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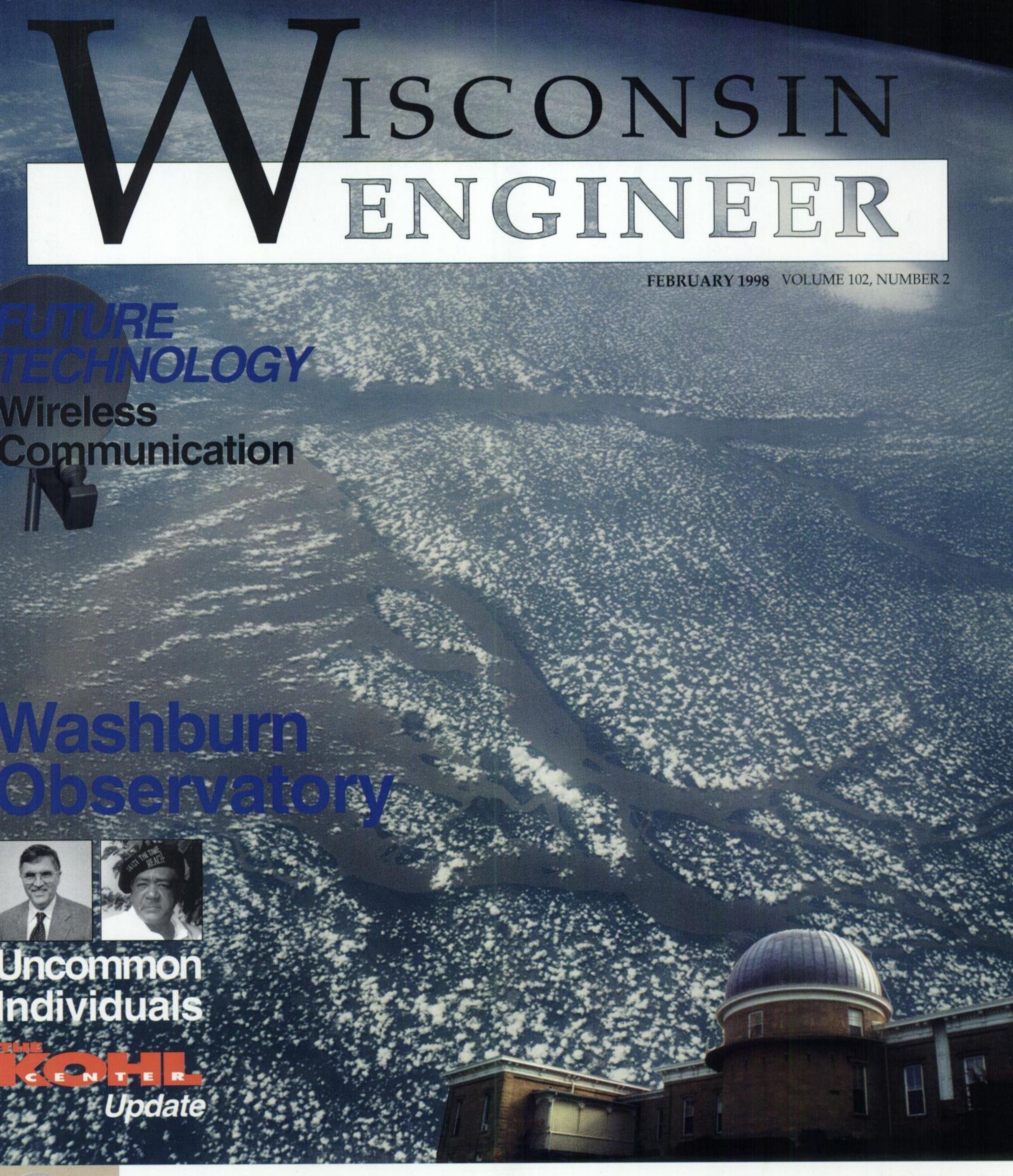
WISCONSIN ENGINEER

FEBRUARY 1998 VOLUME 102, NUMBER 2



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Wireless Communication

Washburn Observatory

Uncommon Individuals

THE KOHL CENTER Update

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Engineering Bobby

WWW.BOBBYSEALE.COM

Bobby Seale was a Black Panther, a political activist, perhaps a "gun-totin' radical", prefers to be thought of as a "revolutionary humanist," but most remarkable is that he is also an engineer. Seale was one of the co-founders of the Black Panther Party, which started in 1966 as a response to the death of Malcolm X. Seale was moved to get another grass roots organization going and dedicated himself to "...turning this backward racist world around: to make some human sense." Though he was influenced by Martin Luther King, Jr., Nelson Mandela and Malcolm X, he felt frustrated with their seemingly passive tactics for promoting social change. The Black Panthers advocated the right to self-defense, full employment, decent housing, true history education, an end to exploitation, free preventive medical health care, constitutional civil-human rights and fairness in the courts.

Through all of Seale's political activities such as the arrests, court cases and police observations, he has always been an engineer. He served as a structural mechanic in the U.S. Air Force, as an engineer for the Gemini Missle program and attended Merrit College as an engineering/design major. To this day you can find him eager to discuss his home computer and how he loves to use technology to educate people.

Seale's engineering mentality was evident even as a child when he would draft architectural plans. It has been Seale's engineering mind that has givien him such great success.

It was at Merrit College, while communicating with the college administration, that Seale met Huey Newton and started the groundwork for the Black Panther Party. When Bobby Seale spoke here on campus, he explained how they planned the activities of the party to achieve their goals. One example was of police observation in California. Picture a line of men and women dressed all in black, with black berets, each holding a rifle pointing straight in the air. No one spoke unless a police officer addressed them first, and only one person in this group spoke at a time. They were simply observers.

Seale and Newton researched and understood the law to the smallest detail to make all of their political actions completely legal. It was legal to have a rifle in your possession as long as it was not pointed at another person. Pointing a gun at a person would indicate the intent to harm and only then be a criminal act. They researched legal decisions and were able to find the proper distance to be an observer of police duties and not be interfering with police proceedings. They also waited until the police officer spoke to them, so that they would again just be observers. Dicipline, training and thoroughness was what allowed their party to be so effective. They were well read and prepared for their activities. This impressive preparation can be seen in that 95% of all their political courtroom cases were won.

In engineering class we are taught to assess situations and brainstorm all of the different possible outcomes before acting. It is part of the engineering code of ethics not to act with improper or insufficient knowledge. Bobby Seale, being an engineer, used similar methods to plan the activities of the Black Panthers.

It is the goal of all of the extra-curricular activities of the College of Engineering and the mark of an excellent engineer to be able to properly identify, examine and solve problems. Be it the TEC prize, the Schoof's Prize, or the urging of Dean John Bollinger, engineers are trained to see and solve problems.

We found it remarkable that the political activist was basically relying on his engineering background to create social change in an area where he believed problems existed. His were not typical engineering problems, but Seale used the typical engineering thought process to tackle social problems of the 1960's and continues to tackle issues today. In a sense, one could say that Bobby Seale engineered social change.

Gottlieb John Marmet — Jennifer J. Schultz

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HOST OF THE 1998 ENGINEERING COLLEGE MAGAZINES CONFERENCE

APRIL 23 THROUGH APRIL 26, 1998

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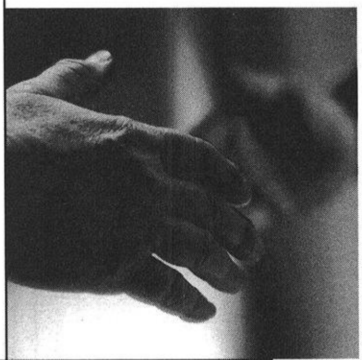
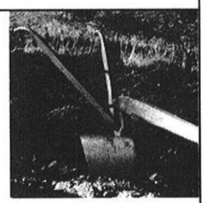




When we first reported on the engineering wonder called the Kohl Center last fall, we felt the same as many of you now have. The Kohl Center is a loud, wonderful, exciting building, filled with splendid facilities for athletes and fans. The construction and installation of the basketball and hockey facility is now complete.

The arena seats over 17,000 for basketball, close to 16,000 for hockey, and around 14,000 for concerts. As we reported, the Kohl Center is the first arena in the United States to feature a variable rise endline seating system. The 1000 seat system changes the seating pitch between hockey and basketball in six minutes. Only three hours are required to go from an afternoon basketball game to a Badger Hockey match. The Miami Heat have been only one of many groups to visit the state-of-the-art facility. The Australian Olympic Committee planning for basketball during the Games in Sydney in 2000 have even come.

With the Men's Basketball lockeroom showerheads set at 7'3" one might think that the Kohl Center Designers thought of everything. However, while they are proud to speak of restroom equality and access, the designers placed the womens basketball showerheads at a low 6'6". Not only is this a case of inequality, it may not serve the team well. The tallest member of the current Women's Basketball Team is 6'5" Center, Amy Wiersma, and who can refute that basketball players continue to grow larger.

A tax-free facility, the Kohl Center has taken no state funds. Over $40 million was donated from private sources, the remaining funds being in the form of bonds. The revenues from the events will cover overhead facility and labor costs, and pay off the bonds.

The quick construction time gave rise to better asthetics. Because the arena was completed in 21 months, labor and overhead construction costs were cut and the extra money was used for impressive floors and wall tiles.
The facility offers much more than Badger Basketball and Hockey. State High School tournaments will be held here as well as the NCAA Championship Volleyball Tournament in the end of 1998. Entertainment groups have also discovered the Kohl center. Aerosmith, Lord of the Dance and Discover Stars on Ice, will appear before the end of April. Even the Dalai Lama of Tibet, Tenzin Gyatso, may appear in the building in May.

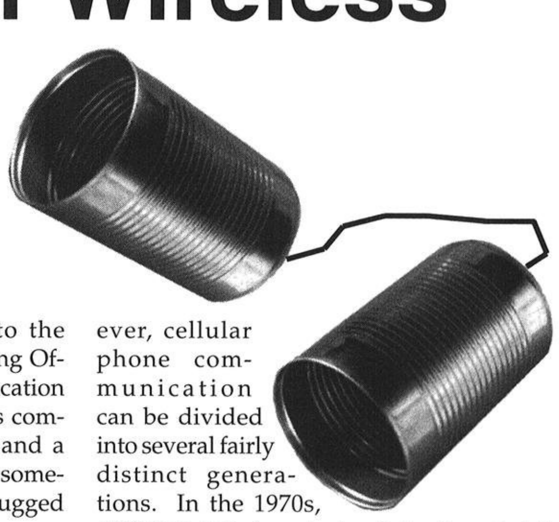
The Kohl Center may be considered a significant landmark in the resurgent Wisconsin Athletic Program. Nationally recognized Basketball, Hockey, Volleyball, Soccer, Football, Cross Country, Track and Crew all have facility improvements in the future. The Kohl Center has been acknowledged as a great recruiting tool by all three coaches who will use the Kohl Center. The Field House will be fitted with a volleyball floor, which will reduce the stress on the athletes jumping, landing, and diving during competitions. The soccer and track programs are looking towards permanent sense of place, with the installation of permanent bleachers. The football team continues to set its Big Ten and national sights high, enjoying the McClain Center to train year round in. Finally, after more than 15 Midwest Rowing Championships, and multiple national titles, the Men's and Women's Crew teams have a new facility planned to carry their success into the next century.

Field House traditions may have ended. Even graduation ceremonies will moved to the Kohl Center this Spring. But new traditions can be formed, excellence will still reign and UW-Madison will still be in the hearts of millions.

Compiled from: UW Athletic Department press releases and staff contributions.

Web sites of interest
http://www.wisc.edu/ath/kohl/
http://www.wisc.edu/ath/kohl/brochure.html
http://www.wisc.edu/ath/kohl/pictures.html
http://www.wisc.edu/news/thisweek/Events/Y98/jan/Kohl

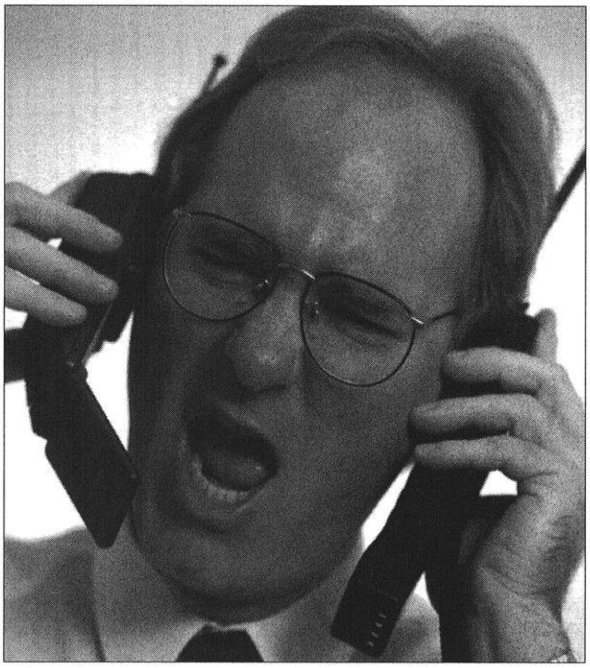
The Cutting Edge of Wireless Communication



By Aaron Volkening

Imagine using a portable phone to send and receive e-mail. Picture downloading the latest weather forecast and displaying it on a screen built into the phone, or receiving an important fax from the office as you are driving across that state. These capabilities, and many others, will soon be available to consumers as new mobile communication systems hit the marketplace. You've probably heard and seen the blitz of advertising for these new communication services, promising you the ability to communicate with anyone you want no matter where you are in the world. Have you ever wondered how these new communication systems actually work? Are you curious about what technology is available now, and what is coming in the future?

First, it is important to have a basic idea of how cellular communication networks work. As the name implies, a cell is a basic component of the system. A cell site, the focal point of a cell, receives and transmits communication from all the mobile units that are within the cell, such as car phones and handheld phones. Each cell site is connected via wires or microwave signals to the network's Mobile Telephone Switching Office (MTSO), which handles communication between cells. A MTSO also handles communication between a mobile unit and a "hard-wired" unit so that you can call someone on a car phone from the phone plugged into the jack in your room.



When a cellular customer makes a call, the mobile unit first sends a signal to the cell site. This first signal does not contain any of the actual voice message. Instead, it is purely data - the sender's phone number, the receiver's phone number and a unique numeric code used to prevent unauthorized calls charged to the user's account. This signal is sent on a control channel. When the cell site receives the signal, it sends a message back to the mobile unit telling it to switch to a different frequency. The voice communications will occur on this channel. Actually, two channels are involved in voice communications. The communication from the cell site to the mobile unit (forward connection) occurs at a different assigned frequency than the communication from the mobile unit to the cell site (reverse connection). Together, these two channels are called a channel pair. Once this channel pair is established, the actual voice communication can begin.

One obvious advantage of wireless cellular communication is the mobility it allows the user. The cell site can recognize when a mobile unit is about to leave the cell area and then searches for another cell site which will be closest to the mobile unit. These two cell sites communicate via the MTSO and perform a "handoff." The mobile unit receives a signal telling it to switch to a new frequency. As the user enters a new cell, it begins communicating with the new cell site on this frequency.

The above model can be used to describe a variety of cellular systems, both new and old. However, cellular phone communication can be divided into several fairly distinct generations. In the 1970s, AT&T Bell Laboratories introduced Advanced Mobile Phone Service (AMPS). AMPS became the first commercially available cellular system in the United States. It is a good example of a first generation cellular system.

AMPS relied on analog technology. Analog systems send voice or other signals as a steady stream in wave form. Meaningful information is transmitted by varying characteristics of the wave such as wavelength, amplitude and phase. Our current television and radio stations transmit their signals in an analog format. The Federal Communications Commission (FCC) licensed companies to use a portion of the electromagnetic spectrum around 800 MHz to implement cellular phone systems.

New digital phones allow you to receive e-mail, surf the Web and subscribe to services that offer stock quotes and sports scores

Analog technology dominated the cellular industry throughout the 1980s and into the 1990s. However, an increasingly mobile and fast paced world began to demand communications that the old analog systems were not equipped to handle. Thus, a second generation of cellular technology was developed. This generation is distinguished by the use of digital technology. Unlike analog technology, which transmits information as a continuous wave, digital technology breaks information into discrete bits (patterns of 1 and 0). The trend toward going digital has revolutionized the cellular industry.

continued on page 6

One big advantage of digital technology is the ease in which it transmits non-voice data digitally. Computers store and process information digitally in bits, and as computers pop up in more and more places, it becomes increasingly important to transmit these bits between computers. Digital communication can do this. New digital phones allow you to receive e-mail, surf the Web and subscribe to services that offer stock quotes and sports scores. In short, these phones speak the language of computers. Digital systems also offer better voice quality because background noise is filtered when the signal is transmitted digitally. Communication is also much more secure.

The latest development in cellular communication is the arrival of Personal Communication Services (PCS). PCS refers to new cellular networks that operate at frequencies around 1.9 Gigahertz. Formerly, this area of the radio spectrum had been used for police calls and other public purposes. However, starting in 1994, the FCC auctioned off this part of the spectrum to companies for the purposes of establishing new cellular networks. The federal government raised about $20 billion by selling licenses to use this spectrum in about 500 markets in the U.S. In the past year, the new PCS systems have started to become operational.

PCS systems offer many features that the old analog systems did not have. As mentioned previously, PCS can be used to send and receive e-mail, if the handset has the proper capabilities. PCS phones can communicate with a fax machine and send and receive short messages like a pager. Some PCS phones include an electronic organizer, with a calendar, address book, notepad and calculator. Even more, PCS systems generally do all this faster, cheaper and with less energy than older cellular systems.

What does the future hold? Most people in the wireless communications industry agree that digital systems such as PCS are the wave of the future. New satellite systems such as Iridium and Globalstar are being launched that will allow wireless communication from almost anywhere in the world. Phones will continue to add more features, yet will become smaller in size. As technology continues to advance, the capacity of cellular networks will continue to increase. It had better. A decade ago, only ten million people in the United States used wireless phones. Today, the number of users is up to 43 million. The opportunities for growth are even greater overseas. Many developing countries lack any kind of telephone infrastructure. Twenty years ago, governments would have pushed to link their cities and farms by a network of copper wires. Today, many countries are considering using cellular networks as the backbone of their communication system. No doubt about it, cellular phones are here to stay.

Author Bio: Aaron Volkening is a senior in civil engineering. He enjoyed learning about cellular phones, but couldn't analyze a circuit to save his life.

Be sure to look for more technology stories in upcoming issues

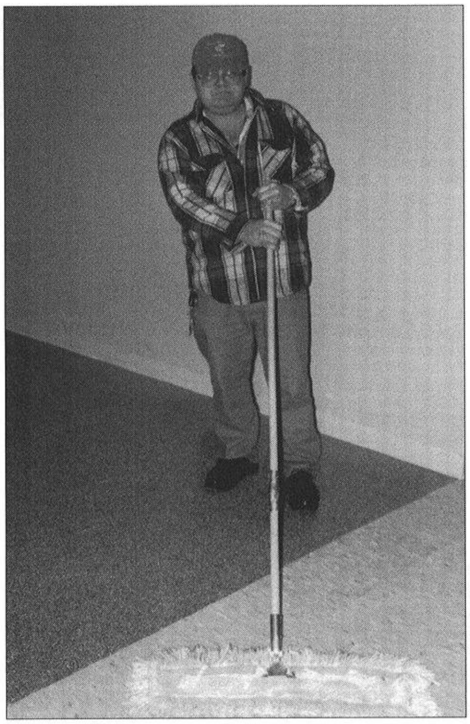
Late Night on Engineering Campus

By Trent Nelson

Hey you! Yes, the one with the squeaky Reeboks. Be quiet. You may actually get the engineers excited. Look how studious they are at their computers in the CAE; you wouldn't want to disturb them, would you? And don't be throwing that paper on the floor. The custodians don't want to be disturbed either. They've got their hands full keeping everything behind the scenes on the engineering campus running smoothly .

I arrived at the CAE building at about 12:17 A.M. The computer labs were fairly full, but so quiet you could hear the incessant pounding of the computer keys. Thus, I forged on to my next adventure.

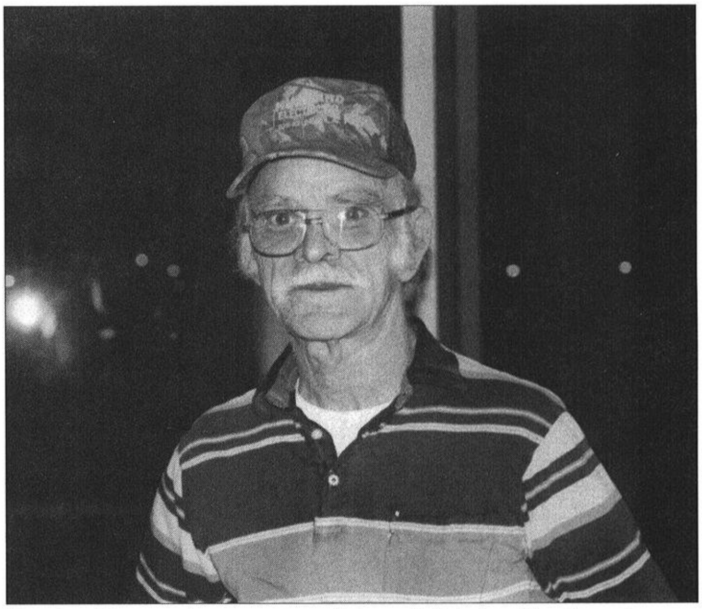
12:23 A.M. rolled around, and I found myself trying to get into Engineering Hall, but to no avail. I happened upon Rich, a fellow engineering student, trying to get in also. Rich told me he was trying to get in to see his teaching assistant for a particular class.



Source: Dorene Kent

George doing a bang up job.

What kind of teaching assistant holds his office hours at 12:23 in the morning? The last I saw of Rich and his Pizza Hut cap was both of them sprinting to head a janitor off at the door.



Source: Dorene Kent

Gordon Brown does a super job maintaining Engineering Hall's beauty.

After talking to Rich, I strolled over to the front of Engineering Hall and sat next to Gordon Brown. Gordon is a custodian at Engineering Hall who has been here for the last eighteen years. After retiring from his fifteen year career in the Air Force, Gordon drove trucks for several years before being employed at Engineering Hall. Gordon said that he and the other custodians work from 10:30 P.M. to 7:00 A.M. Sunday thru Thursday. Gordon enjoys his work, despite the odd hours. However, Gordon did make a good point about the unusual hours. "If I want to eat and keep driving my used car, I better work." According to Gordon, the most exciting thing that has happened at Engineering Hall was a fire alarm.

Engineering Hall is kept in really good shape. The kids respect the building quite a bit and that in turn makes my job easier

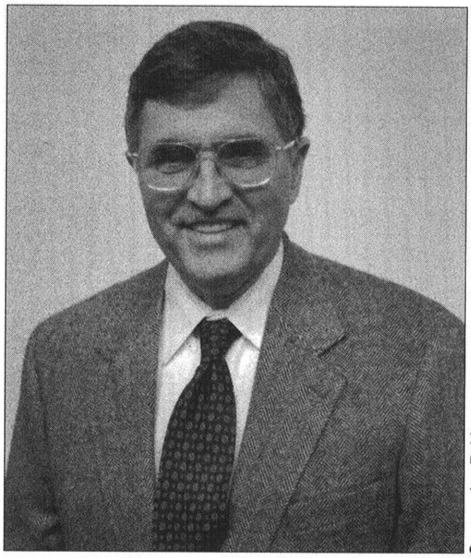
Mike, another custodian at Engineering Hall, keeps the basement of Engineering Hall in great shape. He has had a little more excitement in the basement then Gordon has in the rest of the building. It seems that the cockroaches in the basement get to be quite large, up to two inches in length.

At about this time, George, yet another custodian, came out for his cigarette break. He said something that surprised me. "Engineering Hall is kept in really good shape. The kids," George continued, "respect the building quite a bit and that in turn makes my job easier." He would like to thank the engineering students for their help.

They left me one by one, all going back to clean, repair and make sure everything was okay for the next day. I came looking for some exciting, funny anecdotes about late night on the campus, but what I found was people who make this place livable. It makes you realize you should step back and say "Hey, thanks guys." So if you are ever wandering around late at night near Engineering Hall or the CAE building say "Howdy," to Gordon and the others, but be careful not rouse the engineering students too much. God only knows what might happen.

Author Bio: Trent Nelson is an engineering mechanics major and enjoys playing golf in his free time.

A Truly Universal Professor-Harrison (Jack) H. Schmitt



Source: Joe Robinson

By Dan Peirpont

For most of us, it is not often that we walk into class and listen to a lecturer who is an astronaut, geologist and former U.S. Senator. However, in nuclear engineering 602, *Resources from Space*, this is the situation. Harrison H. Schmitt (Jack) is one of the co-teachers of this intriguing class. It is also not every day that you listen to a person with credentials as amazing as Jack Schmitt, for how many professors do you know who have been to the moon?

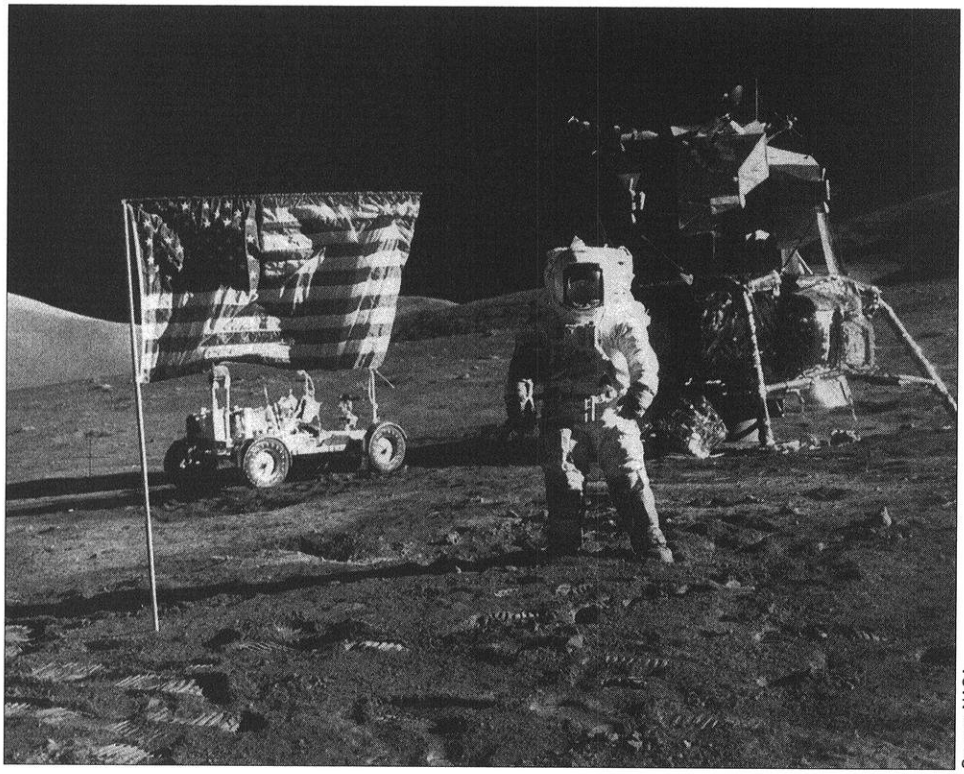
Jack's career started with his studies at Caltech and continued later in Oslo as a Fulbright Scholar. In 1964, he received a Ph.D. in geology from Harvard. In 1966, he became a pilot, receiving Air Force jet pilot wings, followed by Navy helicopter wings in 1967.

Perhaps his greatest accomplishment occurred when Jack represented not only his country, but all humankind as an Apollo astronaut. Jack, the only scientist on the Apollo 17 mission, is the last of 12 men to have set foot on the moon.

Jack's preparation for the Apollo mission began in 1965 when Jack was selected for the Scientist-Astronaut program. He worked in many areas of the Apollo program including hardware development and lunar exploration procedures. After serving as the back-up pilot for the Apollo 15 mission, he became the Lunar Module pilot and only scientist on the final mission, Apollo 17. When asked what it felt like to walk on the moon, Jack said he felt honored. "There were 450,000 people helping in the Apollo project. It was clearly important for the United States to lead humankind into space. The United States represents liberty and freedom, thus, we have a tremendous obligation to the human race."

Space travel is a subject that interests most of us, and few would consider it a low risk proposition. Fear is something that can easily creep into the picture for many people. When asked if he was ever afraid throughout the Apollo program Jack said, "Fear-none; excitement-plenty! Our lengthy training made us very confident so fear never really entered the picture." He emphasizes that, "Preparation is the best way to eliminate fear."

Schmitt continued his diverse career by entering politics in 1976. He served in the U.S. Senate from 1977 – 1982, representing his home state of New Mexico. During his time in the Senate, Schmitt served as Chairman of the Subcommittee on Science, Technology and Space and on the Appropriations Subcommittee on Labor, Health and Human Services and Education. He later served on the President's Foreign Intelligence Advisory Committee. In addition, while serving on the President's Commission on Ethics Law Reform he held numerous positions including: Co-Chairman of the International Observer Group for the 1992 Romanian elections, Vice Chairman of the U.S. delegation to the 1992 World Administrative Radio Conference and Chairman of the Technical Advisory Board for the U.S. Army Research Laboratory.



Source: NASA

Harrison H. Schmitt representing the nation and world on the moon in 1972. Schmitt, the only scientist on the Apollo 17 mission, is the last of 12 men to have walked on the moon.

With such an exciting past, one might wonder why Jack is now teaching college classes? In 1986, Jack was called as a consultant on the geology of lunar regolith by nuclear engineering professor George Kulcinski. After working for a few years together in research, Kulcinski and Schmitt decided to begin a class about resources from space. Nuclear engineering 602(*Resources from Space*), is one of the most unique classes offered at UW-Madison. Jack's main goal is to have students broaden their career and thought horizons to include space.

Obviously Jack feels strongly about continuing our space exploration, but not everyone shares that view. The use of taxpayer money to fund space expeditions is controversial. Jack thinks part of the solution to this problem of funding future space endeavors is through private enterprise. "The government will not sponsor the next major space program; the money will have to come from a private investor."

Looking into the past, we have not been on the moon since 1972. How long is it going to take to get man back to the moon, or beyond? According to Jack, it all depends on independent investment. As soon as someone puts forth money to cover some initial costs, the efforts can begin. Even though the overall cost is $10 – 15 billion, the startup to get another moon program on its feet is around five million. From the time when initial funding is received, Jack estimates that it would be ten years until actual space exploration begins again. So, realistically, if the initial 5 million dollars is invested in the program within five years from today, man will arrive on the moon again around the year 2015.

Why the forty year differential between trips to the moon? Jack attributes it to the Nixon and Johnson era. During this time the United States moved away from the space race and concentrated on war and domestic problems. There is a lack of perception about our role in space. Jack feels we need someone to lead the United States into the space frontier, much as Thomas Jefferson led pioneering into the Western frontier.

With role models like Jack Schmitt around, it is easy to envision a bright future. Through his teaching, Jack has emphasized that our generation must lead the United States and the world into the space frontier, for space holds the key to the future of all humankind.

Author Bio: Dan Peirpont is a senior majoring in Chemical Engineering.

Nuclear Engineering 602

This year's nuclear engineering 602 (*Resources from Space*) class honored Jack on December 8 for the 25 anniversary of his landing on the moon.

Are you looking for a enjoyable interesting class to take? Are you looking for an escape from your challenging engineering classes? Do you want to learn more about the universe and Space exploration? If any of these questions apply, check out Nuclear Engineering 602, *Resources from Space*. You don't have to worry about prerequisites because none are required. This intriguing class covers such topics as the history of the moon and Mars, energy resources, fusion technology, and space travel. A number of highly qualified professors teach the class, including: Harrison H. Schmitt (geologist and Apollo 17 astronaut), Gerald L. Kulcinski (nuclear engineering professor), John F. Santarius (nuclear engineering professor), Edward B. Churchwell (expert on the history of the universe), Howard E. Thompson (expert in finance), Philip E. Brown (geologist), and guests Michael D. Griffin and Nick Fuhrman.

Watch the timetable for the next time this class is offered. According to Schmitt, the class will likely be given again in **Fall of 1999.**

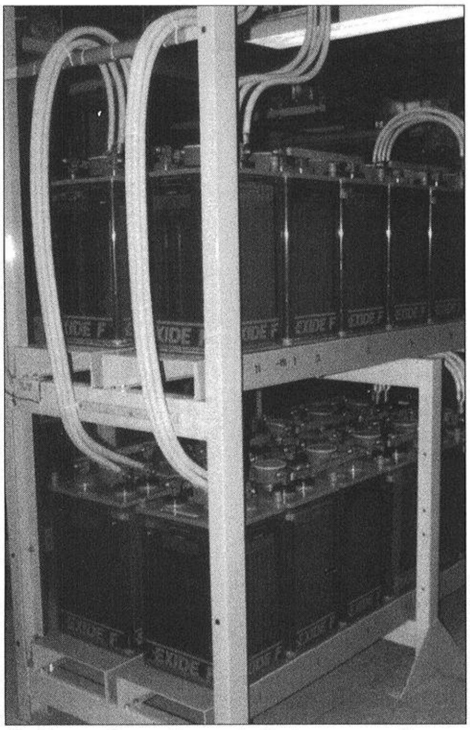
Photo courtesy of Joe Robinson

The Future of Communication Technologies

By Rob Nelson

We are at the dawn of a new age, an age of unfettered communications between all people, both visual and audible, and someday even touch, smell and taste. The topic of communications is very broad and very important. As a measure of its importance, try to imagine living without the telephone, email or the television. Going further, we can separate this subject into two main areas of interest: mass communications and personal communications.

Mass communications involves a large variety of forms, including television, newspapers, magazines, radio, film, CD, video and most uses of the Internet. By far, the fastest speed of communication is found in television, radio and the Internet, where electronics are heavily utilized. Recently, a lot of innovation has occurred in these high speed areas, such as HDTV, DVD and satellite broadcast to name a few. However, mass communications' main idea of entertaining masses of people with sounds and images has changed little.



Source: Dorene Kent

Cells such as these help to power the communication system.

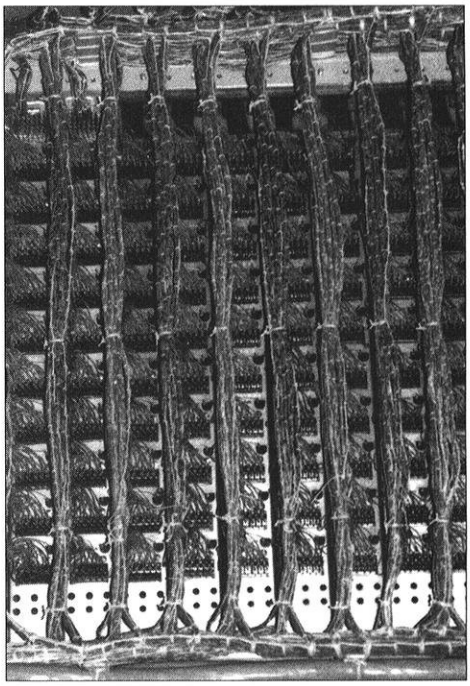
In contrast, personal communications involves fewer forms, including the telephone, fax and glacially slow Internet connections. However, because of high demand and new developments, this area will probably see the most innovation in the years ahead. We will see in our lifetimes much faster Internet connections, video conferencing and communications from anywhere in the world.

Our history is littered with many communication successes and some failures

To fully understand communications, it must be defined. To communicate we require signals. Signals are anything that varies in time or space, and since practically everything varies in time or space, everything is therefore a signal. However, one can not hear a person talking or read their body language from 1,000 miles away. This loss of information is proportional to distance and causes a problem. To solve the distance problem, we use electric signals, which lose information much slower. If one transmits the right signal, one can transmit the length of the universe.

Our history is littered with many communication successes and some failures. The first practical high speed/long distance device was the telegraph, which was digital in design, very much like our computers today. Later, analog devices were developed such as the telephone, radio and television that are still largely with us today.

The early development of the television is unique because, at first, two radically different prototypes were competing. One, from England, was mechanical with a large rotating disk. The other, from the United States, was fully electrical with no moving parts. The mechanical TV, at first, had better resolution and was faster. The electrical TV later caught up and became the standard because of its lower cost, its greater popularity with the masses and the mechanical TV's limited speed.



Source: Dorene Kent

Bundles and bundles of wires make up a bulk of the main telephone system.

In recent years, satellite, computer and communications companies have laid out plans for linking the earth together with large numbers of satellites. Each plan calls for using hundreds of low-earth-orbiting satellites, which require much less power than those in higher orbits. In addition, due to its low earth orbit, one satellite will not be able to stay in a single position in the sky very long, therefore hundreds of satellites are needed to assure that one will always be overhead. These plans were pipe dreams until the cost of launching each satellite fell to less than 25% of 1970s levels. Someday this cost may be as low as 1%. Many potential uses exist for these satellite systems, including global mobile phones, faxes, paging systems and high-speed data connections (10 Mbits/sec).

continued on page 12

Moving to the local level, the regional telephone companies are planning a major overhaul of their networks soon, where they will implement DSL (Digital Subscriber Lines) technologies. This change is being done in response to the growing use of the phone network for Internet use. Internet use has forced the telephone companies to add extra capacity to their lines because the average Internet call is around 45 minutes, versus the average voice call of only 3 minutes. In addition, the telephone companies are running scared, for fear that the cable companies, using high-speed data and phone technologies, may eradicate the telephone companies' monopoly in local phone service.

The DSL system has many inherent advantages. First, it will use the twisted pair wires popular today. Second, it will require adding only two modems, one at home and one at the telephone company (which can be shared), making DSL cost effective. Finally, because DSL will be sold in addition to regular phone service, it will be a potentially lucrative business. DSL is only in trial markets now, but next year it will be marketed across the nation for use in very fast Internet connections (1.5-8 MBits/sec) and video conferencing. Later, newer technologies (+13 MBits/sec) will be used to display movies and television programming.

Other new technologies are also in the works. Cable companies are already using cable modems to give high speed downloads, but uploads still use the slow phone system. The cable companies are also working on a plan to offer telephone service to counter the telephone companies' threat. Another technology, LMDS (local multi-point distribution system), is viable now that the government has auctioned off bandwidth (a range of frequencies set aside to avoid conflicting multiple transmitters) for this purpose. LMDS has a 1.3GHz bandwidth, which is over 200 times the bandwidth of a TV station, and a range of 25 miles, making it great for use in cities. Satellite technology also looks promising, although for now, like cable modems, it uses the slow phone system for uploads.

Understanding the technologies that will be used to increase the communications bandwidth, we now have to ask the question, "How will we use all this communications bandwidth?" One obvious use, video conferencing, will allow people to work further apart, families to be closer together and learning to take place anywhere. Because of video conferencing, an individual person will command more power then ever, regardless of location. Another potential use is linking all the computers on the Internet via high speed connections to form a virtual parallel processing supercomputer. This virtual supercomputer could be used to work on problems not possible with even the fastest supercomputer on earth. Lastly, older mass communications technologies, such as TV and movies, will increase in quality and quantity and may even become interactive with their audiences.
The future promises to be bright because of the massive increases in communication speed coming soon. Many technologies will vie to become the answer including DSL, satellite, cable modems and LMDS. These technologies will allow us to do many things both better and completely different than the way we do them today. Let's hope that this technology makes our world less complicated, instead of even more complex, but I pose the question: "What do you think the chances are of that happening?"

Author Bio: Rob Nelson is in his last semester of electrical engineering. He's also living in the shadow of his quest for a job and being both nervous and excited, and everything in between.

Lot 17 Ramp & Pharmacy Building

With hopes to alleviate some parking woes for football games and campus in general, the planning for building a parking ramp in lot 17 has been in the works for some time. The construction of the Engineering Centers Building on the end of the Engineering Campus will only begin once the ramp is complete.

Numerous community members have been consulted on the construction of the ramp, so that issues of construction noise, design, and traffic patterns could be addresses by those affected. The Ad Hoc Neighborhood Committee recently met and the the Traffic Impact Analysis was shared with local residents. The schedule of the Environmental Impact Analysis was also disclosed.

A new West Campus Development Committee has been formed to address similar issues in the construction of the Pharmacy Building. The path of Observatory Drive will be altered to accomodate the new building. The construction and rerouting of the road will affect the Village of Shorewood and the residents of University Bay Drive.

For more information, please contact:
Lamarr Billups, 608-263-5510,
billups@mail.bascom.wisc.edu,
500 Lincoln Dr. Madison, WI 53706.

The *Wisconsin Engineer* has quite a collection of resources on our web site. With past issues, intermittent news updates, college and campus links, job placement assistance, staff biographies, technical writing and production links and advice, and the homepage of the 1998 ECMA Conference, the web staff of the *Wisconsin Engineer* has just begun to showcase its talents.

This spring semester we are launching a new look, accompanied by more interactive pages, easier to use interfaces, better looking design, and much more information.

We have been able to concentrate more on the design of the site now that we can ouput directly into HTML from PageMaker 6.5. We are also offering complete PDF files, to be read with Adobe Reader 2.1, so that even at a distance, our web audience will be able to see what the hardcopy looks like.

To make this re-launch even more exciting, we are beginning the ***Wisconsin Engineer* Web Excellence Awards**. We will be searching the College of Engineering web pages, individual engineering student and faculty pages, and engineering student organization pages at first. Later we will spread the search to sites and pages across campus.

To make sure that we receive your recommendation for a *Wisconsin Engineer* Web Excellence Award, please see the award site to submit your suggestion or email John Marmet by midnight, February 15.
gjmarmet@students.wisc.edu
http://www.cae.wisc.edu/~wiscengr/award

Outstanding Seniors

The Outstanding Senior Award is given every semester by the Polygon Engineering Council. Awards are based on who has been involved, participated, and demonstrated leadership in anything the College of Engineering offers students. This includes societies, organizations, work experience, military experience, and many more.
The 1997 Fall Outstanding Senior are
Leon Baumann
Brian Dondlinger
Christopher Egle
Eric Iverson
Maura Jenkins
Luciano Oviedo
Matthew Vokoun

Photographer Apology

The Wisconsin Engineer inadvertantly neglected to credit photos from our November issue. We would like to extend a special thank you to Joe Robinson and Dorene Kent for the photos they submitted for the November issue. We appreciate your hard work.

News from COE Organizations

To announce your organization's events contact Kate Jehring at 262-3494 or email at cjehring@students.wisc.edu

American Institute of Chemical Engineers

AIChE is a student organization that is committed to giving undergraduate chemical engineering students the opportunity to learn more about chemical engineers in industry and to give them a chance to interact with other chemical engineering students. It also gives the students the chance to learn by competing in events such as Engineering Expo, the Rube Goldberg Competition, and the Reactor Design competition. Contact us at **aiche@cae.wisc.edu** or visit our web site at **www.cae.wisc.edu/~aiche**

Meetings that have been scheduled for Spring '98 are:

2/11 Monsanto
2/25 Bio Panel (Genentech, Amgen, Promega, Biotech Resources)
3/18 Dow

Pizza (free to members) is served at 6:00 with the meetings starting at 6:30 Locations TBA

Pi Tau Sigma

Pi Tau Sigma is an Honorary Mechanical Engineering Society whose objectives are to foster high ideals in the engineering profession, promote academic and professional development and encourage leadership and citizenship.

The top one-fourth of the junior and top one-third of the senior class in ME are invited to join Pi Tau Sigma. Members are reconized for their outstanding academic performance and achievements, and have the opportunity to develop leadership and communication skills. Activities include general meetings with speakers from industry, student/professor volleyball and cookout, plant trips and more. Pi Tau Sigma is also known for its Top Quality Tutoring Service that is free to everyone on campus. We provide help in all ME required courses which includes all underclassman Math, Chemistry and Physics courses. For more information, visit our website at **http://www.cae.wisc.edu/~pitau** or email us at **pitau@cae.wisc.edu**

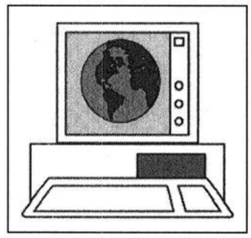
Pi Tau Sigma Spring 1998 Officer Team:

President - Jerome K. Lim **Vice President** - Vicki Bassett **Vice President** - Dave Hwang **Treasurer/Computer Chair** - Andy Wittman **Secretary** - Kevin Wenzel **Social Chair** - Kurt Kissinger **Fund Raising Chair** - Max Siker **Convention Chair** - Julie Marshaus **Polygon Rep** - Chris Egle **ASME Rep** - Chad Jansen **Faculty Advisor** - Professor Ken Ragland

Polygon Engineering Council

Are you interested in getting CREDIT to talk with industry recruiters from across the nation, and build your resume in the process? Polygon Engineering Student Council is taking applications for the position of Career Connections Co-Chair. These two people will be responsible for planning and organizing Career Connection 1998. This position comes with the option of receiving 3 elective credits for your work. If you want to virtually guarantee yourself a job when you graduate, or even a co-op position, the contacts you will develop while heading Career Connection 1998 will make it happen. Applications are available in the Engineering Career Services office or contact Eric Wobig (phone 284-8879 or email at ecwobig@students.wisc.edu) or Andrew Kroll (phone 238-0902 or email at ahkroll@students.wisc.edu) with questions.

Engineers for Environment and Technology



EET is a collection of individuals involved in addressing the future. It is the role of our organization to help collect resources and disseminate knowledge.

EET will be having another panel discussion pertaining to sustainable development or the impact of the Kyoto Agreement on engineering technology. There will also be interesting talks given by individuals in industry and faculty throughout the year. One speaker of note will be a Monsanto representative.

We have developed several internship contacts and are planning on having a role in the Federation of Environmental Technologists 13th Annual Conference: Environment '98. The conference is March 2-4, 1998, at the Milwaukee Hilton.

Please see our web page for our latest information as well as an extensive group of online resources ranging from environmental technology, sustainable development, remediation, and local and national environmental organizations. For more info on our meetings and to see our resources, point your browser to **www.cae.wisc.edu/~eet**

American Nuclear Society

The American Nuclear Society provides students within the university community a means for professional development, contributes toward the development of nuclear science and technology at UW-Madison through activity with other branches and with the Society, and serves as a focal point within the university community for interchange of information in the area of nuclear science and technology.

We hold monthly meetings with speakers on various topics. We speak to local schools and organizations about nuclear science and technology as well as conduct tours of our nuclear reactor facility. We also organize trips to conferences and nuclear related facilities such as recent visits to Fermilab and Byron nuclear power plant. Our Engineering Expo '97 display included samples of irradiated food and a model of one of the latest nuclear power plant designs.

Our next scheduled meeting is this Tuesday, Frebruary 3 in 106 ERB at 7 pm. For more information visit our web page at **ans.neep.wisc.edu/~ans/** or email us at **ans@ans.neep.wisc.edu** or call at 265-3992.

Dreams Can Come True

www.datagration.com

By Kristin Shuda

Many of us have had the dream since we were very young to someday own our own business and be our own boss. A group of students at UW-Madison have a different idea - why wait? The group just recently spun off of the Virtual Cooperative Program, offered by the College of Engineering, to become a limited liability company in the State of Wisconsin. This company is called Datagration.

It all began a little over two years ago when David Overbo, Jason Bell, Francisco Gonzales and Peter Bell wanted to start an internet technology group, not necessarily for profit. They explored many options and finally decided they wanted to create an on-line directory for students. However, their troubles always came back to the question of money. How would they fund their project? With all their talent and ambition, they were nothing without the funding to get the project started. They consulted Dean John G. Bollinger and Assistant Dean Lawerence Casper of the College of Engineering, who encouraged them to prepare a proposal. Their pursuit for funding and support lasted approximately four months, during which time they presented their ideas at meetings and spoke to many people about getting started. Everyone tried to punch holes in their project, but the group stuck it out.

Datagration eventually became the first student run group in the Virtual Cooperative Program, so the company had a learn-as-you-go type of approach. Through this program they were given funding, advising and support on how to create a business. One of the program's rules is that oncea company starts making a profit, it has to separate from the program. The group of four students worked on the project for four months as part of the Virtual Cooperative Program. In August 1996, they decided to expand their team and added Jonas Zahn, Travis Fiertag and Aaron Berken. At this point, they decided to evaluate who they were and what they wanted to do.

In February 1997, the group reinvented itself and decided to focus on databases. All spring and summer the group worked on projects. Finally, in September 1997 the team realized the talent they possessed and spun out of the Virtual Cooperative Program to become a limited liability company in the State of Wisconsin.

What exactly is Datagration? Datagration is a company based on the internet, intranet and extranet industries. It is committed to utilizing web technologies to engineer solutions custom-designed for their customer's needs. Datagration focuses on the construction industry which operates within a 1-3% margin. Therefore, anything this company can do to save the customer money is desirable.

Datagration's portfolio project is Career Expert, an on-line resume database. The idea behind this project is to have a place where people can put their resume on the web for employers to view. The project was initiated in the spring of 1996 and construction bdÌ-Áan in May 1997. The project is not targeted at making money, but rather at gaining experience for future projects.

The company also has a few other projects in the making with industrial firms. They operate on a first come first serve basis, yet manage to work on multiple projects at once. As the number of projects increases, so will the staff size. Datagration plans to make use of UW-Madison's resources by hiring students to write programs and help in the creation of many databases.

Many of us have had the same dream as the founders of Datagration, but we have not motivated ourselves to follow through with them. After all, how many failures can a person endure before they give up? When asked why they created Datagration, Jonas Zahn replied, "I don't see a reason why not to. If I work hard now and am successful, great. But if the company fails, at least I'll still have succeeded, and I'll have something to talk about in a job interview." A few other key phrases mentioned by the members of Datagration on how to succeed in creating a business were communication, teamwork, concentration on your ideas and strategy, persistence and execution.

The Datagration team also attributes its success and learning to the resources UW-Madison has provided them. Dave Overbo comments on the unique environment the university has created for entrepreneurs. "The administration has a deep understanding of what young entrepreneurs need to succeed. I feel fortunate to attend one of the top universities for entrepreneur development."

Datagration has entered a new contest UW-Madison started last fall called the Tec Prize. The goal of the Tec Prize is to encourage students in engineering, business and science to work together and prepare a business plan. Prizes range from $10,000 for first place to $1,000 for fourth place, and the first competition will be held in April 1998. Not only does the university offer programs and competitions, but they also offer support and technology.

The dream of starting your own business is definitely familiar to many people. Whether you are a student or someone who has been in industry for many years, remember it is never too late, nor is it ever too early. All you need is a little self motivation and the will to succeed. Good luck in all your future endeavors!

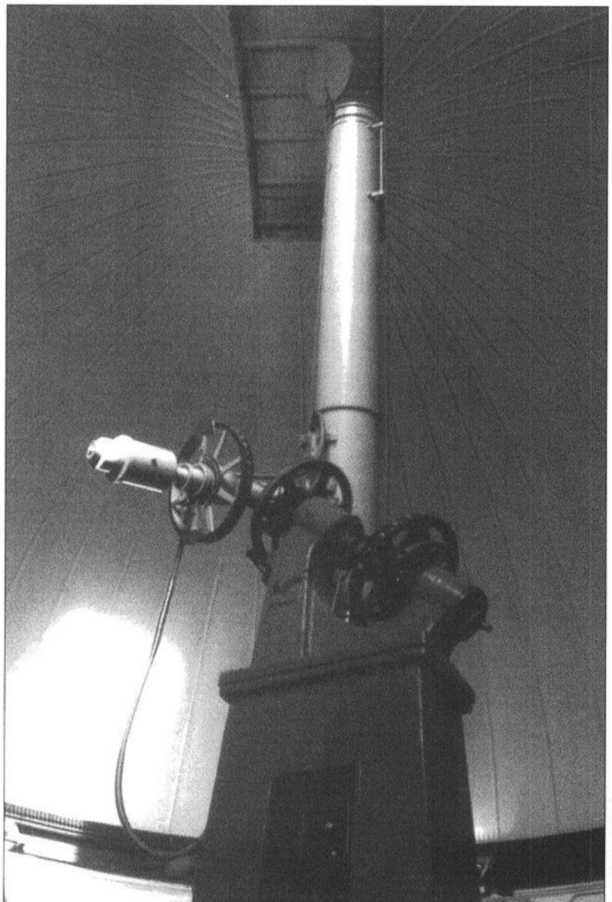
Author Bio: Kristin Shuda is determined to someday own her own business. She would like to work as an industrial engineer in industry for a few years first. After that she hopes to open her own business, and if it is engineering related, she will call it Square Peg, Round Hole Engineering.

The Washburn Observatory: 120 years of Heralded History

By Heather Wagner

Did you ever cover the ceiling of your bedroom with glow-in-the-dark stars? Did you ever enjoy a clear summer night out in the country gazing up at the sky with a thousand questions in your mind? Did you ever make a "coffee can galaxy" by placing a candle inside a coffee can full of tiny punched holes? If so, you may be due for a trip to UW-Madison's Washburn Observatory. Although it is currently used primarily by the public during open houses and by students in the introductory astronomy courses, many people may not know that the Washburn Observatory has been on campus for 120 years and was actually a major research facility for much of that time. In its 120 years, Washburn has been home to several famous astronomers, and it has a history rich with fascinating contributions to the field of astronomy.

In 1876, former Wisconsin Governor Cadwallader C. Washburn allocated a sum of $3000 per year over three years for the creation of an observatory for the University of Wisconsin. At the time, $3000 represented one seventh of the University's state-funded budget! On September 18, 1877, UW President John Bascom announced that he intended to meet all provisions and provide a fully equipped observatory, including a telescope which was to be larger than the 15-inch Harvard refractor telescope. In May 1878, construction of the telescope began. With a 15.6 inch aperture, the Washburn telescope was renowned as the United State's third largest refractor of its time.



Source: David Rolintzky

Even after 120 years, the 15.6 inch refractor telescope is able to amaze its viewers with spectacular images of stars and galaxies.

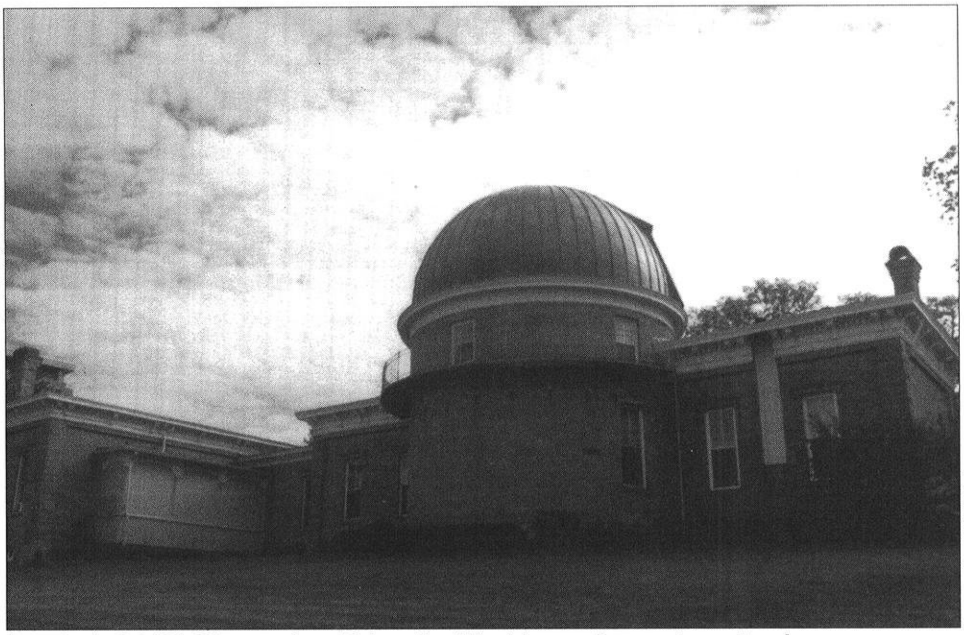
Due to his international reputation for the discovery of 22 minor planets and for his book *Theoretical Astronomy* , the active and prominent James C. Watson became the first director of the Washburn Observatory. Watson supervised the completion of the original structure, started work on the east wing and with his own money, began construction of both the Students' Observatory and the Solar Observatory. The Students' Observatory contained a small transit instrument and a 6 inch refractor used for instruction, enabling the 15 inch refractor to be used for research. The Solar Observatory was intended for observations of the intra-Mercurial planets. Unfortunately, Watson died early at the age of 42 in November 1880, and did not see the completion of these projects. Edward Holden became Watson's successor.

By the spring of 1881, the 15 inch refractor was ready for use, and Holden, along with Burnham and G.C. Comstock, began the Washburn Observatory Publications. Their observations were primarily micrometer measurements of double stars. They also included catalogs of nebulae and red stars and observations and drawings of the comet of 1881. At this time, the Observatory became available on the first and third Wednesdays of each month to anyone interested in viewing celestial objects. This practice has been maintained to this day.

The Observatory was fully equipped in 1884 and set on a course of research it was to follow for the next 40 years. In addition to the 15 and 6 inch telescopes, the Observatory acquired an excellent 5 inch meridian circle and placed it in the west wing of the main building. Three accurate pendulum clocks were also maintained: one for sidereal time, the other two for standard time. The Observatory set local time in Madison by controlling various clocks in the city, including one at the State Supreme Court, the Western Union office, the Park Hotel and the Wisconsin State Journal. It also set the clock in the University President's office which controlled bells signaling the beginning and end of class periods. In addition, the Observatory earned several hundred dollars a year by selling time to the Wisconsin railroads.

The Washburn telescope was renowned as the United State's third largest refractor

Holden left Wisconsin in 1885 to become the President of the University of California. For a little more than a year after Holden's departure, John E. Davis, the physics pro-


Source: David Rolintzky

Located at 1401 Observatory Drive, the Washburn observatory stands as a testament to the history of University fo Wisconsin - Madison.

fessor whose enthusiastic research in electromagnetism led to the establishment of the University's magnetic observatory, took charge of the Observatory.

In August of 1887, G.C. Comstock, then at Ohio State, returned to Madison as Associate Director of Washburn, and he was soon named Director. As the third Director of the Observatory, Comstock held this office longer than anyone else. His astronomical work focused on precise visual position observations, a tradition begun by Holden. His first research, an accurate determination of the constant of aberration and an associated investigation of atmospheric refraction, quickly brought him to the attention of his peers. Throughout his long career he also measured visual binary stars which were an early hint of the concept of giant and dwarf stars. Comstock was also prominent in the professional activities of his day. He was involved in the founding of the American Astronomical Society (AAS) in 1897 and served AAS for ten years as its first secretary and for one year as its President in 1925. He was also chairman of the AAS committee formed to coordinate the observations of Halley's comet in 1910. In 1899, Comstock became the first Wisconsin faculty member to be elected to the National Academy of Sciences. Five years later, he was appointed the first Dean of Wisconsin's Graduate School, a position he held for 16 years.

After Comstock, Professor Joel Stebbins left the University of Illinois to become the fourth Director of Washburn Observatory in 1922. Stebbins had been trying to develop electrical means of detecting starlight. When Stebbins came to Wisconsin with his photocells, the Observatory passed immediately from the 300-year-old era of visual astronomy to that of the new techniques of photoelectric astronomy. The use of the photocells, along with A.E. Whitford's success in constructing the first workable DC amplifier suitable for astronomical use, simplified work at the telescope and made it possible to attack an extremely wide range of problems. Stebbins and Huffer (who was awarded the first Wisconsin Ph.D. in astronomy and remained as a faculty member) were able to use this system to derive fundamental data concerning the sizes, brightness and masses of stars. Another highlight of Stebbin's contributions was his determination in 1932 of the currently accepted size of our galaxy. Stebbin's result was that the sun is about 30,000 light-years from the center of the Milky Way galaxy and the outer edge of this galaxy is about 50,000 light years from the center.

Another notable achievement of Washburn Astronomers came in the 1940s when they showed that interstellar dust, oriented in various directions in space, dimmed light of different wavelengths in a way which departed systematically from earlier results. In this work the Wisconsin astronomers used the six color photometry system, which measured the brightness of objects in six wavelength bands spaced from the violet to the near-infrared. They devised this system for use on galaxies as a means of determining the velocity of recession of distant galaxies by measuring their colors over a wide spectral region. This color system was the forerunner of modern photometric systems.

In 1948, Stebbins retired as Director of Washburn Observatory. More than any other astronomer, he was associated with the development of photoelectric astronomy. He began with primitive instruments able to detect only the moon and ended with photoelectric measurements of faint galaxies. The achievements of his long and remarkably successful career were rec-

continued on page 18


Source: David Rolintzky

Chris Conselice of the UW - Madison Department of Astronomy explains the complexity of operating such an old telescope, while author Heather Wagner looks on.

ognized by his colleagues electiing him to the National Academy of Sciences in 1920. He was also elected President of the American Astronomical Society in 1940, and in 1941, he was recipient of the Bruce Medal of the Astronomical Society of the Pacific. A.E. Whitford then succeeded Stebbins as Director of Washburn.

For the first 70 years of its existence, Washburn had remained a separate entity within the University. In 1948, however, it became part of the College of Letters and Science and by 1958, offered greatly expanded opportunities for advanced study in astronomy. Throughout the University's early years, most juniors and seniors took nearly a year of astronomy. By the turn of the century, several courses were offered—general astronomy, celestial mechanics, practical astronomy, and astrophysics. At the time, total enrollment in these courses was about 35. By the mid-thirties, astronomy enrollments had increased to about 100, and by 1942, to more than 200. In 1950, the first graduate courses in astronomy were listed in the UW catalog.

By 1942, astronomical research on Observatory Hill became more difficult due to more lights, smoke and dust caused by the rapidly growing city of Madison and University of Wisconsin. A larger, modern telescope at a better location was needed. In the mid-fifties, the Wisconsin Alumni Research Foundation agreed to provide $200,000 for the construction of a new observatory at a dark sky site near the village of Pine Bluff, about 15 miles west of Madison. Along with its 36 inch mirror, the new observatory was dedicated on June 30, 1958. Thus, when Whitford went to California later in that same year, he left behind an observatory well provided in research equipment and academic course offerings for advanced training in astronomy.

A.D. Code, Whitford's successor as Director, was no stranger to Wisconsin, since he served on the Washburn staff in 1951-53. On his return to Madison from California, Code was accompanied by D.E. Osterbrook, his Caltech colleague. Code and Osterbrook established what became the two primary strands of research at Washburn over the next twenty years—ultraviolet astronomy from space vehicles and the study of the properties of interstellar matter. Observational studies of interstellar matter at Wisconsin then expanded into the ultraviolet spectral region, x-ray region and finally, in the 1970s, into the radio region of the spectrum. With the help of the Orbiting Astronomical Observatory, the astronomers at Washburn were able to observe about 1000 objects including planets, comets, a great variety of stars, star clusters and galaxies. The enormous amount of new data obtained continued to yield useful results. Among these results was the discovery that comets are surrounded by huge hydrogen halos. Their data have been used to investigate the physical properties of interstellar dust and to map the distribution of hydrogen near the sun.

Although UV astronomy and studies of interstellar medium have become major activities of the Observatory, Washburn astronomers have pursued a wide variety of other astrophysical interests including observational studies of comets, planets and the zodiacal light, as well as photometric measurements of the continua and spectral lines of stars of almost every type. Theoretical work here has addressed problems in a broad range of fields including stellar interiors, the transfer of radiation in gaseous nebulae and in stars, stellar winds, the shapes of spectra lines in a variety of situations and studies of large telescope systems.

As the number of staff and graduate students increased in the 1960s and new activities developed, the administrative demands on the director became increasingly time consuming. Consequently, it was decided that upon Code's resignation as Director in 1969, this position would henceforth be rotated among staff.

Since the dedication of the Pine Bluff Observatory, the Washburn Observatory has been used as a teaching aid to the introductory astronomy classes and for public viewing open house nights. We recognize 120 years of contributions to astronomy by the astronomers of the Washburn Observatory. So the next time you are gazing up at the stars on a clear summer night, with a thousand questions in your mind, think of the Washburn Observatory and the many contributions made by its observers in their pursuit to find answers to those thousands of questions.

ASTRONOMY GLOSSARY

Compiled with the help of Chris Conselice - UW-Madison Department of Astronomy

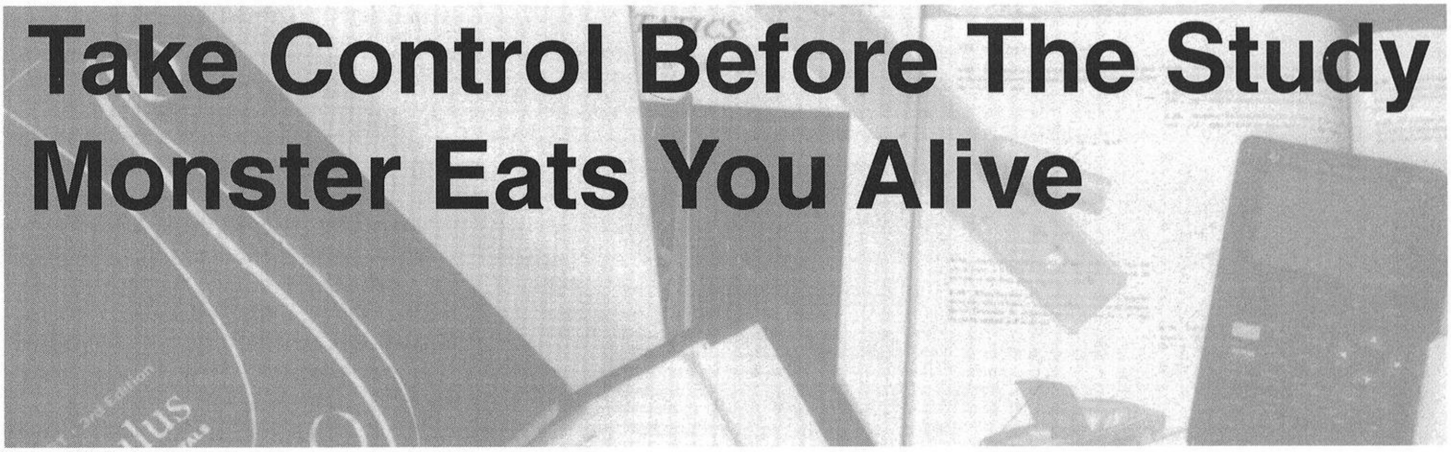
Double Stars: two stars that appear to be orbiting each other
Nebulae: something in the sky that looks like diffused light; most likely a distant star cluster, galaxy, or ionized gas
Red Star: stars that look red because they are older
Meridian Circle: instrument used to find exact locations of stars; usually mounted on its own stand; a meridian is an imaginary line drawn from the south pole to the north pole
Sidereal Time: time measured from the stars; usually we use solar time (measured by the sun)
Constant of Aberration: the amount that stars appear to move, due to the earth's motion
Atmospheric Refraction: the bending of light due to the earth's atmosphere
Binary Stars: two stars that are orbiting each other
Giant Stars: older stars that are done fusing hydrogen and who's outer atmospheres have expanded
Dwarf Stars: young stars that are still fusing hydrogen in their core
Interstellar Dust: dust in space
Velocity of Recession: how fast a star is moving relative to where the observer is on earth
Interstellar Matter: anything that is in space; mainly dust, and gases
Hydrogen Halos: spherical halo of hydrogen that surrounds a star
Zodiacal Light: sunlight that is reflected off dust in the solar system
Photometric Measurements: measuring the brightness of an object
Continua and Spectral Lines of Stars: breaking up the light into different wavelengths and observing the spectrums at those wavelengths to measure their brightness
Stellar Interiors: the inside of a star

Article taken in large part from "A History of the Washburn Observatory" by Bob Bless May 1978.

Author Bio: Heather Wagner is a senior in mechanical engineering and the technical communications certificate program.

OPEN HOUSE HOURS
The host will decide when to close the observatory based on weather and interest.

January to March- 7:30 PM 1st and 3rd Wednesdays **April to May**- 9:00 PM 1st and 3rd Wednesdays **June to August**- 9:00 PM Every Wednesday **September and October**- 9:00 PM 1st and 3rd Wednesdays **November and December**- 7:30 PM 1st and 3rd Wednesdays For more information check out the Washburn webpage www.astro.wisc.edu/~dolan/Washburn

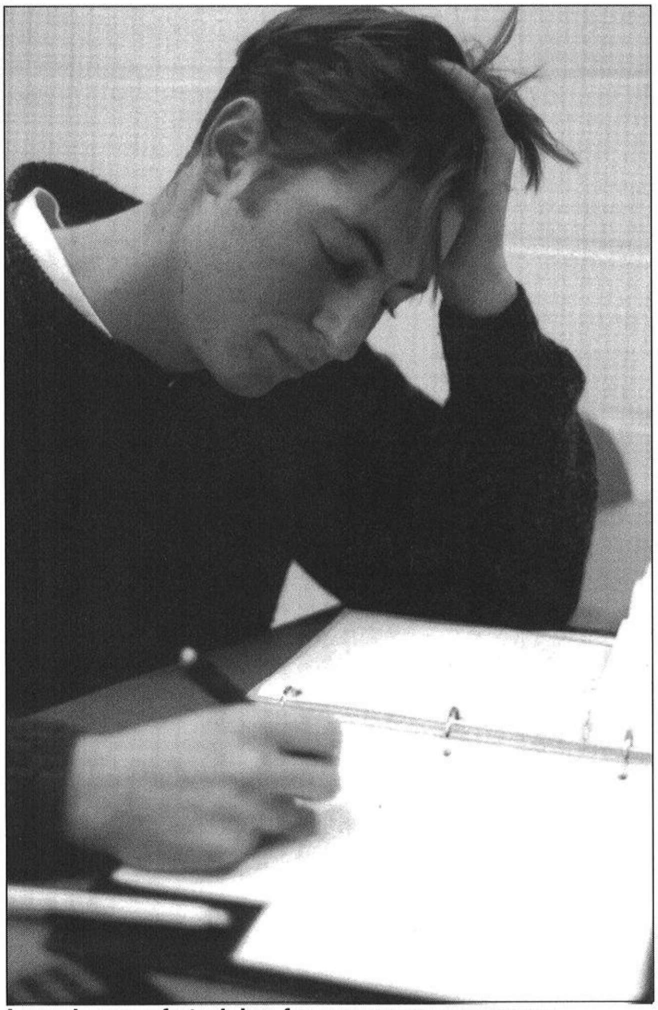


Take Control Before The Study Monster Eats You Alive

By Shana Gadlin

Up! up! my Friend, and quit your books;
Or surely you'll grow double:
Up! up! my Friend, and clear your looks;
Why all this toil and trouble?
-Wordsworth

Dizzy, mass confusion swirling like a tornado around your head. Numbers, calculations, equations, vectors, circuits, cash flows, programs . . . Has school work taken over your life?



Source: Joe Robinson

Long hours of studying for exams causes many students to feel stressed out and frustrated.

Have you experienced this chaotic, mind boggling tug of war? Do you feel like there is no meaning in your life? Are you so self-absorbed and overwhelmed with school work that you've forgotten about the world outside of engineering? Take control! Reduce your hectic academic schedule and partake in the rewarding experience of volunteering. Bring back a healthy mental balance and discover the true meaning in life you have been searching for. What's the use of overloading your classes if they drive you to insanity and possibly cause you to drop out of engineering? Through volunteer work, you can benefit from devoting a small amount of time to helping others. You will make a difference in the world and boost your self esteem at the same time. In effect, your mind will feel clearer, your difficult classes won't seem so painful, and you will be more likely stick with engineering and earn your degree.

Engineering students are faced with school pressures every day. For many engineers, performing well in school becomes a strongly driven goal. For other engineers, 'A' grades become an unhealthy obsession. Crossing the fine line from just wanting good grades to a fanatic craze of only accepting good grades can be dangerous. Unfortunately, this risky crossing occurs too often and plunges some engineering students into the deep ends of thrashing, out of control waters. The uncompromising study monster gets loose and causes many bright and capable engineering students to drop out of engineering completely.

When engineering students get swallowed by a life filled with constant studying, their surrounding world becomes foreign and they begin to lose the perspective of life as a whole. Although frequent studying is required to survive this arduous field of engineering, students should not base their self worth and self confidence on their exam grades.

Engineering classes are extremely strenuous on the brain. Learning to cope with these tough classes is part of the engineering experience. Obviously, if a student is in the engineering program, he or she has the brains to succeed. The next step is believing in this ability and figuring out how to balance studying with the rest of life. Of course, the option of counseling is highly recommended when students need assistance with this difficult balance. However, another notable option to help soothe the troubled soul is volunteering.

Learning to cope with tough classes is part of the engineering experience

Volunteering is a great way to feel good about yourself and help others feel good at the same time. Branching out into the "real world" can also give engineering students a broader view of life. By helping others, engineering students can improve the world we live in as well as boost their own self-confidence. Engineering students are bright individuals with special talents. By volunteering, they can share their special abilities and help make a difference in this world at the same time. In effect, life would become more than just a world of studying and the

continued on page 20


Source: Joe Robinson

Even in the icy cold weather of winter many adults and children still live on the street.

feelings of failure from troublesome classes would be counterbalanced by rewarding feelings of bettering the society we live in.

Have you taken a walk down State Street recently? The weather is bitter cold, and many adults and children are still living on the streets. Old, torn winter coats wrapped around their shivering bodies are their prized possessions. Many of them have no money, no family to turn to, no place to call their own and no hope for their future. On the other hand, here we are; well educated engineering students with food to eat, warm apartments and houses to sleep in, money to spend and a successful future filled with our hopes and dreams. Is it too much to ask to give up a little of our time to help others succeed? Isn't teamwork what engineering is all about?

If you want to volunteer and don't know where to start, the UW-Madison Volunteer Center is located at Union South, Room 303. Stop by or call them at (608)263-6825. They will help try to match your interests with the volunteer opportunities available.

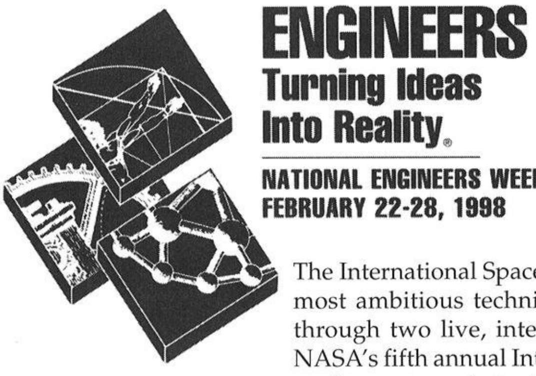
Another great opportunity for volunteering is at a homeless shelter. Grace Episcopal Church on Capital Square serves dinners at 8 p.m. everyday, and they will always welcome a pair of helping hands. Many students also choose to volunteer at hospitals, crisis center programs, special education programs, tutoring programs, museums and environmental programs. For example, you could be a mentor for a young child or teenager, help care for the elderly, counsel people in need over the phone and spend time with children who are undergoing long term treatment at the hospital. Volunteering can even be as simple as donating blood or participating in a walk for charity. You can decide how involved you want to get. Volunteering has limitless possibilities. The hardest part is deciding what would interest you. Volunteers are always needed. If you feel like there's not enough time to look for a volunteer opportunity on your own, check with the engineering clubs and societies you belong to. Social action among clubs has significantly increased over the years on the engineering campus.

Don't allow the world to become so narrow that you forget one of the most important human qualities, helping others. Through volunteer work, engineering students can share their talents and gain a better perspective of how to balance school work and the rest of life. Take a step back and look at the whole picture. Don't let the study monster eat you alive!

Author Bio: Shana Gadlin writes this article with personal experience in stressing out. She is living proof that volunteer work is chicken soup for the soul.

E-Week Activities at the COE

National Engineers Week was founded in 1951 by the National Society of Professional Engineers to increase public awareness and appreciation of the engineering profession and of technology. Thousands of engineers, engineering students, teachers, and leaders in government and business participate each year. The 1998 National Engineers Week (February 22-28) co-chairs are the Construction Specifications Institute and Phillips Petroleum.



http://www.eweek.org

The International Space Station represents one of the most ambitious technical projects in history. Now, through two live, interactive satellite programs — NASA's fifth annual International Space Station Teleconferences — students and professionals will have an opportunity to speak directly with astronauts, scientists, researchers and engineers as they discuss plans for the International Space Station (ISS).

On February 26, the National Engineers Week Committee and National Building Museum in Washington, D.C. , will unveil an exhibition of creative breakthroughs in engineering while focusing on the people and processes behind them.

As of press time, The Institute for Industrial Engineers had a tentative plan to have three seminars in 159 Mechanical Engineering at noon on Monday, Tuesday and Thursday. Topics covered may include human factors, operations/decision sciences, manufacturing and quality control. Wendt Library has also planned to continue their triva question of the day contest, with prizes awarded for whomever answers the most questions correctly.

Polygon Engineering Student Council has the following events planned for E-Week as well:
Monday - Egg Drop
Tuesday - Organizational fair, Comedy Sports at night
Wednesday - Free pizza at noon
Thursday - Snow sculpture contest (tentative)
Friday - *New* Casino Night

Presidential Welcome

Warm greetings to all those celebrating National Engineers Week, 1998.

The efforts of engineers are vital to building a competitive and prosperous America. As we approach the 21st century, we recognize more than ever the many contributions engineers make to our quality of life. Turning ideas into reality, our engineers provide us with the research, innovation, and technological achievements that help keep America strong and growing.

I commend the organizers, volunteers, and supporters of National Engineers Week for using this time to educate our nation about the importance of engineering. Through hands-on activities and scientific demonstrations across the country, you are sharing your love of engineering and encouraging thousands of young Americans to pursue careers in this exciting field. With your continued commitment to excellence, we can look forward to unprecedented prosperity and achievement for generations to come.

President, *William Jefferson Clinton*

Giving Education Value

by Gottlieb John Marmet

Late last semester I attended an evening meeting at the Memorial Union introducing a program called Teach for America. What I later discovered was a passionless engineering education, horrible differences in how we equate our values with what we believe is proper compensation, and a fresh look at the enormous problems facing future generations.

Teach for America is an organization which places women and men in schools around the country. All of the individuals who are in the Teach for America program WWW.TEACHFORAMERICA.ORG come from non-traditional education backgrounds. They are science, engineering, history, sociology or business majors, to name a few. They are not graduates of any education college. The program takes these somewhat altruistic people and gives them brief lessons in modern teaching methods and practices and sends them on their way. The men and women are given equal starting pay similar to any other entry teacher, the only stipulation being that they work toward their teaching certificate while in practice. The program lasts two years, and while some are not able to withstand the personal, academic, social, and economic pressures, those that do praise the program and speak of the great impact that it had upon their lives.

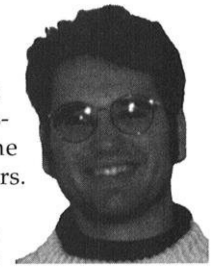
Teach for America places people in situations where they may be the only one of their race. They often find that they are placed in communities which are far from economically privileged as their own home towns. Teaching itself can be a difficult prospect under the best circumstances. These teachers struggle with unknown environments, sometimes physical attacks, and the stresses that accompany practicing a profession which you know little about.

We... value engineering training much more than the training for people who help engineers be what they are. This is clearly a case where the mentor has less status than the student

The one thing that stood out for me, besides the great challenges, was the reminder of how little teachers are valued in this country. The starting salaries for primary and secondary teachers in entry level teaching positions, range from as low as $15,000 up to $27,000 in some areas. Compare this with the average annual starting salary of $38,684, for new engineering graduates.

During several encounters with fellow engineers, I found that none were willing to go through the rigors of engineering course work for as little as $15,000. Most said that it simply was not worth the tremendous effort expended. Perhaps engineering is a passionless profession. Certainly there may be a difference in academic standards and training for engineers and teachers, and salaries can reflect this difference, but who can argue that without effective teachers our country could not continue its great experiment of democracy, stamp out racism, solve homelessness, hunger and disease.

The over $10,000 difference in salary points to a large problem. We have come to value engineering training much more than the training for people who help engineers be what they are. This is clearly a case where the mentor has less status than the student. I don't claim that engineering is the only profession which has a higher entry salary than that of educators. However, engineering is one profession that requires intense training. It is with the assistance of secondary school educators that engineering students begin to set themselves on a track of rigorous mathematics and science study. Within the last few years, it has also become evident that the best engineers are those who can effectively communicate. Most of this type of knowledge is gained during secondary school, since few engineers have the time or inclination to study communication while completing their bachelors degree work. It would seem that engineers could especially appreciate the need for valuing teachers.



It was Erasmus who said, "The main hope of a nation lies in the proper education of its youth." This view is echoed many times by politicians, community groups, environmental activists, and educators alike. It is in the future that hope exists.

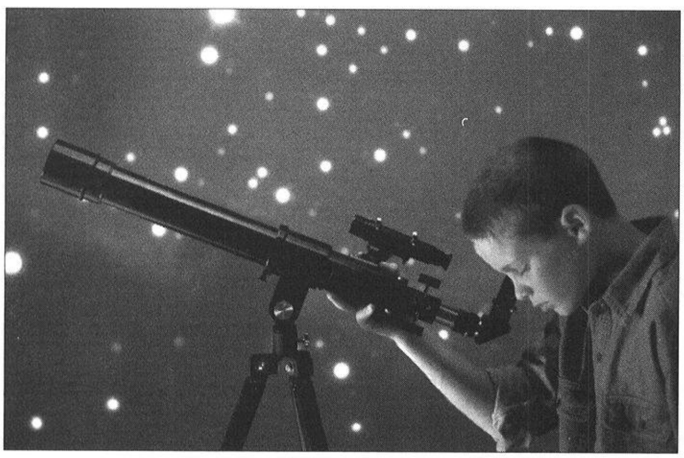
We cannot simply refuse the salaries that we are given as engineers, nor do I think such an act would serve anyone. However, we should support those individuals who helped us along the path we have chosen and give our children better opportunities for knowledge and understanding than were afforded to us. We can all learn more about the difficulties that teachers face. We can all become aware that it is often the most dire circumstances where educators are valued the least. We can raise the standards of education and press for the end of social double talk and give teachers their due.

Just One More

KIDS ON SCIENCE

The beguiling ideas about science quoted here were gleaned from essays, exams, and class room discussions. Most were from 5th and 6th graders. They illustrate Mark Twain's contention that the, "most interesting information comes from children, for they tell all they know and then stop."

1. A vibration is a motion that cannot make up its mind which way it wants to go.
2. Genetics explain why you look like your father and if you don't why you should.
3. Vacuums are nothings. We only mention them to let them know we know they're there.
4. Some oxygen molecules help fires burn while others help make water, so sometimes it's brother against brother.
5. We say the cause of perfume disappearing is evaporation. Evaporation gets blamed for a lot of things people forget to put the top on.
6. To most people solutions mean finding the answers. But to chemists solutions are things that are still all mixed up.
7. In looking at a drop of water under a microscope, we find there are twice as many H's as O's.
8. Clouds are high flying fogs.
9. I am not sure how clouds get formed. But the clouds know how to do it, and that is the important thing.
10. Clouds just keep circling the earth around and around. And around. There is not much else to do.
11. Water vapor gets together in a cloud. When it is big enough to be called a drop, it does.
12. Humidity is the experience of looking for air and finding water.
13. We keep track of the humidity in the air so we won't drown when we breathe.
14. Rain is often known as soft water, oppositely known as hail.
15. Rain is saved up in cloud banks.
16. Question: What is one horsepower? Answer: One horsepower is the amount of energy it takes to drag a horse 500 feet in one second.
17. You can listen to thunder after lightening and tell how close you came to getting hit. If you don't hear it you got hit, so never mind.
18. Talc is found on rocks and on babies.
19. The law of gravity says no fair jumping up without coming back down.
20. When they broke open molecules, they found they were only stuffed with atoms. But when they broke open atoms, they found them stuffed with explosions.
21. When people run around and around in circles we say they are crazy. When planets do it we say they are orbiting.
22. Rainbows are just to look at, not to really understand.
23. While the earth seems to be knowingly keeping its distance from the sun, it is really only centrificating.
24. Someday we may discover how to make magnets that can point in any direction.
25. South America has cold summers and hot winters, but somehow they still manage.
26. Most books now say our sun is a star. But it still knows how to change back into a sun in the daytime.
27. Water freezes at 32 degrees and boils at 212 degrees. There are180 degrees between freezing and boiling because there are 180 degrees between north and south.
28. There are 26 vitamins in all, but some of the letters are yet to be discovered. Finding them all means living forever.
29. There is a tremendous weight pushing down on the center of the Earth because of so much population stomping around up there these days.
30. Lime is a green-tasting rock.
31. Many dead animals in the past changed to fossils while others preferred to be oil.
32. Some people can tell what time it is by looking at the sun. But I have never been able to make out the numbers.
33. In some rocks you can find the fossil footprints of fishes.
34. Cyanide is so poisonous that one drop of it on a dog's tongue will kill the strongest man.
35. A blizzard is when it snows sideways.
36. A hurricane is a breeze of a bigly size.
37. A monsoon is a French gentleman.
38. Thunder is a rich source of loudness.
39. Isotherms and isobars are even more important than their names sound.
40. It is so hot in some places that the people there have to live in other places.
41. The wind is like the air, only pushier.



Suggested by Heather Wagner

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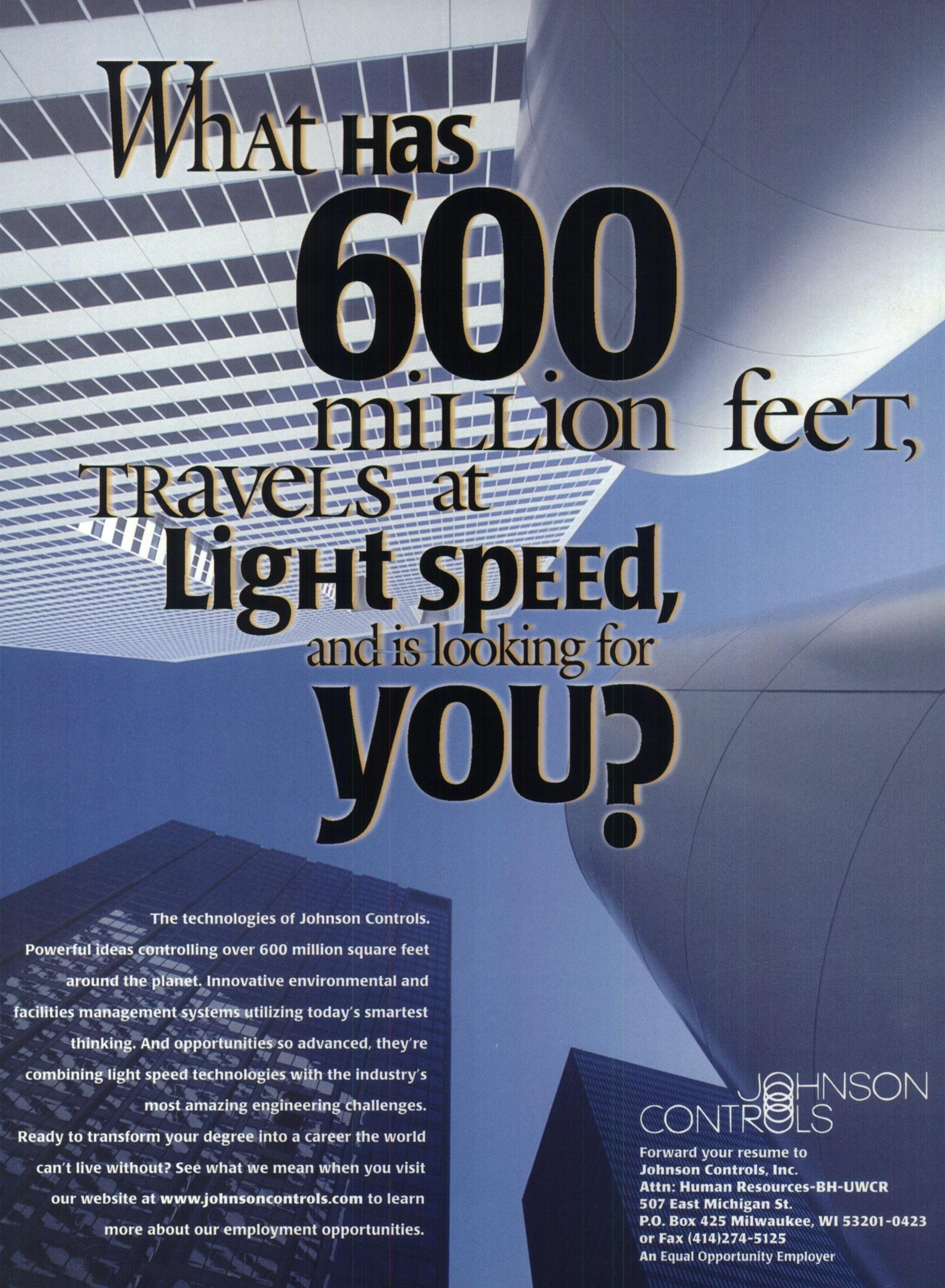
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