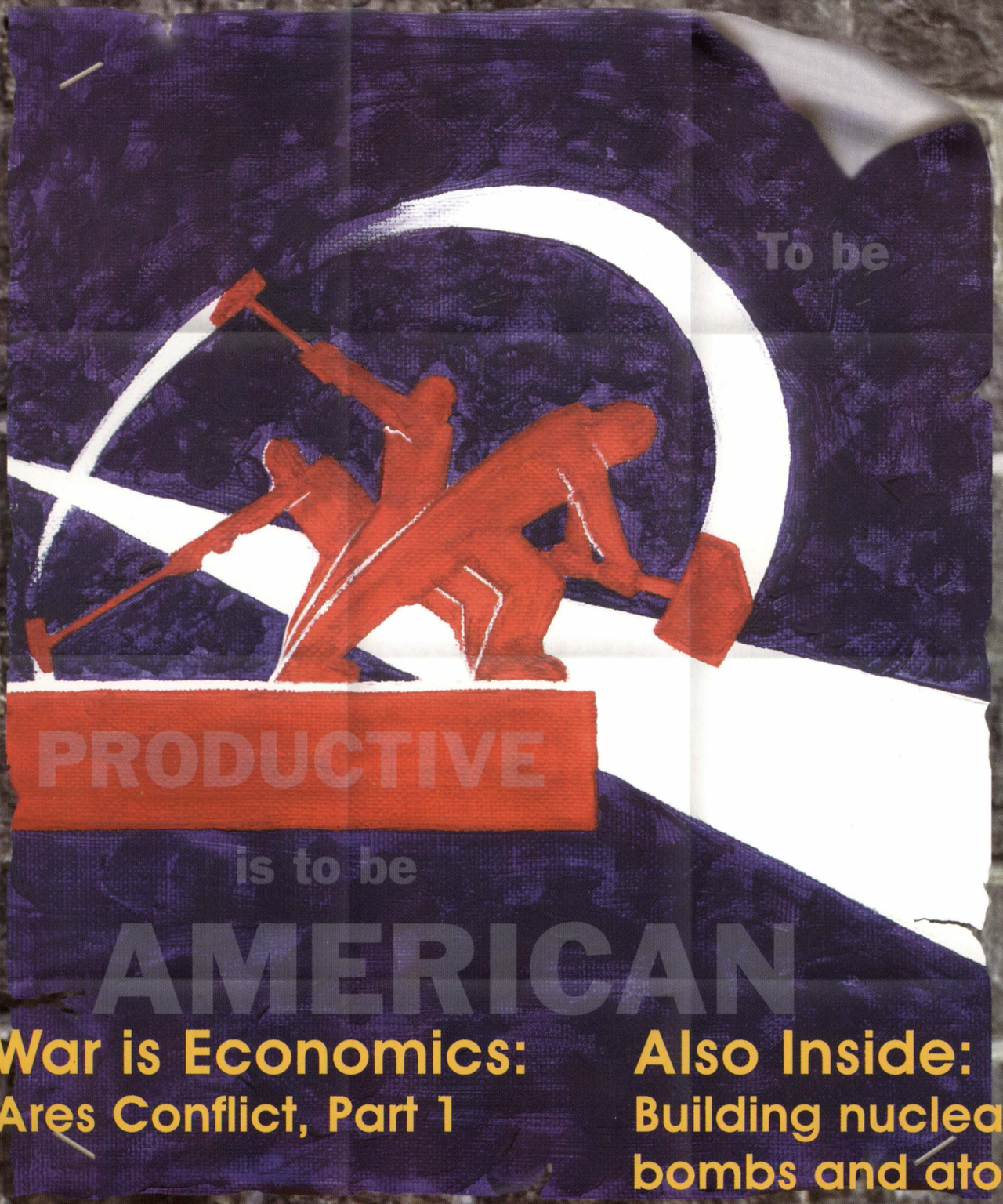
ENGINEERS' FORUM

VOLUME 17 • NO 4 DECEMBER • 1998



All War is Economics:
The Ares Conflict, Part 1

Also Inside:
Building nuclear bombs and atomic homeruns, but at what cost?

The Forum: Where and When

Ever wonder how often the Forum comes out or where you can get one? Here are your answers.

When

Early
- February
- April
- September
- December

Comments? Concerns? (Gulp!)
Criticism? Care to join? Email
forum@vt.edu.

Where

McBryde 100 Lobby
Randolph Lobby
Norris Breezeway
Owens Dining Hall
Schultz Dining Hall
Dietrick Dining Hall
Newman Library Lobby
Whittemore 2nd floor, by EE advising
Burruss Breezeway
Hancock Atrium
Patton Lobby
Johnston Student Center 2nd Floor

The Student Engineering Magazine of Virginia Tech

ENGINEERS' FORUM

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contents

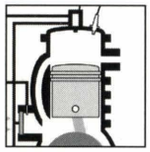
sports

2

dollars for distance:

the engineering of baseball bats

Alloys, double walls, and pressurized nitrogen come to the aid of today's homerun hitters. by Tom Catherwood



technology

4

the stuff dreams are made of

A design to improve fuel injection in combustion engines leads to increased efficiency, a cleaner environment, and a fantasy home. by Ted Hessing

people

8

bridging the gap between cultures

Even in technical fields, adjusting to business in a foreign culture takes a certain amount of savvy. by Jenny Grubb

fiction

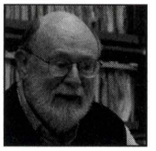
10

cover:

the ares conflict: how accountants took over the world (part 1 of 3)

Government conspiracy meets aerospace engineering and economics in the first installment of this short story. by Jeremy West

• cover illustration by Mui Vuong



history

16

the birth of the bomb

A former Tech professor gives commentary about his work refining Uranium for the first atomic bombs. by Chris Thaiss

19

from the email bag

20

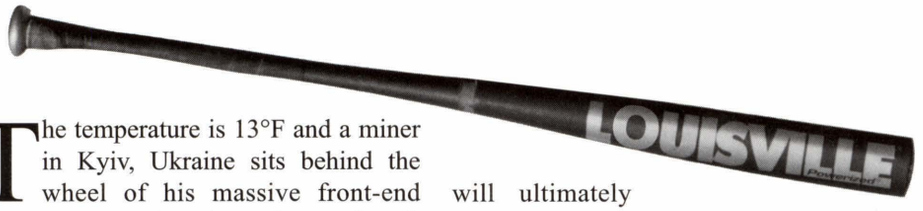
letter from the editor

Engineers' Forum is Virginia Tech's student-run engineering magazine. *Engineers' Forum* is published four times during the academic year. The editorial and business office is located at 223 Femoyer Hall, Virginia Tech, Blacksburg, VA 24061. Phone: 540-231-7738. Email address: forum@vt.edu. World Wide Web address: http://www.vt.edu:10021/eng/forum. Member of Engineering College Magazines Associated, Mike Dorcey, Chairperson.

Dollars for Distance:

The Engineering of Baseball Bats

by Tom Catherwood



The temperature is 13°F and a miner in Kyiv, Ukraine sits behind the wheel of his massive front-end loader. Between the wisps of warm breath condensing in the freezing temperature, the miner removes ton after ton of rock from the earth; rock which contains the rare earth element scandium. Across the Atlantic Ocean, an engineer sits behind his computer studying the electronics system used to cancel vibrations in the F-18 fighter. These two seemingly unrelated people are actually working in the same industry, advancing the development of similar products. What products are these? Some kind of revolutionary technology? A new weapon? Cold Fusion?

Since aluminum bats are hollow tubes, they offer significant weight reductions that allow the bat speeds of younger players to approach those of major league hitters.

No, these individuals, and thousands more like them, are working to bring the newest aluminum baseball bats to the booming market in the United States. The bat that will lead to more hits, more home runs, and more total offense for teams from the little league level all the way up through college ball, not to mention the bat will ultimately lead to more profit for the companies involved.

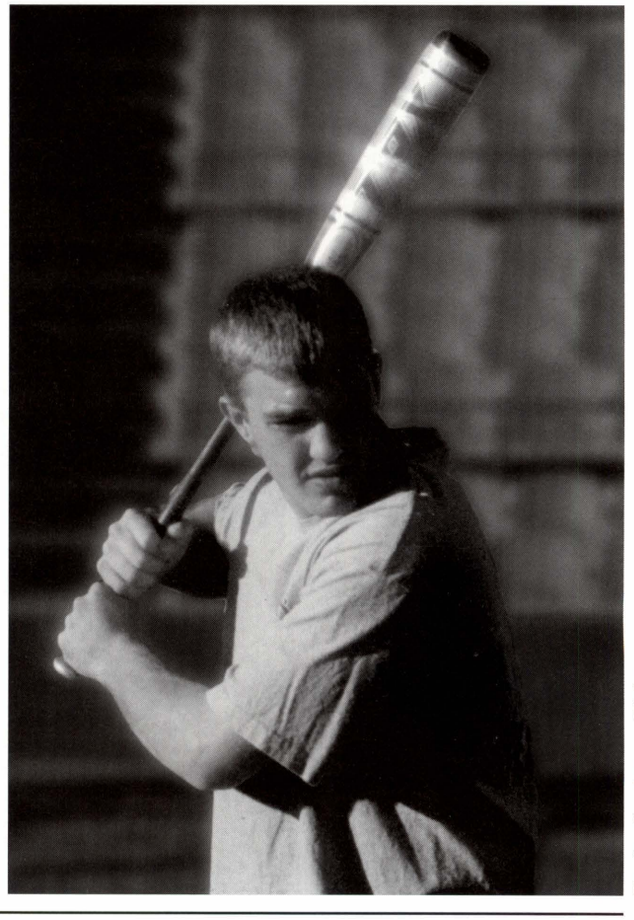
Before the 1970's, baseball was played primarily with wooden bats. The downside of using wooden bats is their tendency to break when a batter mis-hits the ball. The costs of replacing wooden bats led to the introduction of the metal bat in the 1970's. Metal bats, consisting primarily of aluminum, promised increased durability and decreased expenses.

Aluminum bats offered other advantages to young hitters besides increased durability. The average high school hitter can swing a wooden bat at speeds up to 70 mph. A major league hitter can reach speeds of 95 mph with a similar bat (98 mph in the case of Mark McGwire). Since aluminum bats are hollow tubes, they offer significant weight reductions that allow the bat speeds of younger players to approach those of major league hitters. Furthermore, the walls of an aluminum bat absorb less energy than a wooden bat. Therefore an aluminum bat has a "trampoline effect" on a baseball; it directs the ball with greater speed and distance than its wooden counterpart.

Companies have found that the key to producing a bat with the least amount of weight and maximum trampoline effect (also called pop or jump) is decreasing the thickness of the aluminum. A decrease in thickness can result in reduced durability and a tendency to dent. To counter these disadvantages, companies are applying new technology and exotic alloys to aluminum baseball bats.

Louisville Slugger uses an alloy called C405 Ultra in their new Air Attack 2 bat. This alloy of aluminum includes the elements zinc, magnesium, copper and small amounts of zirconium and chromium. The "Ultra" refers to new heat treatment techniques applied to the metal that supposedly increase the pop of the bat. Besides the new alloy, the barrel of the Air Attack 2 is filled with a chamber containing 30 psi of nitrogen. The air-pressurized chamber is supposed to increase the trampoline effect of the bat while supporting the thin C405 alloy shell. Virginia Tech's baseball team is currently under contract to use Louisville Slugger's bats, including the Air Attack 2.

Demarini, a relatively new company in



Photos by Jason Gibbs

the baseball marketplace, uses the same C405 Ultra alloy as the Air Attack 2, but it has two walls instead of one. Inside the barrel of the bat is another cylindrical sheet of C405 Alloy that is meant to catch the rebound of the outside shell. The combined forces of the inner and outer walls acting together propel the ball off the bat much more forcefully than a single-walled bat.

Easton Aluminum Incorporated, which produces the Redline C-Core and Z-Core bats, sticks with the single-walled technology, but uses a revolutionary type of alloy. Easton's alloy, Sc500, contains zinc, magnesium, copper, zirconium, and the rare-earth element scandium. The scandium in Easton's bats comes from the world's one known reserve, mined in Kyiv, Ukraine. To support the shell of the Redline bats, the thinnest on the market, a layer of carbon reinforcement is situated on the inside of the barrel. When these fibers are arranged in circular forms around the inside of the barrel they are designated "C-Core." When the carbon fibers are situated at a 45-degree angle with the barrel of the bat the designation becomes "Z-Core."

Worth surpasses all of the other manufacturers in technology usage by including electronic dampers in their new Copperhead ACX baseball bat. The bat, which utilizes C405 Ultra alloy as its shell, uses a system developed to cancel vibrations in an F-18 fighter. When a ball hits a bat in an area called the "sweet spot," an area approximately six inches down from the end of the bat, it is redirected with maximum velocity because little of the ball's momentum is converted into mechanical vibration energy. Whenever a ball is hit above or below the sweet spot, mechanical vibration energy increases, robbing the ball of velocity and distance. Worth utilizes a system of electronic shock absorbers called piezoelectronics to convert mechanical vibration energy into electrical energy. This electrical energy is then dissipated as heat. Since vibrations outside the sweet spot are decreased, more solid hits are produced. Therefore Worth claims the Copperhead ACX has "an unlimited sweet spot."

All the advanced technology and aluminum alloys applied to baseball bats today are meant to give baseball players extra hitting power, distance, and total offense, but do they really work? Some numbers support the idea that new aluminum bats provide more offense. For example, in the 1998 College World Series 19 more home runs were hit than in any previous series. Can all credit for the extra offense be attributed to the baseball bats? Virginia Tech's Assistant Baseball Coach Jay Phillips says that credit should be divided between the new bats and the strength and conditioning regiments of the players. Coach Phillips added that the offense supplied by new bats detracts from other areas of the game: "Personally, I feel like it [aluminum bats] detracts a little bit, you see great offensive numbers but… with the aluminum bat the way it has evolved right now it's kind of gone away from the pitching and defense aspect of baseball." Regardless of the effects on the game of baseball, as long as players are allowed to use aluminum bats, companies will continue to search for new technologies and more exotic alloys that will boost both players' offensive numbers and company profits. BF

Some numbers support the idea that new aluminum bats provide more offense. For example, in the 1998 College World Series 19 more home runs were hit than in any previous series.

The Stuff Dreams are Made of

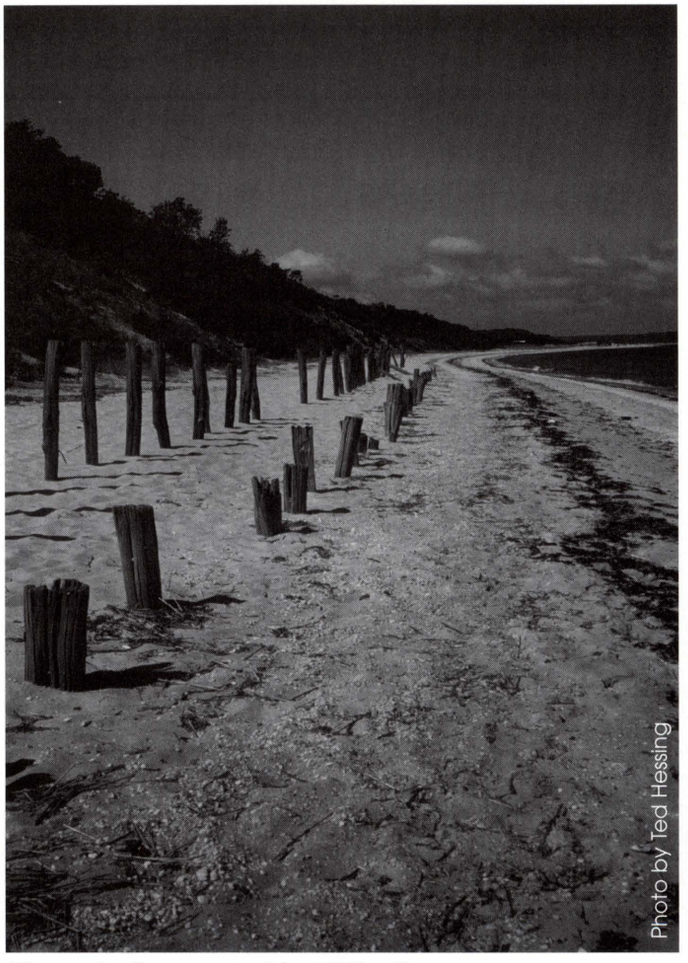
by Ted Hessing

My dream house overlooks a body of water. Beach front or bay-scape, it doesn't matter to me. As long as some part of the ocean is visible from my backyard I will not be picky. A boat moored in a personal harbor, Sea-Doo's parked nearby and maybe some ducks or starlings making a nest in some corner of the property would suit me fine. It will be wonderful. When do I move in?

Unfortunately, my engineering analytical skills have turned me into a cynic. I know that pollution will ruin the landscape, the wildlife, my swimming water, and my disposition. My backyard will be changed decidedly for the worse. Murky, oil slicked water, decaying plant life, and a foul smell will eventually descend upon my castle by the sea. Ironically, my luxury yacht will be a leading contributor to this mess, leaking hydrocarbons and harmful exhaust into the environment. The parkway leading to my home will be covered with gas and oil drippings which will make their inevitable way to my shore. The emissions from every vehicle in the state, nautical and terrigenous alike, will contaminate the air. Holes will be torn in the ozone, leaving me with a cancer-crisp tan when I lay out on my sandy lawn. It seems my dream house with matching cruiser is a self-negating goal.

Not so, says Orbital Engine Company (OEC) based in Perth, Australia. With such afore-mentioned, environmentally-sensitive thoughts as well as hosts of emissions legislature in mind, they have come up with an answer. They call it the Orbital Combustion Process (OCP). I call it the solution to my dream-house woes.

Try to visualize an engine that has significantly reduced emissions, uses less fuel, and makes less noise. Now imagine that this engine is actually lighter than its fuel-guzzling brethren, has less parts and is more efficient. This is what engineers at Orbital have made possible.



The work of companies like OEC will preserve picturesque beaches from the terrible effects of pollution.

Orbital did not set out to invent a better engine. What they did was to work hand-in-hand with car, motorcycle, snowmobile, and marine engine manufacturers the world over to create a process that can be fitted to engines across the board. Instead of inventing a new engine design, they have developed and patented a process that can be applied to a multitude of existing engines. In fact, one of OCP's most attractive features from a manufacturing standpoint is that it can be applied directly to existing engine production lines. Manufacturers can apply OCP to their wares with a slight modification to their pre-existing product instead of scrapping the entire assembly line in order to meet emissions legislation.

The Problems of Combustion

Before delving into the technology of the Orbital Combustion Process we should review the problem. Everyone knows that to make things go we need to have something to power them, usually fuel. Fuel is converted into power by combustion. Combustion is a high speed, high temperature chemical reaction. Essentially combustion is a controlled explosion that involves the rapid union of a fuel with oxygen resulting in the production of heat. Fuel consists primarily of hydrocarbons (compounds of carbon and hydrogen) and sulfur.

In combustion, hydrogen and oxygen combine, creating intense heat and water vapor. Intense heat is also released upon the combination of carbon and oxygen. Sadly, carbon monoxide or carbon dioxide is produced. Sulfur and oxygen combine also to form heat and sulfur dioxide.

The basic concept behind an engine is to utilize the reactions in combustion and harness the heat energy produced. The by-products are released into the atmosphere.

As said before, the combustion process is dependent upon oxygen. The amount of oxygen united with fuel is critical to engine performance, both in terms of the amount of heat produced and the actual

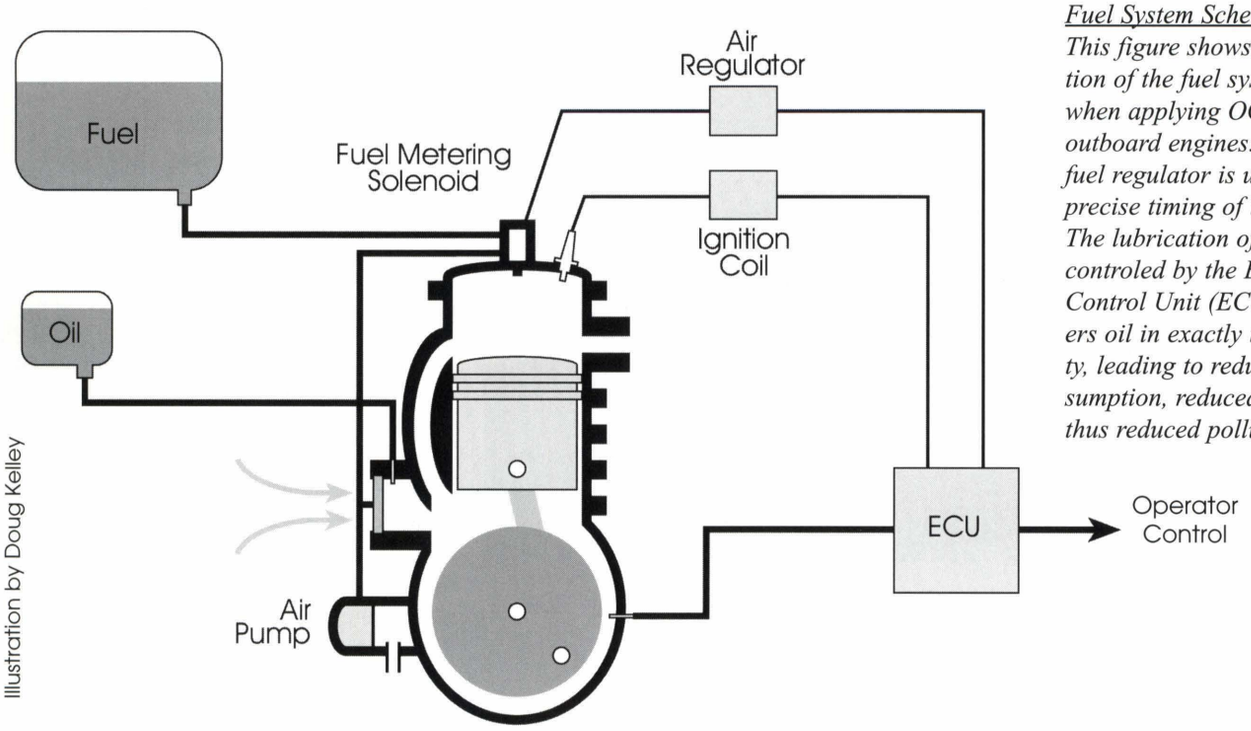


Illustration by Doug Kelley

Fuel System Schematic:
This figure shows the cross section of the fuel systems used when applying OCP to OptiMax outboard engines. An electron fuel regulator is used to ensure precise timing of the injection. The lubrication of the engine is controled by the Electronic Control Unit (ECU) which delivers oil in exactly the right quantity, leading to reduced oil consumption, reduced smoke, and thus reduced pollution.

amount of fuel burned. The fuel that is not burned is released into the atmosphere along with the reaction's by-products.

Most engines draw oxygen from the surrounding atmosphere. Air, however, has much more then just oxygen in its make-up. Nitrogen is a major component as well. Oxygen is 21% by volume the make-up of air, nitrogen is responsible for most of the other 79%. Nitrogen contributes absolutely nothing to the combustion process. It must be accepted into the process in order to obtain the needed oxygen. Nitrogen steals heat from the reaction and must be vented out with the other wastes. The venting of by-product gases causes serious environmental problems. Releasing unburned fuel causes additional pollution and is just plain wasteful.

Now that we know how combustion works we can see Orbital's answer. The rationale behind OCP lies in the mechanics of engine operation as well as the physics behind combustion. Simply, Orbital engineers decided that if more of the fuel could be burned, less waste would be created and more power would be generated. When this occurred, the amount of fuel needed for a machine to operate under a given demand would decrease. When the amount of fuel required decreased, pollution would follow suit.

Two-stroke engines dominate the marine, motorcycle, and recreational markets for good reason. They are known for their simplicity in design, light weight and high power-to-weight ratios. Although OCP can be fitted to a multitude of engines this article will focus on the basic two-stroke engine.

Two-stroke refers to how many times the piston moves in the mechanical cycle of combustion within the engine. This two-part process boils down to the power stroke and the compression stroke. The power stroke refers to when the piston is lowered. First the exhaust port is exposed, allowing the partial release of exhaust gases. Second the intake port is cleared and a fresh fuel-air-oil mixture is rushed into the piston, clearing most of the remaining exhaust fumes. The compression stroke refers to the fuel mixture being compressed and ignited by the spark plug atop.

Normal engines work using processes such as electronic fuel injection and carburetor injection. These procedures load fuel into an intake port and then draw it into the combustion chamber by vacuum where the spark plug ignites the fuel so the engine can convert the released energy into work. The Orbital Combustion Process takes a different approach.

You may have guessed that two-stroke engines have inherent problems. For example they have no exhaust valves. As said before they rely on strategically placed ports in the cylinder wall to expel wasted gas. With every revolution of the crankshaft these systems spill unburned gasoline out of their exhaust ports. Also, it is necessary to introduce oil into the fuel-air mixture to lubricate the moving parts. When oil burns it creates visible

Visualize an engine that has significantly reduced emissions, uses less fuel, and makes less noise... This is what engineers at Orbital have made possible.

Photo by Ted Hessing

Coastal waters like these house marine life vulnerable to the very pollutants coastal ships produce.

smoke and more pollution. This is a wasteful and inefficient process.

OCP provides the solution to this waste by changing the mechanics of the problem. First, compressed air is introduced into the gasoline charge. The compressed air shatters the liquid fuel into microscopic droplets. Gasoline particles are generally from 10 to 100 microns (1 micron = 10^{-6} meters) in size with most being in the 30 micron or larger range. OCP breaks them up so that 85% of them are smaller than 10 microns.

Second, the fuel-air mixture is put directly into the combustion chamber, bypassing the crankshaft and thus the need to put oil into the fuel line. This is known as direct fuel injection. Direct injection only occurs when the piston has risen high enough to close the exhaust port thus no usable fuel can escape.

Next, the atomized fuel blast is strictly controlled by applied geometry. OCP shoots the fuel-air mixture into a dome shaped area which is located near the spark plug. This keeps the mixture very close to the source of ignition and is known as stratified charge.

Lastly, the entire process is controlled by electronic monitors which are ruthless on the efficiency of the entire operation. Obviously the size, shape, and volume of the plume of gasoline is of critical importance. The greater the volume of the mist the more power and greater RPM produced. Controls can adjust the feed according to the demands of the situation.

"What does all this mean," you ask? Breaking down the gasoline particles expands the surface area of the injected fuel thus exposing more of the gas particles to oxygen, creating an airy mist. This mist aides ignition by improving the physical properties of the gasoline. Increasing the surface area of each particle to oxygen by reducing the size of the gasoline particles so dramatically increases the percentage of gasoline burned that the waste can be considered negligible. Using direct injection we can do away with wasted fuel due to the mechanics of two-stroke operation. This reduces the amount of impurities in the mix and aids in the burning of more fuel. When more gas particles ignite, more fuel is burned and less waste is generated. When more fuel is burned more power is created. When less waste is created, more heat can be recovered from the reaction and less damage is done to the environment. Less fuel is wasted along the way which also means less pollution and better economy.

Did it work?

Reports have shown OCP to increase fuel efficiency by 30% to 40%. Unburned hydrocarbons that get ejected into the environment are also claimed to decrease by 80%, which reduces visible exhaust smoke to nearly zero. If that was not impressive enough, users of engines fitted with OCP claim it to have a substantially smoother idle and "razor sharp" acceleration. Apparently OCP allows a more consistent amount of fuel to be burned in every cycle allowing the engine to run smoother and better.

These benefits are not only for two-stroke engines either. Four-stroke engines can be improved by OCP. Claims have been made that the fitting of four-stroke engines with OCP results in fewer and lighter engine parts, smaller size and up to 30% more efficiency. The increased fuel efficiency translates directly into more power generated per cubic inch.

Who Else Believes in it?

Sure, this all sounds good, kind of like those hi-tech commercials. When is it going to come to my backyard?

It already has. Orbital has made several alliances in markets key to their everyday integration. Registered patents related to the OCP process number over 1000.

Mercury Marine has teamed up with OEC under the name Meteor to develop the Mercury and Mariner OptiMax motors. These models, released in 1996, were the first direct injection outboards to be sold. As the demand for low emissions

Instead of inventing a new engine design, Orbital has developed and patented a process that can be applied to a multitlude of existing engines.

Photo by Stephen Drowne

Wind power works here, but try it on the interstate. Cars will need gas — and their polluting engines — for a long time to come.

Reports have shown OCP to increase fuel efficiency by 30% to 40%.

marine vehicles increases, so will OCP technology as suppliers adhere to stricter environmental laws. Currently, direct injected outboard motors consume up to 40% less fuel then conventional two-stroke outboard motors. OptiMax motors are heralded to reduce emissions up to 80%! They are now being produced in 135-, 150-, 200-, and 225-HP ratings. The very-near future calls for plans for even more models. OptiMax engines have already received acclaim by setting the speed record in American Power Boat Association Pro Bass's low emissions class.

Tohatsu Marine seems to think that OCP is a good idea as well. Their joint effort with Orbital has yielded a successful adaptation of direct injection into a 50-HP outboard. This is a significant achievement because it proves that mid-sized motors can benefit from OCP and be marketed at reasonable prices.

Canada's Bombardier Inc. has also signed an agreement for the long-term supply of fuel and engine management systems last May. Their intent is to apply OCP to their popular Sea-Doo Personal Watercraft products.

A joint venture with Siemen's Automotive, begun in February 1997 and strengthened again in mid-May, is called Synerject. Its goal is to ensure that "total systems" are available for vehicle manufacturers. The May agreement came in time for Synerject to attract the attention of Daimler-Benz sufficiently to begin the application of OCP to Mercedes' engines.

General Motors and Ford are also amongst the list of those who purchased the rights to the use of OCP.

Conclusion

A more efficient engine is the holy grail of many a mechanical engineer, but this innovative process should make anyone living in or near any mechanized civilization happy. Air and water quality in many places of this world are so poor that living in those areas creates serious and often fatal problems. Eventually lower emissions will be mandated the world over. Common sense tells us that the engines of the future will be made to adhere to these standards. Everyone living will be affected.

Out of necessity we are becoming more economically and environmentally conscious. Thus, the focus of engineering will be on reclamation, innovation and conservation. "Green Engineering" is an aspect of design that every sector of the field will have to contend with, not only to preserve our way of life now but to ensure the reality of our dreams to come. The Orbital Combustion Process was designed with this in mind. Now that major firms are catching on to the idea, we can expect to see this "tomorrow" technology today. EF

Bridging the Gap Between Cultures

by Jenny Grubb

It is scary, as students, to imagine ourselves out in the workplace. Not only will we be in the "real world" for the first time, but we will also have to adapt to the changes being made in our lives. Now imagine having to make those changes in a different country.

Each year hundreds of men and women are sent abroad to assist in the designing and building airports, bridges, dams, and villages. Skills and knowledge are key factors in these situations, but a willingness to learn and adapt are just as important.

Michael O'Malley, a licensed architect now employed by the government, spent eighteen years overseas. During that time he worked for the Kalicak Construction Company, a St. Louis based general contractor with an office in Douala, Cameroon, constructing office buildings. He also worked for George Gray International, an architectural and engineering firm that built three airports in Saudi Arabia. Over the years, O'Malley has worked doing community development in West Germany, France, Morocco, Mali, Gabon, Zaire, the Ivory Coast, and Tunisia.

During his overseas experiences, Mr. O'Malley had to associate with a variety of people who spoke a range of languages and abided by a whole different set of customs and traditions than those of the United States. "I had to adjust to seeing young African and Saudi guys walking down the street holding hands and realizing that they were not gay. I had to focus on some rituals that would not be acceptable to my parents or family back here in the States."

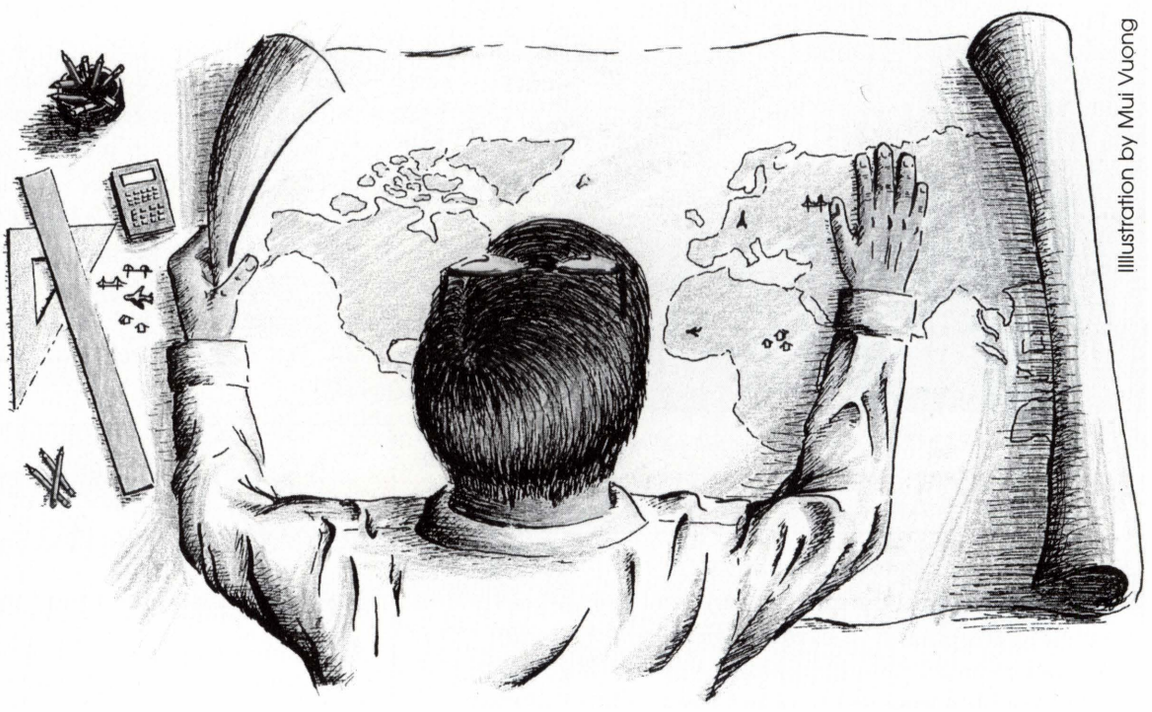


Illustration by Mui Vuong

You have to have patience when dealing with other cultures, no matter what country.

One of the most difficult barriers to overcome was that of language. "Speaking a different language takes interaction, time, effort and willing subjects." Without these things, a person can feel completely helpless. Although training is provided, it is often not enough to prepare you for the real thing. "I had attended a three-month training course, but my level of French was terrible. A language cannot be taught – it has to be lived. I did not know the French language until I was thrown into a situation where English was not spoken. It was terribly frightening in the beginning, but after several months I began to actually not have to translate the thought from English to French before I spoke; I just spoke it." In addition he also had to learn "a ton of idiomatic expressions so that I wouldn't embarrass myself or the people I was with."

O'Malley found that if he was "honest and forthcoming with what I didn't understand or found strange, the people, no matter what culture, were very happy with me." Most of the time, that is. "In Saudi Arabia, we had an 'off' day every week

which was a Thursday, the holy day in an Islamic week. We usually went to the souks, or outdoor markets, in downtown Riyadh. Each souk specialized in a certain good, so there was the gold souk, and the pear souk, etc… One Thursday I was wandering around and found myself in a souk that I had never seen. It had every known piece of cloth I had ever seen. I was mesmerized until, before long, I felt a very hard *thwap* across my shins that shot pain throughout my entire body. It was a 'religious' policeman indicating that I had wandered into the women's souk and no males were allowed to enter. I immediately raised my hands to signal that I had no weapons and was hurriedly ushered out of that souk. My shins ached for several days and forthwith I was really alert about wandering around old town Riyadh."

It is important to be open and accepting of the way that other cultures may cope with issues and problems. "You have to have patience when dealing with other cultures, no matter what country. Our educational system really prepares us for always producing, exceeding and exploiting. The cultures and systems of the countries that I was in simply did not."

Although training is provided, it is often not enough to prepare you for the real thing.

One also has to adjust to the fact that a simple task that would seem to be universal may be done in an alternative way in another country. Once while building an airport in Saudi Arabia, Mr. O'Malley was constructing the bathrooms. Apparently, the bathrooms in Saudi Arabia are not exactly like those that we use in the States. Instead of using a toilet, the people there use something that more resembles a hole in the ground. Not thinking about this, O'Malley accidentally installed American toilets instead of the kind that the people of Saudi Arabia were accustomed to. Not knowing what to make of the contraptions, people would stand on top of the toilets and then proceed to go to the bathroom.

The hardest thing for O'Malley to adjust to was not having the things he used to take for granted. The availability of goods was limited, so making sure there was enough drinking water and food was a daily worry. It was also hard being so far away from his family and friends. " I wasn't married at the time, but if someone in my family had died or had a terrible thing happen to them, I wouldn't have been able to get there very quickly." He was also unable to take pleasure in some of his favorite pastimes, such as playing golf and listening to sports on the radio.

Overall, O'Malley found that his experiences were very rewarding. "I am very accepting of diversity in the workplace. I adapt to difficult situations very easily and usually produce the desired results. I also am an architect as a direct result from my first experience on working overseas. In a certain manner, it has made me what I am today." EF

The Ares Conflict

by Jeremy West

Illustration by Doug Kelley

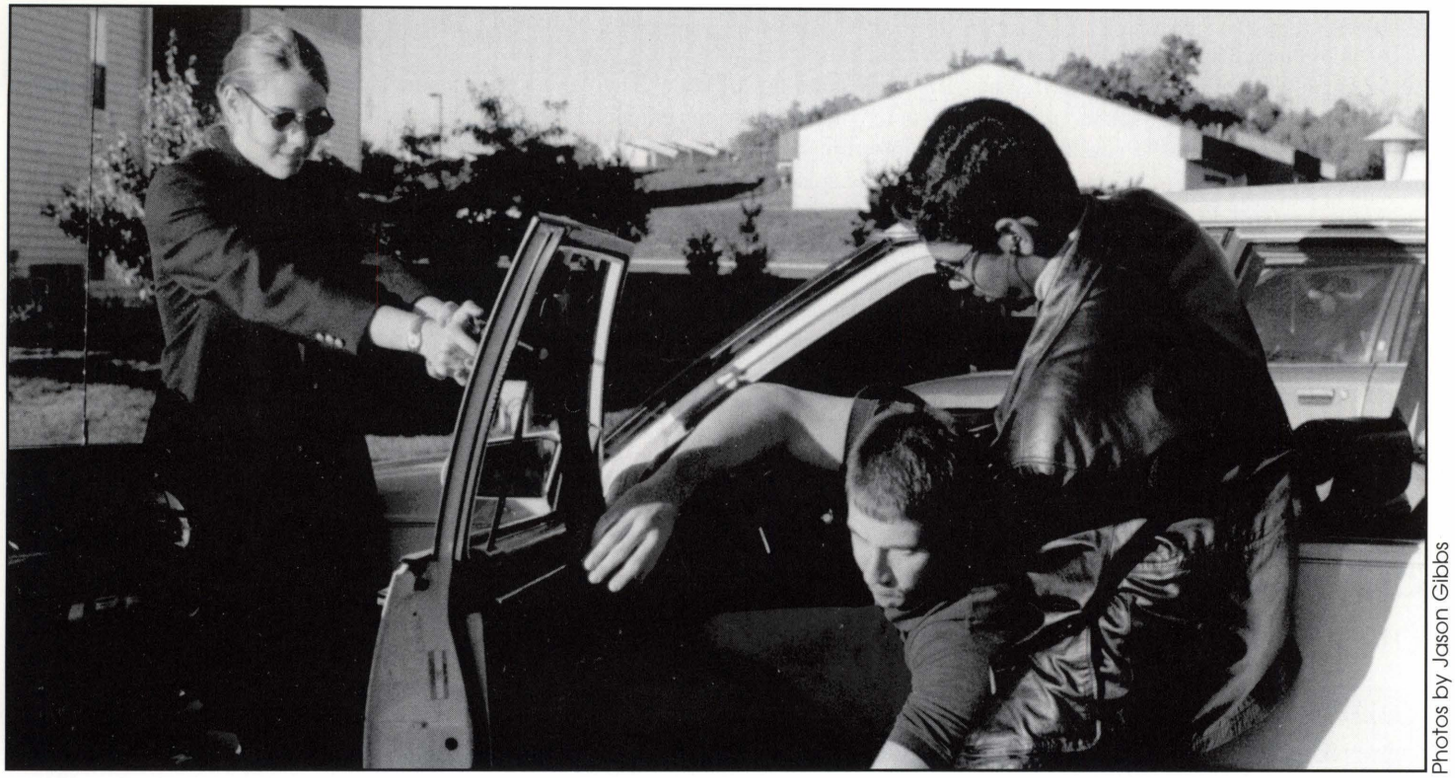
How Accountants Took Over the World

Part 1 of 3

A smiling family, standing in a green field, looking up at a falling star streak across a star-filled sky as slowly the camera pans from the young girl's face out into space until it focuses on Mars, "Mommy, what is out there?" Father answers, "We may never know."

The television screamed muted words as the president waited impatiently for his call to be transferred. He had been proud of his post-campaign propaganda commercial when it had been first produced, but making it reality was now more important. It amazed him that with three commercials and a few lead stories in the national news, the citizens of America could be so impassioned to leave their small planet and venture out into the depths of space, but then again they were stupid animals — that was what had gotten him elected.

The phone fell into its cradle with a dull thud as in the deafening silence the President realized the profoundness of the short and cryptic conversation that had just transpired with the director of the CIA. He sat down on the couch in front of the television to allow himself one minute of igno-



Photos by Jason Gibbs

rant bliss before he had to return to his role as president. All over the world people were watching televisions to escape the reality they could not cope with, and yet for him the mindless pictures meant nothing. There was no kindness in the pictures meant to soothe, no happiness in the pictures intended to reinforce just how great everyone was, only the flashes of colored pixels and the blare of sounds unrecognizable. His hands shook as he once again muted the volume on the television. The world had changed when he had hung up the phone, and though the people across the world watching television would never know it, he could not escape that reality.

It could only be described as the most anticipated event in the history of the free world, or at least that is what the commercials billed it as. Every channel switched its programming to cover the president's speech. There was a smile in his eye as he looked at the handsome charismatic president who with youthful exuberance was about to lead the world into the future. Through the television monitor he could no longer see himself, only the image of what he would be. Today reality would be made.

"My fellow Americans, today I have sad news to tell you. The United States is not the greatest nation in the world." The cameras zoom in on his charming smile to reassure the people that the next thing he is going to say will be positive. "But, we will not remain second." In living rooms across the nation people's attention spans are now beginning to wane. The next shocker. "I see a stock market crash in the near future. I see terrorist acts by many nations against the United States. I see the European Union launching a Mars mission before the year ends, but I also see in this future an America at an all time high." Using small words so the people do not get confused. "We will be on Mars first!" The image of a rocket lifting off superimposed on the background behind the president. "We will be economically stable in the coming years!" Sparks from a forge pouring hot steel dominate the backdrop, while enthusiasm pours out of an artificial smile into every living room in America. "We will prosper." Fireworks superimposed on the American flag. Children with a teacher smiling. People at home get up to get a snack while patriotic music blares from their surround sound entertainment centers. In five minutes they will have forgotten everything except the summary they read in tomorrow's paper.

Enthusiasm pours out of an artificial smile into every living room in America.

"The belief that a conspiracy exists is as powerful as an actual conspiracy."

— President's personal memoirs

"American superiority will not be compromised on the issue of Mars. If the European Union will put a colony on Mars in six years America will do it in four. It is the manifest destiny of mankind to venture out into the heavens. Yesterday we watched. Today we plan. Tomorrow we set forth on a journey to expand humanity."

Again traffic was as at a standstill as Bill tried desperately to get home. Normally the rat race home did not bother him, but today he had promised his daughter that he would be there for her soccer game. Cars all around him blew their horns while the people inside impatiently spoke on car phones or yelled obscenities at the cars in front of them. He could feel the hatred of a hundred other stranded motorists with places they needed to be and gave into the

frustration.

His door opened and a dark figure, without saying a word, took his arm. At first he thought he was being car jacked, but with traffic stopped for miles he could not figure out how they intended to actually steal the car. He was pulled from the car with the help of a second man with a precision that identified them as professionals. One of them took his place behind the wheel while a few more roughly pulled him off the highway and down into a field where a helicopter was waiting. He was drugged before take-off and could remember little else about the encounter when he awoke.

The drugs were still wearing off as he entered the dimly-lit conference room. The cavernous room hid many things in the thick shadows and concealed the dark figures standing at guard along the wall. He was seated at the elliptical black marble table next to the men he had spent most of his life competing against. As his head slowly cleared, he recognized not only his rival, the CEO of America's second largest aerospace corporation, but one or two representatives from other major industries. He could only wonder at what force could have brought together such men as these.

Having not paid much attention to the recent presidential election, it took him a minute to realize that the president had entered the room, and was now making his way towards the head of the table. A spotlight focused on him as he stepped up to the podium and began his speech.

"You are not here because you are the most powerful people in the world. You are here because I am going to take over the world, and you are going to be my army. You are the best generals this nation has ever produced. A product of economic Darwinism, you are here because you have, up until this point, survived, and because of your will to continue to do what is necessary to stay alive." There was a momentary gasp as the president paused.

"All war can be broken down to economics. As long as you can destroy more than your enemy can produce you will eventually win. However, this type of warfare has gone out of style. The American people will not allow any extended conflict to interrupt their must-see television for too many episodes. This is why you are my army, fighting not a war of boundaries and bombs, but instead a war of economy. You have all been drafted of course, anyone in this room who is unwilling to participate in this venture will lose everything, their positions, their families, and even their lives, so do not think for one moment that just because I am president, I am moral. With that said, I will leave you for a few minutes to discuss this amongst yourselves and when I return we will get down to business."

"You are not here because you are the most powerful people in the world. You are here because I am going to take over the world."

After he left, the room remained silent for long minutes as the most powerful men in the world sat in fear. There was little open talk of treason, only whispers of disbelief to those who sat close at hand.

In the dark hall that lead from the conference room the President waited, letting the tension in the room build while his crack team of psychoanalysts finished the profiles of his captive audience. After looking over the top five names on the list that had been identified as potential mutineers, he confidently walked back into the room. No one moved when he entered, hoping to escape him in the deep shadows, but they all realized there could be no escape.

"Unless anyone has anything to offer I will assume that we can continue?" A fat man smoking a cigarette spoke up in outrage, gathering a mild response from the crowd, but the president ignored his complaint skimming down the paper and recognizing his name as the fourth on the list. He had hoped for someone a little higher up, but this man, who controlled most of the nation's transportation industry, would have to do. He pulled a gun from his jacket and shot the man twice in the head. With his example made, he returned to business.

"Now that you all realize that I am serious let us get down to business. Let me start off by explaining that, while you have no choice in belonging to this organization, you will all benefit greatly from it. Your companies will be immune to all government regulations — no EPA regulations, no antitrust laws — you will be all but guaranteed success. This organization will control all of the world's stock markets, and all aspects of food, energy, and technology production. All you will have to do is continue doing those things that made you the successful elite that you are."

The meeting stretched late into the night as the president went over his goals for each aspect of the group. Everyone was encouraged to take part in the discussion, and as the meeting progressed more as more people ventured to do so. The whole time Bill's thoughts remained distracted by memories of his wife and children. He knew what would happen to them if he did not play along, but this situation posed success as a potentially greater threat.

Time had no meaning in the darkness of the room. Hours crept by and many of the group had realized the need for self-preservation and shared their most intimate company secrets. Bill could see how anyone leaving this meeting could potentially make a killing in the free market, if such a thing even existed anymore. Bill imagined the sun just breaking the horizon as they were finally dismissed and escorted to a hall with hotel-like rooms. They were kept on the hall by security but had complete freedom to roam and converse amongst themselves. There were no windows, telephones, or any other trace of the outside world, and in their loneliness they were left to determine for themselves just how much they would do to insure their survival, and the survival of all that was dear to them.

The experience did unify them, as it was intended to do. Not everyone had made it though. Several had tried to escape in the night and had been shot down; their absence was noted at breakfast. They worked straight through the morning and after a two hour break for lunch they reconvened to tie up loose ends. Several more people were removed during these meetings, either because they broke under the stress or because they could not live with themselves being active participants in this conspiracy. In the end it was only those men without a conscience, and those

who believed they could live without one, who remained. The president ended the summit with one last joint meeting after a dinner that no one ate. All of his newfound generals filed into the room and sat silently, looking at the scattered empty seats of those who had not made it.

"I am glad all of you could make it." A sick joke but the humor did not go unnoticed. "I just thought I would give all of you a little prize for surviving the first phase of our officer training school. In two days, all of the major American stock markets are going to crash. This is going to happen because all of you are going to liquidate all of your company's stock assets during the day re-investing in specified Asian markets. This sudden withdrawal and a little manipulation on our part will trigger a sell off. With most of your assets in other markets you will then be able to buy back holdings in U.S. markets at a significant profit."

"Do you mean to tell us that the President of the United States controls Wall Street?" The man, a multibillionaire who had spent the vast majority of his life playing the market, had not been able to contain his belief in the depth of this conspiracy.

"Wall Street is nothing. People see the prices scroll by and they believe them. Buy a million at this price, sell it at that, all of it is arbitrary. If the stock of your company goes down twenty percent does that mean that suddenly twenty percent of your factories no longer exist? Regardless of the actual value of the stock the numbers that flash across the screens are the reality people chose to believe. I do not need to control all of Wall Street. I do not even need connections in high places. I just need one person sitting at computer to change fifteen numbers and the market will take the largest dive since the depression. No, this conspiracy is not about the elitists like yourself. It is the janitor that told us when you usually leave the office, the bum on the side of the street, that you refused to give even your spare change to, who radioed when your car passed the check point, your son's third period history teacher whose name you do not even know."

The man, mortified by even the suggestion that a conspiracy of this magnitude could exist, shrank back into his chair while the others contemplated whether it would be possible to organize such a vast group.

"As you will all soon see, reality exists only because we choose to believe it. Humans are static creatures that need to live in a controlled world. They like boundaries. They like laws. They even like the television telling them how to feel, what to wear, and who to love. Is it inconceivable to believe that the American people are so resistant to change that they will not let anything stand in the way of their nine to five job, and their right to vote?" He let that thought drift through the room for a minute. "But you will not have to worry about such things, for I am the keeper of boundaries. It will be my job to make the world go 'round without anyone knowing."

A PICTURE OF A SMALL CHILD SITTING IN FRONT OF A STRAW HUT COVERED IN MUD AS A ROCKET SHOOTS UP INTO THE SKY IN THE BACKGROUND. "AT THIS COST WE CAN NOT LET THEM WIN!" DISPLAYED PROMINENTLY ON AN ALL-BLACK SCREEN.

As Bill finished his drive home, he pondered what he would tell his wife. He had been gone for almost two days without a word. He wanted to call her on his cellular phone but needed more time to think of an alibi. His house would almost certainly be bugged; even his car was already broadcasting to unknown ears all of the thoughts that he was unconsciously speaking aloud. He would have to hide from her all of what had happened. To keep her safe, that was the only option.

She met him on the steps, with a hurt smile and a hug that lasted just a bit too long. He started to apologize but was interrupted. "I am so glad you are safe." A tear ran down her face from her eyes that screamed a combination of rage and relief. He could only guess what she was talking about. Then he noticed the security guard that had followed her from the house. "I got your message. I still can not believe they actually tried to kill you" She kissed him on the cheek and then began to move him inside.

Once within the safe confines of home, she took him

Pictures of major industrialists flashed across the screen as a journalist reported the plot by the European Union to assassinate the heads of all of America's major corporations.

aside shielding her voice from the guard. He could not tell what she had been told, but he could tell that she did not believe it. "I do not know what all of this is but maybe it is time that you step away. We have plenty of money set aside, we could live comfortably for the rest of our lives." She had not always been in the upper class. Her parents had worked all their lives to make ends meet, which allowed her to look at situations such as these with eyes unlike his own. For Bill there was no out. He could no more walk away from everything that he had spent his life building than he could walk away from her.

They argued all through dinner. There were no words exchanged in this conversation, only glances, small facial expressions that they had come to know in each other through years of marriage. It was not until he turned on the television that he discovered the story behind his disappearance.

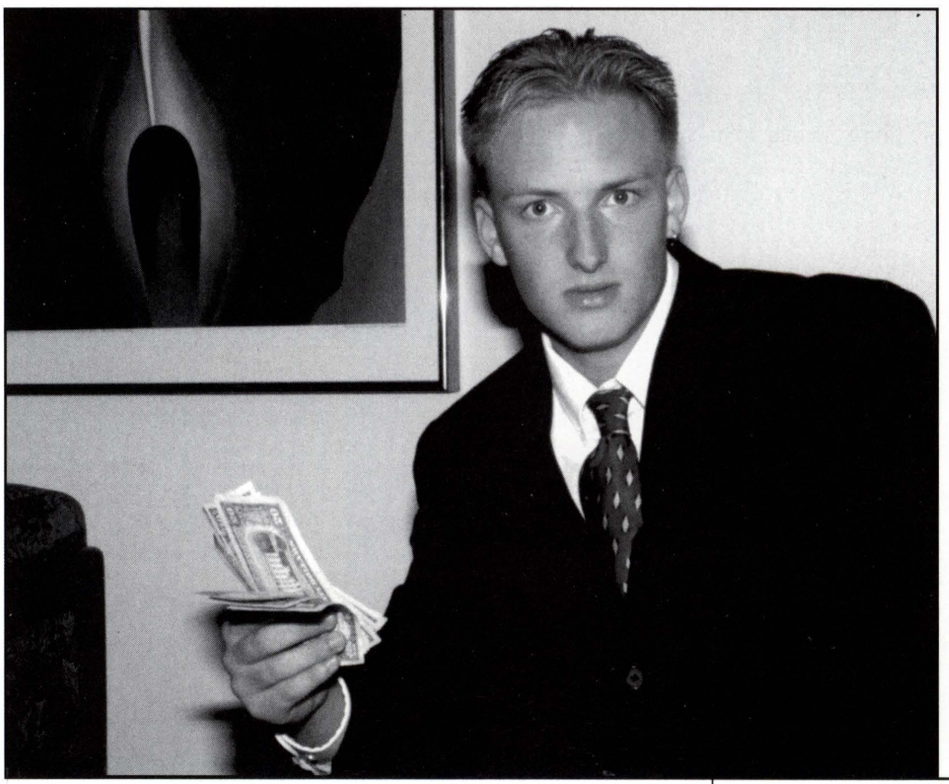
Pictures of major industrialists flashed across the screen as a journalist reported the plot by the European Union to assassinate the heads of all of America's major corporations. Forty two had been killed. Most of them had not been at the meeting, however, they would have caused problems for the conspiracy had they been allowed to live. The FBI had intervened when it learned of the plot and had picked up all potential targets and taken them to safe houses until the threat could be neutralized. There was then a related story about America's response to this action being an economic retaliation. After hearing this Bill went to sleep, hoping that when he awoke this would have all been a dream.

"Speak softly and carry a really big stick. That will be the attitude of the White House when it comes to international policy such as this."
— White House Press Secretary's report

"Mistress Prime Minister, do you mean to tell me, with the world as my witness, you know nothing of this European Union?" Without giving her a chance to repeat, for a third time, a negative response, he turned to France's president, "And I guess that the advances your space program has made has nothing to do with the combined financial and technical support of the rest of Europe?" Once again he did not wait for the translator. Moving to within a foot of the German chancellor he looked deep into his eyes ignoring the rest of the world. The chancellor looked nervously for support, but no one dared speak and possibly bear the brunt of the president's attacks.

"Every time Germany has been united it has lead to world war. Is that what you hope to gain by all of this? Perhaps this time you have realized that you can not take Europe by force and this European Union is simply a front for your imperialistic ways? You now even have a single currency for all of Europe. Who do you think you are fooling?" Walking back into the center of the United Nation's main auditorium he paused, approaching the grand finale.

"Control the world's money and you control the world. Well, I am here to tell you that the United States will not stand idly by and let you rape and pillage the financial resources of the world. You have tried to kill our most powerful capitalists, but you underestimate America. You can kill the rich. You can cause the stock market to crash. You may even launch the first Mars mission. But America will remain strong. We will beat you! We do not fear you, and we will not back down. We will even land on Mars first." With that he stormed out to thunderous applause.



"Be careful what you say, the EU is listening," a poster reads.

All of America had watched as their president battered the confused leaders of Europe. Like McCarthy, his shouting and storming about on live television for the whole world to see brought to life an otherwise apathetic nation. But most importantly, it gave the American people exactly

what they needed to see — a strong young president willing to fight for them. And they threw their support to him.

While the world's financial markets reeled to adjust to the "Great American Crash" and subsequent recovery, and the fear of open physical war between the European Union and America escalated, the presidents approval rating shot through the roof. European assets were frozen and imports were subjected to economically unjust tariffs.

America, sliding deep into isolationism and yet stronger than ever, parked its Atlantic and Pacific fleets off the coasts of the major European cities while tripling defense spending. The economy also saw one of the largest stock market jumps in history, and for the next months the world stood still, waiting and watching, and being entertained.

Power corrupts. Absolute power corrupts absolutely.

Bill sat uncomfortably in his chair at the same black marble table that had witnessed the deliberation that was changing the world. He was no longer afraid that he would fail and loose his wife and kids. He was afraid he would succeed. He could see into the president's future and, as improbable as it had seemed at first, it was slowly becoming reality. Every night the news fed the propaganda that he was partially responsible for creating. The American people could not separate the fact from the fiction, and even he was beginning to believe some of the lies that he was creating.

He remembered a field trip to Philadelphia he had taken as a child to see where the Declaration of Independence had been written, and could only wonder if one day children would wander into this very room and marvel at the table were the fate of the world had been written. Would they smile and leave in awe, or would they pass by looking at the darkness and wonder how such a thing could have happened.

And yet Bill had sat uncomfortably for three years around this same black marble table. It was now possible for him to slip away one night, to leave everything behind and venture out away from the president and his conspiracy. But for three years he had sat around this dark table, shrouded in shadows and corruption, and had become accustomed to its power. His corporation was monstrously large, monopolizing an aerospace industry that could not produce enough weapons for a world preparing for war. His personal holdings were now so vast that he could not even begin to estimate his net worth.

He was not the same man who had been dragged from his car three years earlier, and though he still could not justify to himself the action he was a part of, that voice within him was slowly being silenced.

To be productive is to be American.

Bill watched NASA's new technological revelation of a shuttle launch with little enthusiasm. Today was supposed to be the day that America won the space race, but he could not rejoice in this fundamental victory over the tyranny of the European Union. The president smiled and waved to the crowds as confetti poured down from the heavens. Europe's first attempt at a manned Mars mission had failed and the President had claimed victory in the race to Mars even before the shuttle lifted off. But in these glory days it would be difficult for the president to say anything wrong. His re-election was as preordained as the coming of Christ, and with his conspiracy corporations raking in billions of dollars to be funneled into various projects there seemed no end.

The world was in chaos, while Americans sat comfortably numb within its vast borders oblivious. Already he had watched three shuttles launch secretly for Mars in what the conspiracy was now calling the Ares Project. There was an undersea colony deep in the Pacific, a practice for the colony that would be built on Mars in the coming year. Advances in hydroponics and various other techniques that could feed everyone — man, woman, and child — on earth were kept secret while mysterious plagues of insecticide-immune insects ravaged the lands beyond the borders. In America, fossil fuel had been replaced by clean cheap nuclear energy, breaking the last outside dependencies.

Bill could not help but see the irony in the naming of the Ares Project. It was obvious that the president knew of the differences between the much hated Greek god of war, who was noted for the chaos and destruction that he brought, and the highly revered and honored Roman equivalent Mars, who was friend and defender of the imperialistic race. While the president spoke of Mars to the millions of Americans he was so boldly leading, it was clear that he really meant Ares. Mars was not the finish of a space race. It was the start of the end of the world as we knew it.

Continued in the next issue...

The Birth of the Bomb:

The Story of the Manhattan Project at Oak Ridge, Tennessee

by Chris Thaiss

"I am become death, destroyer of worlds." Physicist Robert Oppenheimer was reminded of these lines from the sacred Hindu text, the Bhagavad Gita, when, on July 16, 1945, he saw the first atomic blast, brighter than several suns, sear the desert around Alamogordo, New Mexico, fusing the desert sand into glass. This event was the culmination of years of effort put forth by thousands of individuals all over the United States. Everyone from physicists to design engineers had helped in some way to build the bomb that would start the nuclear age.

One such individual was Arthur M. Squires, Ph.D., a former professor here at Virginia Tech in the Chemical Engineering department. His chemistry background began in 1938 when he was an undergraduate at Cornell University. While taking classes from Professor John G. Kirkwood one day in March of 1942, a man by the name of Manson Benedict visited Kirkwood, looking for a student to join what was described as an "important war project" at the M. W. Kellogg Company, the maker of aviation fuel plants for the war effort. The job would be at Kellogg's Jersey City plant, not too far from Cornell.

On Monday, June 15, 1942, Squires joined Benedict, becoming the eighteenth member of "Project X," a project designed to determine the possibility of using the gaseous diffusion technique to separate uranium from its natural concentration of 0.71% found in uranium ore, and compact it into a concentration of 90%, which was the purity needed to build an atomic bomb. These steps were necessary to drive ahead of Germany's atomic bomb project, which according to Army Intelligence at the time was at least a year ahead of the United States. Later this proved to be false information as the Germans were never able to perfect the nuclear chain reaction.

However, in 1942 the German threat was very real. "I had nightmares," Squires relates. "There would be a flash of light and I would think, 'Oh my God. Is that the German bomb?'" The scientists therefore needed to work at a feverish pace to be the ones to come out on top in the race to create the bomb. Before it could be brought into reality, there needed to be some way of turning uranium ore into bomb-grade uranium. When uranium is mined from the ground, most of the mass is uranium-238, a compound too stable to be used in a nuclear chain reaction. To separate uranium-235 from the uranium-238 there were two different processes. The first, which Squires worked on, was the Gaseous Diffusion technique. Here, uranium hexaflouride was diffused through a thin, porous barrier which separated regions of higher and lower pressures. Uranium-235, being lighter than uranium-238, diffused through the barrier more quickly than its heavier cousin and thus was able to be separated. The difference in weight was very small, however, so to get enough fissionable uranium, there needed to be thousands of diffusion stages. The other type of separation used a gas centrifuge that spun the heavier material outward, therefore making it easier to collect the uranium-235. Both of the techniques were shown to the government, and in the end, they decided to build a monumental gaseous diffusion laboratory in Oak Ridge, Tennessee. The gaseous diffusion plant called K-25 that the Kellex Corporation, a subsidiary of The M. W. Kellogg Company, designed was gigantic. If placed in a single line the

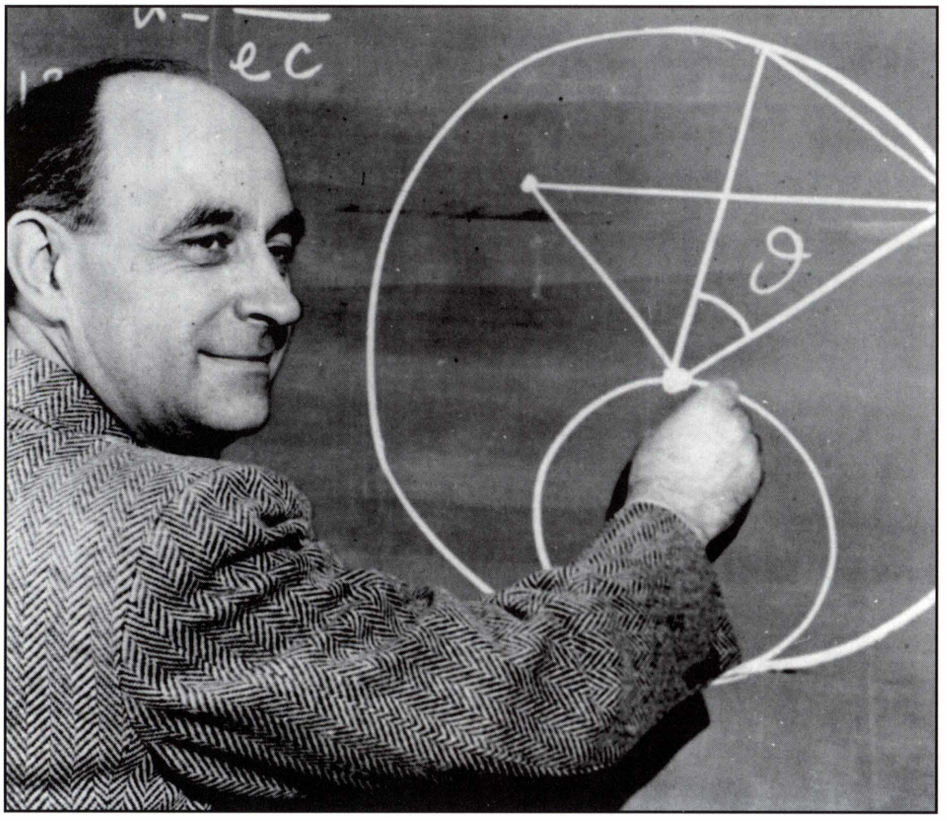


Photo courtesy of Oak Ridge National Laboratory

Physicist Enrico Fermi directed design of the graphite reactor at Oak Ridge.

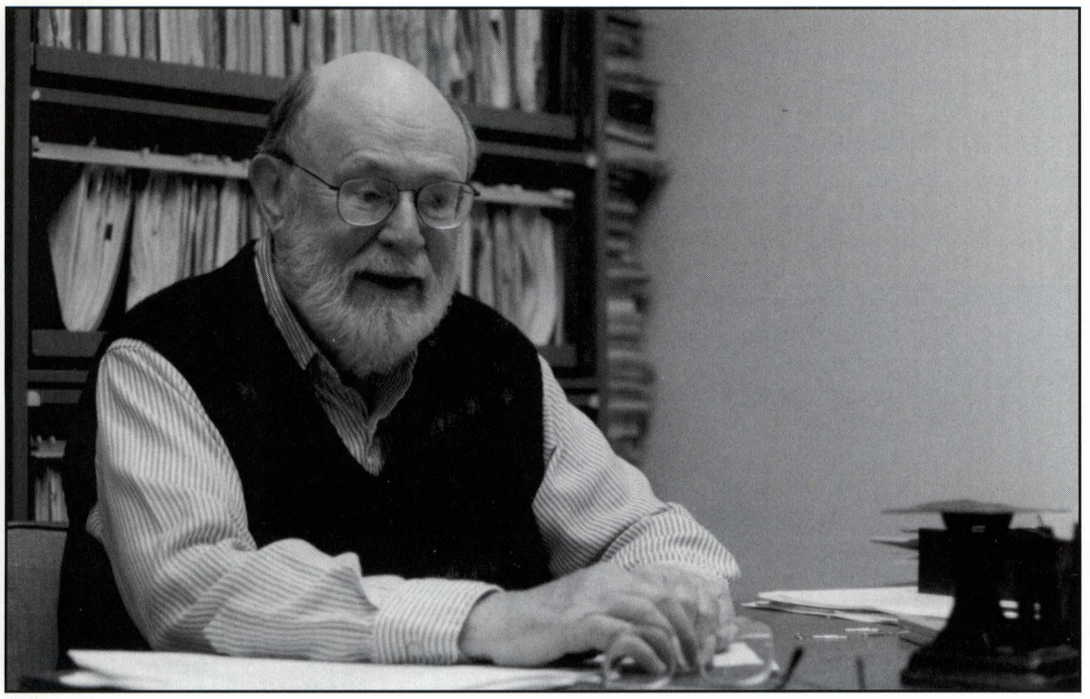


Photo by Jason Gibbs

Arthur Squires remembers his days working on the Manhattan Project.

buildings used to house the diffusion stages would be over 400 feet wide and over 0.9 miles long, a total area of 44 acres. All of this area would house the diffusion stages, for separating the uranium and de-greasing equipment, to make sure the parts that came in contact with the uranium hexaflouride or "hex," an extremely corrosive gas, were clean. "Hex" in contact with materials other than copper and nickel — what the pipes that contained it were made from — would cause the entire plant to break down from serious corrosion, costing millions of dollars in the process.

Days after engineering teams moved into plant K-25 at Oak Ridge, General Leslie Groves, the head of the Manhattan Project, ordered an addition to be constructed to allow for increased output. The entire operation could have only taken place because companies like Chrysler wound down their production lines in favor of supplying equipment to Oak Ridge. "During the three years that I worked on the project," Squires revealed, "80-90 hour work weeks happened. I don't mean every week, but the regular work week was 57 hours." The number of hours that the scientists put in finally paid off when shipments of semi-pure U-235 from K-25 to Y-12, the electromagnetic separation facility also at Oak Ridge, finally started on March 12, 1945. The Y-12 electromagnetic separation process contained the final phase of the separation process, called the β-phase. It involved charging uranium tetrachloride gas and directing it past a weak electromagnetic field. The lighter uranium-235 particles were less affected by the magnetic field so when the atoms had passed through the chamber, the U-235 atoms had deflected differently than the U-238, causing separation of the two types of atoms.

Although the physics done at Y-12 was phenomenal, there were also mishaps. Arthur Squires relates a story of an incident that occurred at Y-12 with the electromagnetic transformers, which "were wound in silver because copper was short, and silver was just sitting there not being used in some government vault. So the silver was used for the Y-12 transformers, they turned them on and they burned out just like that. Nobody had thought to take away the heat!" The problem occurred because the resistance of silver is lower than that of copper. When put into the equation Power = Voltage^2 / Resistance, the lower the resistance the higher the power, therefore the higher the temperature. This situation caused a wild downturn in the production of Uranium-235 at Y-12 for about six months.

Nearing the summer of 1945, Squires would travel almost continually between Knoxville and New York City, where work on the Manhattan Project originally began. This was necessary to compare information about K-25's capabilities to other scientists whose knowledge was integral to the production of the bomb. Squires, in his book, *The Tender Ship*, relates his experiences travelling once or twice a week: "I carry with me a briefcase full of productivity calculations, always conscious of what I will face if I were to lose it. It will be years before I am comfortable travelling without a briefcase. I will be subject to sudden frights: Where have I mislaid it? Why is it not in my hand?" Such stresses of travel and security were common for the engineers and physicists at the time because of the lack of communication that they had then. There was no such thing as a fax machine or email, postal mail was much too slow, and even the telephone was an inefficient way of communicating engineering data, so most everything had to be delivered by hand. Not only were the stresses of travel extensive on the scientists, but sometimes they had unexpected surprises that came up.

I carry with me a briefcase full of productivity calculations, always conscious of what I will face if I were to lose it.

One morning in 1945, Squires arrived at work only to discover that the cascade of diffusion stages had broken down and was full of nitrogen gas, a gas essential for the separation of the two atoms. Because of this mishap — which caused Squires to lose his temper one of the very few times

he lost it — enriched hex and depleted hex were mixed, giving the average percentage of pure U-235 to mixed U-235 and U-238 to be somewhere between 0.71% and 3%. A total lack of attention on the operator's part caused the extremely unwanted delay in deploying the enriched uranium to Y-12 to carry out the β-phase

wrote in *The Tender Ship*, "Instinctively, I reject the 'silver lining' statements that are appearing about the wondrous age of atomic power just around the corner."

The largest impact that the Manhattan Project had on the world was that it had ushered in the atomic age, heralding the cold war and the many years of anxiety

At the time it was understandable why the United States was so feverishly involved in creating this bomb: to ward off the threat that Germany posed to the United States and its allies. Even with claims that dropping the bombs on Japan saved thousands of lives in the long run, perhaps the United States did not have as

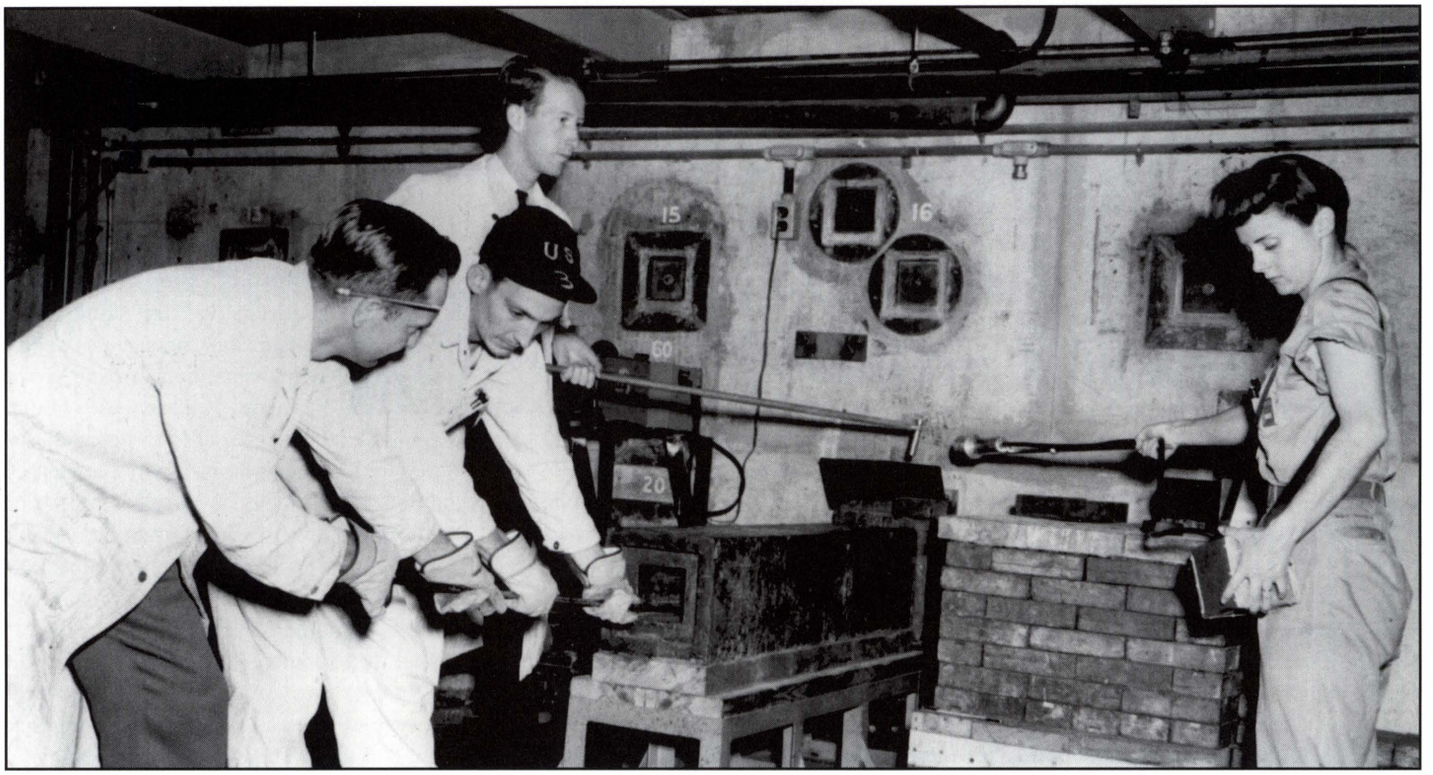


Photo courtesy of Oak Ridge National Laboratory

Irradiated materials are drawn from the graphite reactor in Oak Ridge.

of enrichment. The problem was caused by a leak in the nitrogen system. Previously, Squires had given explicit instruction on what to do if nitrogen was detected. His operating manual for the system clearly stated that in the event of nitrogen being detected, the operator should promptly isolate the rest of the building from where the leak had occurred, something this one had failed to do.

Despite the setbacks at K-25, engineers were able to ship U-235 at α-phase top purity of 7% to Y-12 for β-phase by mid-June, steadily increasing the output until on August 6, 1945, Squires and his counterparts saw that the headline of the New York Times contained a picture of K-25 with the news that the bomb had been just dropped on Hiroshima. When the second bomb was dropped on Nagasaki, many of the engineers who worked on the project had second thoughts about their careers. Squires, being a farsighted character,

that went along with it. Totaling up the cost for the Manhattan Project shows an expenditure of $20 billion (1996 dollars). Compared to other World War Two expenditures, the Manhattan Project was one of the greatest expenses that the United States had.

much foresight as they should have before they built such a weapon of mass destruction. Now that we know Germany didn't have the capability of building a bomb of the same destructive power as that of the United States, don't we feel foolish for creating the monster that we did? BF

US WWII Expenditures
(in 1996 dollars)

Heavy field artillery	$4 billion
Manhattan Project	$20 billion
Small arms (excluding ammunition)	$24 billion
Bombs, mines, and grenades	$31.5 billion
Light field artillery	$33.6 billion
Tanks	$64 billion

from the email bag

When I was in high school, most of my peers had no clue what they wanted to be when they graduated, but I always knew I was going to be an engineer. Often, parents and teachers would tell me that being an engineer was very difficult, but I just assumed they did not know what they were talking about. When I got to college, I began to understand that, maybe, being an engineer was not as simple as I thought. I had to take a lot of courses that seemed totally irrelevant to my career choice, but I stuck with it. Through the years, my path continued to get harder, but I would not let my dream of becoming an engineer fade. I studied every night and did homework on weekends until finally I graduated. Looking back, I cannot help thinking, that was an a lot of work just to drive a train.

If 99.9% were good enough...
2 planes landing at Chicago's O'Hare airport would be unsafe every day.
12 newborns would be given to the wrong parents daily.
291 pacemaker operations would be performed incorrectly.
315 entries in Webster's dictionary would be misspelled.
3,056 copies of tomorrow's *Wall Street Journal* would be missing one of the three sections.
18,322 pieces of mail would be mishandled every hour.
20,000 incorrect drug prescriptions would be written each year.
103,260 income tax returns would be processed incorrectly during the year.
114,500 mismatched pairs of shoes would be shipped each year.
880,000 credit cards in circulation would contain incorrect cardholder information on their magnetic strips.
2,000,000 documents would be lost by the IRS each year.
2.5 million books would be shipped with the wrong cover every year.
5.5 million cases of soft drinks would be produced flat.
2.5 copies of the Engineers' Forum would claim the Sun revolved around the Earth.

letter from the
editor

A Numbers Game

Like most students, I was surprised at the university's recent announcement that incoming freshmen would no longer be required to have names. The idea struck me as being utterly ridiculous; until, that is, I began to examine the facts.

As school officials pointed out in their press conference, while two students may have the same first or last name, no two can have the same ID number. Thus, cataloguing all of a student's personal information solely by number would not only eliminate any mix-ups, but make names redundant. Additionally, removing the 24 characters allotted for names on every form currently requiring both a student's name and ID number will save the university over 200 hours of data processing and $45,000 a year.

Truth be told, names are a burden to modern society.

And while the new policy doesn't forbid students to use their given names in everyday life, it is the first step in phasing out that cumbersome tradition. Truth be told, names are a burden to modern society. Nowadays, naming something can actually render it more indistinct. Which building's purpose would a new-comer to our campus have a better idea of: the named Randolph Hall or the anonymous New Engineering Building? Which title paints a clearer picture of what the building is used for: Slusher Wing or New Residence Hall West? And why should it stop there? Imagine the improvement in clarity we would reap if the university stopped dragging its feet and took the next logical step in this new campaign, retroactively un-naming all the buildings on campus!

Faculty members have also voiced overwhelming support for the new no-names policy. Teachers, now to be provided only with a list of the ID numbers in their class, will find themselves freed from the nagging expectations of learning their students' names, backgrounds, goals, likes, dislikes, and other such messy details. What, really, has ever been gained by teachers making the effort to establish a real and lasting relationship with their students? Nothing. Teachers know they exist only to pass on the textbook's information in audio form, not to actively engage each student in gaining the skills necessary for their later life. Under the new policy, professors can focus their full effort on the lecture at hand, finally being able to treat each student as what he really is: just another number.

This, then, is the hidden genius behind the university's policy change: unlike other laws, it goes with human nature, not against it. As is healthy and natural, we all care less about others than about ourselves. This is shown in all of our interactions (and non-interactions) with people. Did the person you sidestepped in the hall without acknowledgment have a name to you, or was he just a faceless obstacle in your way? How about the people that clean your dorm, drive your bus, or serve your dining hall food? Do they have names, are they real people to you, or are they just robots doing their jobs? That is why the school's idea makes so much sense. Under the new policy, all those people WILL be nameless, faceless entities that we can happily ignore as we go about our now uncluttered lives. And deep down inside, isn't that what we all really want?

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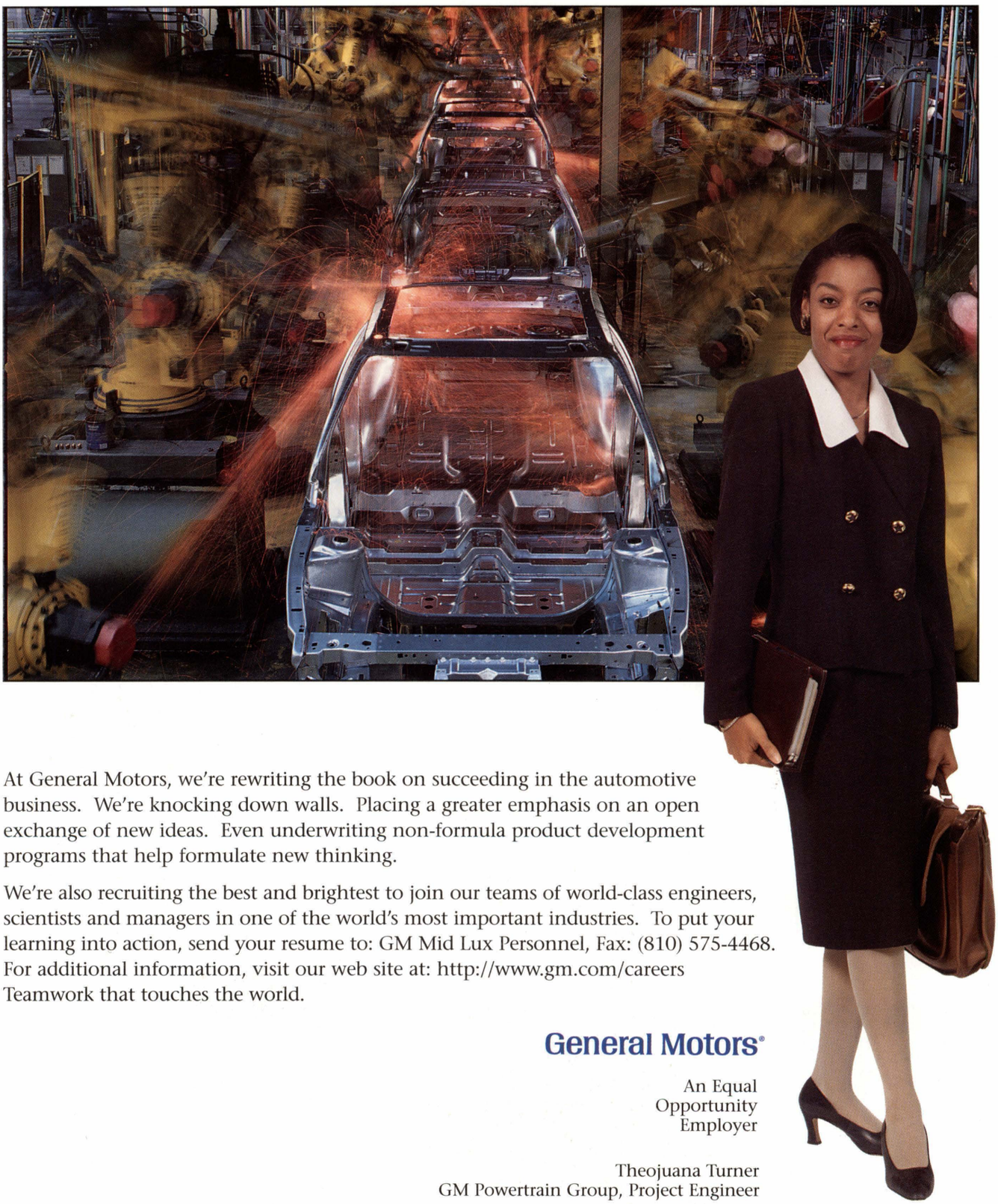

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