn Mawr School's award-winning madrigal vocal ensemble. The rest of the program consisted of instrumental music, including performances by violinist Austin Hartman, cellist Kenneth Whitley, and a string quartet. To start off the entire concert, Herbert Greenberg, Concertmaster of the Baltimore Symphony Orchestra, performed as a special guest with me on J.S. Bach's *Concerto for Two Violins in D minor*. Including speeches, intermission, and a raffle, the concert lasted about two hours. A local celebrity, Sally Thorner, co-anchor of WJZ-TV 13, was the emcee, and thanks to her expertise, the concert ran very smoothly.

Although I was busy making sure everything went as planned during the concert, it was amazing to see the event I had spent so much time arranging finally come together. The audience was supportive, and the performers' excitement throughout the afternoon was extraordinary. The concert raised more than $8,000, surpassing my goal of $5,000.

The event was a success for me on not only a financial but also a personal level. I received recognition through both a Governor's Citation and a Mayoral Proclamation. I was also named the 1997 Outstanding Youth Volunteer Fundraiser in the high school category by the Maryland Chapter of The National Society of Fundraising Executives. In addition, I received an Honorable Mention in the Entrepreneurial Spirit competition of the Maryland Chapter of The National Association of Women Business Owners. Most importantly, the concert was the culminating experience of my senior year, as I combined my knowledge of music with my desire to help children.

I hope that my efforts will not only benefit children, but also encourage other young people to do their part in the community. I hope that with the support of their parents, teachers, and peers, they will take the initiative and find a way to extend their individual interests past their daily lives and into the world around them.

Danielle Kalish is now a freshman at Columbia University, where she is active in the orchestra and Women in International Affairs. She continues to take violin lessons in New York City.

PROJECT RESCUE VISION

by Cory Snyder

My brother, Brock, and I started Project Rescue Vision in Spring 1996 after seeing a story on NBC's *Dateline*. The program related how three children died in a fire after firemen, who couldn't see them, crawled right over them. Then the program explained that an Infrared Imaging System (IRIS) might have saved the children's lives. Normally firemen have to locate victims by feeling their way around, but the IRIS allows firemen to see through smoke, fog, and darkness to rescue victims.

At the time of the television program, only three fire departments in the United States had an IRIS device, and unfortunately, our town of Bowie, Maryland, wasn't one of them. Our fire department did not have the $25,000 to buy an IRIS, so Brock and I decided to help buy one for the benefit of our entire community.

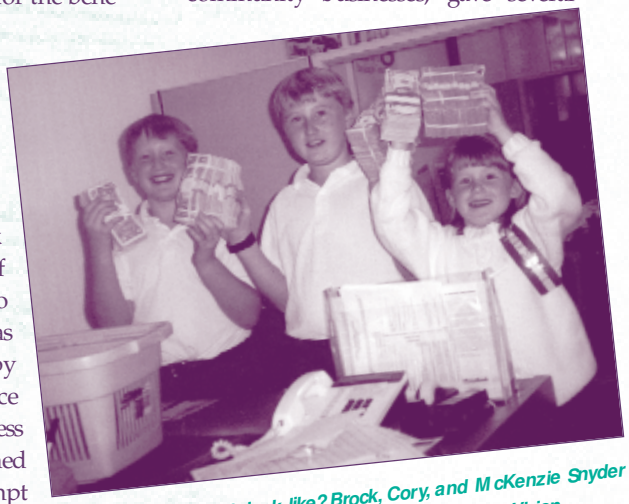
The first thing we did was name our effort "Project Rescue Vision." I appointed myself president and Brock vice president. We then applied for and received a trademark for the name from the State of Maryland. We created a logo and promotional phrases such as "Started by kids . . . Run by kids." We got our own post office box and opened a small business savings account. When we learned that we would need a tax-exempt number, we called a local law firm we selected from the phone book for advice. Senator Leo Green happened to be the lawyer we spoke to, and he gave us free advice over the course of our project.

We also contacted the National Firefighters Protection Association for statistics related to deaths and injuries caused by smoke inhalation. We requested information about the IRIS, such as pamphlets, posters, and videotapes, from the manufacturer. With this information, we wrote a letter outlining the goals of Project Rescue Vision to distribute to residents and businesses.

When we started receiving donations, we gathered supplies, such as envelopes, copy paper, record-keeping books, business cards, and T-shirts. We enlisted the help of our family, friends, kids of various ages from preschool to high school, - business persons, and city, state, and local officials. We contacted several local newspapers and television stations to inform the community about our project.

Brock and Cory make a sp
to the

During our spring break and summer vacation, we spent an average of five hours a day working on the project. With the help of our volunteers, we colored, stuffed, and handed out thousands of project-information envelopes all around town. We hand-wrote letters to major corporations, visited hundreds of community businesses, gave several speeches, attended various meetings, and obtained media coverage. We organized a huge raffle, solicited businesses for the raffle items, kept records of all donations, and sent out thank-you letters. We made bank deposits, scheduled appearances and events, kept up with incoming and outgoing telephone calls, and maintained an ongoing photo album, diary, and scrapbook.


What does $25,000 look like? Brock, Cory, and McKenzie Snyder display the money raised by Project Rescue Vision

We began our project on March 19, 1996, and continued through October 12, 1996. In only four-and-a-half months, we raised the $25,000 needed to buy the


Cory, Brock, and Project Rescue containing

A Bowie volunteer firefighter tries out the IRIS for the first time

eech before presenting the IRIS Bowie VFD

IRIS. While we waited for the IRIS to be manufactured, we planned the dedication ceremony that took place on Fire Prevention Day at Bowie Volunteer Fire Department.

We accomplished our goal of making our local fire department the second in the state of Maryland to be equipped with the IRIS. The local Bowie Fire Department is now equipped with the latest in firefighting technology, which benefits the entire community. Brock and I and the other kids who helped with Project Rescue Vision also benefitted by gaining self-confidence and the knowledge that children can make a difference in the world.

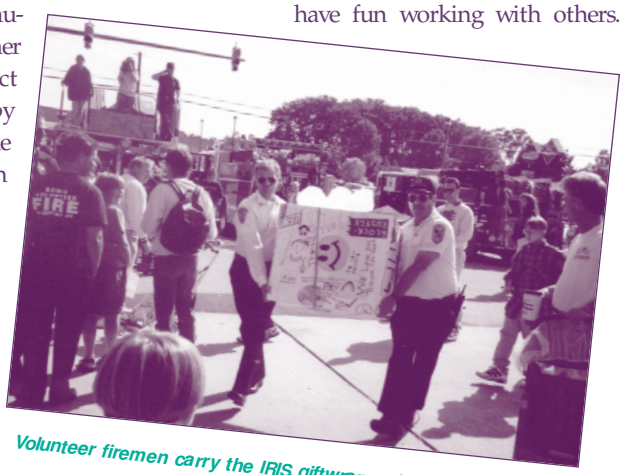
Soon after the IRIS dedication, Brock and I spoke with the fire chief and learned that the fire department still had a critical need for other rescue equipment. Since the department didn't have the funds to purchase what they needed, we decided to continue to help. This time, I was vice president and Brock took over as president of Project Rescue Vision. Our goal was to obtain even more lifesaving equipment.

On Fire Prevention Day 1997, we presented the Bowie Volunteer Fire Department with $10,000 worth of vital equipment: two full state-of-the-art Necessary Self-Contained Breathing Apparatus systems and three gas monitors, one for each station in Bowie.

Vision volunteers open the box g the IRIS

With the success of Project Rescue Vision, I realized how important it is to get and stay involved in my community. I am currently volunteering my time at Bowie Cable TV, where I perform duties ranging from those of camera man to floor director. I am putting together my own teen show, which will inform kids of volunteering opportunities in and around Bowie. I hope to air my first show in December.

Brock and I would like to ask each of you to please help out with a need in your community. It can make the difference between having and not having what is needed in our world today—like equipment for a fire department, food for a soup kitchen, clothes for a shelter, or books for a library. We believe that volunteering is a way to fulfill the responsibility we all have to help others. In addition, while volunteering, you can learn many new skills, get to know the people in your community, and have fun working with others.



Volunteer firemen carry the IRIS, giftwrapped in paper made by Project Rescue Vision Volunteers

By doing our project, we learned always to be positive, polite, and never to take no for an answer. We also learned that you can achieve the impossible if you are determined and willing to try.

Brock, 11, and Cory, 13, both enjoy swimming, playing baseball, and participating in Boy Scouts. For his work as president of Project Rescue Vision, Cory was selected as one of the ten National Honorees in the 1997 Prudential Spirit of Community Awards program.

Cory and Brock encourage you to write to them at Project Rescue Vision, 3262 Superior Lane # 288, Bowie, MD 20715.

For more information about the Prudential Spirit of Community Awards, visit Prudential's Web site at www.prudential.com/aboutpru/community/apczz1004.html

Serving Your Community

Danielle Kalish was looking for a way to use her musical ability to help others. Brock and Cory Snyder recognized a need in their community. From such simple motivations, incredibly successful volunteer efforts were launched.

The first step toward making a difference in your community is to identify a need you want to meet. Perhaps you're concerned about homelessness, pollution, or crime. Or maybe you think your local library needs more updated resources, or that the kids in your neighborhood would benefit from a youth recreation center. No matter what concern you choose, you'll need to think of solutions in very specific terms. For example, you might make an impact on crime in your area by setting up a neighborhood watch; you can help purchase library resources by helping to raise money.

Before you begin work on your project, you'll want to do some research. Find out if any organizations in your area are already working on the problem; if they are, you might consider working with them. If you'll be starting your own project, you'll need to do even more research.

Whether you want to join an organization, start a new chapter of one that's already established, or found your own, John W. Bartlett's *The Future is Ours: A Handbook for Student Activists in the 21st Century* (Henry Holt and Company, 1996) is a great place to start. This book includes advice on everything from getting organized and working with the media to raising funds and keeping momentum. A useful resource directory lists organizations you can contact for more information.

Take a look around your community to see how it needs your time, talent, and energy. Even if you have only a couple of hours a month to donate, you'll find numerous ways to make positive changes. Ask your guidance office about volunteer opportunities in your area; call local hospitals, libraries, churches, nursing homes, and shelters; or contact organizations such as SADD and the Red Cross to find out how you can make a difference.

Exploring Career Options: Robotics

Interview with Greg Chirikjian

by Carol Blackburn

The term "robot" was coined not by a scientist but by a playwright. "Robota"—Czech for "servitude"—first appeared in Karel Capek's 1917 play about artificial humanoids built for use as servants.* Greg Chirikjian's *fascination with robotics has been fueled by a lifetime of watching the film and television successors of Capek's creations. After completing degrees in mathematics and mechanical engineering at Johns Hopkins and a Ph.D. in applied mechanics at Caltech, Chirikjian returned to Hopkins to become one of its youngest and most popular engineering faculty members.

***I believe you are our first interviewee to admit that his career dreams were inspired by* The Six Million Dollar Man.**

It's true. When I was a kid, science fiction shows kindled my imagination. I enjoyed thinking about whether those futuristic devices could really be built. When I was seven or eight, I tried to build a robot like the one on *Johnny Sako and his Flying Robot*—a 1960s TV show with bad special effects. I've always liked to work with my hands, and I've always been interested in building gadgets with futuristic sorts of applications. So it was natural for me to tie my interests together by studying engineering.

When did you start your more formal research in robotics?

My master's thesis at Johns Hopkins concerned the dynamics of motion of a satellite's extendable arm. The arm was folded very tightly, but could unfold, popping out into a long structure. How would it move during that unfolding? My research on that problem initiated my interest in the geometry of motion of devices with many joints, an interest that continues to the present day.

It sounds as though your work involves considerable mathematics as well as engineering.

In robotics, more than in most engineering fields, you study motion and relationships between objects in space. When you examine such phenomena in any detail, the analysis becomes very mathematical. All the physical laws we know are based on calculus. In fact, at the graduate level, most engineering courses are applied math: the mathematics of how a fluid flows, or of how a solid deforms when forces are applied to it, or of how an object vibrates. Math also plays a role in the computer programming component of robotics: at the core of any program is an algorithm, and at the core of any algorithm is math. Mechanical engineering certainly includes a large experimental component, but I've found my knowledge of mathematics to be the most valuable skill I have in my work.

Could you tell us more about many-jointed devices and why they interest you?

Let me step back and give you some context. My work is at the very basic end of the research spectrum, especially for an applied field like robotics. Robots are already in use in industry, and some people study how to improve existing robots. I prefer to ask, "What comes next? What will be the next jump in robotic evolution?"

Two problems that currently limit the use of robots are cost and lack of versatility. Most robots are designed for a specific task. When a company changes its product, as, for example, General Motors does every year, last year's robots may become obsolete—turning into expensive junk.

One reason contemporary robots are so expensive is that they require sophisticated control systems. Robots have historically been made of components—joints and motors—that produce a continuous range of motion. That flexibility may sound desirable, but it's actually a liability: because of it, a robot requires a complex control system to direct its movements and a complex feedback system to monitor precisely where its moving parts are at all times. For most things robots do, they need to reach only a small number of fixed locations. So for most robots, a continuous range of motion is overkill, needlessly adding to the complexity required of their control systems.

As an alternative, I'm designing robots with what I call "binary actuators." Each joint has only two states: it can go to either one angle or another. Using many of these together, we can create robots capable of reaching many locations and of executing complex motions (we've made snake-like binary-actuator robots that slither with the best of them). However, since the binary joints limit the robot's movements, a lot of positional control is built into the joints—the hardware—so the robot requires a much less complex control system.

How does your work address the problem of versatility?

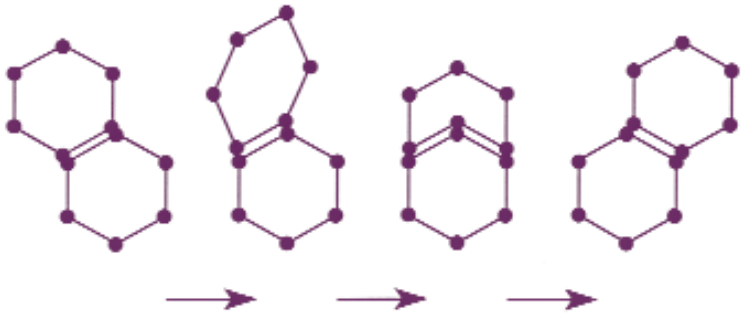
This is my other major research area, which was actually inspired by the movie *Terminator 2*. A fluid-metal-alloy robot is obviously out of the question, but *T2* got me thinking about the possibility of metamorphic—that is, "shape-changing"—robots.

Today's robots are fixed in form: you can't remove a finger and reattach it somewhere else. I started thinking about a robot composed of many small modules, each with the ability to move relative to its neighbors. Such a system would have the ability to self-reconfigure—to begin as one shape and become a completely different one.

Metamorphic robots would have innumerable uses. Imagine, for example, a truck full of modules pulling up to a building that collapsed in an earthquake. The modules could migrate into the building, then reconfigure to form a buttress, shoring up the structure so rescue workers could safely enter.

Of course, it takes a while for a concept to go from the drawing board to the initial prototype stage—which is where we are now—to a commercial product. It may take ten or twenty years of work before we have a robot that can go into an environment like a collapsed building.

At this point, we're still working on the basic shape-changing control of the robot, developing algorithms to organize the movements of modules needed to transform a robot from one shape to another. After these sorts of basic problems are solved, we can think about equipping the modules with sensors (so they can "see" in that collapsed building).



"Walking" Hexagon

How did you come up with the design for your metamorphic robot's basic module?

Once I knew the properties I wanted the modules to have, it wasn't really that hard. To keep things simple, I chose to limit the modules and their movements to two dimensions. (We'll tackle three dimensions after we work out the bugs in our two-dimensional prototypes.) There are only three regular shapes that can fill a planar space: an equilateral triangle, a square, and a regular hexagon. Of those, only the hexagon has enough flexibility to "walk." Geometry allowed me to identify the most appropriate shape to use.

What do you mean by "walk"?

Each hexagonal module has a motor at each vertex that can change the angle at that vertex. By specifying the angles, you control the shape of the hexagon. We can change the angles, causing a hexagon to deform enough that it simultaneously touches another hexagon along two edges. Two hexagonal modules can start out attached along one edge, then become attached along a second edge, at which time the initial link can be released. When the "walking" hexagon regains its original shape, it moves into an adjacent space. The modules thus remain linked at all times, but the overall form changes.

It's interesting that you were inspired by a humanoid robot—T2—but ended up with a completely different sort of structure.

Many robotic devices are modeled on biological forms. But just because a biological structure has survived evolutionarily doesn't mean it's the optimal structure for the task it now performs. The human form has evolved from earlier forms, and its architecture carries baggage from its past.

That's why I try to create robots that are very non-anthropomorphic. In engineering, we don't have to carry baggage; we have the luxury of starting from scratch. I can consider what a robotic device will be used for and ask, "What traits would a robot need to perform this task?" Then I try to develop the best design.

What do you find most satisfying about your work?

I enjoy the pleasure of visualizing an idea, then implementing it—of creating something I can see and hold that actually works and moves.

I also enjoy the satisfaction of knowing two disciplines well enough to be able to draw connections between them, then to transfer knowledge from one to the other. I think the most interesting work always occurs at the border of two (or more) fields. Doing traditional work in a field is valuable, but making connections that didn't exist before is, I think, even more important.

I also enjoy talking to colleagues in different realms of science, trying to find connections between their worlds and my own, looking for new applications for the ideas I'm working on. When you do research in more than one field, it becomes easier to see connections not only *between* those fields but *beyond* them, in other fields, as well.

Continued on next page

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How should aspiring roboticists pursue their interests educationally?

Robotics research requires the combined expertise of scientists from several disciplines. Mechanical engineering, electrical and computer engineering, computer science, even biomedical engineering can all prepare you to work in some facet of robotics.

Multidisciplinary teamwork is required not only in robotics but in much of engineering in the real world. It is, therefore, surprising that engineering undergrads are given very little opportunity in their classes to work collaboratively with other kinds of engineers. They don't get a full picture of the pleasures or challenges of a lot of professional engineering.

To give students such an opportunity, I teach a project-oriented course in "mechatronics"—the integrated use of mechanical engineering, electronics, and computer programming. Small groups of students are given a project that no one of them has all the skills to complete. They must parcel out the tasks among themselves, deciding who will do the programming, who the mechanical design, and who the electronics. They have to develop a working communication among themselves if the project is to come together.

Do you have any final words for students considering engineering?

Perhaps just a word of caution. Some of my undergraduate students don't seem to appreciate the importance of learning math. "If the computer can calculate the area under a curve for me, why do I need to learn calculus?" they ask. "Because it's not enough to obtain the correct answer; you need to understand *why* it's correct," I reply. To have a firm footing in engineering, you must master the math that underlies it. ■

Selected Resources

Dr. Chirikjian's home page
caesar.me.jhu.edu/

Robot Information Central
www.robotics.com/robots.html

PLANNING AHEAD FOR COLLEGE

Preparing for College in Residential Summer Programs

by Linda E. Brody, Ed.D.

What are your plans for this summer? Will you take a class? Travel? Seek a summer job? Or use the summer to read and explore topics on your own? The choice of summer activities during your precollege years deserves as much consideration as your classes in school. Though summer may feel far off, it is definitely time to think about what you want to do before deadlines pass and opportunities diminish.

Summer is a wonderful time for learning. You can study subjects that aren't available—or that you don't have time for—during the school year. You can do this in a formal classroom setting or in less structured ways. Whatever your choice, taking advantage of opportunities that extend beyond the school year will enable you to have a broader academic background when you enter college. And including your summer experiences on your college application may make you a stronger candidate for admission.

If your plans this summer include taking a course or two, consider the advantages of a residential program held on a college campus. The talent searches have a long history of offering advanced course work to academically talented students in programs held at various colleges, and the concept has spread so that precollege students heading to class with books in tow are a common sight in the summer on many college campuses.

Residential summer programs offer solid academic course work and much more. You can immerse yourself in rigorous academic content in the company of your intellectual peers while improving your study skills, enhancing your motivation, and preparing yourself for the academic challenge of college life.

Living on your own in a college setting can also help develop self-reliance and independence. In most programs, you will live in a dormitory, be responsible for your personal needs such as laundry, and become involved in a variety of social activities. If you spend one or more summers in this environment, you will enter college knowing that you can excel in advanced-level course work, live away from home, and make new friends in a short period of time.

Spending time on a college campus through a residential summer program can also help you in your college search. Even if you have no interest in attending the college at which you spend your summer, you can use the experience to identify characteristics that are important to you. Are you likely to be more comfortable on a large or small campus? Do you prefer an urban, suburban, or rural environment? Is there something special you would want in terms of living arrangements or dining facilities? What about special facilities such as computers, laboratories, libraries, or a museum on campus? A summer on a college campus can help you answer such questions about the type of environment in which you want to spend your undergraduate years.

The next pages provide a list of some of the best academic summer programs in the country. Others can be found in the books listed as references (especially *Summer on Campus*) and on the Web. If you are interested in a particular campus, you can contact that institution directly.

It can be overwhelming to think about all the options for summer. Travel, reading, volunteering … all are exciting possibilities. All offer opportunities to learn and grow. All can enhance your preparation for college. But an academic summer program can allow you to live and study on a college campus—an experience that will increase your confidence in your ability to navigate the demands of college life. ■

Selected 1998 Academic Summer Programs

Many opportunities exist for you to continue to challenge yourself academically during the summer. We have received positive reports from participants about the programs listed below.

Space in many summer programs is limited, so we suggest you apply early. You'll want to inquire about qualification requirements, course options, dates, fees, and scholarship availability. Grades specified refer to students' current grade level.

IAAY ACADEMIC SUMMER PROGRAMS

Center for Academic Advancement (CAA)

Grades 7–9, 3 weeks, residential sites in CA, MD, and PA.

Center for Talented Youth (CTY)

Grades 7–10, 3 weeks, residential and commuter sites in CA, MD, NY, and PA.

CTY Young Students

Grades 2–6, 3 weeks, commuter sites in MD and VA. Grades 5 & 6, 3 weeks, residential sites in CA, CT, and MD. *IAAY Summer Programs, The Johns Hopkins University, Baltimore, MD 21218; (410) 516-0277 or (818) 500-9034.*

SDB Learning Center

Grades 4–6, 4 weeks, commuter site in CA. *SDB Learning Center, IAAY, The Johns Hopkins University, 206 N. Jackson Street, Suite 304, Glendale, CA 91206; (818) 500-9034.*

OTHER TALENT SEARCH PROGRAMS

Center for Talent Development

Grades 4–12, 3 weeks, residential and commuter. *CTD, Northwestern University, 617 Dartmouth Place, Evanston, IL 60208; (847) 491-3782.*

Duke University Talent Identification Program

Grades 7–10, 3 weeks, residential. (See also Study Abroad.) *Duke University TIP, Box 90747, Durham, NC 27708-0747; (919) 684-3847.*

Rocky Mountain Summer Institute

Ages 10–15, 2 weeks, commuter. Ages 12–16, 3 weeks, residential and commuter. *Rocky Mountain Talent Search, University of Denver, Wesley Hall-Room 203, 2135 East Wesley Avenue, Denver, CO 80208; (303) 871-2983.*

ADVANCE Program for Young Scholars

Grades 7–11, 3 weeks, residential. *Programs for the Gifted and Talented, Northwestern State University, P.O. Box 5671, Natchitoches, LA 71497; (800) 259-3173 (within state); (318) 357-3174 ext. 105.*

Academic Talent Search and Accelerated College Entrance Center

Grades 6–9, 1–5 weeks, commuter. *ATS, California State University-Sacramento, 6000 J Street, Sacramento, CA 95819-6098; (916) 278-7032.*

Belin-Blank Center

Grades 6–8, Junior Scholars Academy; grades 9–11, National Scholars Academy, and Summer Institute for Creative Engineering and Inventiveness. One week, residential. *Belin-Blank International Center for Gifted Education and Talent Development, The University of Iowa, 210 Lindquist Center, Iowa City, IA 52242; (319) 335-6148 or (800) 336-6463.*

Continued on next page

Center for Academic Precocity

Grades preK–11, 5 weeks, commuter. Grades 6–11, 5 weeks, residential. *CAP, Arizona State University, Box 872711, Tempe, AZ 85287-2711; (602) 965-4757.*

Center for Gifted Studies

Grades 7–10, 3 weeks, residential. *The Center for Gifted Studies, University of Southern Mississippi, Box 8207, Hattiesburg, MS 39406-8207; (601) 266-5236.*

Office of Precollegiate Programs for Talented and Gifted

Grades 7–9, Explorations, 1 week. Grades 7–10, CY-TAG, 3 weeks. Grades 10–11, Iowa Scholars Academy, 4–8 weeks. Residential and commuter. *OPPTAG, W172 Lagomarcino Hall, Iowa State University, Ames, IA 50011-3180; (515) 294-1772.*

Purdue University Gifted Education Resource Institute

Grades 7–8, Star; grades 9–12, Pulsar; Nova college credit; 3 weeks. *Summer Residential Programs, Purdue University GERI, 1446 LAEB, Room 5114, West Lafayette, IN 47907-1446; (765) 494-7243.*

Southern Methodist University Gifted Institute and Precollege Programs

Grades 7–9, 3 weeks. Grades 10–11, 5 weeks. Residential and commuter. *SMU/TAG, P.O. Box 750383, Dallas, TX 75275-0383; (214) 768-5437.*

Summer Program for Verbally and Mathematically Precocious Youth

Grades 7–10, 3 weeks, residential. *VAMPY, The Center for Gifted Studies, Western Kentucky University, One Big Red Way, Bowling Green, KY 42101-3576; (502) 745-6323.*

Summer Stretch

Grades 7–9, 5 weeks, commuter. *Halbert Robinson Center for the Study of Capable Youth, University of Washington, Box 351630, Seattle, WA 98195-1630; (206) 543-4160.*

Wisconsin Center for Academically Talented Youth

Grades 5–6, 1 week, residential. Grades 7–12, 3 weeks, residential. *WCATY, 2909 Landmark Place, Madison, WI 53713; (608) 271-1617.*

HUMANITIES AND THE ARTS

Concordia Language Villages

Ages 7–18, 1–4 weeks, residential. *Concordia Language Villages, 901 South Eighth Street, Moorhead, MN 56562; (218) 299-4544, (800) 247-1044 (within state) or (800) 222-4750 (out of state).*

Foreign Language Institute, and Writing & Thinking Workshop

Grades 9–12, college credit, residential. *Foreign Language Institute, Simon's Rock College of Bard, 84 Alford Road, Great Barrington, MA 01230-9702; (413) 528-7227.*

Interlochen Arts Camp

Ages 8–18, 8 weeks, with 4-week option for grades 3–9, residential. *Admissions Office, Interlochen Center for the Arts, P.O. Box 199, Interlochen, MI 49643-0199; (616) 276-7200.*

Boston University Tanglewood Institute

Ages 14–18, 2- to 8-week sessions emphasizing music, residential. *Boston University Tanglewood Institute, 855 Commonwealth Avenue, Boston, MA 02215; (617) 353-3386.*

MATHEMATICS

Program in Mathematics for Young Scientists

Grades 9–11, 6 weeks, residential. *PROMYS, Department of Mathematics, Boston University, 111 Cummington Street, Boston, MA 02215; (617) 353-2563.*

Ross Young Scholars Program*

Ages 14-17, 8 weeks, residential. *Ross YSP, The Ohio State University, 100 Mathematics Building, 231 W. 18th Avenue, Columbus, OH 43210; (614) 292-1569.*

** NSF-sponsored program. To learn about other subsidized science and math Young Scholars Programs, call the National Science Foundation: (703) 306-1616.*

STUDY ABROAD

CTYI, Dublin

Ages 12–16, 3 weeks, residential. *The Irish Centre for Talented Youth, Dublin City University, Dublin 9, Ireland; 353-1-7045634; fax 353-1-7045693.*

Duke TIP International Summer Study Trips

Grades 8–11, 3 weeks; England, Germany, and Italy. *Duke University Talent Identification Program, Box 90747, Durham, NC 27708-0747; (919) 684-3847.*

International Summer Science Institute

Grade 12 with independent research experience, 5 weeks, study and travel in Israel. *International Summer Science Institute, American Committee for the Weizmann Institute of Science, Suite 117, 51 Madison Avenue, New York, NY 10010; (212) 779-2500; fax (212) 779-3209.*

Oxbridge Academic Programs

Ages 14–18, 4 weeks, England and France. *Oxbridge Academic Programs, 601 Cathedral Parkway 7R, New York, NY 10025-2186; (800) 828-8349 or (212) 932-3049.*

OTHER RESOURCES

For additional academic summer programs, ask about precollege programs at local colleges and universities, search the Web, and consult these guides:

Advisory List of International Educational Travel and Exchange Programs 1997-98 ($15.00)
Council on Standards for International Educational Travel, 3 Loudoun Street SE, Leesburg, VA 20175; (703) 739-9050.

Educational Opportunity Guide: A Directory of Programs for the Gifted (1998, $15.00)
Duke University Talent Identification Program, P.O. Box 90780, Durham, NC 27708-0780; (919) 683-1400.

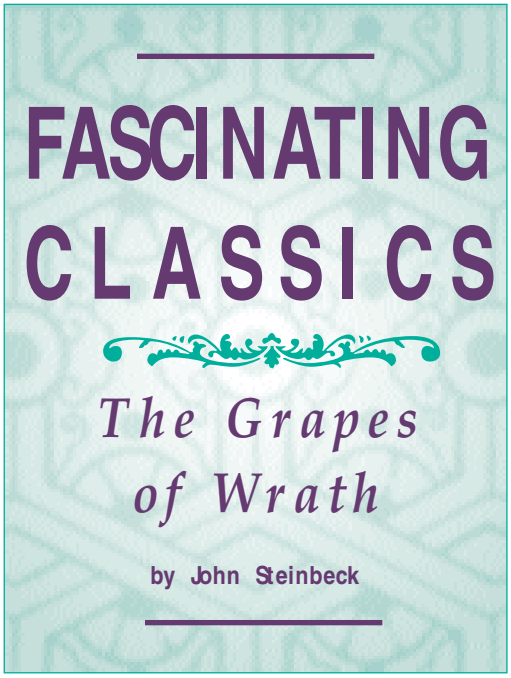
Program Opportunities for Academically Talented Students (1998, $12.00)
IAAY Office of Public Information, The Johns Hopkins University, 3400 N. Charles Street, Baltimore, MD 21218; (410) 516-0245.

Summer on Campus: College Experiences for High School Seniors (1995, $15.00)
Available in bookstores or from College Board Publications, Department A40123, Box 886, New York, NY 10101-0886.

Summer Opportunities for Kids and Teenagers (1998, $26.95)
Available in bookstores or from Peterson's Guides, P.O. Box 2123, Princeton, NJ 08543-2123; (800) 338-3282.

All summer program photos by Vilma Lonsdale

FASCINATING CLASSICS



Review by
Michael Henry & Lesley Mackay

Michael: Lauded as his best work, Steinbeck's *The Grapes of Wrath*, which won the Pulitzer Prize in 1940, is rich in character, powerful in imagery, and moving in its portrayal of the human spirit during one of the most trying eras in American history. In the 1930s, the economic disaster of the Great Depression was worsened in the southern plains states by the natural devastation of the Dust Bowl. *The Grapes of Wrath* explores one family's struggle to survive these crises. The novel focuses on the experiences of the Joads as they give up their Oklahoma farm and migrate west, lured by the promise of work in fertile California.

Lesley: The book can be viewed as a road novel that incorporates a vast chunk of the American landscape, with its endless highways and open spaces, as its backdrop. Steinbeck's main characters are three generations of the Joad family—frail, overwhelmed grandparents; the stoical but disillusioned Pa Joad; the loving but tough-as-nails Ma Joad; and a colorful set of siblings, including Tom Joad, a principled ex-convict; Rose of Sharon, a sensitive young woman who is pregnant; and Winfield and Ruthie, both children.

Forced off their land, the Joads and a family friend, ex-preacher Jim Casy, cross the country in a single covered truck that also carries all their possessions. They begin their hard journey battered by brutal, impersonal forces—drought and dust storms, a stagnant economy, and the greed of wealthy corporate farmers. Joining hordes of other people on the great east-west Highway 66, the Joads are part of an exodus that is Biblical in scope:

> *66 is the path of a people in flight, refugees from dust and shrinking ownership, from the desert's slow northward invasion, from the twisting winds that howl up out of Texas, from the floods that bring no richness to the land and steal what little richness is there. From all of these the people are in flight, and they come into 66 from the tributary side roads, from the wagon tracks and the rutted country roads. 66 is the mother road, the road of flight.*

Michael: As he documents the Joads' migration, Steinbeck examines the capitalistic system that helped drive them out of Oklahoma and that faces them again as they try to resettle in California.

In an environment of unbridled capitalism, Steinbeck finds much that is amoral and even cruel—the exploitation of laborers, the manipulation of wages, and the inaccessibility of basic goods, such as food. Steinbeck draws the reader's attention to disturbing paradoxes; in his novel, people starve while meat and milk spoil and mountains of fruit are left to rot so that corporations can keep the price of food artificially high.

However, *The Grapes of Wrath* is as philosophical as it is socially and politically passionate. Steinbeck's most powerful characters demonstrate a calm perseverance. Tom and Ma Joad take life one day at a time. Casy, having given up preaching to live in humility and friendship with others, denies the existence of good or bad luck, explaining that a man "got to do it all hisself." Through it all, Steinbeck's simple agrarian folk demonstrate tremendous patience and resolve.

Lesley: They do so despite the darkness that surrounds them. In the beginning of the novel, this darkness, both allegorical and real, is rendered through the powerful imagery of the Dust Bowl:

> *Little by little, the sky was darkened by the mixing dust, and the wind felt over the earth, loosened the dust, and carried it away. The wind grew stronger. The rain crust broke and the dust lifted up out of the fields and drove gray plumes into the air like sluggish smoke. The corn threshed the wind and made a dry, rushing sound. The finest dust did not settle back to earth now, but disappeared into the darkening sky.*

Steinbeck is a great naturalistic writer, and his primary theme is the need for people to live in harmony with nature. However, his perspective on the natural world is not sentimental, and he makes it clear that at times nature can be man's greatest enemy.

Michael: Yet Steinbeck suggests that in community people can survive almost anything. For example, on the road to California, the

The Historic Crises Behind Steinbeck's Novel

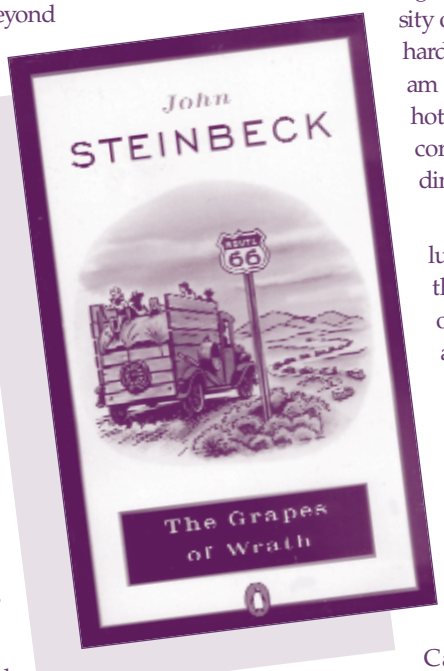
The Dust Bowl of the 1930s encompassed 150,000 square miles of land in Kansas, Colorado, New Mexico, Oklahoma, and Texas. For decades before, the soil of this region had been enormously strained by the aggressive grazing, planting, and harvesting that characterized westward expansion in the United States. These pressures combined with typically high temperatures and low rainfall to accelerate the process of soil erosion.

Then, from 1933 to 1939, a drought devastated the southern plains states, and seasonal high winds blew layers of loosened earth into the sky, creating vast clouds that came to be known as "black blizzards." The dry storms not only whipped dust into the atmosphere, but also swept it into dunes up to 30 feet high that dotted the useless farmland of the Dust Bowl region.

The federal government, long active in the development of the West, responded actively to the disaster, planting grass and trees, and teaching farmers to let some of their fields lie fallow in order to store moisture in the soil. The Dust Bowl subsided by 1941, after an intensely difficult period also

Joads reach out and help others in need, even though they have very little to give. In so doing, they achieve a sense of solidarity with others that proves to be a kind of salvation. Later, when the family arrives in California, they find and briefly join a democratically-run migrant community and feel joy as members of a cohesive group that supports and respects individual dignity.

When Ma Joad arrives in this camp, she exclaims, "Why, I feel like people again." Steinbeck depicts the residents of this humane environment experiencing a kind of rebirth as life moves beyond survival and they are reawakened to the desire to share, to play, to tell stories, and to make music. One night, a camp resident realizes, "the stars are close and dear and I have joined the brotherhood of the worlds. And everything's holy—everything, even me."



Lesley: Steinbeck works from these priceless instances of community to a dramatic climax in which Tom Joad and Jim Casy risk their lives to help form a union of migrant laborers. Creating the union is an urgent matter for the thousands of migrant families: until workers are organized, they compete with each other for jobs, allowing the landowners to bid wages so low that the workers cannot buy food.

Tom Joad and Jim Casy are unruly but principled, and tough but caring antiheroes. I think of them as brothers, although they are not.

Michael: I agree with you, Lesley, that Casy and Tom make powerful, unconventional leaders. However, I think that the strengths of the Joad women are even more striking. In the course of Steinbeck's narrative, a shift takes place among the Joads, and the family structure changes from patriarchal to matriarchal.

At the head of the new social order is Ma Joad. She holds the family together as they drive across the country and, once they arrive in California, as they struggle to establish a home and obtain work. So dedicated is Ma that, one night, determined not to slow the family down as they cross the desert into California, she silently comforts Grandma as the older woman dies in the back of the family truck. Upon realizing that she bore this ordeal alone, "The family looked at Ma with a little terror at her strength...." Afterward, Ma is offered a seat in the previously male bastion at the front of the truck.

Lesley: That's a great point, Michael. While Tom and Jim become political leaders, the Joad women urge the family and others on as they meet the tremendous challenge of survival. While I admire the novel's masterful evocation of social, political, and economic realities, I think that its tale of staying alive moved me most. The novel has a highly visual and tactile quality. In the gritty intensity of its descriptions, it brilliantly evokes terrible hardship. Reading it, I can easily imagine that I am riding under the tarps with the Joads down hot highways, the gas meter on empty, or eating corn mush and a couple of green peaches for dinner after a hard day's work in an orchard.

The Grapes of Wrath reminded me how lucky I am, and made me think about the thousands of people who still work on farms on a seasonal basis, and who must worry about feeding their families.

Michael: The novel definitely does arouse compassion and respect. To me, though, it also buoyantly upholds the American dream and the impulse to fight for a better life. Tom and his family survive their westward journey in part because they are inspired by the mythic image of California's fertility and beauty. Later they learn that California's vast natural wealth is controlled by banks and the rich and that the family must face just as much adversity there as they had escaped in Oklahoma. However, they refuse to give in to despair, and the end of the novel finds them as determined as ever to survive and prevail. To me, the Joads' nobility of character, as demonstrated by their persistence and hope, is the ultimate strength of *The Grapes of Wrath*. ■

Lesley Mackay

Michael Henry

marked by the Great Depression, the most severe economic crisis in American history.

However, as Steinbeck describes in *The Grapes of Wrath*, this tough episode brought not only instability and suffering, but also a new era of political commitment and organization. Under Franklin D. Roosevelt, the government created an array of programs intended to aid and educate citizens and to foster economic progress. And Steinbeck's fictional Tom Joad and Jim Casy illustrate the growth of a significant political movement: In 1935, the National Labor Relations Act made it easier for workers to advocate for their own rights, and from 1932–1941 union membership in the United States rose from three million to ten million.

Upcoming Fascinating Classics:

Virginia Woolf, *To the Lighthouse*
Ernest Hemingway, *The Old Man and the Sea*

The College Review Series is intended to aid prospective college students in their search by offering insiders' views of selected colleges and universities, as expressed by current undergraduates or recent graduates who have high academic ability. Note that the number of reviewers is small. Consider their personal perspectives as only one component as you gather information and impressions from many sources.

STUDENTS REVIEW

UNIVERSITY OF VIRGINIA

Our reviewers include fifteen students, who major(ed) in biology (2), chemistry (1), foreign affairs (2), government (1), history (2), math (3), philosophy (1), physics (1), psychology (2), Russian studies (1), and systems engineering (1). (The number of majors exceeds fifteen because some students completed double majors.) Students' comments appear within quotation marks.

Quality of Academic Instruction for Undergraduates

Perhaps no other university can boast such a distinguished origin. Founded by Thomas Jefferson, who designed the Grounds (that is, the campus) and the original buildings, UVA continues to promote the values of learning, self-governance, and public service that inspired Jefferson.

"What I liked best academically about UVA is the emphasis placed on teaching undergraduates. While research and scholarship are acknowledged to be important, the administration has made it clear that faculty are expected to teach undergraduates and teach them well. Some of my first-year classes were large, but even then, I found the faculty to be very approachable and eager to interact with curious students. All my professors taught with great enthusiasm, truly demonstrating a love of teaching. The faculty is definitely one of the school's best attributes."

"My academic experience at UVA was tremendous. The faculty is very undergraduate-friendly and keenly interested in cultivating the cream of the undergraduate crop. I wrote a thesis with a nationally-renowned scholar who dedicated a few hours a week to my project. Graduate-level courses are also open to qualified undergrads. I took four graduate seminar courses that met entirely in the living rooms of distinguished Government and Foreign Affairs faculty members."

"A feature that makes UVA especially attractive is the Echols Scholars Program. The top 10% of students accepted into the College of Arts & Sciences are given the title of Echols Scholar, which removes them from all distribution requirements; they don't even have to major. Using this privilege, Echols Scholars can really pursue their own interests, creating a curriculum that fits them uniquely."

"Echols Scholars have priority in registering for courses, giving them unfettered access to the best classes at UVA—which can, I think, hold their own with those at just about any school. With Echols, you can consistently find superb teachers."

"While the quality of instruction varies, every department has some outstanding teachers. UVA's best undergraduate programs include those in the schools of Architecture, Commerce, and Education and the departments of Systems Engineering, Computer Science, History, English, Government, Foreign Affairs, Religious Studies, and Spanish. UVA also has a large internship program; during their fourth year, students can earn four credits per semester working in their field of choice. As for 'gut' classes, there are few, and at UVA a gut only means an easy B, not an A."

Social Life

The vibrant extracurricular life and strong sense of history make the UVA experience distinctive.

"One of the school's greatest assets is the positive attitude that pervades the student body. Most people are very happy to be here. The University has a conservative, historic, Southern feel to it, but many kinds of people can find a niche. The school boasts a very strong Greek community, tons of student-run activities, a strong intercollegiate athletic program, and one of the best intramural programs in the country. Charlottesville is a beautiful town nestled in the Blue Ridge foothills, in horse country, only an hour or two from Richmond and Washington, D.C. The surrounding area offers many places to go hiking, camping, or rock climbing."

"For me, the quality of life at UVA is the school's greatest selling point. We support a daily newspaper, a weekly magazine, and at least ten other completely student-run publications. The Jefferson Society, the oldest organization at UVA, hosts a Friday night lecture series, after which discussion and debate continue until the early hours of the morning. The University has a strong history of student self-governance. Our student-run Honor System is a model for other honor systems across the country, and the Student Council is very active in promoting the quality of student life, participating in much of the decision-making around the University. We also have over 300 student organizations, including many religious and service groups."

"Very few students who graduate from UVA do so without having given back to the community. The largest organization on Grounds, Madison House, is dedicated to supplying volunteers to the local area. Service organizations and fellowship groups abound, especially for evangelical Christians."

"School traditions provide experiences that unite the student body, creating a strong and enduring sense of community. Going to a football game in a jacket and tie is great fun, and makes for a handsome sight to see. UVA has a history of which it is very proud, yet it's not unwilling to change. Tradition is important here, but it does not overwhelm reason."

"UVA's Southern hospitality fosters a cordial atmosphere; decorum definitely counts around here. Consequently, UVA looks conservative and homogeneous. However, there are plenty of left-of-center and unconventional students; they just aren't as outwardly defined as at many other schools. With organizations from the Honor Committee to the punk rock radio station, almost any undergrad can find like-minded friends."

"As a member of the Greek system, I recognize its problems: noise, an abundance of alcohol, and some 'old-boy' attitudes. However, I would encourage prospective students to consider UVA's reputation as a party school with rational caution rather than paranoia. First, the frats are geographically isolated. If you don't like them, don't go. Second, only about 35% of UVA's students are in the Greek system. Non-Greek organizations offer an extraordinary range of social activities and opportunities. Finally, even among Greeks, there is very little peer pressure to drink if you don't want to do so."

What Do You Like Best about UVA?

Reviewers appreciate the congenial atmosphere, diverse opportunities, and lovely campus. The historical context is also meaningful to many.

"Mostly, the fact that UVA is a friendly university. People—professors, students, head residents—are always ready to help. Profs are more than willing to work one-on-one with gifted students. In addition, the leadership skills I developed in my extracurriculars meant as much to me as the knowledge I gained in my classes."

"Like most college grads, I treasure the friends I made in college and the precious memories from those years: walking home in my stocking feet after a sorority formal, tailgate picnics, the semiannual Foxfield steeplechase, strolling the Lawn at night, the pervasive sense of history. On the practical side, I landed a job right out of school after an interview that consisted of my interviewer reminiscing about UVA."

"I spent my last year at UVA living on the Lawn, an honor given to outstanding fourth-year students. Living amidst the sense of history of that place was an experience I will always cherish. Jefferson was an incredibly talented man who had an extraordinary educational and architectural vision, and who made it a reality. UVA was founded on the basis of his ideals, and I think there really is a concerted effort to live up to those ideals. At the same time, we are all aware that he had inconsistencies in his life, as any complex person will. The Lawn was built by slaves, and their contribution to UVA's history must be recognized as well as Jefferson's."

What Do You Like Least about UVA?

Some found the weekend partying excessive.

"The Greekness, with the associated drinking, noise, litter, and moronic behavior. It's not that I don't enjoy a bit of that kind of fun, but there's just too much of it."

"UVA is an awfully easy place to become an alcoholic. Our student nickname, 'wahoo,' refers to a species of fish that can drink its own weight in water in a day. Some UVA wahoos try very hard to match that feat at keg parties."

University of Virginia

Charlottesville, VA 22906
(804) 982-3200

- 4-year coed state university.
- Campus in a small city in the foothills of the Appalachian mountains.
- Full-time undergraduate enrollment 1997–98: 5,736 men; 6,635 women.
- Special features: For more about the Echols Scholars Program, call (804) 924-3350 or see www.virginia.edu/~clas/echols/

"The strong sense of school pride can lead to a kind of smugness. 'Hoos can be a bit, well, pretentious about their school."

"The student body is only moderately multicultural. The average student is still white and comparatively conservative. You can, however, find any and every kind of person if you look."

Who Would Be Most Compatible with the Academic and Social Atmosphere at UVA?

"UVA's beautiful setting, exceptionally wide range of extracurricular activities, superior academic programs, nationally ranked athletic teams, and strong traditions of honor and self-governance give the school an enormously broad appeal. Students flock to Charlottesville for many reasons, but most appreciate the school's uncanny ability to engage simultaneously the heart, soul, and intellect."

"Someone confident and outgoing, who wants academic challenge and bright peers, but whose goal is to live a full life, in which academics are simply one facet. Wahoos relish all aspects of life: putting out a terrific newspaper, hiking the Appalachian Trail, and wild exploits with friends, as well as arguing over the exact nature of Petruchio and Kate's relationship."

"As a kid, I loved watching Animal House, and I wanted my college years to include that kind of crazy fun. But I also wanted an academically prestigious university. UVA was the perfect combination. Those who cherish political correctness may find some aspects of UVA a bit backward; there are few open gays, and football games are still coat-and-tie affairs."

If You Had It to Do Over Again, Would You Go to UVA?

Most reviewers are passionate about the place. All but one would gladly go there again.

"Without question. It's hard to adequately convey the depth of feeling most students have for the school, a truly remarkable place. UVA presented me with a delicious array of choices, and I created the best four years of my life."

"Absolutely. UVA gave me a chance to learn a lot, to grow socially, and to create a strong foundation for my career. My friends at work admire my strong (well, fervent) school pride, which I share with almost all UVA alums."

"Yes. If you ask me, UVA's lively mix of academics and socializing is a good preparation for the real world. And the tuition at a 'public Ivy' is hard to beat."

"No. I loved my friends and the beautiful Grounds, but the weekend partying was too rowdy for me. Prospective students should visit before deciding whether to come here."

As you try to find the college or university best suited to you, the views presented above may be helpful. Keep in mind that these students might have had similar positive or negative experiences had they attended a different school. At any college, it is important to seek out challenging academic experiences and to create a social life that fits your personal style. ■

Note: The students quoted in the College Review Series are expressing their own views, which are not necessarily those of JHU or IAAY.

THE COACH'S CORNER

by Chengde Feng

Mr. Feng teaches mathematics at the Oklahoma School of Science and Mathematics (OSSM) and has coached many students who have competed successfully in mathematics contests in China and the U.S. In this column, Mr. Feng offers Imagine *readers questions designed to improve their problem-solving skills.*

PROBLEMS

1. For real number k, given that the system of linear equations $\begin{cases} x + ky = 10 & (1) \\ kx - y = 10k + 2 & (2) \end{cases}$ has exactly three integer solutions $x_1 = m_1$, $y_1 = n_1$; $x_2 = m_2$, $y_2 = n_2$; and $x_3 = m_3$, $y_3 = n_3$ with $m_1 < m_2 < m_3$, find the value of $m_1n_1 + m_3n_3 - m_2n_2$. (Hint: Find the value of k first.)

2. Find all three-digit numbers $\overline{abc}$, with $a \neq b$ and $a \neq 0$, such that the average value of all the numbers obtained by arranging $\overline{abc}$ in six different ways is $\overline{abc}$.

3. Given that a, b, c are three distinct numbers with $a + b + c = 0$, find the value of $\dfrac{a^2}{2a^2 + bc} + \dfrac{b^2}{2b^2 + ac} + \dfrac{c^2}{2c^2 + ab}$ (*).

SOLUTIONS

1. (1) x k – (2): $(k^2 + 1)y = -2 \Rightarrow y = \dfrac{-2}{k^2 + 1}$ (3)

   (1) + (2) x k: $(1 + k^2)x = 10 + 10k^2 + 2k \Rightarrow x = \dfrac{10 + 10k^2 + 2k}{1 + k^2}$

   (3) $\Rightarrow$ y is an integer if and only if k = –1, 0, and 1
   If k = –1, then x = 9, y = –1. If k = 0, then x = 10, y = –2. If k = 1, then x = 11, y = –1.
   Therefore, $x_1 = m_1 = 9$, $y_1 = n_1 = -1$; $x_2 = m_2 = 10$, $y_2 = n_2 = -2$; $x_3 = m_3 = 11$, $y_3 = n_3 = -1$.
   Thus $m_1n_1 + m_3n_3 - m_2n_2 = -9 - 11 + 20 = 0$.

2. $\dfrac{\overline{abc} + \overline{acb} + \overline{bac} + \overline{bca} + \overline{cab} + \overline{cba}}{6} = \overline{abc}$

   $\Rightarrow \overline{abc} + \overline{acb} + \overline{bac} + \overline{bca} + \overline{cab} + \overline{cba} = 6\,\overline{abc}$

   $\Rightarrow 100a + 10b + c + 100a + 10c + b + 100b + 10a + c + 100b + 10c + a + 100c + 10a + b + 100c +$
   $10b + a = 6\,(100a + 10b + c)$

   $\Rightarrow 222(a + b + c) = 600a + 60b + 6c$

   $\Rightarrow 162b + 216c = 378a \Rightarrow 7a = 3b + 4c$ or $7(a - b) = 4(c - b)$

   $\Rightarrow$ either $a - b = 4$ and $c - b = 7$ for b = 0, 1, and 2, or $a - b = -4$ and $c - b = -7$ for 7, 8, and 9.
   $\Rightarrow$ There are six such numbers altogether. They are 407, 518, 629, 370, 481, and 592.

3. $\dfrac{a^2}{2a^2 + bc} = \dfrac{a^2}{2a^2 + b(-a - b)} = \dfrac{a^2}{2a^2 - ab - b^2} = \dfrac{a^2}{(a - b)(2a + b)} = \dfrac{a^2}{(a - b)(a - c)}$

   By symmetry, $\dfrac{b^2}{2b^2 + ac} = \dfrac{b^2}{(b - c)(b - a)}$ and $\dfrac{c^2}{2c^2 + ab} = \dfrac{c^2}{(c - a)(c - b)}$

   $\Rightarrow (*) = \dfrac{a^2}{(a - b)(a - c)} + \dfrac{b^2}{(b - c)(b - a)} + \dfrac{c^2}{(c - a)(c - b)} = -\dfrac{a^2(b - c) + b^2(c - a) + c^2(a - b)}{(a - b)(b - c)(c - a)}$

   $= -\dfrac{a^2(b - c) + bc(b - c) - a(b^2 - c^2)}{(a - b)(b - c)(c - a)} = -\dfrac{a^2 + bc - a(b + c)}{(a - b)(c - a)} = -\dfrac{a(a - b) - c(a - b)}{(a - b)(a - c)} = 1.$

CREATIVE MINDS

Imagine...

The Strangest Planet I Ever Heard Of

by Stacy Cowley

We get people from all corners of the universe in here, from little blue fuzzballs to rainbow-colored gaseous blobs and everything in between. The Boxly Roundabout is just around the corner from pretty much anywhere anyone would ever want to head to, and most everyone who heads through winds up at my place at some time or other.

I've been running Bill's All-Night Bar & Grill as long as anyone can remember. Official name aside, this bar is really just a good place to go for a decent meal and a conversation. Sounds nuts, but that's all most travelers really want. Intergalactic nature, I suppose. A man roams the width and breadth of the galaxy seeing the marvels of creation, and deep down inside all he's really looking for is something to eat and someone to talk to.

Like I said, we get all kinds in here, with all kinds of stories to tell. They all want to talk about who they are, where they've been, where they're heading, and mainly where they came from. Seems most galaxy wanderers get homesick sooner or later, and telling someone about their world is the next best thing to going back there.

I met one furry little critter who came from a planet that's nothing but a bunch of gases, and all the stuff on it just sorta floats around. There's another world I heard about where the ground is too hot to walk on, so everyone lives in the sky, like birds.

But by far the strangest planet I ever heard of is a little blue and white one tucked way out at the very edge of the Centauri sector. A tall tan-colored fellow who was in here about three years ago told me about it—swears he was born there. The strange thing about the planet is that it's almost like a whole little universe. It's got oceans as beautiful as those on Voomph and volcanoes as fiery as the ones on Nymth—both, on the same planet! The traveler claimed that there are rainforests like those in the Galen sector and deserts like the famous ones at the other end of the universe in the Rynak cluster. It has snow-capped mountains and canyons and huge cities and pyramids and exotic animals—a sampling of all the most spectacular sights in the universe and an infinite number of possibilities, all on *one planet.*

I've never heard of anything like it, but the man swore by Sinax that it was all true. I wondered aloud why the man would ever leave such a paradise. He just smiled and gave a vague answer about it taking him a long time to realize what was truly important.

The traveler wasn't sure exactly where the little blue-white planet was nowadays, but he gave me a rough set of coordinates before he left. I never saw him again, but I've often thought of him and his strange world. Who knows? Someday I may retire, take the coordinates he gave me, and wander around looking for that planet. It's probably just a fairy tale, but if not, well, we could all use a little time in paradise.

Stacy Cowley wrote this story when she was a sophomore in high school. She is now a sophomore at Barnard College, where she is majoring in Political Science/Political Economy. Stacy is still an active writer and plans to take a fiction class in the spring.

YOUR WRITING COULD BE ON THIS PAGE!

We welcome submissions of poetry, short stories, essays, book reviews, and puzzles.

Please write to *Imagine* • SET at IAAY • The Johns Hopkins University • Baltimore, MD 21218

MARK YOUR CALENDAR ...

with these registration deadlines for selected academic competitions. Inquire about competition format, dates, and fees.

DEADLINE	COMPETITION
January	**National Mythology Exam**—Schools register students in grades 7–9: American Classical League, Miami University, Oxford, OH 45056; (513) 529-7741, fax (513) 529-7742.
Spring and Fall	**Ralph Waldo Emerson Prize**—Students submit history essays to *The Concord Review;* authors of published essays are eligible for one of three $3,000 prizes; grades 9–12: Dr. William Fitzhugh, The Concord Review, P.O. Box 661, Concord, MA 01742; (800) 331-5007; www.tcr.org
Mid-February	**National Federation of Press Women High School Journalism Contest**—Individuals submit entries through state affiliates, grades 9–12; *some state deadlines may be earlier:* NFPW Headquarters Office, 4510 West 89th Street, Suite 110, Prairie Village, KS 66207; (800) 780-2715, fax (913) 341-6912; 71072.2356@compuserve.com
April 2	**Knowledge Master Open**—Schools enter one team each for middle, junior high, and high school divisions: Academic Hallmarks, Box 998, Durango, CO 81302; (800) 321-9218 or (970) 247-8738, fax (970) 247-0997.

DEADLINE	COMPETITION
April 8	**USA Computing Olympiad Competition Round**—Grades 9–12: Dr. Donald T. Piele, University of Wisconsin-Parkside, Kenosha, WI 53141; (414) 634-0868, piele@cs.uwp.edu; usaco.uwp.edu
May 1	**American Regions Math League (ARML)**—Teams register for national competitions held at Penn State and Universities of Iowa and Las Vegas; grades 7–12: Mark Saul, ARML President, 711 Amsterdam Avenue, New York, NY 10025; (212) 666-5188.
June	**USA Mathematical Talent Search (USAMTS)**—Individuals enter for 1998–99 school year (collaboration between the Consortium for Mathematics and Its Applications and the National Security Agency): Annette Moccia, COMAP, Inc., Suite 210, 57 Bedford Street, Lexington, MA 02173; (800) 772-6627 x29.

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F. Free distribution	785	785
G. Total distribution	7206	7439
H. Copies not distributed	705	705
I. Total	7911	8144

I certify that the statements made by me above are correct and complete.
Marie R. Hansen, Associate Director.

JANUARY

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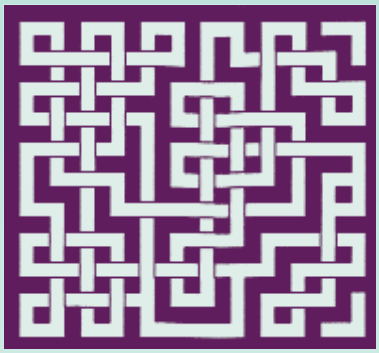


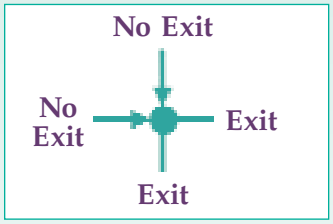
Knossos Games

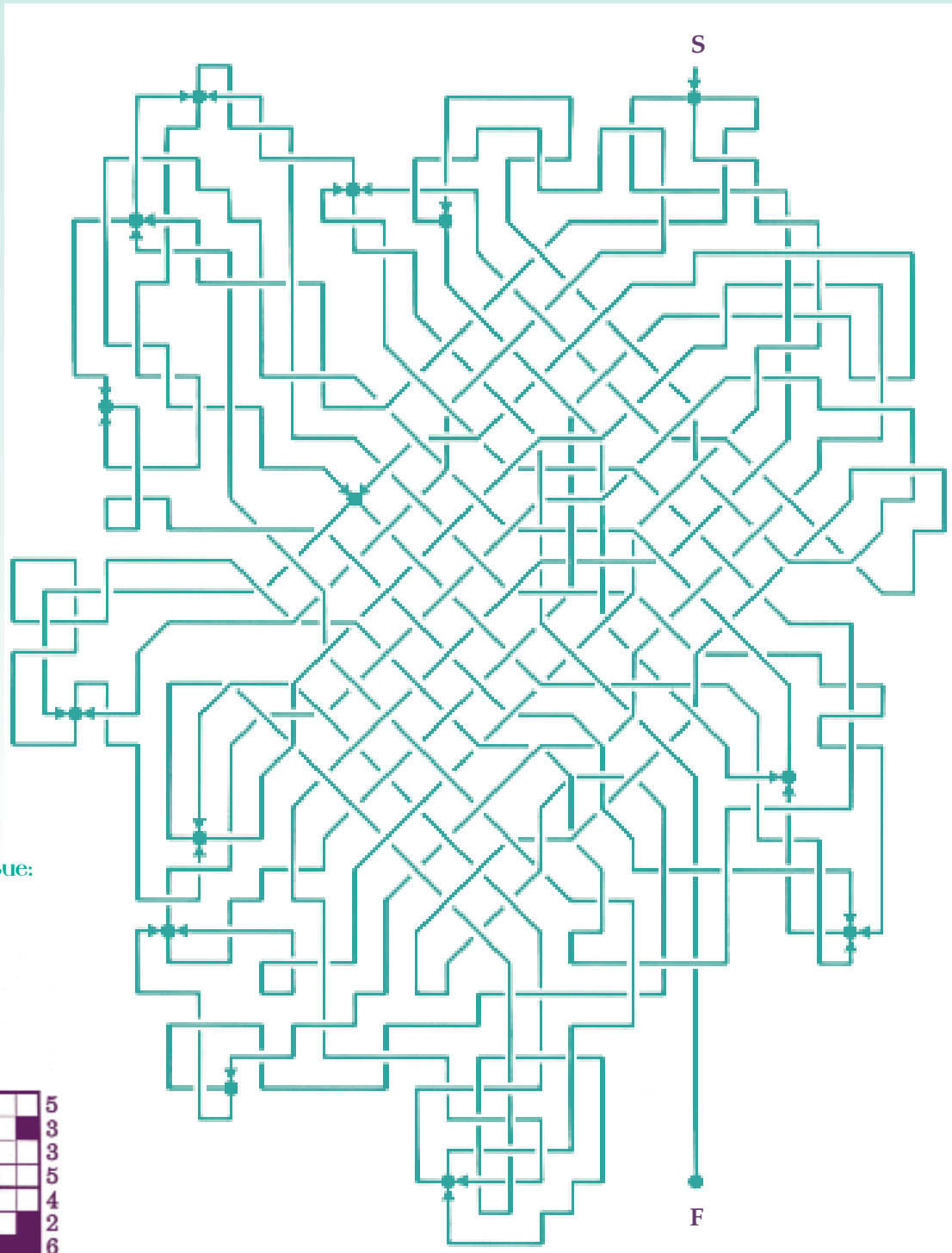
by Tim Boester

A fourth-year mathematics student at the University of Chicago, Tim Boester is fascinated by puzzles and mazes. He is currently applying to graduate school, where he plans to continue his mathematical pursuits.

The Goal:
Go from Start to Finish passing through as few nodes (circles) as possible.

The Rules:
You may enter a node by any path, but you cannot exit a node against the arrows (see example).





Solution to Knossos Games in our November/December issue: