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This lead engineer will operate in a highly visible environment and will be able to impart on POS systems design direction.

We invite you to respond as soon as practical.

Mr. Robert W. Donovan
Terminal Systems Division-
Cambridge
NCR Corporation
Cambridge, Ohio 43725
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Forum

Readers are invited to comment in this department on material previously published in *IEEE Spectrum*; on the policies and operations of the IEEE; and on technical, economic, or social matters of interest to the electrical and electronics engineering profession. Short, concise letters are preferred. The Editor reserves the right to limit debate on controversial issues.

Financial pressure

Congratulations to *Spectrum* and President Dillard for the two articles on IEEE finance in the March *Spectrum* (pp. 64-73)! This material was so well and convincingly presented as to give every member an understanding of the pressure for the staff cutback and for unwelcome (but probably necessary) dues increases in the future.

There is one aspect of IEEE finance, however, that does not seem to me to have been sufficiently emphasized. I refer to an increase in dues-paying membership. It is my impression, after many years in the profession, that the IEEE has only about half the number of members that it should have. There are many thousands of employed individuals who benefit from the publications, meetings, and professional support provided by IEEE, and who contribute nothing. These "freeloaders" are a potential source of revenue that surely exceeds the incremental cost to IEEE in serving them. If, for example, the present 180 000 membership were doubled, there might be a net gain of several million dollars, not an inconsiderable sum.

To examine the point further, there are two categories of potential future members. The most important, of course, is the professional directly involved in engineering who uses his company or institutional library for publications, and his colleagues or subordinates for more personal contacts. There are many such, including chief engineers, physicists, and chemists who now do electrical engineering, and qualified technicians who have not dared to join because of some feeling of inferiority. Second in line are engineers who still depend on engineering accomplishments but who have moved into adjacent areas, such as finance, patent law, manufacture and production, and administration. The careers of most of this second category would be handicapped tremendously if IEEE did not exist, yet they contribute nothing personally. They also lose the advantage of direct access to publications and meetings that report on developments that affect their future.

What can be done to attract these people? First and foremost, I suspect, is peer pressure. If every IEEE member recognized his non-member colleague, friend, or associate as the freeloader that he really is, there would gradually arise a social stigma that would increase the pressure to join. A second form of pressure comes from above. In certain large law firms, senior partners make clear to their juniors that they are expected to be members of the ABA and even of other law associations, as a necessary part of a successful career. If every

IEEE member impressed upon his nonmember subordinates that personal support of his profession is an expected duty, there would surely be an effect.

It is my hope that the *Spectrum* articles will impress upon all IEEE members the need for greater personal involvement, and that some of this may show up as an increase in membership. In conclusion, as a Life Member, I must confess to embarrassment at being a freeloader myself. I strongly support a change of Institute policy; as a minimum, Life Members should at least pay dues sufficient to cover the cost of the publications that they receive.

*Edward W. Herold
Princeton, N.J.*

It is not difficult to understand that IEEE has financial problems, when it takes ten pages in *Spectrum* (March, pp. 64-73) to say that in 1977 "we ought to go for a dues increase."

*C. D. Beck
Scotia, N. Y.*

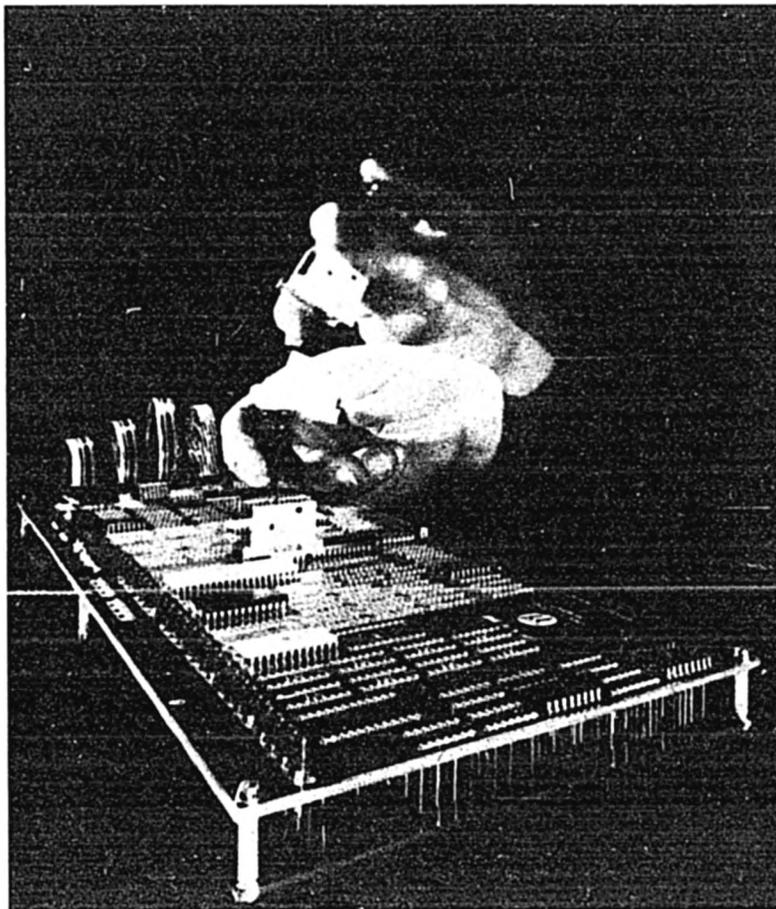
Pristine parklands

Slowly and seemingly irrevocably a great environmental tragedy is in the making in the southwest United States. U.S. electric power engineers and utility companies may not be the only culprits but we are surely and deservedly going to bear our share of the full blame when the whole story has been told and all the losses have been counted.

The scenic splendors that have become the myth and mystery of the "American West" are mostly concentrated in a relatively compact region of northern Arizona and southern Utah. Generations of U.S. citizens have lovingly preserved this heritage in a series of national shrines with names like Grand Canyon, Zion, Capital Reef, Arches, Bryce Canyon, and many others. The Congressional charter act of 1916 established the National Park Service "... to conserve the scenery and the natural and historic objects and the wildlife ... in a manner ... as will leave them unimpaired for future generations."

These Congressional directives were followed to the letter until coal was discovered in the area. In the late sixties, the now infamous Four-Corners power plant went into operation. It became the single largest polluter in the U.S.A. In a land formerly famous for its unlimited vistas, smog now often is reducing the visibility to a fraction of a mile. Today's visitor to Monument Valley and the Navajo's sacred Shiprock must be content to view the spires and buttes rising out of a yellow-brown haze.

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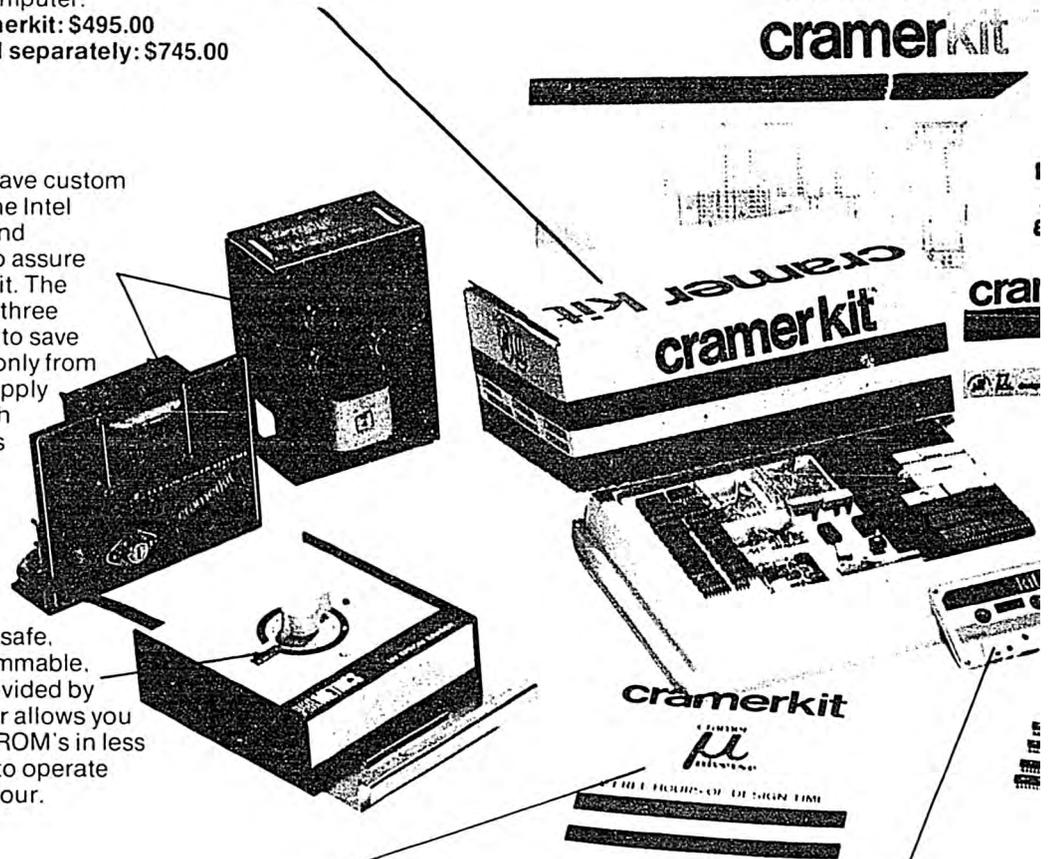
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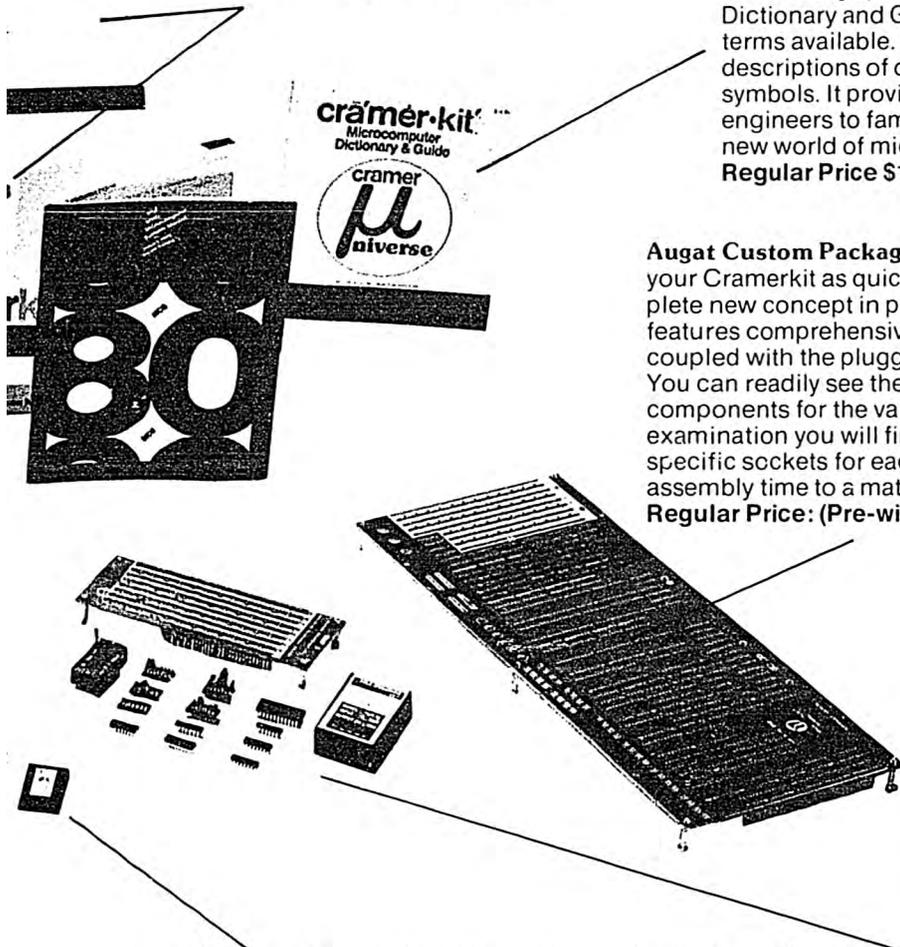
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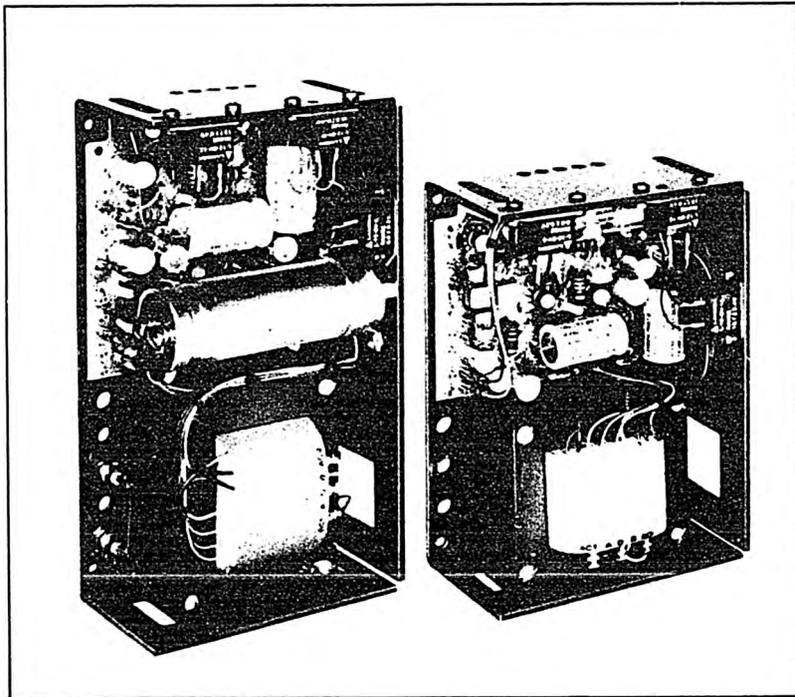
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The distance effects and the wide diffusion of the Four Corners stack plume surprised many observers (including the Apollo travelers who could see it from the moon), but the lessons were not heeded. In 1971 in Nevada, the 1500-MW coal-fired Mohave plant went into operation, periodically wagging its smoke tail over the Utah parklands as far as Zion.

Then came the 2250-MW Navajo plant in northern Arizona and by now the cumulative pollution effect was being experienced. In addition, the crisscrossing maze of giant power lines added another dimension to the degradation of the scenic landscape. When on occasion in the dark desert night the smog is lifting and the hundred-mile visibility returns, the garish illumination of the power plants and their 600-foot stacks competes with the stars for the viewer's attention.

The whole question of the Southwest's parklands has come to a climax with the Kaiparowits project. This giant coal-burner, the largest envisioned electric generating concentration in the country, would be located midway between Grand and Bryce Canyons, both of which would be enormously environmentally impacted. As this is being written, a final decision has not yet been reached on the go-ahead for this project. [Two of the three utilities pushing this project have withdrawn their support, effectively killing it.—Ed.]

Is it too late to save from total despoliation the great parklands of the Southwest? Many concerned engineers don't believe so. Not if we view these lands as a sacred national heritage that must not be wasted as a result of temporary political expediency! Not if all Americans realize their ownership in this priceless resource that must not be sacrificed for local and temporary financial gains!

We can have both the electricity we want and the unsullied parklands if we are willing to face these facts:

1. The pristine character of this kind of nature is totally incompatible with coal-burning technology as it exists today and tomorrow. Nothing short of a plant construction moratorium will save the parklands.

2. Existing plants and plants under construction must be equipped with the most effective pollution-control devices that money can buy. Half-measures must not be tolerated.

3. By transporting the coal from this inviolate region closer to the population centers, we create the best incentive for most effective stack cleanup. Furthermore, we eliminate the need for unsightly overhead lines.

4. We must overcome our fears of nuclear power and accept it for what it really is—the only clean workable alternative to coal for electricity generation. It seems ironic that the California-based conservation organization that deserves the credit for having earlier saved the Grand Canyon from being flooded now indirectly is responsible for filling the Canyon with sulfur oxides by spearheading the upcoming antinuclear referendum in California.

Taken together, the above alternatives are going to cost electric users a few more dollars. But then—what price Grand Canyon?

Olle I. Elgerd, Gainesville, Fla.

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Rapid transit

Gordon Friedlander's fine summary of recent transportation developments (January, pp. 73-75) mentions the renaissance of the streetcar as the light-rail vehicle and its non-polluting nature versus the motor bus. Another vehicle enjoys the same advantage, and deserves similar attention: the trolleybus. In its familiar North American form, the trolleybus shares the basic body components of, and costs less than 50 percent more than, a regular motor bus. Its most sophisticated form, now operating in several Swiss cities, is an articulated unit 18 meters (nearly 60 feet) long with chopper control—a true competitor to the light-rail vehicle. So far, however, no one has come up with a new euphonious name for it!

For use on streets, the overhead wire structure is far less costly than the track plus overhead required by the streetcar. With no engine exhaust, the trolleybus is nicely suited to operation in subway tunnels. Boston, Mass., has a short trolleybus tunnel under Harvard Square, and Guadalajara, Jalisco, Mexico, is constructing a 40-km (25-mile) trolleybus network with a 5-km (3-mile) tunnel through the center of the city.

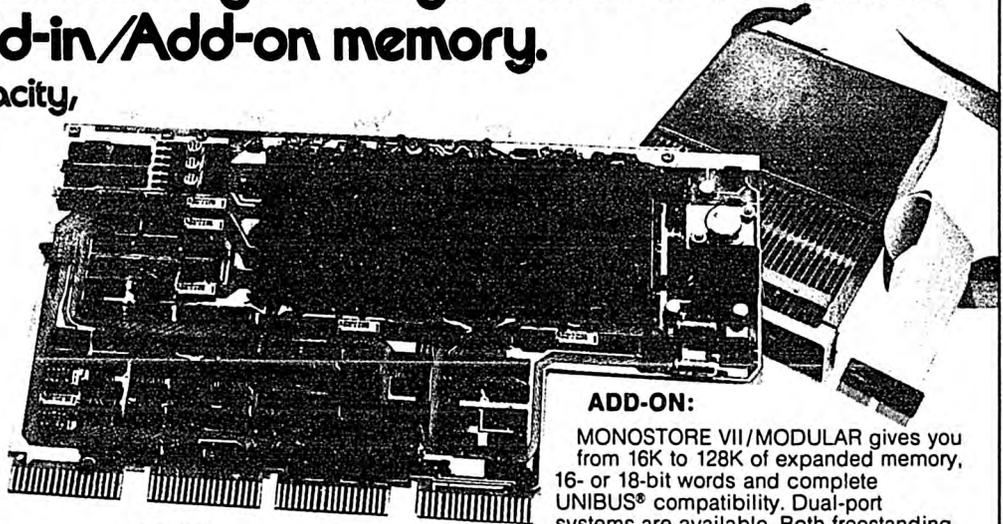
Five cities in the U.S. and four in Canada use the trolleybus today. All nine either have recently renewed their fleets or are in the process of doing so.

An articulated trolleybus was leased from Bern, Switzerland, in 1974 and demonstrated successfully in Seattle, Wash., and in Van-

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cover, B.C. In Seattle, design work is under way for a rehabilitation and expansion of the overhead electrical system. Most of the expansion routes are lines that were dieselized in the days when fuel cost 3½ cents per liter (14 cents per gallon). While hardly a contender for the title of "King of the Road," this cross between a bus and a streetcar is definitely alive and kicking.

John Aurellus
METRO
Seattle, Wash.

Review procedure

I was dismayed to see the article by J. A. King, "Air safety as seen from the tower," appear in the form it did in the August 1975 *Spectrum*.

I was dismayed that one of our prominent IEEE publications should publish an article so littered with incongruous constructions, Goldwynisms, and grammatical gaffes after it had gone through the *Spectrum* editorial process.

I was dismayed to read a diatribe against the air traffic controllers, their union PATCO, and its leadership, and to see unsubstantiated charges thrown at the FAA. The statements made about PATCO, in my opinion, border on libel, and those against the FAA are cheap shots.

I was dismayed because I had reviewed the article before its publication and pointed out the goofs and the possible libels, the blunders and the bias, in a two-page letter and a

marked-up, 21-page manuscript that in most cases offered substitute words or phrases that did not do violence to Mr. King's basic premise or technical conclusions.

I was dismayed because not one of these "suggestions, comments, or corrections," which *Spectrum* so urgently sought from me, saw the light of day: the article appeared in exactly the form in which it had been sent to me and other reviewers.

And what has been done about this damage to the controllers, and about this imposition on reviewers whose suggestions were ignored?

The management of *Spectrum* made no substantive response to a complaint for two and a half months, and then replied only after the complaint was brought to the attention of the IEEE President. When it finally did come, that answer was incomplete and misleading concerning the events leading up to, and following, the publication of the King article. Nor has the IEEE yet done anything to make *Spectrum* account for the handling of this article and set the record straight on the outside review it got—or didn't get—although it has been repeatedly brought to the attention of IEEE management.

Since September 1975, I have been making suggestions as to how the IEEE should review this matter including referring it to the IEEE Board of Directors, or the Editorial Board of *Spectrum*, or the Publications Board, or the Group on Professional Communication, but only recently has it been put on the agenda of the Publications Board.

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This issue is important to the IEEE. As members, we should be concerned that the pages of one of our publications should contain possibly libelous, biased, inaccurate blasts against another organization's members and leaders. As *Spectrum* readers, we should be concerned at the poor editing of a *Spectrum* article on which we might rely for technical information.

As past or potential reviewers of *Spectrum* articles, we should be concerned that the volunteer work we do for *Spectrum* may end up, unread, in the waste basket.

*Richard G. Gould, Chairman
Satellite Systems Panel, S-AES
Washington, D.C.*

[Although the author and the manuscript editor are expected to consider carefully all reviewers' suggestions, not all suggestions are necessarily honored in the process of manuscript revision.

In the future, a box entitled "Commentary" may sometimes be appended to or included with an article. Such a box may include comments from reviewers supporting, amending, or disagreeing with points made by the author in the article itself. Such comments will not be attributed to the reviewer(s) unless permission to do so has been granted.—*Ed.*]

Contested claim

This letter has been occasioned by the photograph and description on page 61 in the January issue of *Spectrum*, in which the Continental Electronics 2-MW transmitter is claimed to be the world's most powerful unit in the medium-wave range.

We regret that we have already been forced to contest this unfounded claim of Continental in other technical journals, where not only has misleading information been given in advertisements, but has also penetrated into editorial news items.

The Continental transmitter consists of two 1-MW transmitters in parallel.

Our company commissioned such a transmitter in the Geshlag Station of the National Iranian Radio and TV Organisation in spring 1971. A second similar unit has been in service in Iraq since November of last year. In addition we have had a 2-MW long-wave transmitter in operation in Poland for more than two years. We also have two single 1000-kW units in Libya and a further 1000-kW transmitter in Yugoslavia, all in service for more than five years.

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*J. Kane, O. Kreis
BBC Brown, Boveri & Co., Ltd.
Baden, Switzerland*

Since, to our knowledge, neither BBC nor any other manufacturer has built a transmitter more powerful than the Continental 2000 kW, the Radio Televizija Beograd, Yugoslavia, unit is, as stated, the world's most powerful. It was not claimed that this was the first or only

transmitter of this size.

Continental has built many other high-power broadcast transmitters including a quantity of 1000-kW transmitters that have been in service at Voice of America stations for more than 25 years. Other 1000-kW Continental international broadcasting stations have been in service throughout the world for more than ten years.

Continental Electronics is the only manufacturer of high-power transmitters in the United States. We compete vigorously in the international market.

*Mark W. Bullock
Continental Electronics Mfg. Co.
Dallas, Tex.*

Geopolitical lesson

A letter that appeared in your December 1975 issue (p. 24) was signed by R. Cahit of the "Dept. of Planning and Coordination, Turkish Federated State of Cyprus, Nicosia, Turkey."

You may be aware that following the Turkish invasion of Cyprus and the occupation of 40 percent of its territory by 40 000 Turkish troops, the Turkish Government in collaboration with the so-called "Turkish Federated State of Cyprus"—an illegal body residing in the occupied Cyprus territory and not recognized by domestic or International Law, or by any member of the International Community, except Turkey—has followed a well-organized plan with the aim of exterminating and destroying the Greek population of the occupied areas, altering the demographic ratio of Cyprus, ruining or usurping the sources of livelihood of the Greek Cypriots, and creating such a *fait accompli* as would prejudice the solution of the political problem in favor to the Turkish objective, which is none else than the de facto partition of the Island, without excluding the possibility of the annexation to Turkey of part or of the whole of the island at some opportune moment.

Already, as is shown in Mr. Cahit's letter, Turkey officially includes the occupied areas of Cyprus in the area under its administration, having denominated these areas as part of Turkey.

So we now blame you for your lack of elementary geography such as not knowing that Nicosia is the capital of an independent republic, Cyprus, recognized by all members of the International Community, including the Government of the United States of America.

*G. C. Papaioannou
and nine other IEEE members
Nicosia, Cyprus*

Computer-aided design

In reference to your article in the October 1975 issue of *Spectrum* (pp. 40-47) on computer-aided design, you did not mention the Computer Sciences Corp. version of TRAC. In a survey and evaluation of computer-aided design programs that I did for Norden in 1974, I found the CSC TRAC program to be one of the most powerful and cost-effective programs commercially available. Recently I bench-

marked this program against the NCSS ISPACE program and, although the ISPACE program is generally less expensive to run, it lacks many of the features of the CSC TRAC programs. I am presently using both the CSC TRAC and NCSS ISPACE programs. I use the NCSS ISPACE program for ac, dc, or transient analysis, which do not require extensive modeling or which do not require use of the continue feature. I use the CSC TRAC program for problems that require extensive modeling or that require ac/dc sensitivity, worst case, Monte Carlo, or failure analysis.

CSC TRAC has ac/dc sensitivity, worst case, Monte Carlo, and failure analysis. Most other programs have none of these or only dc. The NCSS ISPACE program has none of these.

Also, CSC TRAC has built-in Ebers-Moll transistor and diode models, as well as built-in MOSFET, JFET, op amp, integrator, limiter, and transformer models. In addition, it allows expressions and Fortran subroutines, has a built-in library of transistor parameters, and allows a private library of transistor parameters.

*Vincent G. Bello
Norden
Norwalk, Conn.*

Image enhancement

One evening, recently, I had an idea so fantastic I thought it best to hide it quickly lest I find myself wearing a jacket with strap-down

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sleeves. It concerned a possible method of obtaining actual photographs of scenes from hundreds, or even thousands, of years before the invention of photography. However, one article, "Russians use Stroke method to de-blurr space photographs," on the Focal Points page of the February 1976 *Spectrum* (p. 20), has caused me to change my mind. It is still a very long shot, but the rewards make it worth consideration. As the subject is outside my area of competence, I offer it to anyone who is willing to gamble time and money on the idea.

There are three cases that could lead to recoverable photographs, in theory. All are based on the fact that all materials are light sensitive to some degree. The sensitivity of most materials is many orders of magnitude lower than silver-based photographic materials, but it is not zero. Furthermore, medieval alchemists had a proclivity for working with precious metals and their compounds, so some fairly sensitive materials were exposed to light in those days.

In case one, light passes through a natural lens and falls on a surface at the proper distance to receive a reasonably well-focused image. The lens might be a goldfish bowl, a wizard's crystal ball, or similar object. If the arrangement remained undisturbed for a considerable period of time, the cumulative effect of the projected image on the exposed surface may have left an imprint that could, with modern technology, be recovered. Of course, only stationary objects would be recorded. Moving objects, such as humans, would not, as the exposure time would be too short. One possible exception might be in the case of the alchemist's laboratory, where silver compounds were used.

In case two, light passes through a pinhole into a darkened area. I remember seeing a room without lights several years ago where light passing through the keyhole projected an image on the opposite wall. Although the image was so dim as to be almost invisible when one first entered the room, after the eyes became adapted to the low light level the image was surprisingly bright. I spent considerable time in the room, fascinated by the image of the courtyard outside, with inverted people walking past. Ancient castles would seem to be the logical place to look for this type of image, especially in the dungeons.

Case three opens up the field considerably. This case concerns images recorded holographically, as there is no need to have any kind of lens or pinhole present in order to record the image. In theory, everything that has ever taken place has been recorded in this manner, although the extreme faintness of the images, superimposition of later images, and recording with white light rather than a single wavelength have all conspired to make reconstruction of these images extremely difficult. Even so, in some instances, recovery of these images just might be possible.

I sometimes wonder, if just possibly, the centurion in charge of the crucifixion might have been carrying a silver shield that had been wet with salt water while traveling by ship from Rome to Palestine, thus producing a thin

film of silver chloride. Or, perhaps, was there a camera obscura in ancient Pompeii, where lava and cinders have protected the faint images from light for almost 2000 years? Could this letter possibly stir some genius to solve the fantastic problems that stand between this dream and reality?

OK, let the men in the white coats in—I will go peacefully.

Viron E. Payne, Sr.
Merritt Island, Fla.

OUCH!*

I am sitting here reading the New Product Applications section in the January issue of *Spectrum* (pp. 95–99). I suddenly have a deep desire to wish that your CMOS RAMS would take a big byte out of the SOS RAM of the CMOS/SOS. In that way, maybe the whole 4-kb NMOS dynamic RAM would start EP-ROMing.

R. Kessler, Omaha, Neb.

[* *Ovines Unmuzzled Can Hurt!*—Ed.]

Avis and hertz

In the December 1975 *Spectrum* (p. 25), Sooyoung Chang proposed the new term edison for the SI unit of magnetic reluctance, which presently goes under the self-explanatory name ampere-turn/weber (or henry⁻¹). The convention was long ago adopted, however, of calling reciprocals by names spelled backward, as in the case of *mho*. Thus, the unit of elastance is the *daraf*, and the unit of magnetic reluctance is the *yrneh*.

Since the cycle/second is now called the hertz, the proposal has been made elsewhere to give a similar name to the unit of angular velocity (the radian/second), viz., avis, with aves as its plural; but this is for the birds. It would seem most appropriate that that unit should be given the name of Edison, inventor of the phonograph.

I hope this suggestion does not appear unduly revolutionary. Turning it around, I take *noside* in this regard to mean second per radian, but I hope we can avoid adopting unnecessary new terms.

Nelson M. Blachman
GTE Sylvania Incorporated
Mountain View, Calif.

Help

Henry B. Brainerd, a Senior Member of IEEE, is working on a history of railroad signals. He is interested in source material from the earliest days to about 1930, but especially from the late 1860s to the early 1900s.

Mr. Brainerd has compiled a list of unanswered questions that he will send to anybody interested. He will appreciate all available help.

To avoid duplication and risk to valuable material, please do not send anything irreplaceable without first inquiring. In most cases, photocopies or microfilm will serve equally well. Mr. Brainerd's address is 10 Upland Road, Wellesley, Mass. 02181.—Ed.

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