

73 AMATEUR RADIO

APRIL 1989
ISSUE #343
USA \$2.95
CAN \$3.95

International Edition

A WGE Publication

VHF AND ABOVE ANTENNAS!

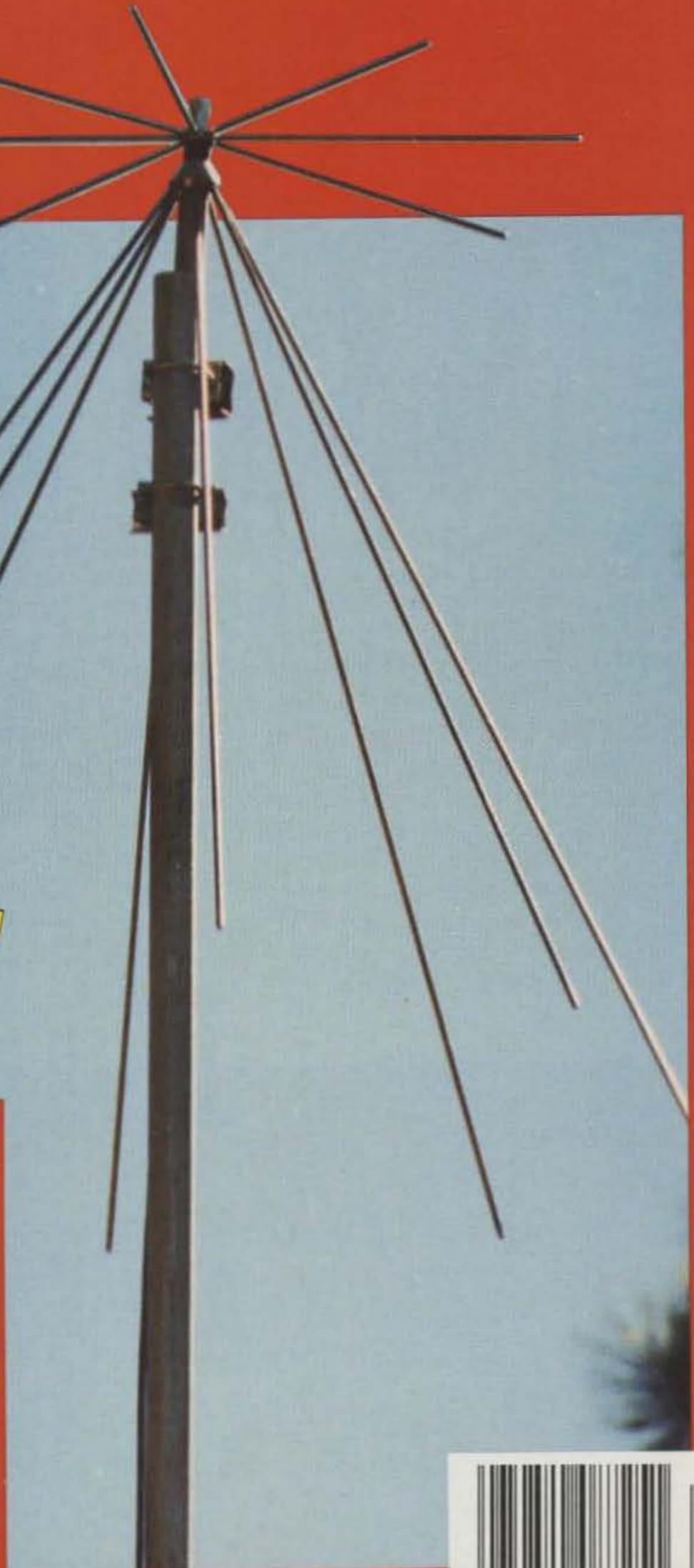
Wide-band discone
Hot VHF/UHF HT antenna
Tri-band vertical
Great VHF RFDer

HOME-BREW:

Uniden 10FM split mod!
New life for Bird elements
PC monitor adaptor

REVIEWS:

2m/220 MHz mobile marvel
Deluxe data decoder
Smallest full-featured HT!



projects for 73, I'll put out booklets of them.

Suggestions for Construction Projects

What can we build? Lordy! We haven't even scratched the surface with 10.5 GHz equipment. We need QRP gear for 10 meters to use with the new sun spots. We need conversions of CB to 10 meters. We need small receivers and antennas for hidden transmitter hunting. We need all sorts of simple test equipment—dippers, field strength meters, capacitor and resistor decodes, Q-meters, etc.

Is anyone building outboard accessories for our commercial ham gear? How about inventing an automatic call identifier for HF rigs? How about hooking up some ICs and developing some really narrow-band communications systems?

We need lots more beacon stations on 6 meters and up so we can hear when our bands open. These beacons need automatic keying systems. Perhaps we could work up some beacon digipeaters so we could send coded pulses out periodically and listen for beacons that we've triggered to tell us where the band opening is. There's plenty to do if you'll take the time.

Our 1250 MHz band is almost unused, so how about some simple rigs and receivers for it? If our amateur TV fanatics had used 1250 instead of fighting over a single lousy channel on 430 MHz, we might have been able to keep from losing 30% of the band.

How long will the FCC hold 900 MHz for us if we keep ignoring it? It isn't like it's difficult to make rigs for this band, you know. Of course, if you feel it's more important to watch the ball games and sitcoms and rent movies, then I question your priorities. Are you throwing away time every single morning watching the *Today* show? You can keep up with the news in just five minutes. The rest of the show may be entertaining, but it isn't of much informational value.

The evening news on TV? Another five minutes will let you know what's top and the rest you can catch up on in a few days with *Newsweek*. If it's of any importance it'll be in *Newsweek*. If it isn't, the chances are you've wasted your time. Newspapers? You're joking.

Let's get those soldering pencils sharpened and start getting stuff working you can get into 73. UHF, QRP, RTTY, I don't care... just DO it!

There, I haven't said a word about no-code. Doesn't that make you happy?

Ham Suers

It is difficult not to think of an amateur who stoops so low as to sue another amateur or group in less than the worst terms we can apply to a human being—but I'm trying. This is supposed to be a hobby. It's supposed to be for fun, and that has no connection with suing.

My first reaction is to ask the FCC to enact a new regulation that says that anyone who brings a lawsuit against an amateur or an amateur group involving amateur radio, have his license revoked forever. Actually, while I'm not generally a fan of capital punishment, I might go for the death penalty for ham suers. And none of this stuff like the electric chair or the gas chamber; let's get back to public hanging or perhaps something with boiling oil.

In amateur radio we have a hobby that of necessity has to be regulated to some extent by the government, since we're using several billion dollars worth of publicly-owned frequencies for our entertainment, with just enough public service thrown in (my estimate: 0.001%) to barely keep commercial in-

terests at bay.

The FCC is happiest when they hear nothing from us. They really don't want to be bothered with rule changes or with our interfraternity squabbles. They don't want to monitor and regulate us, so if we cause them trouble and/or expense, it's likely they'll take the obvious path: get rid of us. They have enough to do with the commercial services and they don't need to waste time on us freebies.

When you get your ham license, you get the authority to start using our ham bands. In general we agree among ourselves how we'll cut 'em up, and the FCC goes along with our decisions. They'd like it much more if we could manage ourselves 100% and leave them out of it.

Self-Regulation

Indeed, I've proposed that we organize a national conference every other year with the specific purpose of updating our regulations. I suggested that interested ham clubs field two representatives for the conference. It would be modeled after the International Telecommunications Union Conference in Geneva.

The first order of business would be for member clubs, those fielding conference teams, to submit their proposed rule changes well before the conference. These proposed changes would be discussed by the clubs and their delegates instructed as to the wishes of the group. These would be circulated to the other clubs for further consideration.

At the conference, each rule change would be remanded to an ad-hoc committee to consider it and come up with a compromise recommendation to present to the conference as a whole (the plenipotentiary) for a vote. The results of the conference would be enacted immediately by the FCC.

I've discussed this with several FCC commissioners and found them all to be enthusiastic about this approach. I've been assured that the Commission would find it in their budget to provide the conference with FCC legal advice so our proposed rule changes would not run into legal hurdles.

Such a system would make it possible for us to have regulations that meet our immediate needs. With the present system, it often takes years before a rule is changed, and even then, in almost every case, the rule is no longer needed.

Such a system might encourage us to develop more gentlemen's agreements in place of cut-in-stone rules. I've never been disappointed at the results of such amateur radio cooperative efforts in the past. Indeed, I've always found them to be almost excessively protective of even the smallest ham interests.

We should understand that our license does not guarantee us anything. It is a license to use the ham bands, but it does not guarantee us a clear frequency or a solid contact. It does not even guarantee a QSL.

Ham Protectors

Now, getting back to the suers in our midst, perhaps it's time for a new national ham organization to get set up primarily to protect amateurs and amateur groups against misguided hams who have the insane notion that their license has guaranteed them the use of a frequency—a repeater, clear channel, or whatever. I have no problem dealing with people who are rational, but when people are no longer rational, I get as frustrated and angry as anyone else.

If we set up a national amateur radio protective association, we could get

ham clubs and groups to join it to give us the national strength we'd need to keep lawsuits from happening. I'll bet we could get some savvy ham lawyers to work with the association to bring counter-suits for harassment, for harm to the general ham good, etc., in the federal courts. The spectre of such an expensive federal counter-suit might put a chill on this suing baloney. We're a national hobby, governed by the federal government, so it only makes sense to mount any counterattack in a federal court, complete with the protection of PRB-4.

No, I don't need the aggravation of running a new national ham association. And the ARRL certainly isn't going to set anything like this up. But is that all we have, me and the League? Give me a break! If that's the only action we have in the whole danged hobby, then it's time to give every suer what he wants.

Buying Justice

Instead of setting dues for club membership in the national de-suer organization, I'd suggest a plan whereby clubs would join and agree to share in the legal costs required to keep litigation at a minimum. If the costs are so high they seem unreasonable, the clubs will drop out. But if we can get 500 ham clubs to join such an association, we'll be able to outspend even the most vicious suer—and that's how you win justice in America. It's got little to do with laws, little to do with what's right, and just about everything to do with who has the money. If you have the idea that I do not respect our legal system, you're right. It is not something of which America can be proud.

Twenty-five years ago I formed the Institute of Amateur Radio. I started it as a way to organize group ham travel. Once started, I found a lot of support for it as a source of funds to help amateurs fighting legal suits, such as tower suits, which could hurt amateur radio. We had a good deal of success with that goal, winning some big ones.

But a combination of a divorce that knocked me for a loop, an inability of the board of directors to find someone else to run the Institute, and endless attacks by the League (that spent far more fighting the IOAR than ever, taken in Institute membership dues), finally did it in.

By the time I'd gotten over my divorce, amateur radio was in a shambles as a result of the ARRL's Incentive Licensing proposal, so the Institute has remained history.

I've been gathering the names and calls of the hams who have instituted lawsuits against hams or ham groups. I'd like to list them in the magazine so you'll all know who these people are. I'll be interested in hearing from anyone who actually has a legitimate suit going. That might change my mind about such hams being cancers on the body of amateur radio.

May I repeat that a ham license is a permit to operate. It does not guarantee anything. Yes, every amateur has the permit to set up a repeater, but since this is a hobby and we have very limited frequency resources, it's up to us as a group to come to agreement on who sets up on what frequencies. And if we can't, then it's just tough.

Until the time I get into an area and don't find at least one repeater unused, with no one answering my calls, I'm not going to be convinced that we have any shortage of repeaters. In my experience—and I travel a lot—about 90% of our repeaters are terribly underused. I view the desire to set up more repeaters as an expression of ham egos out of control and not representative of any public need.

So, are our ham suers dirty, rotten scum, or do they have a legitimate case for helping keep more lawyers living in luxury?

SETI, UFOs and Amateur Radio

SETI, the search for extra-terrestrial intelligence, and the tens of thousands of UFO reports we've had, would seem to make it worthwhile for some of us to look for signs of alien communications. I say, if we can't find intelligence here on earth, let's look for it elsewhere.

But before we waste a bunch of time looking for signs of alien communications, just how probable is it that there are other civilizations out there? And if they're out there, how come we haven't seen or heard 'em yet? It's difficult to work up a computer simulation of the problem because there are so many unknowns. Are we wasting our time looking for something that may not be there?

Many scientists agree that the universe is about 15 billion years old. Fine, except that we've run into some meteors that appear to be about ten times that old. Hmmm. Oh well, just an anomaly, never mind.

And was there a big bang or not? Opinions are increasingly mixed on this, with some scientists opting for multiple big bangs, each forming its own universe and eventually separating from the others. Read *Sky and Telescope* magazine to keep up with the most recent cosmology developments. The field is in an uproar.

There's convincing evidence that life is being spread throughout the universe by an even older intelligence, and that these seeds have been resulting in the sudden springing up of various basic species of life. The seeds seem to be of a wide variety, with those adaptable to the conditions on a given planet taking hold. This line of reasoning and the data that support it may be troublesome to many religious people, who much prefer the comfort of two- and three-thousand year-old explanations over those of modern science, even keeping in mind how rapidly science has had to change its theories to keep up with developing data. *Discover* magazine has had some interesting articles on this.

But let's ignore for a moment that our universe may be of relatively recent development. We have pretty good data showing it to be about 15 billion years old. Yes, there are some problems with this. The estimated age is dependent upon the red shift of distant stars and galaxies. Now we're finding stars that seem to have vastly different ages within the same galaxies, and that's screwing everything up.

If we figure that the first stars in our galaxy started about 10 billion years ago, and we know our sun is about 5 billion years old, it's logical to expect that the first civilizations got started even before our solar system was formed. If it took us five billion years to go from a starting solar system to porno shops and repeater jamming, that's a good yardstick to apply to other solar systems, right?

It turns out that no matter how discouraging a scenario you hypothesize, with most civilizations either nuking themselves, running out of resources, or having no spirit of adventure, the universe would still have been fully occupied billions of years before our solar system even got started. See the November '88 issue of *Analog's* science fact article.

Where is Everybody?

The computer simulations come up with millions of civilizations, organized into about 50 major cooperative

continued on p. 92

groups. So, if the entire galaxy is already civilized, where IS everyone? And how come we don't hear 'em on the radio?

Radio is pretty hot stuff for communications, but I hope we're not so arrogant to think that just because we haven't yet discovered it, there's no better communications system possible. The probability that there are civilizations all through our galaxy, and that they are communicating, is enough to suggest that we have some inventing to do.

It's odd how scientists have always tended to think that all the basics have now been discovered. If you read much, you know that there was a move to close the Patent Office about 90 years ago because everything had been discovered.

Just look at how radio astronomy has grown in the last 50 years. Did you know that this science was developed by a ham who was curious about some anomalies? Scientists hate anomalies. They tend to dismiss them—must be bad data or something. Don't bother me. This has been a major deterrent to mind research and has a lot to do with the still primitive development of psychiatry.

Not Fit Company—Yet

If there are so many civilizations all around us, how come they're not here? Well, we don't know they're not. It's also likely that they know we're here, and they're letting us develop on our own until we're ready to join their galactic civilization. I hope you'll agree that we're not yet fit company for any intelligent group. It still isn't even at all clear that we're going to survive. Between our potential for nuclear self-destruction, and the destruction of our environment, it's iffy.

If you've read Tom Clancy's books, you'll have a better concept of how iffy things really are. His *Red Storm Rising* is a rouser about WW III, and not all that far-fetched.

Terrorism seems to be gaining ground as a minorities' weapon. How long will it be before a group finally gets their hands on a nuke? Whammo will go New York, Paris, or Moscow. Then what? Yes, I know, we'll have dozens of weary old hams trying to provide communications with Morse Code—trying to send the millions of desperately needed messages.

Getting back to communications. Since it's virtually certain that there are a zillion civilizations in our galaxy; and since we know they must have darned good communications to run something like that; and since we're not hearing 'em on the radio—ergo, they've got something better. A lot better. Maybe even faster than light speed. Some time in the next one or two hundred years, someone is going to discover this new system. And when they do, people will say, hey, we should have found that years ago. We had the hints and we ignored them.

It's in the Anomalies

I ran an article in 73 a few years ago about how some hams came across the semiconductor phenomenon and ignored it as an anomaly. They could have beaten Bell Labs to the transistor by years if they'd not been close-minded about it. I wonder if there might be some hams today who have come across something odd and ignored it.

It's getting time for us to do something new. In the past, amateur radio was always way ahead of commercial radio. We did the inventing and pioneering then, after we'd proven to the professionals, against their wills, that what we had worked. They reluctantly climbed aboard. Today, alas, we're

ages behind the industry. Instead of being out front leading, we're at the tail end with our blinders on.

Many amateurs are eager to sacrifice our whole hobby to preserve 400-baud Morse Code in a day when 56,000-baud automated communications will soon be a standard for commercial communications. We're like a mob, blinded by our emotions to the realities of the 80s. When someone says "no code," a lynch mob quickly forms to hang the SOB. Just look at my neck, if you think I'm exaggerating.

The 40% zap of 220 MHz may help to bring some of the angry lynch mob to their senses. It's a cold cruel world and we're going to lose amateur radio if we don't start paying for the use of our billions of dollars worth of frequencies—over 99% totally unused, and the rest being used almost 100% for the entertainment of a small group of rapidly aging, old men.

At any rate, we know there is a far better communications system than radio. It's there, if we can discover it. And who else is there? Government and private research lab groups would be laughed at for even proposing to spend

Then electronics saved our hash, freeing us from the cacophony of chirps and beeps. Now almost all of us read our code on our Commodore VIC-20 or C64 computer screens. Long live CW, I say!

A few days ago I wandered the halls of the Summer Consumer Electronic Show in Chicago. I enjoy seeing what the Japanese have invented and built for us lately. I also almost enjoy meeting the hundreds of hams who come up to me and say hello—complete with their call letters and, with one hand firmly grabbing my lapel, bemoaning that ham radio is dying.

One chap did have something of interest—even promised to write about it. It seems that he's been working on a project for a large communications firm that is interested in getting our short-wave bands, so he's well-funded. His first step was to set up video recorders with wide-band receivers and tape our CW bands for a month.

This is an interesting approach to surveying our bands. I first ran into it when I helped operate the moon-bounce effort at Arecibo a few years back. We were tuning the 1296 MHz

“ . . . we'd need maybe three channels to handle everything we've been using the 80 meter band for . . . ”

what little research money is available for such a project. Labs have to prove that their projects are going to pay off—and quickly—if they're going to get funding. This is why virtually every major advance in science has been made by amateurs.

So let's stop shooting the messenger and see what we can do. If you have any ideas for areas that should be researched, let me hear from you. We may be a doddering group of old men, but we still have some sharp minds left in our old bodies. Let's put 'em to work.

Narrow-Band CW

Last month I explained how new digital technologies have made it possible for us to greatly reduce voice bandwidth, possibly allowing up to 7,000 more users than at present in our bands, yet with far less QRM. And that's without even resorting to regenerating the voice with a computer.

Now let's look at CW and see what technology holds for us there. With CW, we don't have to worry about maintaining the original voice tones and quality, so we're able to head for some serious bandwidth/time economies. After over 60 years of using CW, perhaps it's getting time for us to at least consider updating this mode.

Before I get into compression technologies, let's first consider the whole CW system. It starts with you sitting there (you don't stand, do you?) keying your rig. This sends a series of semi-decipherable dots and dashes over the air. Two generations ago most of us used straight hand keys. Then we shifted to bugs and semi-automatic keys. A few years back, as digital electronics and hundred-dollar computers took hold, most of us shifted to keyboards.

It wasn't very long ago that most of us had to sort out the dits and dahs by ear—a prisoner of our incompetence.

band as best we could, making contacts all around the world. But, just to make sure, we also taped the whole band on video tape so it could be tuned later on to make sure that no signal coming through was missed.

With a month of the CW sections of 80, 40, 20, 15 and 10 meter on video tape, the next step was to set a computer to deciphering the CW signals. Once programmed, a PC clone just sat there and worked its way up the bands, copying every contact made. Each tape had six hours recorded, so it only took four tapes for each day taped.

The complete text of every CW QSO heard during the three weeks was thus decoded and printed out. The next step was to examine the contacts—charting the number in progress in every five-minute period in each band and the code speeds used. As I recall, it came to about 4,500 words, with approximately 300 words accounting for over 95% of all communications except for operator names and locations.

One approach to updating CW might be to digitally encode our Morse and send it in short packets. These would be received at the other end and translated back into Morse—which could then either be copied by ear or with a computer.

We don't need the whole ASCII alphabet for this since we don't send upper/lower case characters in Morse. We could get by with about a total of 50 characters—which could be represented with six bits. We'd add a start bit, a parity bit, and two stop bits, for a total of 10 bits. Better yet, we could send two characters at a time and do it with 16-bits.

Callsigns could be even further encoded for economy. Almost all calls, including a portable designation for displaced hams, could be sent with eight characters. This would take four bytes of 16 bits each—and 16 bits is the way the computer world seems to be

going. If we went to 32-bit bytes, our calls would only require two.

But why spell out the 4500 words we use? If we assigned a number to each English word we could just send the numbers. A word averages five letters plus a space—six characters. If we set up a dictionary of 64,000 words we could communicate them with 16 bits—one byte. That would cut down our transmissions by a factor of six right there. If we could live with a 16,000 word dictionary, we could send two words, complete with start, parity, and two stop bits in our 32-bit bytes.

By sending our packets at high speed, for a fraction of a second, we would occupy a wide band—but the average use of each channel would be far below our present throughput.

A high percentage of our CW contacts are routine, I'm sure you'll be surprised to find out. This provides us with even further opportunities for economy of transmission. The sending of a town name could easily trigger a more complete response on the receiving end which would add "QTH HRZ" automatically. Heck, we don't want to have our digital technology actually spell all our words, do we? No, I think we should maintain our CW abbreviations, just as we do on phone. Phone ops freely use the Q-code, even though it's totally unnecessary.

The whole QSL situation can be covered with one number that would translate on the receiving end into, "QSL HR 100%, PSE SND YR QSL."

The beginning of each contact could include a code that would indicate the CW speed being sent, perhaps in increments of 2.5 wpm up to 20 wpm, and then in 10 wpm increments beyond that. We could send that code with four bits at the beginning of each QSO, taking us to 100 wpm, that should be enough for even the most discriminating ear.

But, you ask, how on earth can a hundred or more contacts all use the same channel without incredible confusion? I'm sure there are a number of ways this can be done. I think I'd opt for a time assignment system. With each transmission taking about a hundredth of a second, we could have our rigs send a short marking pulse every couple of seconds to indicate that this particular time slot is occupied. Our rigs would select an unused slot and start marking it.

By channelizing our communications as we do on the VHF bands, we'd be able to avoid interference (QRM). A CQ could be sent by just sending your call/location in a time slot until someone else answers on the alternate second, and away the contact would go.

A system like this would enable us to clear out about 99% of 80 meters. Actually, judging by the band occupancy study I mentioned, we'd need maybe three channels to handle everything we've been using the 80 meter band for, and even less on the higher bands.

To satisfy our older amateurs who are worried about what will happen if there is an emergency and our commercial power goes out, we really should make everything work on AA-sized NiCd batteries and recharge them with a few solar cells. I visited a solar cell factory the other day, and they're turning out small cells that generate 1.5 watts per cell!

If we do start trying to take advantage of technology, we could end up with almost empty ham bands that would make us either get more hams to fill them or else face their loss.

C'mon, I know there are a bunch of you who have the technical smarts to get us at least into the 80s. Let's see some action—some circuits you've tested that I can publish in 73. 73