

CONTENTS	
TOPIC	PAGE
Editorial	1
The electric car	2
Submitting articles	3
War stories	3-5
IEEE Code of Ethics	6
Preserving your records	6
Nitro health tip	6
Ordering Legacies	7
Where the money goes	8
Roster	8
Where to write	8
Stopping services	8
4th-1st quarters 1996-1997	

As I end my term as Chair of the Life Members Committee (LMC), I am pleased to report that the question of Life Member eligibility is finally on its way to being resolved. After much discussion, it appears that IEEE, pending BoD approval in 1997, will return to the old requirement, wherein Life Member Status requires that an IEEE member be at least 65 years old and the sum of his or her age plus his or her paid years as an IEEE member or member of one of its predecessor societies equals at least 100.

One of the interesting proposals made by the team working on a strategic plan for the Life Members Committee is to have Section Life Member Committees. This is still in the early stages of discussion, but it appears to have great promise for both the LMC and other entities of the IEEE who might, more easily, take advantage of the experience of our members. Incidentally, the team is headed by Dick Jaeger who will replace me as Chair of LMC starting in January 1997.

In November I attended the third annual conference of project RE-SEED. That's the program created by Northeastern University in which retired engineers and scientists are given 12 days of training prior to sending them out to middle schools to help in educating middle school students in science and technology. The program which started in 1991 with six volunteers in the Boston area now has over 200 in New England with plans to go nationwide. The program is funded, in part, by the National Science Foundation and the Noyce Foundation. In support of that effort, LMC has voted to supply funding for the next three years. The conference itself was very stimulating. There were about 75 in attendance. A few of the volunteers put on demonstrations to illustrate the simplicity of the program on the one hand but the tremendous impact their demonstrations have in illustrating technical principles. One statistic that impressed me was the fact that 75% of the volunteers come back for at least one more year. I was also impressed by the fact that a sizeable fraction of the volunteers are IEEE members.

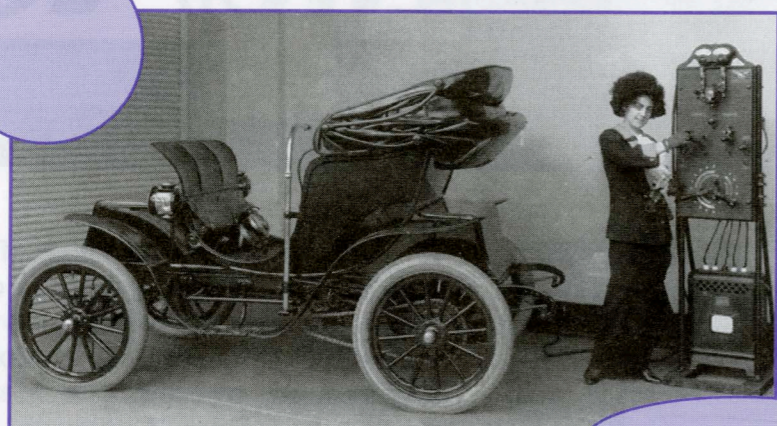
In the last Newsletter I mentioned that some members wondered about what to do with their archival literature. I suggested re-cycling. The result was that I received letters and phone calls from individuals who found ways to dispose of their literature primarily to libraries. Obviously, my suggestion was wrong. In the meantime, the RAB/TAB Transnational Committee under the 1996 Chairmanship of Charles Turner has been working on a project to distribute periodicals to libraries in Eastern Europe. Contacting the RAB/TAB Transnational Committee at the IEEE offices in Piscataway would be a good first step.

**Theodore S. Saad, Chair
Life Members Committee**

"It is not reasonable to believe our civilized society will forever permit poisoning the air of the city streets by the smelling of exhaust gases of thousands of gasoline cars, when electricity can perform the duty in a safer and better manner."

Charles Proteus Steinmetz

The electric car



This 1904 Columbia electric car was built by Pope Manufacturing. The mercury arc rectifier, which converted AC to DC, was used in the home garage to charge the car.

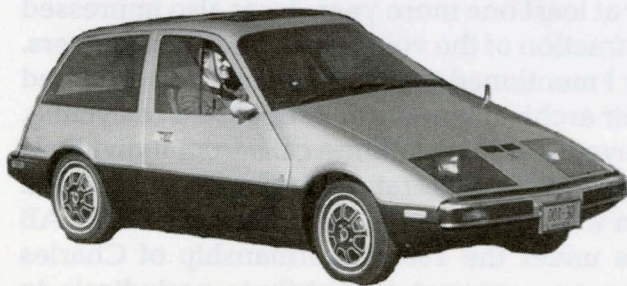
After being successfully sued by the American Lung Association, the US Environmental Protection Agency (EPA) states it will seek stricter rules for air quality compliance (27 Nov. '96). Lowering the allowable ozone amount and extending the time period from one to eight hours, and setting standards for particulates measuring 2.5 microns are the primary changes. The goals: to reduce the 60,000 estimated U.S. annual deaths due to particle pollution by 20,000; reduce by a quarter of a million the cases of aggravated asthma; reduce by 60,000 the cases of chronic bronchitis; cut haze in national parks by almost 80%, and save \$1 billion a year in damage to crops. One hotly debated source of help is the electric car.

The car. Fast, powerful, it means independence and control for its drivers. This has made it immensely popular to the tune of almost 500 million cars worldwide and counting. (Automotive manufacturers project hiring 32% more new graduates in 1997 (NACE 6 Nov. 96).) This is putting a strain on our environment that is starting to show. Within two decades, some experts feel gasoline and diesel fuel run cars and trucks could do our environment in.

The first battery operated vehicle was built by Edison in 1889. By 1914, Edison and Ford had two working electric "Model Ts." However, limited range and weight even then were major problems along with cost and speed. Eventually, electric cars lost the battle of electric vs. steam vs. gasoline.

Those early problems are still drawbacks for many. Being able to drive wherever, whenever is a sacred thing. However, change is in the air. The automotive companies know it. GM has rolled out its first commercial cars in California and Arizona. The government is even helping out with its favorite method: military spending.

With DARPA's (Defense Advanced Research Projects Agency) bucks behind the wheel, success probably will come this time. Their objective, besides supporting the commercial-military industrial base, is to develop vehicles able to operate in a battery-only mode. This supposedly will give the military the ability to move undetected on the battlefield. (Fuel fumes or motor noise won't give them away.)



Described in the PR release as "sleek and low-slung," this 1978 Centennial Electric was rolled out in honor of General Electric's 100th birthday. It accelerated from 0-30 mph in nine seconds.

DARPA is setting up consortia all over the United States. CALSTART, Southern Coalition for Advanced Transportation (SCAT), Mid Atlantic Regional Consortium for Advanced Vehicles (MARCAV) and the Northeast Alternative Vehicle Consortium (NAVC) are just a few.

The projects they are working on also have great acronyms: HMMWV (my personal favorite) stands for Hybrid Electric High Mobility Multipurpose Wheeled Vehicle. The goal is to convert a conventional HMMWV to a hybrid electric power one via a smaller diesel motor-generator set in series with dual electric motors. This energy will come from advanced lead-acid batteries. DARPA states this will minimize the use of imported oil which, in turn, helps the environment, national security (naturally) and US trade deficit.

(You may be thinking that lead emissions are not exactly a healthy, environmentally-safe alternative. This issue is being debated. CARB (California Air Resources Board) contests published findings from a Carnegie Mellon University professor over lead emissions' estimates from lead-acid battery-powered EVs versus conventional vehicles. CARB also points out that lead-acid batteries are viewed as a short term solution.)

Two of the many other EV related projects companies are working on are: NEVs (Neighborhood Electric Vehicles) which resemble enclosed golf carts and are considered useful as second cars for short commutes. The "sparrow" a one-passenger EV that according to its company, Corbin-Pacific, "fits the needs of 87% of the US population with daily commutes of 18 miles or less."

Guidelines for submitting articles

We welcome articles from Life members for the newsletter. Generally, they should be 500 to 1000 words in length. If you want to check out an idea before writing a piece, please query by letter (address on page 8), phone: (908) 562-5526 or email: regional.activities@ieee.org

The deadline for possible inclusion in the next newsletter is 10 April 1997. Editing, including length if needed, may occur.

"War stories" should be approximately 750 to 1000 words. Acronyms should be spelled out once. Reference dates (years) should also be included. Be sure to provide a phone number and/or an e-mail address (if you have one).

War stories

Dashed to ashes

The war story by Walter W. Frey brought back memories. I also was involved with the ASW Drone Helicopter Program in 1963 as an Electronic Design Engineer for Babcock Electronics in California. Babcock had a navy contract to provide radio control equipment for the DASH program (Drone Anti-Submarine Helicopters) built by Gyrodyne in New York. Several drones had been lost due to remote control equipment failure. The autopilot and receiver equipment were possible failure sources.

I was sent to Pax River Naval Air Station to investigate what was happening during the flight tests. I had designed the 450 MHz receiver which was under suspicion. I went up the Chesapeake Bay from Charleston as a guest of the Navy on a destroyer outfitted with a special landing pad and radio control equipment for the helicopter. When we arrived at the test area it was very cold. To my surprise, they had outfitted the normally pilotless jet drone with a seat for someone to manually override any false radio commands. I watched a brave contractor sit on the exposed rear end of the drone while it maneuvered around within 10 feet of the water at 100 mph. He found it necessary to override the radio control equipment several times to avoid crashing.

We were convinced there was a problem. At a subsequent meeting we found out the drone did not have a battery system to stabilize and smooth the supply voltage. The equipment was designed for 22 to 32 volt dc operation. It was determined the voltage supplied to the control equipment in the drone was outside these limits.

see page 4

Mis-directed aim

In 1943, I was at a parachute training school near Ramat David, Palestine. I was to test a radar, code-named "Rebecca/Eureka" as an aiming system for precision parachute drops. During the testing, it was important to know exactly where the aircraft was when the radar operator thought he was over the ground-based transponder. The aircraft was tracked using a theodolite. The tracking was stopped when the radar operator announced, by radio, that he was over the target. Errors in tracking the fast-moving aircraft and in responding to the transmission from the operator proved to be unacceptable; so someone conceived the idea that we should use a smoke signal. This signal would be fired by the radar operator as an aircraft position indicator.

Dashed to ashes . . .

continued

When asked the possible consequences of this out of spec voltage condition, I responded, "The results could be catastrophic." And they were. The problem was corrected but not before several \$100,000 drones were lost. This oversight may have contributed to the demise of the program.

As stated by Mr. Frey, even without system failure, the physical and mental limitations of the operators were potential sources of failure. Only very special people have the necessary attributes required to remotely control a helicopter. Once the drone was being flown by observation on radar, it became easier but still it was a major challenge.

All things considered, I believe DASH was a good ASW weapon.

Thomas Lee Fischer, Sr.
Life Senior

The standard smoke puff exploded about three seconds after firing. During this time, it had considerable lateral velocity, plus the forward velocity of the aircraft. Thus, we concluded intolerable error would still be introduced. The obvious solution was to create a pyrotechnic which produced a smoke puff immediately after it was fired. The smoke signal cartridge contained a propellant and a smoke chemical canister. The latter had a thick plastic baffle at its base, through which the delay fuze burned. I removed the delay fuze, reassembled the cartridge and took it outside to test. I was accompanied by three mechanics from my Unit.

My test results are best reported by my diary entry for Tuesday, 26 October 1943. Based on the old principle that you should not order an enlisted man to do anything you were not prepared to do yourself, I was the guy behind the flare pistol! . . . *I held it up above my head and pulled the trigger. There was a terrific blast and heat and noise. For a couple of seconds I staggered around, trying to maintain consciousness, then I felt Messenger holding me up and asking, "Are you all right, sir?" . . . I was leaning against the wall of the building, holding my limp right hand in my left one while blood dripped from my trigger finger to my knee. The right side of my face was numb and my shoulder and arm were limp. I set off for the sick quarters, where Doc Tolhurst fixed me up. We deduced that the pistol, after the trigger guard had torn free of my finger, travelled back, glanced off my jaw and struck my shoulder with some force, cutting the skin in several places. . . . Later Messenger noted that there was very little smoke - obviously the smoke charge detonated instead of burning. I noted that all the hair had been burnt off my hand, and half way up to my elbow! . . .*

The scar on my trigger finger I wear with some chagrin until this day!

Ralph D. Pynn
Life Senior

The history of GEE

For many years I was associated with the late R.J. Dippy. He is acknowledged as the father of the GEE navigation system.

He told me he had the idea for GEE before World War II (WWII) but the real need for it arose when Bomber Harris (Chief of Bomber Command) visited his organization and said he needed a simple navigation system because his bombers were getting hopelessly lost. Before WWII it was believed that navigation presented no problems since bombers could D.F.(direction finder) on broadcast stations. Dippy introduced his navigation system and it was a great success. Dippy worked very closely with industry and when the need for a name for the system arose he was consulted. He said it was a grid navigation system so it was agreed that its name should be G for grid. The name became better known as GEE, and Long Range Navigation became LORAN.

In my early years, I spoke to an engineer from EMI (Electrical Musical Industries U.K.) who had been involved in the introduction of airborne microwave radar. He told me that there had been many meetings about the impact of airborne radar falling into enemy hands. At that time, the major concern was the magnetron. Various schemes were devised to make it self-destruct. But when the various pieces were brought together, it was always possible for someone, without any knowledge of the magnetron, to reconstruct it. At a meeting when the engineers were discussing Microwave Airborne Radar one of them said "it stinks" because of its potential use by the enemy. From this comment it became known as H₂S (hydrogen sulfide).

Churchill gave permission for the radar to be used in action. Dippy told me that shortly after its introduction to the R.A.F. (Royal Air Force) an almost intact radar was obtained when a bomber crashed near Rotterdam. The set became known as the Rotterdam Set by the enemy.

Dippy indicated it was not the magnetron which caused the enemy troubles. The enemy

did not recognize it was necessary to have some moisture in the TR (transmit-receive) cell to stabilize the arc.

C.T. Carson
Life Member

P.S. Dippy also made the following comments in the early sixties when computers were in their infancy.

"It has taken 200 years to come to terms with the industrial revolution's social implications, and it will take another 200 years to come to terms with the social implications of the computer revolution."

He also said that during his career he had seen many talented young people destroyed by the system.

In response to Walter W. Frey's War Story "Of Locusts and Engineering" in the penultimate paragraph, he refers to "No one checks the archives for previous similar difficulty..."

How often too true. I shudder to think how many ideas have been invented over again. A case in point is an idea presented in a recent *Spectrum* article that poses the idea that advances may be made in motor vehicle engines where the starter and generator would be one unit. What bold thinking! Try looking back to the 1928 Dodge, for instance. Guess what?

Vincent S. W. Dymek
Life Member

IEEE's Code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making engineering decisions consistent with the safety, health and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology, its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age or national origin;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Approved by the IEEE Board of Directors
August 1990

Preserving your records

Been part of some great technological moments? Or just a pack rat without peer? How do you know if the material you've been hoarding holds archival value? You have to ask. "...the best idea is to consult an archivist, historian or other person knowledgeable about records to determine whether your materials have lasting value," states *Enrich the Future by Preserving the Past*. This brochure is available free of charge from the IEEE Center for the History of Electrical Engineering. With places to call, and other useful information, it is a good place to start.

The brochure also points out that you should not be discouraged if the first facility you check with turns you down. Space and funding are limited for most groups. As a result, most have a "collecting mission" on the types of materials they are interested in preserving. (IEEE is primarily interested in institutional records of the IEEE or its parent organizations – AIEE or IRE.)

For the brochure or more info, contact: IEEE Center for the History of Electrical Engineering, Rutgers University, 39 Union Street, New Brunswick, NJ 08903 USA, Phone: 908-932-1066

Nitro health tip

Those who suffer from angina can increase their safety and comfort if they take their nitroglycerin before any activity that typically causes them chest pain or shortness of breath. These words of advice are from Dr. John S. Schroeder, professor of medicine (cardiovascular medicine) at Stanford University, CA.

Schroeder says being proactive, i.e. tracking when chest pain or shortness of breath generally arises and taking the nitroglycerin just before is much better. (Angina is caused by lack of oxygen to the heart. Nitroglycerin works in several ways to increase oxygen-rich blood flow to the heart, thus reducing risk of a heart attack.)

Note: Nitroglycerin loses effectiveness relatively quickly in storage. The drug should be replaced with a new batch every six months or so. A slight headache or a slight stinging sensation on your tongue when you take it are signs the drug is still active, Schroeder states.

REcapture an era

Electrical, power, aerospace and...oh, yeah...computer engineering came into their own this century. As we enter the 21st century, *Legacies* remembers – on a one-on-one basis—how engineers impacted and were impacted by technology in the 1900s.

This compilation tells tales about school, war and work. *Legacies* shows how IEEE members in forging their careers have promoted progress. Tightly edited vignettes ranging from: working on the Manhattan Project to helping Japan rebuild after the war; surviving the Depression to surviving retirement; from getting the countryside powered up to getting the space age off the ground and much more.

Reminisce and learn just how much engineers have touched our cultures' and each other's achievements. IEEE's greatest success has been allowing its diverse members a forum to exchange information. *Legacies* gives an inkling of just how vital this role has been.

In years to come, this book will gain in sociological and historical significance. More importantly, *Legacies* will help you tabulate just how popular re-inventing the wheel stays in the new millennium.

Complimentary to Life members, you only pay shipping and handling costs. Here's what just one reader had to say:

You have produced an attractive and readable work that is a worthwhile contribution to the history of electrical engineering. I am enjoying it very much.



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Where the money goes

Year after year, you are asked to donate to the IEEE Life Member Fund. Where does the money go? Well, three primary criteria are used based on responses to a Life Member survey conducted several years ago. They are: 1) young electrical engineers and potential electrical engineers; 2) IEEE Life members and other similarly mature members who lack Life membership tenure, and 3) history of electrical engineering.

In 1996, the Life Member Fund sponsored and/or approved the following activities: RE-SEED, a program that prepares retired engineers and scientists to assist middle school teachers in science activities. RE-SEED includes training and materials to help volunteers conduct hands-on lessons for students; the IEEE Student Prize Paper Contest which awards financially the top three papers in each of the 10 IEEE Regions; the *History of IEEE Technologies* Project which includes a three-volume overview that attempts to cover electrical technology since 1830. Two other components are 150-200 oral history interviews, documenting important historical materials. Other projects include: Oral Histories, Graduate Fellowship Program in the History of Electrical Engineering, the Donald G. Fink Prize Paper Award and, of course, this newsletter.

If you wish to make a contribution, please make your check payable to: *IEEE Life Member Fund*. All contributions are greatly appreciated.

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Where to write

Any ideas you would like to share? Opinions you wish to make known? Questions or problems that require assistance? Simply contact the Life Members Committee or its Staff by writing to: IEEE Regional Activities, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

Stopping services

As Life members, membership in IEEE is free. This is great! But what happens when it's time to terminate or partially stop services? Those who wish to have all services stopped must submit this request to IEEE in writing. Many use the label on this newsletter with a brief note and their signature. This works just as well as a formal letter. This way IEEE has something for its records. Sorry – phone calls cannot be accepted as notification.

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