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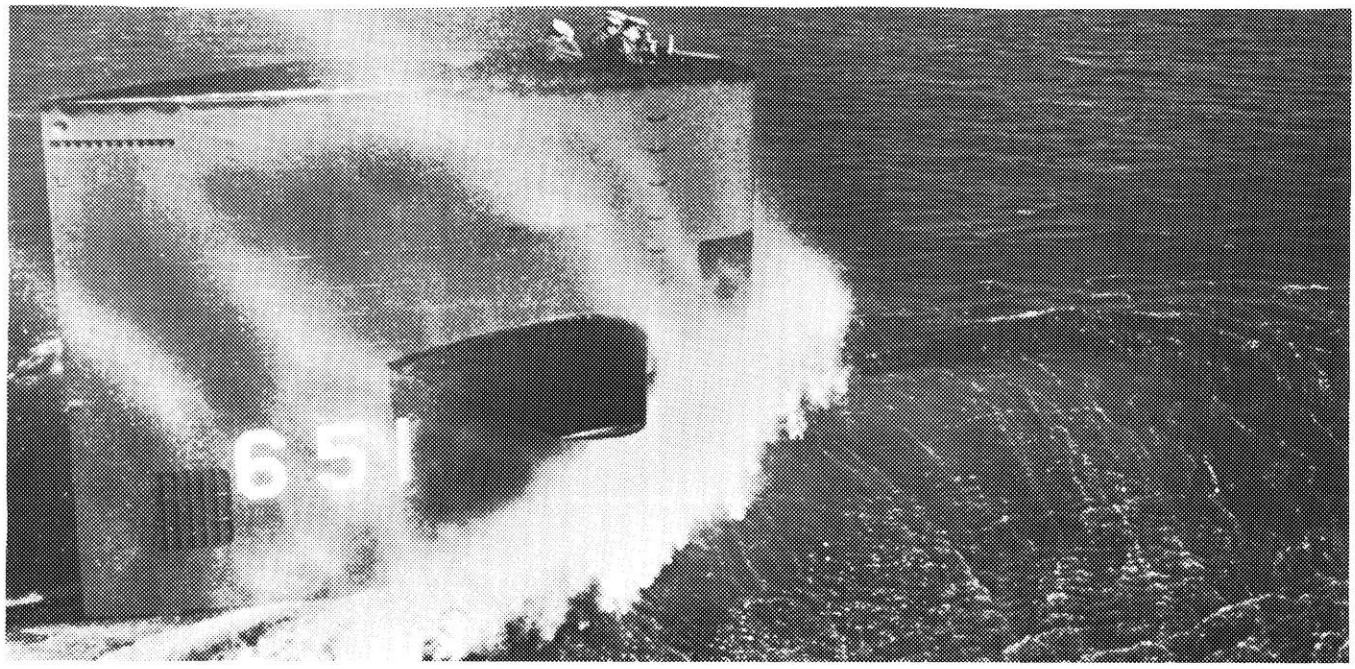
VOLUME 81, NO. 3 DECEMBER, 1976

wisconsin engineer



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wisconsin engineer

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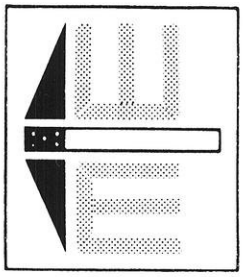

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Santa Claus is an engineer

by Lauren Schlicht

Myth and machinery mix in the person of Robert Niemann. Behind the Santa Claus on our cover lies a retired product research and developer, living proof that it doesn't take a degree to make an engineer.

Niemann arrived in Madison in January of 1923, fleeing a Germany torn by depression and inflation. Although lacking technical training and knowledge of the English language he planned to make a mark for himself in the new world. Home became his uncle's house on Atwood Ave.

Like most immigrants, Niemann had left his past behind but had not forgotten it. He lived in the Harz mountains until the war drove him into the army. The first job he was assigned was that of a general's chauffeur, since he was one of the few Germans with a driver's license. In 1916 his second application for flight school was accepted. He left for the Albatros School near Schmerdemeul the next day.

Flying and Niemann mixed well. As a student he was required to make 71 flights before his solo flight. Instructors were careful about letting a student solo because their pay was docked if a student smashed up a plane. It was not long before he had master Rumpler, LVG, Albatros, Aviatic and DFW, all biplanes flown by the German Air Force.

After finishing his training in April, he joined the 250th artillery squadron near Minin-Covcov, close to the front lines. Here he flew four types of missions, photo reconnaissance, bombing missions, artillery observation to direct artillery fire and infantry flights, firing into the trenches from the air. Two people crewed a flight, the pilot and observer who took photos or manned the rear machine guns. Pilots were enlisted men while observers were usually officers. Being an observer was a dangerous job. During one air flight, a quick evasive maneuver caused the observer to fall out of the plane and to his death 12,000 feet below. There were no parachutes.

Reconnaissance flights were Niemann's specialty. He flew missions up to 30 miles inside enemy territory to photograph troop formation. On one of his flights his escort aircraft was piloted by Baron Manfred von Richthofen (The Red Baron).

On March 9, 1918 Niemann piloted an artillery spotting mission over enemy territory when three British Sopwith Camels came at him. Luft, Niemann's observer, was shot four

Nieman as he appeared in 1918.

times while Niemann took two bullets. He grabbed his machine gun and emptied an ammunition belt into the plane in front of him. Descending almost 14,000 feet in 6 miles at full throttle, he made it back to German territory and landed before passing out. After several months of recuperation, he became a flight instructor, returning to his squadron just before the November 11 armistice.

Now he was in the "New World" and his past skills were obsolete. His first job was that of a machine operator at Gishalt Machine Company. During his spare time he studied some technical manuals he brought with him, some of the few things that were written in German. At night attended vocational school to learn English. Purely by accident he met and old acquaintance from the war, Max Klieforth.

Max had been one of Niemann's students at flight school. A star pupil, he had been shot down and captured by the British. No one had heard of his where abouts until now. Niemann and Klieford remembered old times together.

In 1928, something in Niemann's line of interest came into his shop. George Johnson, then president of the Gishalt Machine Company, bought the rights to the Comet Motor. Being

The 250th artillery squadron.

at home with airplanes was one of the reasons Niemann was put in charge of preparing the engine for use in a plane to be used in the east to west race. The race never occured, for 1929 brought the crash of the U.S. economy. Gishalt went bankrupt and all the workers lost their jobs.

Without any jobs to be found, he was glad when Max Klieford called to offer him a job at Burgess Labritories. He started as a technician, building what others designed.

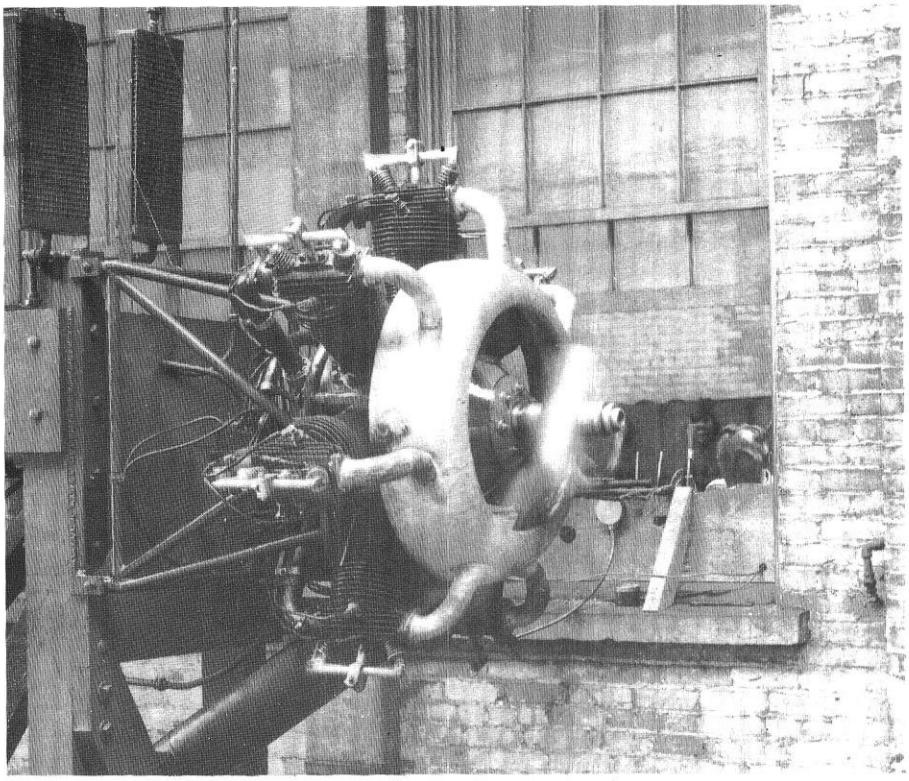
Soundproofing tiles were the company's main income product. The accoustic tiles were made of perferated metal plates covered with cheese cloth then again with felt. Even the capitol building had a room covered with their tiles.

One of his greatest accomplishments at the Burgess lab was helping to design the states first temperature controled cars. It was built from the parts of an old Ford taxi. Air was drawn in from below the front windshield. There it entered a heater and the flow was then divided, half of the air stayed to warm the car while the other half was forced between panes of glass that made up the double windshield. This heated double windshield became the first defrosted windshield. Inside the car the heated air went into a chamber at the ceiling. Airpressure forced the hot air from the ceiling to the vents in the floor of the back seat. Opening and closing of side vents kept the car at an even 70^{0} even in the winter, something Madison had not seen in the '30s.

Wisconsin taxes forced the Burgess Company out of the state, so the company's board of directors bought out several of the labs important patents and started Research Products Lab.

Now Niemann was allowed freer rein of the lab. He helped develop a rubber mesh called Neotex, that is now used on trays at rootbeer stands. After the second world war came, rubber was scarce, so a process was developed to make the same kind of mesh using rubber coated paper fibers.

Soundproofing was still one of the major concerns of the new company. They profected the first soundproofing for mufflers. It consisted of Goose Lake clay pellets fired at high temperature and packed around the muffler.



Here Nieman is testing the Comet Engine.

One way the lab made money was to develop a manufacturing process far enough to patent it and sell the patent to other companies. It was for this reason that they sold their process for producing white paint without using white lead to Sherwin Williams.

Extended aluminium was one of the secrets they kept to themselves. This process took a sheet of aluminium and cut it in such a way that it could be stretched to form joles. The concept was used to make several types of filters.

Niemann produced the first intake filters using outside layers of extended aluminium with inside layers of fine wood fibers (wood wool) which was then heat treated. He also developed a paper seal used on soda bottles of the day. He worked his way up in the lab until he was in charge at his retirement in 1967 at age 74.

Being away from his lab doesn't mean Niemann is not busy. He is deeply involved in a society of people interested in WWI and gives many slide shows on the subject. In the early 60s he served as a technical consultant for the movie 'The Blue Max'. His correspondants include many survivers of WWI, and such notables as George Papard and until his death Jona Von Ustinow, Peter Ustinow's father. But with the coming of the Christmas season he is better known as the Lodi Santa Claus.

So forget all you've heard about St. Patrick being an engineer and remember Santa is an engineer; and a self made engineer at that!

Jim Mitchell helps make glass ultra-transparent...

so that hair-thin glass fibers can carry telephone calls as pulses of light in lightwave communications systems.

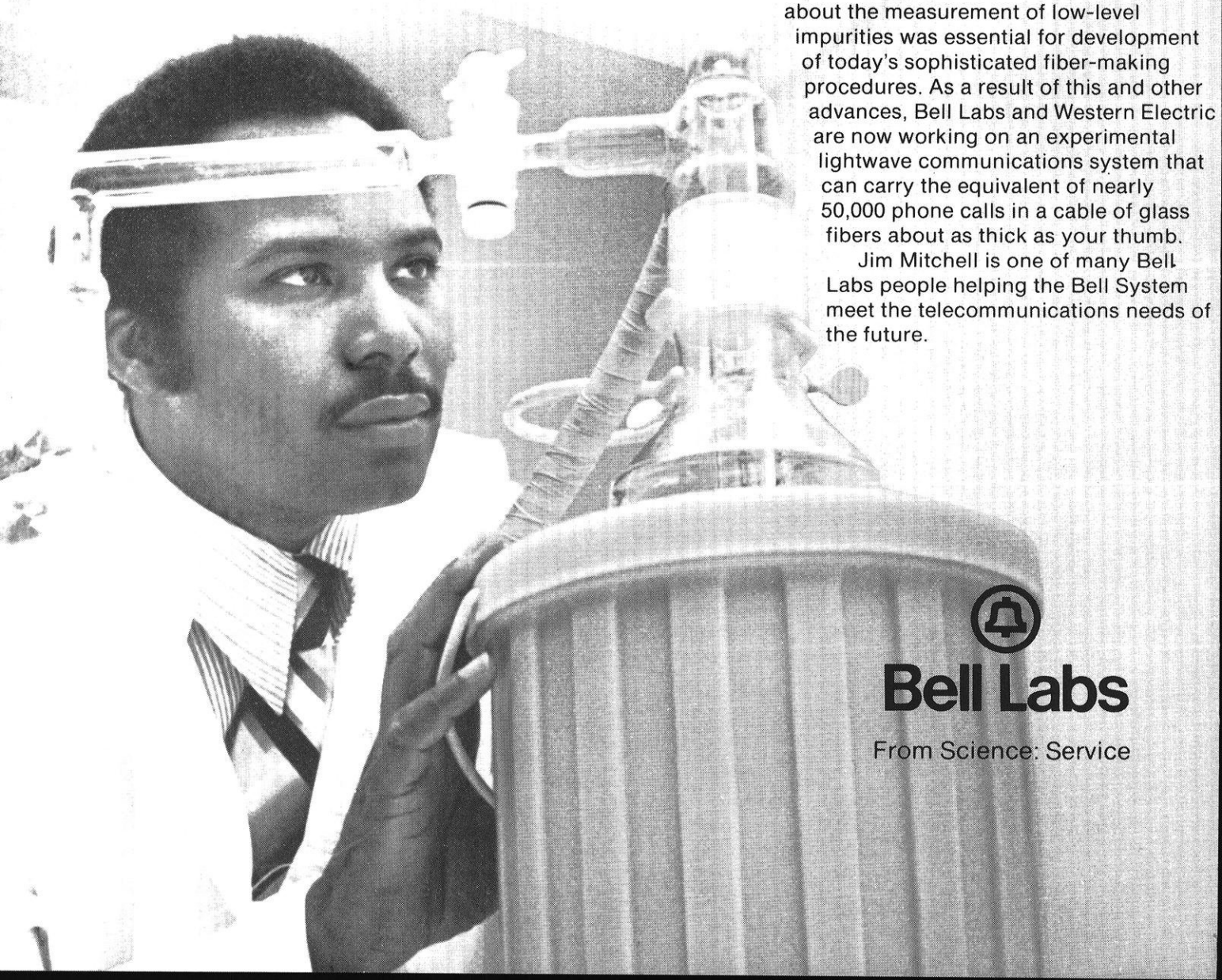
In this new technology, transparency of the glass fibers is a critical factor in their ability to carry light signals for communications. And thanks, in part, to advances in materials analysis achieved by Jim Mitchell and his colleagues, Bell Labs and Western Electric are producing some of the most transparent glass the world has ever known.

Jim led a task force that identified and measured extremely small amounts of impurities in raw materials used to make glass fibers. With a BS in chemistry from North Carolina A&T, and a PhD in analytical chemistry from Iowa State, he was well prepared for the job.

Since contamination could easily be caused by lab equipment and even the air in the room, Jim first designed a special "clean room" for the research, and then devised highly sensitive analytical methods for measuring impurities as low as two parts per billion. One of his techniques, called cryogenic sublimation, is a promising low-temperature process for purifying chemical reagents.

Jim's contribution to basic knowledge about the measurement of low-level impurities was essential for development of today's sophisticated fiber-making procedures. As a result of this and other advances, Bell Labs and Western Electric are now working on an experimental lightwave communications system that can carry the equivalent of nearly 50,000 phone calls in a cable of glass fibers about as thick as your thumb.

Jim Mitchell is one of many Bell Labs people helping the Bell System meet the telecommunications needs of the future.



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Electrifing Issue,

Electrocution

by Sue Brunkow

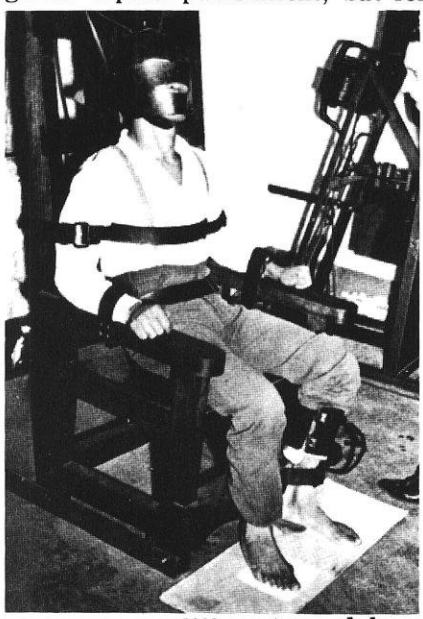
Professor Theodore Bernstein of the Electrical Engineering Department is considered one of the nation's leading authorities on legal electrocution. His curiosity about electrocution and the history of the electric chair developed from his interest in electrical and lightning safety. He was constantly asked how to keep people from being killed by electricity, and began wondering how electricity had first been used intentionally to kill. He has spoken about the topic to many groups, some as far away as Boston, and is planning a lecture here on lightning in January.

The story of the electric chair started in New York state, in 1888. After several unfortunate hangings, where the condemmed men died slowly and painfully by strangulation, the governor of New York appointed a committee of three men to find a more effective and painless method. In hanging, if the rope was the wrong length, it would fail to break the neck, resulting in a slow death by strangulation. Shooting, beheading and strangulation by the garrotte were all considered, but rejected because of the mutulation that they caused to the body. One of the committee members, Dr. Alfred Southwick, a dentist, recommended electrocution. He had seen a man accidentally electrocuted by putting his hands accross the terminals of a generator, and noticed that it was quick and appeared painless. Southwick (known as the "father of legal electrocution") did some experimenting with animals to verify this. The comittee made this suggestion and after January 1, 1889, the death penalty in New York was to be carried out by electrocution.

This new law didn't have to wait long to be tested. In March, a drunk named William Kemmler murdered his drunken girlfriend with a hatchet in front of her five year old daughter. Kemmler was sentenced to die by electrocution, but the details had to be settled first. A major argument had been brewing between Thomas Edison (who developed Direct Current) and George Westinghouse (who developed Alternating Current) as to which should be in general use. Edison had much money invested in his promotion of DC, which was more popular at the time. Its major disadvantage was that it had to be generated at the same voltage it was used at, and power stations were needed every few miles. He thought that AC was much too dangerous for public use, and tried to have a law passed limiting it to very low voltages. Westinghouse had just begun to promote AC, because an efficient, easy to manufacture transformer had finally been developed. Of course, neither man wanted his name or product connected with execution, so when electrocution was discussed, their positions were reversed. Edison was against capital punishment, but felt the electrocution would be painless, and thought that the very dangerous AC should be used. Westinghouse objected, saying that it would give AC a bad name and make people afraid of it, ruining all of his promotional work.

While this argument was going on, Kemmler's lawyer was appealing the sentence. He argued that nobody was sure what voltage was needed to kill, and they couldn't guarantee that it would be efficient or painless. A dog that had survived being struck by lightning was brought in as proof that electricity didn't always kill. The controversy continued, but Kemmler's appeal was finally denied, and the decision was made to use AC. (The word electrocution hadn't been used yet, and Edison suggested using the term "Westinghouse".)

Kemmler was executed in August, 1980. The 20 or so people present were so excited that nobody thought to check the voltage, and the first ten seconds wasn't enough to kill him. The switch was pulled for another 70 seconds to insure his death. The execution caused more controversy,



Many different models of electric chair existed.

Liberal Arts,

Courses We Recommend

There comes a time in every engineer's life when he discovers he needs 15 or more liberal arts credits to graduate. To help the students pick a class that will suit his needs (no the blindfold method doesn't always work) we at the Engineer, asked various students found loitering at the library about their favorite liberal arts classes. Most answered that they had not taken any. Some recommended classes are listed below, along with a short discription.

Macro Economics-Econ 101, 103. 4 credits.

The general standby. Some majors require Econ 101. Most students rate Econ 101 to be harder since it requires several papers on specific case studies.

Fantasy and Science Fiction-Comp Lit. 357. 3 credits.

This is the course for those interested in science fiction. It requires reading several novels and short stories grouped into topics such as utopias, men and machines, etc. The two exams and final are multiple choice and short answer. One project is required. It can be anything from a radio show to writing your own science fiction story.

Symphony-Music 106. 2 credits.

This course is said to fall into the catigory of an easy A and interesting at the same time. There is very little out of class work. The class usually consists of listening to music and lecture or discussion on the piece. Missing a class is not recomended.

Military History of the U.S.-History 396. 4 credits.

As a history course this rates number one. Prof. Coffman is said to be a fantastic lecturer and may change your mind about falling asleep in history lectures. Exams are 25 . multiple choice and 75. essay. One paper, an interview with someone who served in the military, is required.

Intro to Cultural Geography-Geography 101. 3 credits.

Far from being a 'name that river' course, this class deals with the Earth's effect on people. Mountains, rivers, and climate and their effects on a country's political and economic systems.

Civil Liberties-Poli Sci 471. 3 credits.

Do you know your civil rights? How far do your rights of free speech, press and religion go? Class consists of lectures on cases and supreme court policies. Exams consists of three or four mock cases for the student to decide in an essay form.

Computers and Society-Comp Sci 550. 3 credits.

Yes, this is a humanities course. The class is revelent to the engineer or science major. Besides, telling your friends you are in Comp Sci 550 is quite an ego trip. It allows the student alot of computer time and projects can be anything from graphed out pictures to computer produced music.

General Engineering

Technology, Man and Cultural-Gen Engr 121

The Man Made World, Man Machine Interaction-Gen Engr 310

Technology, Values and Changing Life Styles-Gen Engr 328

For those of you who refuse to walk to 'that' side of campus, here are some engineering courses especially designed for the engineering student. They all count as liberal arts credits. Look them up!

If none of these classes fit your needs, you could always try the blindfold method.

---

the electric chair

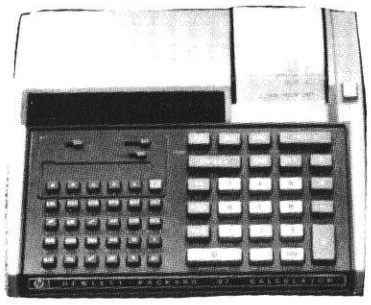
were executed in New York. Soon other states began considering the idea, and electrocution was on its way to becoming an accepted means of execution.

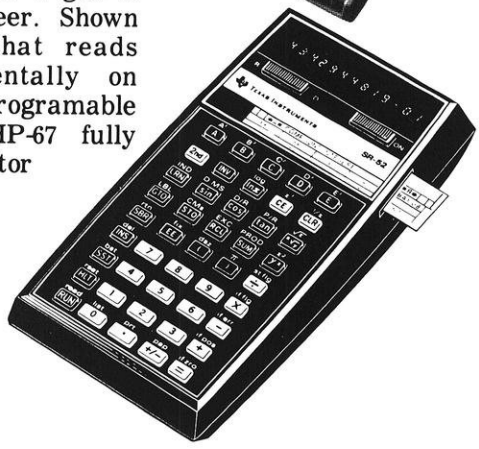
By now, you're probably wondering how it's done. Death is caused by a high current which stops the heart, followed by a lower one which induces ventricular fibrulation ("quivering" of the heart instead of regular beating).Also, a current of more than 1 amp is sufficient to cause tissue damage. The specific method varies from state to state, but all use a cap on the head and another electrode connected to the leg. One method is to use 2300 volts for 7 seconds, followed by 550 volts for 52 seconds, then repeat the cycle. In Illinois, the current used is 7 amps and in Pennsylvania, steps of voltage are used: 2000, 1500, 1000, 500, and back to 2000 for 7-11 seconds apiece, with a current of 8-14 amps.

The last legal execution was in 1966, in Oklahoma. Recently, several states have considered reenacting the death penalty. Personally, Dr. Bernstein is against capital punishment for several reasons. He states that it doesn't really deter crime, because states with and without it have the same murder rate. The legal process is slow because no jury dares make a mistake that would condemm an innocent man to death. Finally, it weighs against the poor and nonwhite, and demeans the people who have to carry out the sentence.

Prof. Theodore Bernstein believes his talk on the electric chair and electrocution will help promote electrical safety.

Gift Ideas For the Engineer





CALCULATORS

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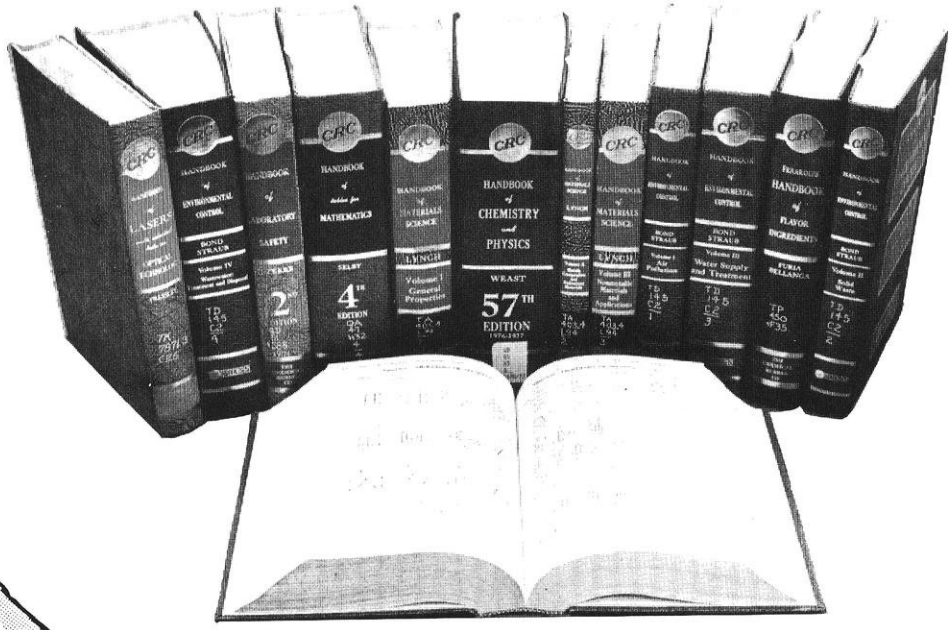

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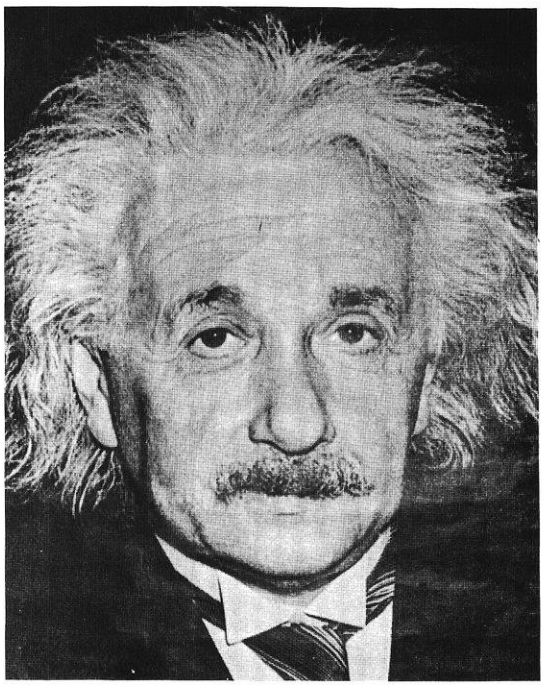
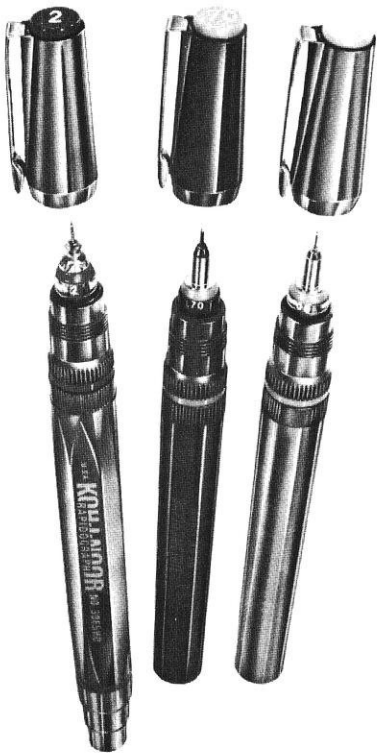
Rubber Company's Handbook of Cheistry and Physics, full of mathmatical equations, physical constants, and other trival data that engineers are supposed to know. He 'll thank you every time he uses this invaluable text.

in Your Life



Einstein A poster for his wall that is sure to inspire him through his math and physic classes.



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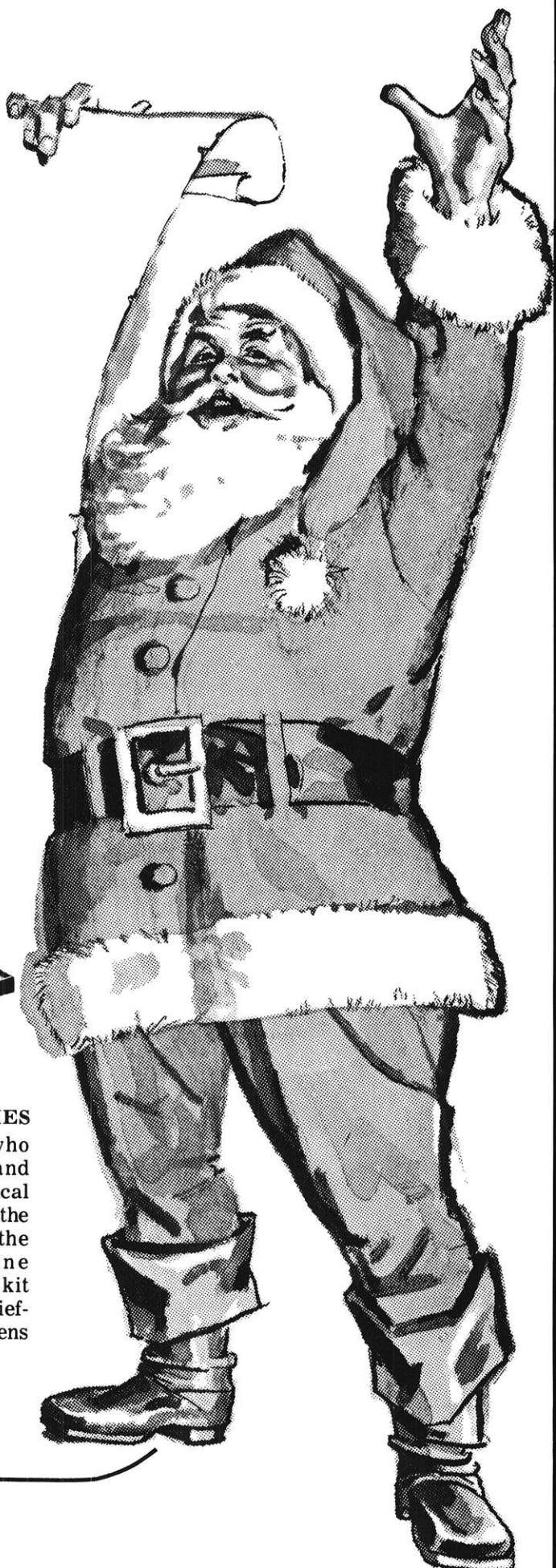

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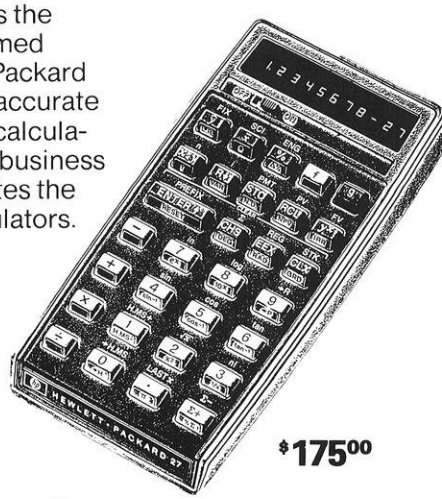

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Friendly Courteous Service

The Christmas Story Retold

by Juanita Smith

"Why do they string up all those lights, Father?"

"It's an ancient custom."

"What custom Father?"

"I think it has to do with an ancient religious festival that occurs once every sun cycle. I have observed many similar lighting customs in the years I've patrolled this sector, but this one seems to be the most consistent, involving the same sun cycle after sun cycle."

"Why do they do it Father? It seems so useless to waste energy like that."

"To them it's not wasted energy. It has meaning, like our igniting ceremony; remember when your mother lost her soul stone? Well, it is like that, sort of."

"Sort of. Only sort of? What's it all about, Father?"

"It's a building festival, according to the Histtechneers. The lights have to do with an event that happened thousands of sun cycles ago."

"Please tell me about it Father, please!"

"Certainly, Phetharinon."

"As I said, thousands and thousands of sun cycles ago, before they had even learned the rule of basic mechanisms, there existed a quite primitive civilization know as the Rominos. Neighboring this nation was and even more primitive group, a tranquil citizenry of peasants and simple fisherfolk called Joodes."

"Now, the Rominos were warlike, somewhat similar to the Felczars of Theklos..."

"That bad?"

"Well, not that bad, but pretty nasty most of the time."

"Anyway, the Rominos were in the process of conquering the Joodes and other close nations. According to the Histtechneer Skirlarinon 75415, the Joodes were very religious and had customs and so-called prophets that dated back before the Rominos, to a time when another civilization ruled. In one of the many prophecies a Saver was said to come when there was urgent need, to free them from oppression and save them from their evil doings."

"The urgent need seemed to be the Rominos invasion, thus the time was ripe for the Saver to arrive."

"Did the Saver arrive in time to keep the Joodes from being dismantled?"

"Yes, but not in the way the Joodes expected. They were waiting for a rich and powerful Saver who would drive out the Rominos from their land and rule them forever, protecting them."

"But instead, in one of the small communities called Bethlemm, the Saver, and ordinary woodshaper's son, was built. He was built in what was known as a manger. His mother and father couldn't find any decent place to stay, so they settled for a manger..."

"What's a manger?"

"I guess it's some sort of storage place."

"Anyhow, to let all the Joodes know about the building of the Saver, a nova became visible in the night sky, which shone down like a headlight on Bethlemm."

"Thus the custom of lights, to symbolize the nova that announced the coming of the Saver."

"What did they name the Saver, Father?"

"Jesus Christ."

"Oh."

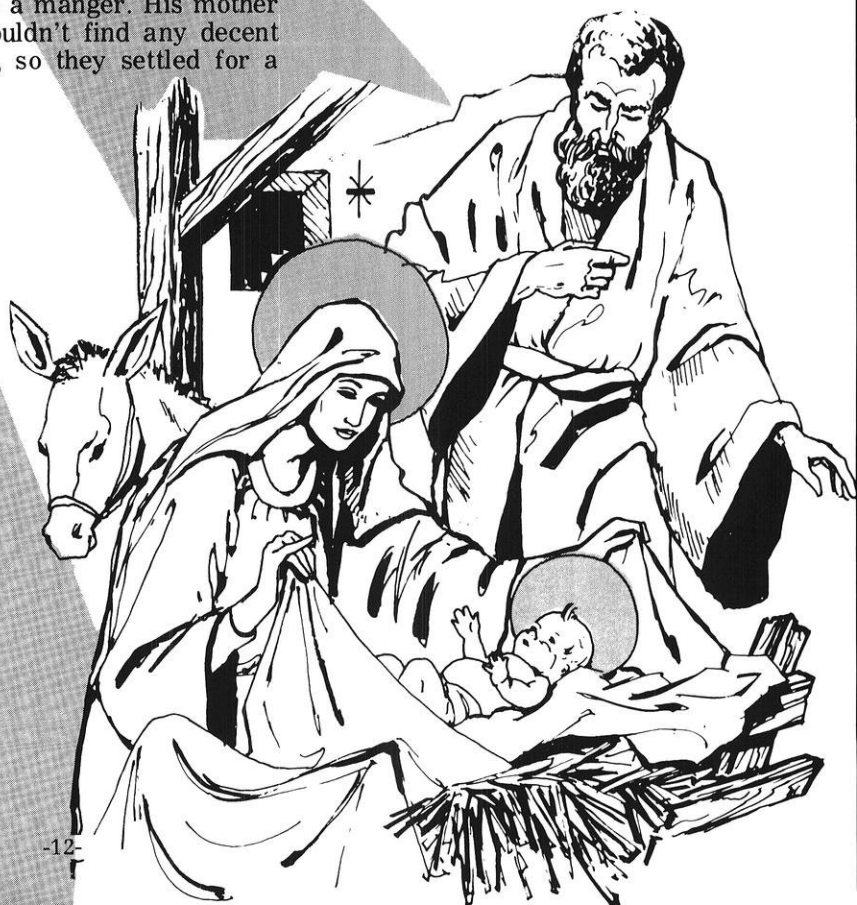
"Shall we go home now, Phetharinon?"

"Okay, Father;Father?"

"Yes."

"Can we string up lights like that too?"

"We'll see, Phetharinon, we'll see."



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In surety bonding there are three parties to the contract. The corporation or individual guaranteeing the performance of the contract is the surety. The person or organization whose obligations are guaranteed is the principal. The person, firm or corporation protected by the bond is the obligee.

In bonding, the principal obtains the bond and pays the premium in order to provide protection for the obligee. In the ideal situation, there will be no losses under the surety bond because in its investigation, the surety would discover any potential losses before agreeing to write the bond. However, a loss may be caused intentionally by the principal. The premium for the bond, unlike insurance, should not have to contain any expected-loss allowance and would thus coner only the surety's investigation and provide some margin for profits and chance events. In practice, some losses are incurred by the surety because its investigation are not completely effective. If a loss does occur, the surety may require the principal to reimburse the surety for the losses once the surety has paid the obligee for the damages.

There are two types of surety bonding used in construction contracts. Bid bonding guarantees that the bidder who wins the awarding of the contract will sign the contract and post a performance bond. A performance bond guarantees that the contractor will complete the work according to the agreement between the owner and the contractor as stated in the contract. The surety usually also guarantees that the contractor will pay all labor and material bills, but the unpaid laborers and material suppliers have no right to proceed directly against the surety. This bond may guarantee that the obligee will not suffer any loss for some specified period of time resulting from defects in constructions. Contract bonds usually cover supply, construction or maintenance. Some of these bonds state that the surety will carry out the contract if the principal fails to do so; others promise to pay damages.

In order for claiming of damages by the obligee to be held valid, the obligee must notify the surety of any accident or loss resulting from the actions of the principal. The surety then does what is necessary in the way of investigation, settlement or defense of suits to properly protect the rights of the insured.

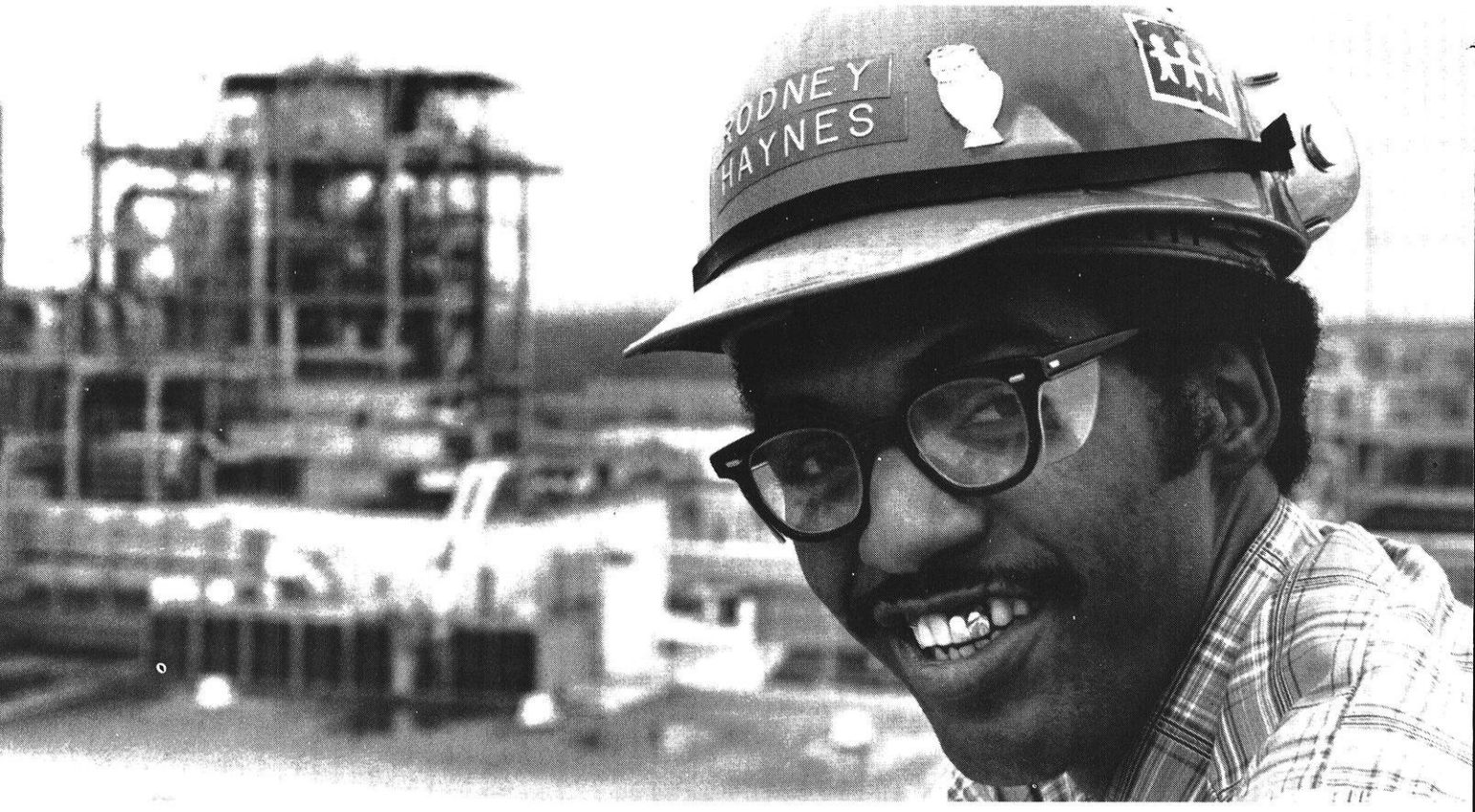
The best protection contractors and engineers have is to be sure they can handle a project both technically and financially before undertaking it.

by Chris Thomas

..Know Your Rights is a series dealing with engineering and the law. Next issue Patents and the Law.

Five Du Pont plants depend on me for design of electrical equipment and instrumentation.

—Rodney Haynes BS, Electrical Engineering



"I've been an energy control design engineer since shortly after my graduation in 1974 from Lamar University. At the moment, I'm working on projects totaling almost a quarter of a million dollars.

"What I like most about my work is the variety...getting into other phases of engineering...plus the responsibility for everything I do."

Rodney worked part time while in high school in a Du Pont-sponsored Minority Manpower Resources Project. Today, he is helping to recruit blacks through the MMRP at Texas Southern.

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UPCOMING INTERVIEWS

SPRING 1977

Check Placement Office

Bulletin Boards

Room 1150, Engineering Building

Regularly for

Additions and Deletions

to Interview Schedules

THURSDAY, JANUARY 27
Louis Allis
Fischer Controls
Hamilton Standard
McDonnell Douglas
Parker Hannifin
Wis. Public Service

FRIDAY, JANUARY 28
Commonwealth Edison
Hamilton Standard
McDonnell Douglas
Radian Corp.
Reliance Electric

MONDAY, JANUARY 31
Allis Chalmers
Eastman Kodak
Hewlett Packard
Ill. Tool
Outboard Marine
Texas Instruments

TUESDAY, FEBRUARY 1
Celanese Corp.
Charmin-P&G Paper Prods.
Eastman Kodak
FMC-Northern Ordinance
Hewlett Packard
Ill. Tool
Texas Instruments

WEDNESDAY, FEBRUARY 2
Celanese Corp.
Charmin-P&G Paper Prods.
Dow Chemicals
GTE-Automatic Electric
Hewlett Packard (summer)
Rohm & Haas
Std. Oil Of Calif.
Westinghouse Electric

THURSDAY, FEBRUARY 3
Dow Chemical
Std. Oil of Calif.
Union Carbide Corp.
Westinghouse Electric
US Energy R&D (government)

FRIDAY, FEBRUARY 4
Aramco
Ladish Co.
Material Service
Northern Ind. Public Service
Std. Oil of Calif.
Union Carbide Corp.
Zimpro
US Energy R&D (government)

MONDAY, FEBRUARY 7
Consumer Power
Conwed
Cutler Hammer
DuPont Co.
Kimberly Clark
Olin Corp.
Square D Co.
Stauffer Chemicals
UOP- Process Division
Wis. Natural Gas
Action / Peace Corps / Vista

TUESDAY, FEBRUARY 8
American Electric Power
Atlantic Richfield
Chrysler Corp.
Inst. of Paper Chemistry
Motorola Inc.
PPG Industries
Schneider Transportation
Action / Peace Corps / Vista

WEDNESDAY, FEBRUARY 9
Conco (continental oil)
CONSO (consolidation coal)
Container Corp. of America
DuPont Co.
General Foods
Interstate Power
PPG Industries
Penn. Div. Johnson Controls
Pratt& Whitney
Union Oil
Action - Peace Corps - Vista

THURSDAY, FEBRUARY 10
Container Corp. of America
DuPont Co.
General Foods
Modine Mfg. Co.
PPG Industries
Pratt & Whitney
Shell Co.
Texaco Inc.
Action/Peace Corp/Vista

FRIDAY, FEBRUARY 11
Bemis Co. & Curwood Div.
Cargill Inc.
Container Corp.
DuPont Co.
General Food
Harnischfeger
IBM
Shell Co.
Action - Peace Corp - Vista

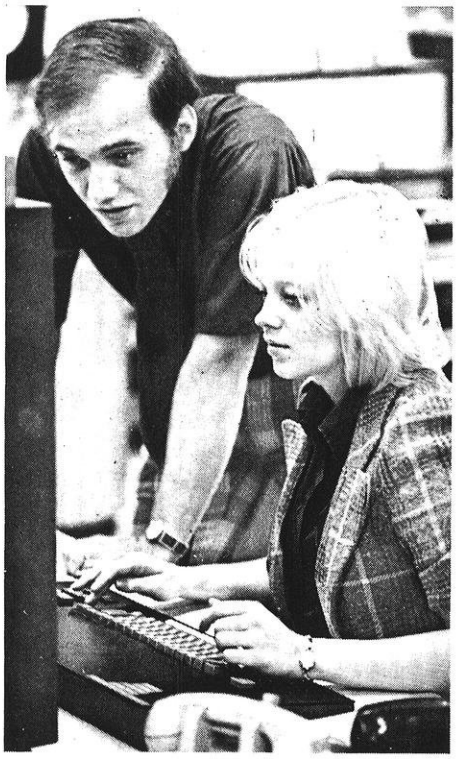
MONDAY, FEBRUARY 14
AMOCO Oil (RT&E)
Gen, Dynamics.
B.F. Goodrich
Goodyear Tire

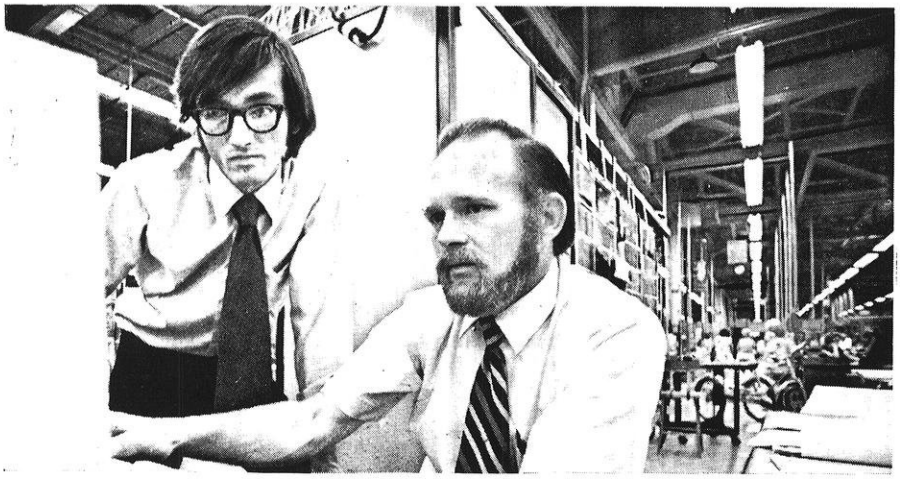
TUESDAY, FEBRRUARY 15
ALCOA
Applied Physics Labs
Babcock & Wilcock
Bell System
Deere Co.
Firestone (Akron)
Maytag Co.
Trane Co.
Uarco
Wis. Electric Power
Wis. Power & Light

WEDNESDAY, FEBRUARY 16
ALCOA
American Appraisal
Applied Physics Labs
Bell System
Deere Co.
Eaton
Firestone (Akron)
Hurcules Incorp.
Shure Bros.
Trane Co.
Whirlpool
Wis. Power & Light

THURSDAY, FEBRUARY 17
Americain Apppraisal
Bell System
Brunswick
Clark Dietz & Assoc.
Factory Mutual Engr.
Firestone (Akron)
Foseco Minsep Inc.
Honeywell Inc.
Owens Corning
Rexnord
Rockwell International
Torrington Co.
Trane Co.
Whirlpool
Wis. Power & Light

FRIDAY, FEBRUARY 18
American Can Co.
Brunswick
Burroughs
Chicago Dept. of Public Works
Clark Dietz & Assoc.
Firestone (Akron)
Honeywell Inc.
Owens Corning
Rockwell International
A.O. Smith
Trane Co.
WABCO- West Air Brake





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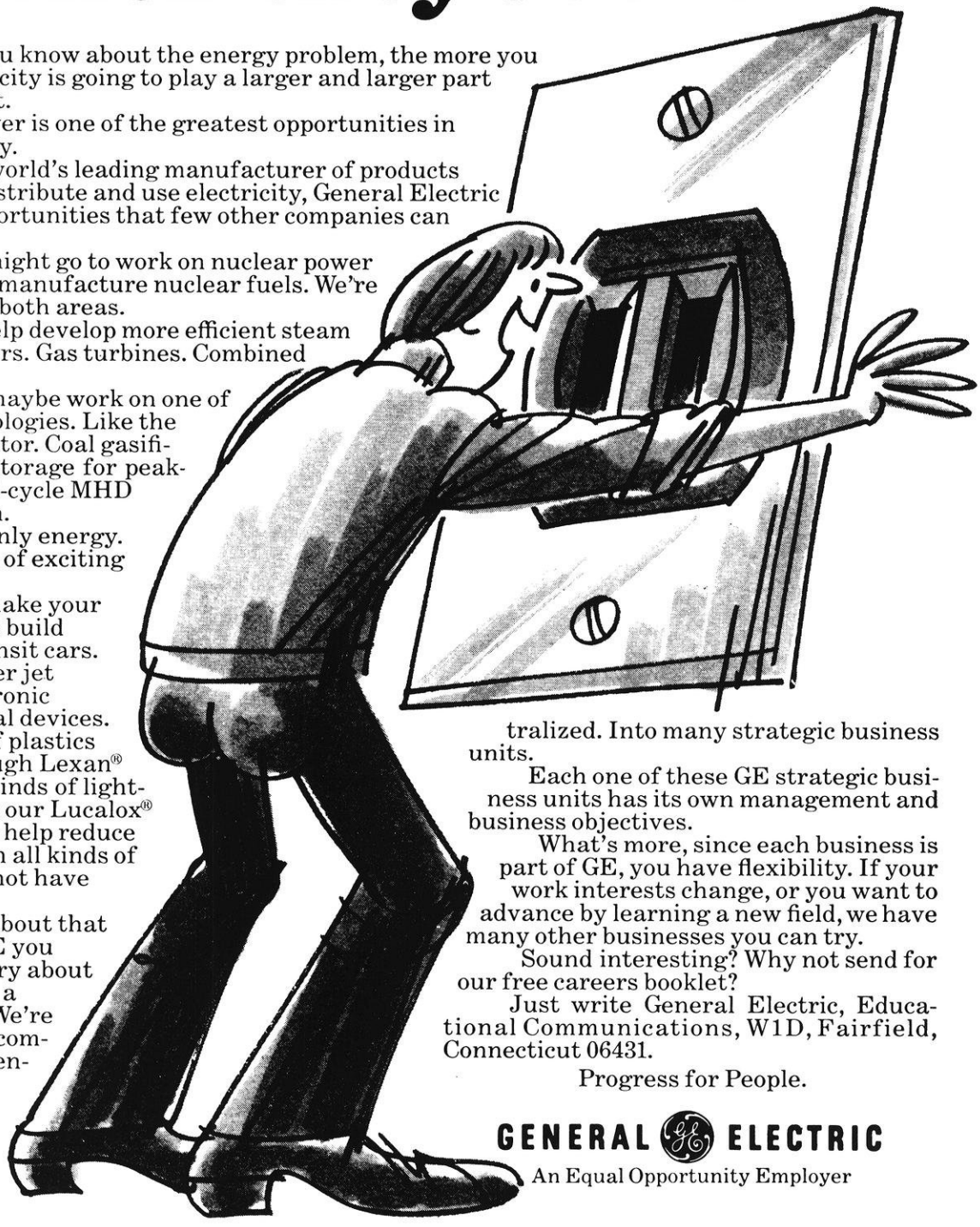

Each one of these GE strategic business units has its own management and business objectives.

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