The Amateur Computerist

Webpage: http://www.ais.org/~jrh/acn/

Winter/Spring 1993 **Volume 5 No. 1- 2**

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"For we can't command Nature except by obeying her"
Sir Francis Bacon

Interview with Henry Spencer:

On Usenet News and 'C news'

[Editor's Note: Henry Spencer is one of the early participants and pioneers of Usenet News. Henry played a significant role in bringing Usenet News into Canada and thus providing access to and participation

in Usenet beyond U.S. borders. In addition, Henry archived much of early Usenet, thus helping preserve it. Along with Geoff Collyer, Henry wrote 'C news,' the widely used Usenet News software. Following is an interview with Henry conducted by some of the editors of the *Amateur Computerist* in Toronto, Canada in August, 1992.]

Ronda: Some of what we would be interested in knowing is where 'C news' came from, how it developed and what your efforts are to deal with it now. We thought it would be helpful to ask a bit about your background with Usenet News so that we have a sense of how 'C news' grew out of your experience with Usenet News and out of Usenet News itself. So our first question is, can you say a bit about when you first became involved with Usenet News and then how that involvement with Usenet led you to understand the need for the 'C news' program?

Henry: Well, there was a USENIX Conference 10 years or so ago. I think it was the Delaware Summer USENIX Conference, which was the Summer of 1980. The folks from Duke University made a presentation on a bit of networking software they had done. Version 7 UNIX, which was more or less just out at the time, had some facilities for using auto dialing modems to pass mail and other things from machine to machine. This wasn't terribly well understood by most people. But these folks had figured it out and made it work. They were using it as a sort of distributed bulletin board system. The software they came up with is now known as 'A news.' It was actually the second or third version they did internally, the first one that was circulated widely outside. Early on, Duke was sort of the central point. The topology of the net sort of evolved from there in random and confused ways. Partly, it was just a neat idea. There was a lot of interest here in networking in general. A lot of the early traffic was potentially very useful things like bug reports on version 7 and bug fixes for version 7. There were some interesting and potentially useful contacts available through it, like for example, you could send mail to Dennis Ritchie and people like that at Bell Labs and sometimes they'd even answer you. So it looked useful. There was a bit of delay in us getting things in place. A lot of sites took a lot of time in switching to version 7. But in the Spring of '81 we cut over to version 7. One of the first things we did was to establish a Usenet hookup. In the

early days, manually dialing at 300 baud was a bit of a hassle. Of course, the traffic was a lot smaller than it is now. But it was valuable enough that we progressed from there. We got a 1200 baud modem and the capabilities just kept on scaling up, more or less keeping pace with the traffic. For a while, the phone bills were kind of interesting to explain. I'm glad we're no longer in that business. But that's how our involvement really got started.

Eventually 'B news' came out as an improved version of 'A news,' better performance, better ability to cope with heavier loads and some other useful features. We were eventually bullied into adopting it. 'A news' was working OK for us for a long time, but some of our neighbors eventually bullied us into switching. There were enough compatibility problems between the two that it was better if everyone ran 'B news.' Things ran quite satisfactorily that way for quite a while. But the 'B news' code was an awful mess inside. It just got worse over time. It had started out as a heavily mutated 'A news' and progressed from there mostly downhill. So we first got involved with it when 'B news' "expire" just basically stopped working due to bugs.

Ronda: Can you say what bugs?

Henry: Probably, the way it looked was a memory leak, dynamically allocated memory that wasn't being freed properly. This got more and more serious as traffic grew and "expire" had to handle more and more stuff. Eventually, it just broke entirely. This was a 16 bit machine, so there wasn't a whole lot of memory available to begin with. I looked at the code and decided that it wasn't really doing anything very complicated and it would probably be quicker to just rewrite it than fix it as it had gotten to be quite a mess by that point. I did and there are still remnants of that code in 'C news' "expire" as it is today. But that's how things got started. Geoff Collyer and I basically just progressed more and more in that direction as 'B news' limitations got to be more and more of a problem. The load on our machines got worse and worse as the traffic grew. The bugs grew more and more troublesome. So we eventually decided just to rewrite it for better performance and better maintainability and over time did so. All along we had the notion of distributing it in our minds. That's just the way we tend to think about software development. There's always somebody else who could benefit

from something like this. Eventually, with some prodding from our friends, we got everything together and produced an actual release. It's needed some more work since, but that's how it got started.

Ronda: So somehow from having redone "expire" you went on to redo the whole program? Did rewriting the code for "expire" help you to realize there was something more needed? How did you go from rewriting the code for "expire" to deciding the whole Netnews program would benefit from being rewritten?

Henry: It was basically just sort of a logical progression. Doing "expire" – something had to come first – and this demystified the stuff, not that it was particularly mysterious to begin with for the most part, and got us started in the right direction. And things progressed from there.

Ronda: Can you say just a bit about what "expire" does in Usenet News?

Henry: "Expire" is just responsible for getting rid of articles off your system. Much of the rest of 'C news' is devoted to getting them onto your system from a remote site or from local postings. "Expire's" job is to get rid of news that's been sitting around long enough, where the definition of "long enough" has gotten shorter and shorter as volume has grown and disks haven't grown to match. There was a time when it was fairly normal to keep a month of news online. And while it's not impossible, today you have to spend a lot of disk to do it.

Ronda: The issue of the change in definition of "long enough" seems important. With regard to "expire," when you did rewrite "expire," was that when you were able to keep one month of news online?

Henry: I think we had about a month online. Certainly it was of that order. It was at least a couple of weeks and I wouldn't be surprised if it was a month. I haven't really kept track. This all started quite a long time ago and volume was pretty low then.

Ronda: What do you mean by volume being low? How would you define the number of news groups at the time?

Henry: Low in just about every way. I don't know, maybe a hundred newsgroups, with maybe a couple hundred sites I'm not sure. Just a wild guess. The traffic at that point was low enough that if you

wanted to spend the time, you could realistically read everything that came over.

Ronda: Were there people who read it all?

Henry: A reasonable number of people actually read everything. It wasn't till the volume started to become overwhelming that people just had to get selective. There was always the possibility of something interesting cropping up in an area you didn't normally read. The possibility is still there, but it's no longer practical to do very much about it, short of having friends alert you to something.

Ronda: What year are we talking about when you started to see the problem with "expire"? Was that around 1986?

Henry: No that would be early 1980s. The development period for this stuff was fairly protracted. It went through a lot of work of one kind or another before we released it. And even that wasn't all that recent. Let me see here. [*Calls document up on his computer -ed*] Well, our first patches were summer 1989, so Spring 1989 must have been the production release. But that was a year or more after an alpha release and stuff had been kicking around in embryonic form for several years before that. We never did mount a systematic campaign to do the whole thing. It just grew a bit at a time until we finally decided it was complete enough to try and get something out the door. It required a surprising amount of work to put everything together actually in distributable form. And it involved some surprises in our beta testing, portability hassles we hadn't been aware of, and systems differing in stupid ways we hadn't realized.

Ronda: You've said you were first interested in Usenet because of the bug reports for UNIX that it carried. Can you explain a bit more about that?

Henry: The Duke people originally thought that the bulk of the traffic on Usenet was going to be things like version 7 bug reports. And that was a noticeable fraction in the very early days.

Ronda: Was Usenet different in the ways it dealt with bug reports from other BBS's?

Michael: Did it have other methods cause I guess a lot of companies have various forms of support?

Henry: Well, for one thing, Usenet predated a lot of company

BBS's and the like. It was basically a cheap way to hear about things fast and this was at a time when practically every UNIX site had complete sources and so a bug report often came with a fix. It was a way of finding out what people had discovered and what fixes they'd worked out for it. Quickly and easily. And for that matter, if you ran into something that you couldn't solve yourself, putting out an inquiry to a bunch of fairly bright people who were fairly familiar with the code, often got a response, "Oh Yeah. We solved that one" or "You're right. There is a bug. Here's how to fix it" or sympathy even if no one had a fix for it.

Ronda: You mentioned something about noticing a particular bug in the PDP-11 that was an obscure bug.

Henry: This was something that was a problem in the long division routine in the C compiler that came with V7 and it was obscure and difficult to spot on the older PDP-11's. On the newer ones it was more conspicuous. One of our users ran into it, pointed it out to me, and I ended up investigating it and reporting it. On the new PDP-11's, it showed up a fair bit and you just had to fix it. Even on the older PDP-11's, it turns out that 2 or 3 things that were known as obscure problems in the stuff magically went away when the fix was installed. What was happening was the code tried using the PDP-11's divide instruction at one point. There was a possibility the result might overflow because the PDP-11 instruction wasn't up to doing the whole job of this particular requirement. If the overflow occurred, the code assumed that the registers which had held the dividend were untouched. On older PDP-11's, that was usually true but DEC had never promised it. On the newer PDP-11's, it was often false. Any combination of operands that led into that particular branch in the code produced grossly wrong answers. But it looks like some boundary cases, even on old PDP-11's, didn't work quite right, because there were a couple of things mentioned as very obscure known bugs in the division stuff that I couldn't reproduce once I put the fix in. So it may have been there all along and just nobody had analyzed it.

Ronda: What's the process of analyzing a bug? You mentioned something about documenting it.

Henry: Oh, there were a couple of problems noted, as known defects in the software. There is something the UNIX community has

always been fairly strong on, admitting things you know just don't work about the software. And this was mentioned in the sources in bits of documentation accompanying them, that there were a couple of cases that didn't work quite right. In this case, I had a user of mine who had run into this. He had actually supplied a case where the answer was just plain wrong. It was just a matter of digging in. I think I ended up inserting some debugging printouts at various points in the routine, and just finding out what was going on where the calculation was going awry. Once I knew where to look, the problem was pretty obvious and the fix, in fact, was about 4 lines of code. That was probably one of the first things that started to make my reputation on the net because a lot of people noticed when I posted that.

Ronda: Why?

Henry: Because it was a really obscure problem that had the potential to make a lot of trouble for people. It was something in that it was subtle code that was from the originators of UNIX themselves, something they'd missed.

Ronda: That's interesting. So the reason people respected the bug you found was because they understood the significance of the problem that had been averted?

Henry: Yes, it was a subtle problem that could have caused a lot of trouble in code, coming from people who were normally pretty good.

Ronda: So are you saying that one is encouraged to find what could be problems that could cause trouble despite who it's coming from? And then to suggest how to deal with it?

Henry: Yes, it's diminished some in recent years because such a large fraction of UNIX sites nowadays do not have sources for the code. But in those days, it was reasonably normal when you hit some sort of problem to go looking for what caused it and produce a fix for it. Partly, this has declined because people no longer have sources and partly it's declined because the community is a lot wider and many of the people using and even running UNIX systems don't have the technical expertise to go hunting for things like this. But, hey, it was very common at the time. This was in the days when UNIX was still treated by the Bell system as, "Oh just something we happen to do for our internal use. You can have a copy if you want, but if you got problems, don't bother us."

And the result was if you wanted UNIX support, you did it yourself or it didn't happen.

Ronda: It sounds then like people trained themselves to deal with problems.

Henry: To a considerable extent, yes. The people got to know how to deal with the things and the community. This is almost certainly one of the things that got Usenet going in the beginning. Having quick access to a community of experienced people was quite important in the days when you couldn't just call the manufacturer for support. If you called Bell Labs or Western Electric, as it was then, about it, they would hang up on you. If you could manage to get through to Ken Thompson or Dennis Ritchie, they might thank you for the bug report. But they certainly weren't going to promise anything like support.

Ronda: Do you miss that in any way?

Henry: To some extent, yes. To some extent it's the community I'm still in because we've been running obsolete versions of UNIX for a long time. And still are. On our Sun, our main time sharing machine, we're running the last stable version of Sun OS 3.5. Sun will hang up on you if you ask about it now. And so we're still used to doing our own support, handling our own problems. Unfortunately, because UNIX has grown so much and diversified so much, there's less of a sense of community of others lending a hand now. Too many people with too many different machines and too many different versions.

Jay: But has the spirit and the sense of that somehow given form to the Usenet community, the grander community?

Henry: It's still there to some extent. But it's diffused considerably from what it was.

Ronda: Is there any way that the bug reports led to the other kinds of discussions? Is there any connection between them? Or is it just that people were interested in other areas?

Henry: It [*the bug report -ed*] was incentive to get onto the network more than anything else. So you could hear about things like this. People have commented also that the USENIX conferences are in some ways less of a hotbed of gossip than they used to be because the net has taken over some of that function. You know it used to be – back in the very early days, when you went to a USENIX conference, more often than

not, you came back with a notebook full of notes on known bugs and what to do about them. And new software available and so forth. The bulk of that goes on via the net nowadays. Things have changed, but originally getting onto the net, the big thing was getting access to the community that knew about these things. And the rest of it was a secondary issue originally. There was a group talking about science fiction, for example. But this wasn't why system administrators were hot on getting their machines connected. Well, not most them. And then, generally, this was a way of doing networking on the cheap. It was a vigorous online community that you could join without spending many dollars and jumping through lots of bureaucratic hoops, to join something like the ARPAnet. With this, all you needed was an auto-dialing modem and someone who was willing to be your connection point.

Ronda: Somehow it seems that having the other discussions is important, also, to the technical discussions. Do you agree? Is there a connection between the technical and nontechnical discussions?

Henry: They [*the nontechnical discussions -ed*] helped broaden support for things. I don't think they really had very much of an effect on the technical end. Then, as now, there are a lot of people who justify the net primarily in terms of its technical benefits. People are heard to claim sometimes, "I like the net for the tiny minority of technical stuff, but all this non-technical trash I could do without." But in fact, it has been a standard misunderstanding from the early days, the theory that there's just a little bit of technical stuff and a lot of garbage. This was as much of a misconception in the days of 30 days of news as it is now. That there was a little bit of technical stuff drowning in garbage. The fact was even then, the technical stuff was quite a substantial slice of the traffic. It's just that individual people [*only -ed*] notice the little bits of technical stuff that appeal to them.

Jay: And they call everything else garbage.

Henry: Or they just don't think about the fact that there was a lot more technical stuff.

Michael: If you don't look for it you don't see it to some extent.

Jay: But I thought Ronda's question was slightly deeper in the sense that she was asking: Was there something almost as profound about the nontechnical stuff in terms of the kinds of things people talked

about that influenced them to be better with the technical stuff?

Henry: Maybe, in small ways. The nontechnical stuff was the first exposure a lot of these people had to an online community. Bulletin board systems were not particularly widespread at the time. They did exist, but they certainly hadn't reached the current level of popularity. Networks like the ARPAnet were much spoken of by the people who belonged to them, but weren't particularly widespread. And there may have been some positive effect in helping to socialize people, so to speak.

Ronda: You have talked a little bit about speed, a little bit about performance. Maybe you can speak briefly about what the limits of 'B news' were that you were dealing with, and how that influenced your objectives with 'C news.'

Henry: Well, our big problem, a contributing factor, was that 'B news' was messy and buggy. There were things you couldn't do with it. There were things that didn't work well on it. It clearly was less and less able to cope with the growing volume of traffic. Even just things like memory leaks. "Expire" wasn't the only code that potentially had memory leaks. It was just getting harder to deal with the stuff. The big thing though was that 'B news' was very inefficient at handling incoming traffic. It took a long time to process incoming traffic. It beat on the machine pretty heavily, meanwhile. And there didn't seem to be any simple way to fix this. There were fundamental structural problems that one really could not do anything about that limited the ability to speed it up. We kicked around a bunch of ideas about improved ways of storing news and so forth. Eventually, we concluded that there wasn't any big improvement to be had. Nothing that would be worth the trouble of being incompatible. The main thing we were after was just greater performance.

Ronda: Can you say who we is? Or if this went on online as well.

Henry: This is Geoff and me. [*Geoff Collyer -ed*] I've never been a big believer in committee design. Our preference, me in particular, but I think Geoff as well, our preference is to do something and then announce it, rather than vice versa. Partly because we've got a higher opinion of our own sense of good design than a whole lot of other people.

Ronda: Can you explain what you mean by good design?

Henry: We're big on writing simple clean software that does one thing and does it well, which is not what you get out of a committee design. And in fact, this is one of the things we have occasionally taken flack for. We make our own decisions on what does and doesn't go into 'C news.' So we don't particularly care if this makes us popular or not. We've made a few mistakes along the way as well. But, it was our own idea. We've modified our own ideas of how things were going to work quite a bit along the way and stuff evolved to a considerable extent as we wrote it. There were muddles that had never adequately been cleaned up. As late as just before our alpha release, there were still three different programs called "rnews" in various places in our stuff. And when we were packaging things up to put together a release, I put my foot down and insisted that there had to be one and only one "rnews." And so we found other names for a couple of things in a hurry. But it evolved along the way. We had ideas of where we were going. But it didn't come full blown as a complete design. It couldn't really. That approach to doing things just doesn't work in the real world. The stuff always evolves. Once you start building up experience with the problem and with your tentative solutions, the requirements always evolve. So you really do have to plan for getting something working and having it evolve from there.

Ronda: Interesting.

Henry: We put a lot of thought over time into the performance issues and also into the precise definitions for a lot of things. The 'B news' stuff - even its documentation - in crucial areas, just sort of waved its hands and said, "well, you know what we mean." In some cases, we actually had to put quite a bit of effort into deciding exactly what should be done in obscure situations. [*These are -ed*] things you find out by doing it. It was not something that really could be predicted from specification in advance.

Ronda: That's interesting. Do you have a sense that the speed and the performance have made possible the ability of 'C news' compared to 'B news' to deal with volume?

Henry: People have adopted our stuff for a variety of reasons. Particularly, after the word started getting out that it was generally

better. There have been a few specific features that won us a lot of converts. Something that went into our version of "expire" sort of midway through its development process and won us a lot of friends, was control over expiry newsgroup by newsgroup. The 'B news' "expire" basically just let you set expiry rules for all the news put together. A lot of people, in fact, had different opinions about the value of different newsgroups, and wanted to keep some things longer than others. The fact that we could do that won us a lot of friends very quickly. It probably wouldn't have been that hard to add to 'B news', but nobody ever thought of it. There were things like this, but ultimately, people switched to 'C news' because 'B news' was eating their machines alive, and they wanted some performance back. And for that matter, because they could see the handwriting on the wall. There were machines, including some of ours, where toward the end, 'B news' was running essentially nonstop from 5:00 in the evening till 9:00 in the morning, turned off during the day because it had too much of an impact on performance when lots of people were trying to get real work done. And it wasn't keeping up with the incoming load. The backlog was growing. People who ran into that kind of situation generally decided real fast that they needed to switch to something else.

Jay: I thought Ronda's question had another component. Can your careful attention to speed and performance be pointed to as accounting for the tremendous growth in Usenet that wouldn't have been possible with something with less performance.

Henry: The trend was very firmly established very early. But certainly Usenet would have had a lot of trouble coping with growth if 'C news' hadn't come along when it did.

Jay: What I am asking is if not as careful a version of 'C news,' would that have been a limit that would have...?

Henry: Probably, because the care and effort we put into performance basically accounted for a lot of the performance. We were a little disappointed, initially, in fact, that fixing some of the basic structural mistakes of 'B news' didn't improve performance more. Yes, it was considerably better than 'B news', but it wasn't as good as we expected. The way you make stuff run really fast, it turns out, is to put a lot of attention into making it run really fast. Avoiding basic mistakes is a

crucial prerequisite, but it's not enough by itself. To really make the stuff perform, you really do have to put a lot of effort into understanding what things hurt performance, where the time is going. You have to put a fair bit of time into thinking about how things are being done and how they might be done better. We got a certain amount of performance just by careful low level tuning, looking for hot spots and finding ways to speed up the code there. But we also got an awful lot by standing back and thinking – "What is this code doing and is there a better way to do it?" "Are we repeating things that we could do just once?" "Is there information we need that we're having to gather laboriously that could just be stored centrally instead?" – and things like that, changes in strategy. Changes in strategy are what win you the big performance improvements on the whole. Not overall strategy in the sense of the mistakes 'B news' made versus the ones we didn't make. But sort of mid-level strategy - how the code does what it does. The way you get big performance improvements is not to make a bit of code run a little bit faster, but to take code out entirely. To find ways of just not doing some things and still getting the overall job done. Reducing the amount of time needed for something to 0 is always better than reducing it to 10%, though the 10% can be useful too.

Jay: But when the problems start building up now, will the next fix not be a software fix?

Henry: To some extent, we've had hardware fixes coming in all along. Faster modems, bigger disks, faster machines. And that's certainly helped. But it's going to be hard to beat 'C news' performance a lot without drastic revisions in something fundamental. There are things we know of and are doing to make it faster yet. But huge performance improvements are going to have to come from something more fundamental. One thing that turns out to be relatively expensive is just looking up a file name in an operating system, opening a file by name. The name look-ups are costly, even in versions of UNIX that have put some attention into optimizing them. And we know where our stuff is doing file name look-ups and we just don't do it any more than necessary. Any major speed up in that area – that is still one of the major bottlenecks – is going to have to come from major revisions to the operating system. It's not something that can be greased up much more

at the user level.

Ronda: You said earlier that you used to be able to get a month of Usenet and now you're down to, I think you said, four days.

Henry: In our case, we're storing 4 days, and using a great deal more disk space for it, too.

Ronda: Does that mean that in fact the size has gotten to a point where there is a need to figure out how to make some change? Is it coming to that somehow?

Henry: People have been predicting the imminent death of the net for a decade now, so I'm very reluctant to do that. But certainly, it's gotten to the point where we store 4 days because that's basically enough to carry you over a long weekend. If it drops much more than that it's going to be a serious problem for maintaining continuity in a lot of discussions. You can mitigate it somewhat by getting bigger disks or by being more selective about what you get. Probably, the bulk of Usenet sites these days are somewhat selective. We used to be a major redistribution point within Toronto. We're still a minor one. Because of that we try to carry everything. But carrying everything is steadily getting more expensive.

Jay: But does that imply there's going to have to be very large central distributing points?

Henry: That's already happening to some extent. A lot of big universities and things like that, for example, now have central news distribution machines, just to keep the load from spreading everywhere. And, for example, most of the news distribution within U of T now is handled by one of two central machines.

Jay: Yours not being one of them?

Henry: Ours not being one of them anymore. We do some redistribution to places outside campus. Not a lot compared to what we used to do. But that's definitely happening. UUNET in the states is another example. Someone once called it Usenet's main sewage pump.

Ronda: What is it? Can you say what UUNET is?

Henry: It's a site which offers mail connections and news-feeds for money, basically. It has done wonders for the connectivity of the net because a lot of people who couldn't do this sort of thing on an informal basis are happy to get a connection to UUNET which does cost money

but is professionally maintained. They're very much in the business of processing mail and news for money. And they're a very central point now.

Ronda: Isn't that also a little bit in contradiction with the way Usenet originally started with it being available to people at a low cost or no cost? But there's also Freenets growing up. For example, the Cleveland Freenet and the Youngstown Freenet and Ottawa is supposed to be developing a Freenet in Canada [*National Capital Freenet in Ottawa and Victoria Freenet in Victoria are now online -ed*]. The Freenets are how I got access. I wouldn't have been able to pay for access and other people I know wouldn't....

Henry: There's always people willing to do a certain amount for free. There's always going to be a considerable amount of that. The point is when you are in it for a long period of time and the demand just seems to be growing, sooner or later you burn out the supply of volunteer manpower. And somebody has got to start paying for it.

Ronda: And some of the contradiction is that it's public money.... In fact the public is paying for it, so to then go and put a commercial person in and charge back again, what we are already paying for in public funds, it's thru the universities and it's thru the NSF....

Henry: The real problem on all of this comes when you start talking about unlimited growth. This is the problem Usenet has had all along, in fact, which is, coping with continued growth. That shows up in a number of ways. That's just one side of it. Eventually a university, for example, decides that too much of its phone bill is being spent on shipping news around for other people and its time to let somebody do this who is actually getting paid for the job. Because NSF in its beneficence doesn't supply unlimited amounts of money for such things, sooner or later the demands get large enough that somebody's got to put up an appropriation specifically for it. And at that point, universities have a tendency to bow out if they can't get somebody nice to give them money for it.

And Usenet has run into problems of growth in a lot of other forms. Like the sort of social compact that regulates behavior to some extent on the net. The problems of finding information when there are thousands of newsgroups. All kinds of things like that. You regularly hear moans

from people about how Usenet isn't the way it used to be. And occasionally some inconsiderate old timer will point out, "Well it never was. You're one of these beginners who only joined in 1986. You don't know the way the net started out."

Michael: The question of growth also brings out the connections through the Internet because that has grown a lot more than it was initially.

Henry: Again, that's been a saving grace to some extent because the Internet has saved us from the pyramiding phone bills to a considerable extent. The bandwidth that has been made available in recent years for the growth of the Internet, a noticeable fraction of that is shipping Usenet traffic around. I don't know about the Internet itself, but there was a link between Toronto and Waterloo, the other prominent university in Ontario. Five years ago or more, I saw a graph of traffic growth over time. Generally, of course, it was upward. But there was this one huge step more or less, in the traffic, and that was when we started shipping Usenet stuff back and forth, that week. I expect that Usenet would have undergone some sort of collapse or transformation by this point if we had to go on shipping it by phone, because even with the modems getting better and better, they weren't getting better that fast, by that much.

Ronda: We have to end the interview soon. So we just want to ask a few final questions.

Michael: I was wondering if there was anything – with you, with your experiences of being on the net and being one of the writers, one of the programmers of 'C news,' and just your general knowledge – is there anything that other people who were system administrators or who were on the Usenet might find useful? Any insights?

Henry: Nothing very dramatic. About all I have to say is that a lot of this stuff is harder than it looks. I really don't know whether Geoff and I would have gotten involved with 'C news' if we had realized everything that was going to be involved because there was a lot more programming than we thought and a lot more ongoing hassle than we thought. If you decide to get into this kind of thing, you have to think very, very carefully about the possible implications.

Ronda: Have there been rewards as well?

Henry: For me, nothing enormously tangible. The occasional free dinner and things like that. And Geoff is currently working full time on News software support.

Ronda: But what about the principles that you clarified in the papers that you have written? Has that been something? For example, in "News Need Not Be Slow," you and Geoff wrote, "In order to know how to get somewhere, you must know where you are starting from." Are there principles like that that have come out of doing the work that have been helpful?

Henry: There's a lot of little things, things which can be useful to know if you're doing something like performance enhancement. But the one general principle I could distill out of it is that: If you want to write software that's fast or portable or well structured, despite years of evolution, you have to care about it and put effort into it. It's easy to be sloppy, but it comes back to haunt you. The only way to make something fast is to care about performance from the beginning and put real effort into getting it. The only way to keep the code clean and maintainable is to constantly put effort into that aspect of it. Resist the temptation to make quick fixes. Or if a quick fix just has to be done for some reason, make a point of going back and doing it right. These things do not happen automatically and they won't happen if you don't care about them. The main reason why a lot of software today is bloated and complicated and obscure and buggy is that people don't care. They may care in the sense that if you ask them they say, "Yes, we care," but the fact is they don't put any effort into it. They don't care enough to work on it.

Michael: Does what you just said help figure out how to keep Usenet running? Everyone says it's loaded now with users and newsgroups and messages? Is there any way to apply this?

Henry: Not really very directly. It's a very different situation from software. I can't think of any particularly direct application other than the very general application you have to think about what the real underlying problems are. And avoid the temptation to settle for quick fixes that don't really solve the problem.

The Tradition of May 1, 1848 Sir Francis Bacon and the Shorter Hours Bill

May 1, 1848 is a special day in the history of the industrial world. On May 1, 1848, the first 10 hour bill became law in Britain. This law was the result of a tradition of applying the methods of science to the problems of production, both social and technical.

To get technology to function, it has long been observed, one must base one's theories and plans on accurate knowledge of the physical world. Over 300 years ago, in the 1600's, a group of amateur scientists began meeting in London. These scientists were part of a tradition that stretched back into Italy at the beginning of the Renaissance and was perhaps best represented by Sir Francis Bacon [1561-1626] who explained how science must base itself on accurate data and observations drawn from this data and that science must serve to benefit the people of the society. "For we can't command nature, except by obeying her," wrote Bacon. Interested in putting into practice the scientific method and principles that Bacon had developed and in applying their science to serve the well being of the British people, these amateur scientists gathered in each others homes and then in Gresham College in London, forming what came to be known as the Invisible College. They gathered to conduct experiments in the different areas of production and science.

A 22 stanza ballad which describes the activities of these amateur scientists who met at Gresham College contains the following two stanzas:

"If to be rich, and to be learned
Be every nations chiefest glory,
How much are Englishmen concerned
Gresham to celebrate in story
Who built th' Exchange to enrich the City
And College founded the Witty"

A second hath described at full
The Philosophy of making Cloth
Tells you, what Grass doth make course Wooll
And what it is that breeds the Moth
Great learning is 'ith art of Clothing
Though vulgar People think it nothing.

(Taken from "in praise of the choice Company of Philosophers and Wits who meet on Wednesday evening at Gresham College," in "The Economic Writings of Sir William Petty," ed Charles Henry Hull, vol II, Cambridge, 1899, p. 324)

In 1660, these amateur scientists formed the Royal Society of London for the Improving of Natural Knowledge. One of those invited to join was John Graunt, a London shopkeeper, even though the science he pursued was different from the physical sciences that others in the Royal Society practiced. When the British Government published a set of data called the Bills of Mortality documenting how and why people of London died, Graunt studied the data and formulated a set of observations published as "Natural and Political Observations...made upon the Bills of Mortality" by Capt. John Graunt. Graunt's observations on the data gathered by the British government about the social and physical conditions of the people of London, was scientific work supported and recognized by the Royal Society, just as was exploration into physical and technical phenomena.

The data gathered by the scientists of the Royal Society, and the observations they made from their data, led to a significant increase in the ability of Britain industry to increase production, a breakthrough that made possible the industrial revolution.

However, the new machines and processes of production did not serve the purpose intended. Workers in the factories using the new machinery and methods of production worked longer hours and under more dangerous conditions than other workers. Factory owners commonly hired children at low wages and threw adult workers, particularly men, out on the streets. Instead of the new mechanization improving the material well being of the society, as the Royal Society scientists had intended, the new production made Great Britain into a

Factory Hell. Workers of all ages were required to work 12 or more hours a day, six or seven days a week. The unguarded machinery resulted in many deaths and injuries of workers, often of young children who worked the machines. The low wages of the parents exerted pressure on them to send their young children into the factories to work in order to keep the family from starving.

Scientific advances in production in Britain were at a standstill. These poor working conditions fettered the financial or social incentive to improve the machinery or utilize further scientific breakthroughs.

Faced with this factory hell, the workers themselves determined that there had to be a change. Though they didn't have the right to vote for representatives in Parliament, workers formed short time committees and publicized the conditions in the factories. They found allies like Robert Owen, a Mill owner from New Lanark, Scotland, who had realized that long hours and dangerous working conditions interfered with production.

By the early 1830s, the British Parliament was under pressure to do an inquiry into the conditions of the Factory Hell. They sent out a set of investigators to gather scientific data of the actual conditions existing in the factories. They also were charged with investigating how the current laws functioned and whether these laws were inadequate to prevent the abuses that were occurring. As a result of the investigation, a report was published. (See "Factory Inquiry Commission: First Report of... His Majesty's Commissioners... to collect information in the Manufacturing Districts....," Great Britain, June 28, 1833.)

A Ten Hours Act introduced in Parliament to limit the hours of labor in the Mills of children and women (and thus of men as well), met with vigorous opposition from a group of Factory owners and their spokesmen in Parliament. They claimed that British industry would be forced to shut down if there were interference from Parliament in the relationship between capital and labor. Factory workers and their allies continued their battle for a Ten Hours Law which would impose a statutory limitation on working hours. (See, for example, articles in "The Ten Hours Advocate," 1846-1847 documenting the strikes, demonstrations and support among factory workers for the Ten Hours Bill, the arguments in favor of the bill, and the efforts of employers and their

parliamentary spokesmen against the bill.) As a result of the accurate documentation of the hellish conditions and the determined battle against the employers wanting to continue the status quo, the Factory Act was passed by Parliament, limiting the hours of work, and establishing education requirements for children. It went into effect on May 1, 1848.

Despite the passage of the law, employers continued their opposition. After a continued battle, a 10-1/2 hour law with some enforcement power went into effect in 1850 and finally established the principle of government intervention in the relations between labor and capital.

As a result of the passage of the 10-1/2 hours bill, British industry enjoyed great health and productivity and there was a remarkable stimulus to the economy. Describing the results of the Shorter Hours law, a British Factory inspector wrote, "The great improvements made in machines of every kind have raised their productive power very much. Without a doubt the shortening of the hours of labor... gave impulse to these improvements. (Frankfurter Brief, p. 763) Another commentator explained, "There is more work done now in ten hours and a half in the factories in England than ever was in twelve or fourteen." (ibid., p. 762) This was the first significant factory legislation of the industrialized world. The law limiting work in the factory to 10-1/2 hours and requiring that children have mandated hours of education also influenced American factory legislation which was modeled on the results of the British experience. But what is considered the most convincing evidence of the success of the shorter hours law is how former opponents of the law were forced to recant and criticize their own mistakes. The "Report of the New York Bureau of Labor Statistics," in 1900, describes how members of the Parliament, Roebuck and Graham publicly admitted their changed positions. The Report explains:

"It came to pass that in 1860, when a bill was introduced to extend the ten-hour law to other branches of the textile industry, J. A. Roebuck, who had originally opposed with bitterness this kind of legislation, made the following recantation:

'I am about to speak on this question under somewhat peculiar circumstances. Very early in my parliamentary career Lord Ashley, now the Earl of Shaftesbury, introduced a bill of this description. I, being an

ardent political economist, as I am now, opposed the measure,... and was very much influenced in my opposition by what the gentlemen of Lancashire [*the Mill owners -ed*] said. They declared that it was the last half-hour of the work performed by their operatives which made all their profits, and that if we took away that last half-hour we should ruin the manufactures of England. I listened to that statement and trembled for the manufacturers of England [a laugh]; but Lord Ashley persevered. Parliament passed the bill which he brought in. From that time down to the present, the factories of this country have been under State control, and I appeal to this House whether the manufacturers of England have suffered by this legislation.'" (p. 50) (Brief, p. 485-6)

A second opponent of the Ten Hours bill added his testimony to that of Roebuck's. Sir James Graham admitted: "I am sorry once more to be involved in a short-time discussion. I have, however, a confession to make to the House.... Experience has shown to my satisfaction that many of the predictions formerly made against the factory bill have not been verified by the result.... By the vote I shall give tonight, I will endeavor to make some amends for the course I pursued in earlier life in opposing the factory bill." (p. 51) (Brief, p. 486)

Describing the lesson later drawn from this battle, the Frankfurter Brief in favor of an 8 hour law in Oregon, quotes from the British Lord Morley, "Can the realities between labor and capital be safely left to the unfettered play of individual competition? The answer of modern statesmanship is, that unfettered individual competition is not a principle to which the regulation of industry may be entrusted." (from Morley's Cobden, pg. 297-298)

The Ten Hours Victory of May 1, 1848, was a demonstration that when the principles of science are applied to the working conditions of the producers, there is a basis to solve those problems. The passage of the Factory Act of 1848 was the acknowledgment of the principle that unbridled competition of the market was not a useful guide in the relations between labor and capital. Thus in honor of the 145th anniversary of May 1, 1848, it is helpful to remember the tradition of the Ten Hours Advocates and renew the battle for shorter hours of labor so that the fruits of the new technology will improve the lives of the workers who have made such technology possible.

The Social Forces Behind the Development of Usenet News

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Right at this moment someplace in the world, someone is being helpful (or someone is being helped.) At the same time, others are participating in various discussions and debates. A new communications medium is currently in its infancy. Over the past two decades the global computer telecommunications network has been developing. One element of this network is called Usenet News (also known as NetNews), and this news' original carrier was called UUCPnet (or just UUCP). The rawest principle of Usenet News is its importance. In its simplest form, Usenet News represents democracy. The basic element of Usenet News is a post. Each individual post consists of a unique contribution from some user placed in a subject area, called a newsgroup. In Usenet's very beginning (and still to some extent today) posts were transferred using UNIX's UUCP utility. This utility allows the use of phone lines to transmit computer data among separate computers. The network (UUCPnet) that Usenet News was transferred on, grew from the ground up in a grassroots manner. Originally, there was no official structure. What began as two or three sites on the network in 1979 expanded to 15 in 1980. From 150 in 1981 to 400 in 1982. The very nature of Usenet is communication. Usenet News greatly facilitates inter-human communication among a large group of users.

Inherent in most mass media is central control of content. Many people are influenced by the decisions of a few. Television programming, for example, is controlled by a small group of people compared to the size of the audience. In this way, the audience has very little choice over what is emphasized by most mass media. However, Usenet News is controlled by its audience. Usenet News should be seen as a promising successor to other people's presses, such as *The Searchlight,*

The Appeal to Reason, The Jewish Daily Forward in the U.S. and the Penny Press tradition in England. Like these other people's presses, most of the material written to Usenet is by the same people who actively read Usenet. Thus, the audience of Usenet decides the content and subject matter to be thought about, presented and debated. The ideas that exist on Usenet come from the mass of people who participate in it. In this way, Usenet is an uncensored forum for debate – where many sides of an issue come into view. Instead of being force-fed by an uncontrollable source of information, people set the tone and emphasis on Usenet. People control what happens on Usenet. In this rare situation, issues and concerns that are of interest and thus important to the participants, are brought up. In the tradition of Amateur Radio and Citizen's Band Radio, Usenet News is the product of the users' ideas and will. Unlike Amateur Radio and CB, however, Usenet is owned and controlled solely by the participants. Currently the range of connectivity is international and quickly expanding around the world into every nook and cranny. This explosive expansion allows growing communication with people around the world.

In the 1960s, the Advanced Research Projects Agency (ARPA) of the Department of Defense began research of fundamental importance to the development and testing of computer communications networks. ARPA research laid the ground work for the development of other networks such as UUCPnet. ARPA conducted an experiment in attempting to connect incompatible mainframe computers.[1] It was called the ARPA Computer Network (ARPAnet). ARPA's stated objectives were:

"1) To develop techniques and obtain experience on inter-connecting computers in such a way that a very broad class of interactions were possible and

2) To improve and increase computer research productivity through resource sharing."[2]

ARPA was both conducting communications research and trying to study how to conserve funds by avoiding duplication of computer resources.[3] A Cambridge, Mass. company, Bolt Beranek and Newman, Inc. (BBN), was chosen to construct the network, and AT&T was chosen to provide the communications lines. ARPAnet was needed because it

was found that a data connection over existing telephone voice lines was too slow and not reliable enough in order to have a useful connection.[4] Packet-switching was developed for use as the protocol of exchanging information over the lines. Packet-switching is a communications process in which all messages are broken up into equal size packets which are transmitted interspersed and then re-assembled. In this way, short, medium and long messages get transferred with minimum delay.[5]

The ARPAnet was a success. ARPA provided several advances to communications research. ARPAnet researchers were surprised at the enthusiastic adoption of electronic mail (e-mail) as the primary source of communication early on. E-mail was a source of major productivity increase through the use of the ARPAnet.[6] By 1983, the ARPAnet officially shifted from using NCP (Network Control Program) to TCP/IP (Transmission Control Protocol/Internet Protocol.) A key point to TCP/IP's success is in its simplicity. It is very easy to implement over various platforms, and this simplicity has accounted for its continued existence as a de facto standard of the Internet up to today. ARPAnet's lasting contribution was demonstrating how a backbone infrastructure can serve as a connection between gateways. A gateway is a computer or part of a computer programmed to receive messages from one network and transfer them onto another network.

ARPAnet grew quickly to more than 50 nodes between Hawaii and Norway.[7] However, it did not extend to all who could utilize it. Computer scientists at universities without Department of Defense contracts noticed the advantages and petitioned the National Science Foundation (NSF) for similar connectivity. CSnet was formed to service computer scientists. CSnet was initially financed by the NSF. Very quickly the desire for interconnection spread to other members of the university community and CSnet grew to serve more scientists than just computer scientists at universities. CSnet became known as "Computer 'and' Science Network" rather than just "Computer Science network."[8]

ARPAnet was phased out by the Department of Defense, and was replaced by various internal networks (such as MILnet). The role of connecting university communities and regional networks was taken over by an NSF funded NSFnet, which originated as a connection for university researchers to the five National Supercomputer Centers.

CSnet and NSFnet were made possible by the research on ARPAnet. The NSFnet became the U.S. backbone for the global network now known as the Internet.

ARPAnet research was pioneering for communications research.[9] Researchers discovered the link between computer inter-connection and increased productivity from human communication. The sharing of resources was proven to save money and increase computer use and productivity. The development of packet-switching revolutionized the basic methodology of connecting computers. The source of these discoveries were the people involved. The personnel involved in the ARPAnet project were very intelligent and forward-looking. They recognized their position of developing future technologies, and thus did not develop products that commercial industry could (and would) develop. Instead they understood that the communications technologies they were developing had to come from a not-for-profit body. ARPA researchers had no proprietary products to support, and no deadlines to meet. Either would have tainted, or made developing networks of incompatible computers impossible or limited. Current users of international computer networks are in debt to the pioneers of ARPAnet.

So ARPAnet was successful in its attempt to connect various spatially remote computers, and thus more importantly the people who used those computers. However, these people were either professors at Universities that had Department of Defense research grants or employees of a limited number of Defense Industry companies. Eventually other Universities connected through CSnet, NSFnet, BITnet and other developing connections. There were still a mass of people who wanted a connection, but were not in a position to gain one. Duke University and the University of North Carolina at Chapel Hill were two such locations. It was in these underprivileged fertile grounds where the grassroots computer communications breakthrough of Usenet originated and developed.

The UNIX operating system provides the basic tools needed to share information between computers. UNIX[10] was developed as "a system around which a fellowship would form."[11] One of the programmers of UNIX, Dennis Ritchie, wrote that the intended purpose of UNIX was to "encourage close communication."[12] UNIX's general principles

thus conceptually foreshadowed the basic tenet of Usenet News. How else should one go about designing communications programs, but on an operating system which was designed with a basic principle of encouraging communication? The UNIX utility UUCP (UNIX-to-UNIX CoPy) was developed in 1976 by Mike Lesk at Bell Labs. UUCP provided a simple way of passing files between any two computers running UNIX and UUCP. UNIX's popularity also arose from AT&T's prohibition to profit from other than their main business, phone services, under the terms of the 1956 Consent Decree. UNIX was thus available on a "no-cost" (or very low cost) basis. The operating system was seen as an "in-house" tool on DEC computers and was in use throughout Bell Labs. Many Universities used the same type of computer and were licensed by AT&T to utilize UNIX. It was thus easily accessible. Schools picked it up, and computer science students used it to learn about operating systems, as UNIX was a model of elegance and simplicity compared to most operating systems of the times. UNIX became a widely used operating system in the academic world. This paved the way for an international public communications system to form.

Usenet News was created by graduate students Tom Truscott and James Ellis of Duke University in conjunction with graduate student Steve Bellovin of the University of North Carolina in 1979. A 5-page leaflet introducing Usenet News was distributed at the Winter 1980 USENIX UNIX Users' Conference in Boulder, CO. Later that year, at the Summer USENIX Conference in Delaware the software needed to participate in Usenet was put on the Conference tape. By this time, Stephen Daniel had rewritten the basic programs and it was called A-News. The software was immensely popular.

Usenet was patterned to mean "UNIX Users Network." The developers thought Usenet would be used to discuss people's problems and to share experiences about UNIX. Usenet did provide a forum for people to solve problems with UNIX, as AT&T provided no support for UNIX. In an early handout, Usenet is referred to as a "poor man's ARPAnet."[13] Stephen Daniel told me that people who didn't have access to the ARPAnet were hungry for similar opportunities to communicate.[14]

Usenet News has been full of surprises from the beginning. The

originators of Usenet News underestimated the hunger of the people. As the initial intentions were to produce an easy method of communicating with other users at the same site, the writers thought people would want to have local bulletin boards.[15] However, people were attracted by the possibility of communicating with others outside the local community. Even today, the wide-spread communication is part of what makes Usenet so enticing. It was also thought NetNews would be useful as a method of communications at individual locations, and between sites close to each other.[16] Usenet grew as a grassroots connection of people. The people who utilized NetNews wanted to communicate, and communicate they did! People have a fundamental need to communicate and Usenet News aptly fills the bill. (See, e.g., Gregory G. Woodbury's "Net Cultural Assumptions")

Early in 1980 or 1981 the gap between ARPAnet and Usenet was bridged.[17] The University of California at Berkeley had connections to both ARPAnet and Usenet News. This allowed another pioneer, Mark Horton, to bring discussions from ARPAnet mailing lists into Usenet newsgroups.[18] This was a significant achievement. Communities other than ARPA sponsored researchers were finally able to see what the ARPAnet had made possible. The gatewaying of ARPAnet mailing lists into Usenet attracted a wave of people. These people became attracted to Usenet News when two ARPAnet mailing lists (SF-LOVERS and HUMAN-NETS) began to appear on Usenet.[19] These lists provided interesting material and discussions. The size of the news feed (i.e., the raw data of Usenet News) thus became larger and provided more for people to read. Later other sites would serve as gateways to even more discussion lists from the ARPAnet. NetNews was also seen as a superior method of holding discussions. Gatewaying these fa (i.e., From ARPAnet) newsgroups proved to be politically courageous. The ARPAnet was only accessible by a certain group of people, and these gateways challenged that notion. The effect on the ARPAnet was important as Steve Bellovin wrote:

"The impact of Usenet on the ARPAnet was more as a (strong) catalyst to force re-examination (and benign neglect) on the strict policies against interconnection. Uucp mail into the ARPAnet became a major force long before it was legit. And it was obviously known to,

and ignored by, many of the Powers that Were."[20]

The network made possible by UUCP expanded to connect people across the entire country. Rather early UUCP expanded internationally when the University of Toronto Zoology Department joined the Net in May of 1981.[21] Two companies proved helpful to this communication by distributing NetNews and electronic mail long distance. Each UUCP site had to either pay the phone bill to connect to the next system, or arrange for the other system to make the phone call. System Administrators at AT&T and DEC did the footwork in order to take e-mail and news where it might not have reached. These people went through the trouble in order to try to see the system work. However easy connections were not always available. In one example, Case Western Reserve University graduate students had to route mail across the continent twice in order to send mail through UUCP to reach their professors who were connected to the ARPAnet next door.[22] Usenet News seems to have introduced the idea of connectivity to the ARPAnet, as gradually the ARPAnet connected to other networks until it became more known as a backbone to other networks than a self-contained network.[23]

Voluntary effort is the crucial foundation of UUCPnet and Usenet News. On one side, there are those who donate time and energy by contributing to Usenet's content – writing messages and answering messages or participating in a debate. Without the time and effort put in by the users of Usenet News, Usenet News would not be what it is today. Also important to Usenet's success are the system administrators who make the running of Usenet News possible. Resource-wise, NetNews takes up disk space on computers throughout the Usenet, and phone calls often must be made to transfer the raw data of the news. In particular, system administrators at AT&T and DEC found it worthwhile to transport the News across the country. Certain sites emerged as clearing houses for Usenet News and UUCP e-mail.[24] These machines served as major relay stations of both news and e-mail. A structure grew that was considered the "backbone" of "the net." Backbone sites formed the trunk of the circulatory system of news and e-mail. A backbone site would connect to other central distribution computers and to numerous smaller sites. These central backbone sites provided a crucial organization to the Usenet communications skeleton. People formed the center

of these connections. For example, ihnp4 at AT&T existed mainly because of Gary Murakami's effort and only partially from management support. Usenet services and support were not officially part of Gary's job description. After Gary left ihnp4, Doug Price put time and effort to keep things running smoothly. Certain System Administrators in Universities also picked up the responsibility for distributing News and e-mail widely. Often these individuals would find ways of having their site pick up the phone bill. Sometimes sites would bill the recipients. However, others who received a free-connection often exchanged that for spreading what they received to others for no charge (e.g.; Greg Woodbury & wolves off of Duke, and plenty of others.)

Initially, expansion of sites receiving Usenet News was slow. Some statistics are shown in the table.

Year	# of Sites	Articles/day	
1979	3	2	
1980	15	10	
1981	150	20	
1982	400	50*	
1983	600	120	
1984	900	225	
1985	1300	375	1MB+/day
1986	2500	500	2MB+/day
1987	5000	1000	2.5MB+/day
1988	11000	1800	4MB+/day

*This was after ARPAnet mailing lists were gatewayed into Usenet. (Gene Spafford, *Usenet History Archives* from the Mailing List) [from Gene Spafford, Oct. 11, 1990, based on presentation on Oct 1, 1988 for the IETF meeting.]

Why did this happen? Initially Usenet was only transported via UUCP connections. Besides UUCP, other resources were used, such as weekly airmailing of mag-tape data to Australia to provide connectivity.[25] Today, Usenet News travels over all types of connections. The evolving ARPAnet (and now the Internet) provided a faster way of transporting news. However, a large number of Usenet News

recipients only have connectivity via UUCP. Universities and certain businesses can afford to connect to the Internet, but many individuals also want a connection. Today 60% of Usenet traffic is carried over the Internet via the instantaneous Network News Transport Protocol (NNTP), but 40% of Usenet News is still carried through the slower UUCP connections. From my own research using Usenet News, I have heard of several examples of various types of connections using UUCP. These representatives of the "fringe" give a clue to what the origins of this communication must have been like.

The number of sites receiving Usenet News continually increased (as already illustrated) and this clearly demonstrates its popularity. People were attracted to Usenet News because of what it made possible. People want to communicate and enjoy the thrill of finding others across the country (or today across the world) who share a common interest or just to be in touch with. Besides the common thrill, it is possible to make a serious relationship. Usenet News makes this discovery possible because it is a public forum. People expose their ideas broadly. This wide exposure makes it possible to find compatriots in thought. The same physical connections which carry Usenet News often also transport electronic mail. Interactions and discoveries are only made possible by the public aspect of Usenet News. Mailing Lists have as wide a range of discussions, but are exposed to a much smaller sized group. The appeal of Usenet can become tiresome at times,[26] but it is rare that anyone leaves Usenet permanently. Unless, of course, someone can't find the time to fit Usenet into his or her life. As more universities, businesses, and individuals connect, the value of Usenet News grows. Each new person eventually can add his unique opinion to the collection of thoughts that Usenet already has. Each new connection also increases the area where new connections can be made through cheap local phone calls. The potential for inexpensive expansion is limited only by the oceans and other natural barriers.

ARPAnet has been supplemented and eventually replaced by networks like CSnet and its successor NSFnet. Both were created by the United States Government in response to research scientists' and professors' pleas to have a similar connection to the ARPAnet. The NSFnet was also created to provide access to the five supercomputer

computing centers around the country. And now NSFnet as the backbone of the global provides another route for Usenet News to be distributed. Similar to the ARPAnet, NSFnet is a constant connection run over leased lines. NetNews is distributed using the NNTP protocol over Internet connections. This allows for News and e-mail to be distributed quickly over a large area. Internet connections also assist in carrying news and mail internationally. The Internet-class networks and connections include the established government and university sponsored connections. However much of the way individuals are connected at home is through the phone lines and various versions of UUCP. There are also commercial services that exist now for a fee that serve to provide connections for electronic mail and Usenet News access, as well as access to the Internet.

Much of the development of Usenet News owes a big thanks to restrictions on commercial uses. Where else in our society is the commercial element so clearly separated from any entity? Many other forums of discussion and communication become clogged and congested when advertisements use space. On UUCPnet, people feel it wrong to assist any commercial venture through the voluntary actions of those who use and redistribute news and e-mail. When people feel someone is abusing the nature of Usenet News, they let the offender know through e-mail. In this manner users keep Usenet News as a forum that is free from the monetary benefit for any one individual. Usenet is not allowed to be a profit making venture for any one individual or group. Rather, people fight to keep it a resource that is helpful to the society as a whole.

On what was the ARPAnet and what is now the NSFnet and the Internet, there are Acceptable Use Policies (AUP) that exist because these networks were initially set up, founded and financed by public monies. On these networks, commercial usage is prohibited, which means it is also discouraged on other networks that gateway into the NSFnet. [*Unfortunately, the NSF is now encouraging privatization of the NSF backbone. See e.g. the U.S. Office of Inspector General's Report on NSFnet, April, 1993 -ed*] However, the discouragement of commercial usage of the global Usenet News is separate and developed differently from the AUP.

The social network that Usenet News represents supersedes the physical connection it rides on. The current NetNews rides on many of the physical networks that exist today. However, if need would ever be, Usenet could re-establish itself outside of the current physically organized networks. Usenet News' quality is such that it will survive because of its users will. As a peer to peer network, Usenet draws its importance. People who use Usenet News wish to communicate with others. This communal wish means that people on Usenet find it in their own and in the community's interest to be helpful. In this way, Usenet exists as a world-wide community of resources ready to be shared. Where else today is there so much knowledge that is freely available? Usenet News represents a living library. Usenet News is only a part of the worldwide computer networks that are "part of the largest machine that man has ever constructed – the global telecommunications network."[27]

Usenet News began with the spirit that still exists today. On several newsgroups I posted a message with the following subject: "I want to hear from the four corners of the Net – That means YOU!" In return I received numerous wonderful answers. One new pioneer was going to use packet radio to send e-mail up to the CIS's orbiting Mir Space Station in the heavens. One person criticized Japan's lack of understanding the computer technology they supposedly "lead." Another user from France told me how the government charged a lot of money to access e-mail and Usenet News, and how there were at least two other "unofficial" connections. Since the government didn't recognize these other gateways, e-mail was to be sent via the United States in order to reach others across the street! Certain cities (e.g., Wellington, New Zealand and Cleveland, Ohio) have free public connections to Usenet News, e-mail and other network resources. Others in Krakow in Poland, Australia and the ex-USSR sent me information about their connection. Some told me of how they made other connections possible. One user in South Africa told me how he distributed news and e-mail and was trying to gain access to a satellite in order to set connections up with the interior of Africa that lacks the otherwise needed infrastructure. The world is still in the infancy of this communications inter-connectivity!

The very nature of Usenet News promotes change. Usenet News

was born outside of established "networks," and transcends any one physical network. Currently, at this time, it exists of itself and via other networks. It makes possible the distribution of information that might otherwise not be heard through "official channels." This role makes Usenet News a herald for social change. Because of the inherent will to communicate, people who don't have access to News will want access when they become exposed to what it is, and people who currently have access will want News to expand its reach so as to further even more communication. Usenet News might grow to provide a forum for people to influence their governments. News allows for the discussion and debate of issues in a mode that facilitates a mass participation. This becomes a source of independent information. An independent source is helpful in the search for the truth.

Administrators and individuals who handle the flow of information have been predicting the "imminent death of the net" since 1982.[28] The software that handles the distribution of NetNews has gone through several versions to handle the ever increasing amount of information. People who receive News have either had to decrease 1) the number of days individual messages stay at the site, 2) the number of newsgroups they receive; or they have had to allocate more disk space for the storage of News. Despite all the predictions and worries, people's desire for this communication have kept this social network floating. Brad Templeton once wrote, "If there is a gigabit network with bandwidth to spare that is willing to carry Usenet, it has plenty more growth left."[29] Brad, and everyone else will be happy to know that such a network does exist! Various research labs (including the NSF Center for Telecommunications Research at Columbia University in New York) are close to producing usable gigabit networks.

Usenet News is a democratic and technological breakthrough. The computer networks and Usenet News are still developing. People need to work towards keeping connections available and fairly inexpensive, if not free, so as to encourage the body of users to grow. There are several cities and governments across the world where the public has access to network services as a civic service. This direction is to be encouraged. Exclusive arrangements for access are to be discouraged. The very nature of Usenet News means people are going to be working

for its expansion. Others will be working for the expansion for their own gain, and I wouldn't doubt that some forces will be an active force against expansion of Usenet. I can only ask that people attempt to spread this document in an attempt to popularize and encourage the use and fight for Usenet News.

Footnotes

1. "In September 1969, the embryonic one-node(!) ARPAnet came to life when the first packet-switching computer was connected to the Sigma 7 computer at UCLA. Shortly thereafter began the interconnection of many main processors (referred to as HOSTs) at various university, industrial, and government research centers across the United States." (Kleinrock, "On Communications and Networks," *IEEE Transactions on Computers*, vol. C-25 No 12, Dec 1976, Pg. 1328)

2. F. Heart, A. McKenzie, J. McQuillan, and D. Walden, *ARPAnet Completion Report*, Washington, 1978, pg. II-2

3. Alexander McKenzie et al, "ARPAnet, the Defense Data Network, and Internet" in *The Froehlich/Kent Encyclopedia of Telecommunications*, vol. 1, pg. 346

4. Lawrence G. Roberts, *The ARPAnet and Computer Networks*, pg.145

5. Leonard Kleinrock, "On Communications and Networks," *IEEE Transactions on Computers*, vol C-25, No. 12, December, 1976, pg. 1327.

6. Alexander McKenzie, pg. 357

7. F. Heart, pg. ii-25

8. Alexander McKenzie, pg. 369

9. "For many of the people in government, at the major contractors, and in the participating universities and research centers the development of the ARPAnet has been an exciting time which will rank as a high point in their professional careers. In 1969 the ARPAnet project represented a high risk, potentially high impact research effort. The existence of the net in practical useful form has not only provided communications technology to meet any short term needs, but it represents a

formidable communications technology and experience base on which the Defense Department as well as the entire public and private sectors will depend for advanced communications needs. The strong and diverse experience base generated by the ARPAnet project has placed this country ahead of all others in advanced digital communications science and technology." (*ARPAnet Completion Report*, section II -109.)

10. UNIX was born in 1969, the same year as ARPAnet.

11. D. M. Ritchie, "The UNIX System: The Evolution of the UNIX Time-sharing System," *Bell Systems Technical Journal*, vol. 63, No. 8 (October 1984), pg. 1578.

12. ibid.

13. Stephen Daniel, James Ellis, and Tom Truscott, "USENET – A General Access UNIX Network," Duke University, Durham, NC, Summer 1980.

14. Stephen Daniel, 1992, *Personal Communications*, November 1992.

15. Bellovin, Steve. M. and Mark Horton, "USENET – A Distributed Decentralized News System," an unpublished manuscript, 1985.

16. ibid.

17. KEY POINT - The first gateway of ARPAnet mailing lists to Usenet was an early force to have gateways with ARPAnet. Gateways to ARPAnet were on the side and in all likelihood not officially sanctioned. However, this provided the impetus for future gateways into ARPAnet. This was the first pressure on the ARPAnet to provide service to a larger number of people - a first step to transforming of the ARPAnet to become a part of the backbone on the Internet.

18. Comment from Steve Bellovin, Oct. 10, 1990, *Usenet History Archive*: "Correct. The original concept was that most of the traffic would be the form now known as UNIX-wizards (or whatever it's called this week). Growth was slow until Mark started feeding the mailing lists in because there was nothing to offer prospective customers. Given a ready source of material, people were attracted."

19. Comment from Tom Truscott, Sept 25, 1990, *Usenet History Archive*: "The very first news groups were "NET." and local groups such as "dept." Later Horton et al. oversaw the lower-casing of NET. Only when ucbvax joined the net did "fa" appear. Indeed I was unaware of the ARPAnet mailing lists such as human-nets until ucbvax enlightened us."

20. Steve Bellovin, Oct 10, 1990 - Usenet History Mailing List. Also - from Lauren Weinstein, Nov. 23, 1992: “Greetings. It’s all too easy to forget, even for those of us who were there all along, how “small” it all started. When I was at UCLA-ATS (ARPAnet site 1) in the early 1970s, even small mailing lists could cause concern. I still distinctly remember the concerns regarding network loading from Geoff Goodfellow’s NETWORK-HACKERS mailing list (this was in the days when “hacker” didn’t have the negative meaning it has picked up since then) as the list passed *100* addresses. A list about wine (WINE-TASTERS, I believe it was called) which was mentioned in “Datamation” magazine caused memos to be sent out from the powers-that-be about “official use” of the net. There was also a lot of hand-wringing about the 255 site limit (that is, a limit on the number of IMPs [*Interface Message Processors -ed*]) in the network topology under NCP [*Network Control Program -ed*]. It’s quite remarkable how much we accomplished on what by today’s standards were slow machines with “tiny” amounts of memory, running with a 56 Kbit network backbone!”

21. Henry Spencer - Usenet History Archives “history” file.

22. From Amanda Walker, Tue, Oct. 16, 09:11 PDT, 1990, *Usenet History Archives*: “Indeed. I suspect that there are any number of examples of this, but the most egregious in my experience was at CWRU. The ECMP department had a VAX 11/780 on Usenet (“cwruecmp”), and the campus computer center had a DEC-20 in the room next door. The machines were separated by a grand total of about 30 feet and a piece of wallboard, but the computer center was not at all interested in “catering” to “those CS types” by stringing an RS-232 line between them. So, it was possible to send mail between them, but only by sending via a route resembling:

```
 crwuecmp => decvax => ucbvax (UUCP)
 ucbvax => columbia (CU20A, I think)
        (ARPAnet)
 columbia => cmu-cs-c => cwru20
         (CCnet)
```

Yup, that’s three networks, and two coasts just to get through a piece of sheetrock :-). Took about a week, too.”

23. Alexander McKenzie, “Indeed, during a typical measurement period in June 1988, over 50% of the active ARPAnet hosts were gateways, and they accounted for over 80% of the traffic.” pg. 369

24. At AT&T, the computers “research,” then “allegra,” then “ihnp4" served as major mail and/or news distribution sites. At DEC - “decvax” gradually increased its role (e.g., “decvax” in New Hampshire would call long distance to San Diego across the country.)

25. Andrew Tabenbaum is quoted as saying something similar to “Never underestimate

the bandwidth of a station wagon full of 9 track tape (or magnetic tape)."

26. "Flame Wars" (highly emotional attacks) can become annoying. There are ebbs and flows of interesting posts. Even though Usenet is addicting, it can also be overwhelming.

27. Ithiel de Sola Pool, *Technologies Without Boundaries*, Cambridge 1990, pg. 56.

28. From the *Usenet History Archives*.

29. From the "posthist" file from *Usenet History Archives*.

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Special Thanks to Bruce Jones for establishing and archiving the *Usenet History Archives*. Also thanks to the Pioneers for getting Usenet News off to the right start.

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The Net and the Labor Movement Editorial

This issue of the *Amateur Computerist* contains articles on the victory of the Ten Hours Bill in England in May, 1848 and on the development of the computer network that now spans the globe. The *Amateur Computerist* has occasionally been asked why we combine labor concerns with articles involving the newly developing computer technology. The articles in this issue, hopefully, will help answer that question.

The current global computer network is the development of work done by scientists, engineers, programmers and many other networking pioneers who functioned much in a tradition like that of the amateur scientists who founded the Royal Society in London in the 1660s. [*See Sir Francis Bacon and the Shorter Hours Bill.*] The ARPAnet was the network developed to give computer scientists and other DOD contractors a way to test their networking theories. [*See Social Forces Behind the Net.*] Based on the actual network to help them to collaborate and to give them a workshop to test their theory and make it more attuned to the real problems of a worldwide network, a global network evolved which amazed even the pioneers themselves.

An environment like that of the Royal Society was also created at Bell Labs where computer programmers involved in scientific research like Ken Thompson, Dennis Ritchie, Doug McIlroy, Mike Lesk and others worked to create a computer operating system that would make it possible for computers to be utilized to the fullest by programmers. They functioned together, helping each other and building on each others' inventions and discoveries. Due to a tradition of honestly admitting their errors and mistaken models and their willingness to make the bugs public that they found in their programs, they were able to create an operating system that has spread round the world and has made possible programming achievements like 'C news' for Usenet News.

The traditions of openness about errors, a scientific approach to

searching out the real problems and simplicities and dealing with them, and testing one's theories in practice, have made it possible for Bell Labs research programmers to create UNIX, for the ARPAnet computer pioneers to build the ARPAnet, and for programmers like Henry Spencer and Geoff Collyer to create 'C news.'

In Fall, 1979, another significant event occurred. Graduate students at Duke and the University of North Carolina were exploring the possibilities of the UNIX operating system Version 7 that had come out with a remote UNIX to UNIX copy program called uucp. They put together some UNIX shell scripts into a program to make it possible to connect the computers at their two schools via uucp and a homebrew autodial modem using the telephone. They then presented their achievement at a UNIX users' conference and offered to set up an electronic newsletter where UNIX users at different locations could help each other with problems.

The computer network they created soon spread broadly and widely and is now known as Usenet News, a computer users news which reaches people around the world. It makes it possible for users to participate in determining and posting the news that will be carried via this global network. This news itself is a splendid achievement as it involves a high level of automation and is administrated by people around the world who have learned to work together and to help each other solve technological problems of the technology. Also, there are many who have created programs and other contributions to help make this news possible. Most have done so with out financial gain, but as a contribution to the networking community.

Via the network, the real conditions of people's lives around the world are being shared. Despite the great promise that computer facilitated communication and automation provide, the conditions of the common people's lives are continually worsening. There are people out of work, with high unemployment in France, Russia, the U.S., Canada, etc. to name just a few of the countries from which this writer has gotten first hand reports. Students are finding it hard to find jobs, either for the summer to raise the money to return to school in the fall, or when they graduate. Some employers even fire their workers for postings on the net that tell the truth about shortcomings in computer industry products

(such as has recently occurred with an employee of Digiboard being fired for a post he made to Usenet.)

Workers who do have jobs are working long hours, with little or no extra pay for the overtime hours. Computer workers in the U.S., for example, have very little legal protection against long hours of work. Meanwhile, trade unions in the U.S. like the UAW are oblivious to any problems of workers and instead are busy putting their financial and staff resources toward promoting the program of their political party, while workers' problems and ever worsening conditions are ignored.

But, what the spirit and tradition of May, 1848 shows is that scientific inquiry and methods must be applied to both social and technical problems if a society is to have the advantages possible from science. Sir Francis Bacon explains how science is only possible if there is a progressive and social purpose for that science. Therefore, when problems are presented, like the further expansion of the net or how to deal with the ever growing load of Usenet posts and newsgroups, there is a need to subject these problems to scientific analysis and examination.

The real problems in society which result from the development of automation have only begun to be subjected to such scientific analysis. The 1833 Parliamentary Inquiry into factory conditions in Great Britain demonstrated the kind of scientific data that needs to be gathered to fashion legislation that deals with these real problems. Such a scientific approach to the questions of the society and its economic problems was pioneered in England and resulted in stronger laws to shorten the hours of labor of the workers in the most mechanized factories of that time. This scientific approach to legislation, whether it be legislation to guide the expansion of the net or legislation in favor of shorter hours, is needed today if the promise of the automation revolution is to be realized. Bacon's insight that the goal of one's work affects whether one's work is scientific or not, applies to today's research in automation and computer communication. Will the efforts and work go to benefit the people of the society or a small handful? The tradition of May 1848 shows that scientific work requires that the actual conditions of the workers involved in the production of the society be subjected to the same kind of scientific methods as other problems of science and tech-

nology. By combining the concerns of workers with articles about computers, the Amateur Computerist is continuing the tradition of the Royal Society and of the Factory Inquiry into the conditions of the laborers that were pioneered in England to make possible industrial revolution. Such an approach is needed today if our society to gain the fruits of the automation revolution.

Letters to Editor

The Net in Russia

The *Amateur Computerist* has corresponded with computer users in Europe, Asia, North and South America, Australia and New Zealand. We told our correspondents that we are interested in any comments they may have about the newsletter and in what is happening with telecommunications where they live. Several have commented on the hard economic times and high unemployment in their countries. We think it is of value to share some of this correspondence with our readers. The following is one example of these difficult living conditions described in e-mail received from around the world. We welcome accounts of current conditions for publication in future issues of the *Amateur Computerist.*

We were told that in Russia there are many networks, but all of them are quite expensive. Still educational and scientific institutions may have free access to e-mail. E-mail is new for many people and there is a lot to learn.

At one site we were told there are some 100 alt.* newsgroups to select from. There are some 60 groups in the Russian language. Of these 50% are for commercial use – sell/buy, etc. About 15% are FIDO echoes translated into newsgroups – you can read and mail to them.

A computer user wrote that his connectivity cost $500 per month including an IP address. He added that e-mail payment depends on your traffic in addition to a fixed monthly payment. He said he had heard about the existence of Freenet and Glasnet in Russia but that they only

provide e-mail.

From the news reports in the U.S. press it sounds like it is hard for people to live in Russia. We asked how conditions were in Moscow? Were prices very high? We were told that we were not far from reality in thinking prices were high. The income per month is 5000 to 20,000 rubles. At the rate of $1 equaled 565 rubles he translated that to the equivalent of $10 - $40 per month. Also the prices are quite high: a pair of shoes cost 15,000 rubles. A user told us that the only good thing is that they pay very little rent for flats but this situation is about to be changed. When we asked if people feel that things will improve? We were told that people were tired of discussing all that – it has lasted already for eight years. The correspondent went on however to agree with us that the computer revolution is the one bright spot that people have to look forward to.

We ended one e-mail message: "Good to be in contact with you." And the Russian user replied, "Me too."

It has been valuable to get first hand information about conditions in other countries. We hope to continue and expand such contact. We invite computer users around the world to write us about the network connections and living and working conditions where they live.

About The Net in Uruguay

This is a more detailed explanation about telecommunications here, as I promised.

For getting to the Internet I'm using the services of Chasque. Chasque is a member of the Association for Progressive Communications, a non-profit organization (at least, that's what THEY say), with other members (networks) in other countries, like Pegasus in Australia, Web in Canada, etc. (I don't actually know much more about them). To use this service for having mail on Internet (no ftp service available), you pay an initial fee of U.S. $20. Then a monthly fee of U.S. $10; you have an hour of connect time free with this. Additional connect time costs U.S. $1.50/hour. Sending/receiving mail to the outside costs about U.S. $.15/KB. So, getting a 100KB msg. costs me U.S. $15, but my

modem is not very fast (1200 baud) so it takes me 20 minutes of on-line time to download it, and that means additional expense.

I once joined a newsgroup on the Internet about the Atari ST; not knowing the amount of text involved, I checked my mailbox three days later and found so much text that although I un-joined the newsgroup immediately, my monthly bill climbed to more than U.S. $35. (As a guide, the minimum wage here is fixed by law at about U.S. $120 monthly, and U.S. $250/month is a good wage for normal office work.)

Recently, Fidonet started working here, thanks to the hard work of a few enthusiasts. Although Fidonet is absolutely free in many countries, here we decided that the expensive international phone bills and the expensive fast modem was too high a cost for a single person. So, a monthly fee of U.S. $3 is asked of all the people using international mail (I think this is quite reasonable).

Well, hope this clarifies the telecomm issue. If you have further doubts you can contact me on the usual Internet address or also on Fidonet at the 4:850/1 node.

Regards, Jose Luis Regueiro

Uruguay

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News and Views from the Shop Floor

The New Dawn

by Floyd Hoke-Miller

Let's be wise and organize!
Get the Polly off our back;
Put the unions on the track
Of workers solidarity!

Educate to emancipate!

Put the parasite to work;
Let none his duty shirk
Of classless regularity!

Don't descry but glorify
The power workers hold:
Form an OBU and don't be sold
As chattels in wage slavery!

Let our toils reap the spoils
Our horny hands produce;
Not for profit but for use
And end the class of knavery!

[Editor's Note: OBU was the IWW dream of One Big Union for all workers]

Eyewitness Account of *Pittsburgh Press* Strike

by Shawn Duffy
e-mail: s462075d@edinboro.edu

The following is a more-or-less eyewitness account of the attempt by the *Pittsburgh Press* to use replacement drivers. It took place in a Xerox warehouse that was sub-leasing space to the *Press*. I don't remember the exact dates, except that they were in August, 1992.

Before the storm: I had been working at the warehouse since late July. Xerox was moving it to Cincinnati. The workers were represented by the United Steelworkers. Us temporaries were brought in to help move things out.

After about a week and a half, the news said the *Press* would hire replacements. Brought in from Boston, they were being paid $15/hr + room + board. Security guards would ride shotgun. They were in rental cars, with easy to spot Ohio plates. All this was on the news. Late Thursday we were warned that they would be distributing the news from

the unused warehouse space where we were working!

Friday: All's quiet. The natural worries about crossing a picket line surface. Being nonunion temporaries puts my work crew right in the middle. All workers, permanent and temporary alike are warned to not risk life and limb coming to work.

Monday: Scab paper goes into production. Two police cars guard the plant gates. It is not known if the Teamsters know about this distribution point. Scant news coverage. With most workers, including myself, being either former union members, or having family union members, and being tired of the way labor has been treated in the city, watching helplessly, rental cars and *Press* trucks enter and exit all morning.

Word around the warehouse is that all hell is breaking loose at *Press* headquarters in town. The story makes short national attention. Curiously, the Judge in charge doesn't issue the automatic limitation of pickets.

Tuesday: The day all hell breaks loose!

4:45 A.M. I enter the warehouse parking lot. Since it's still dark, and I am looking left to turn, I don't notice the Teamsters across the street. But many folks do. Several police cars and local media.

6:45 A.M. It's first break, and light out. All kinds of excitement on the line. I cross the street to get coffee at a little convenience store. Security, which is already high because the warehouse is closing, is fanned out around the parking lot. Most temporaries do not stand with the strikers just yet. Being young and in college, we keep our distance for now, what with all the tension between temps/perm employees to begin with. I watch the hustle and bustle along the highway. I miss them shaking a rental car and blocking traffic. Talking with some security guards, it is apparent they will not stop anything major for the $6/hr they are making. But the combination of them and the 15 or so police keep everyone on their own side of the street.

7:00 A.M. Xerox employees trickle back to work. Some tell the teamsters they will be back next break. I am invited to stand with them next break. Most everyone is on the union's side. One notable exception is a kid who is a journalism major who says, "It's because of the union that the reporters are laid off." Go figure. Most everyone else is totally

with the union, though we talk of mistakes some unions have made in the past, suggesting they need to hire some business majors, etc. But we 100% support them. Especially me and friend Doug. Both our dad's worked for the Port Authority, itself on strike just a few months ago, and back to work by court order, still without a contract.

8:45 A.M. I get coffee and stand with the teamsters. So do many others. In fact, so many do that we seem to outnumber the teamsters 2-1. Teamsters are very happy about this. It looks good for the news. The bus drivers honk to show support (I mentioned their strike earlier). So do most truckers, and many cars. Strikers (and us!) yell "scab," etc.

It is obvious the replacement drivers are under orders not to cause any trouble, for as I cross the street, one stops the car DEAD, and gives me the right of way. I cross her path as slowly as possible. Every little bit helps! (I'm told later that a bus driver stopped in front of the gate and said he broke down, tying things up for a while!).

10:45 We come out for lunch to cheers and applause! One of the greatest feelings you can have! More standing to show support. The picket leader thanks everyone. *Press* trucks are videotaping the line (flipping the bird to them) as they pass. The union counters by taping the trucks!

More police show up.

More shouting.

They ask us to gather round for a live shot for the noon news. A rock was thrown at a car and someone went to the hospital. The Union says it's sticking to a "no violence" policy. The picket limitation order has come down. The Police Chief ask Teamsters to disperse, and (with laughter) tells us to get back to work.

One replacement driver has a change of heart, and refuses to exit the grounds!

One of our workers yells, "You ought to be ashamed of yourself! as we walk back."

1:30 P.M. Last break of the day. Only a couple of pickets left. We go back to work for overtime.

3:30 P.M. The day is over, and I go home. Some houses have signs saying, "stop paper until end of strike" By the way: Many stores did too!

5:30 P.M. Local news has feature coverage. Vivid scenes. The man

with a HUGE "No Scab Paper" sign in his front yard. *Press* drivers sitting in front of the trucks. Young paperboys tossing papers back into the distribution site. Smashed windows and slashed tires on rental cars/*Press* trucks.

The *Press* surrenders and returns to negotiations!

Nightline does a story on the strike, one of the most well balanced ones I've ever seen. Parallels are drawn with the Homestead strike of 100 years earlier (almost to the month).

Rest of week: Back to normal. Scab drivers trickle out. Turns out some "Presses" were published in Canada. Deep scars.

(Epilogue: Jan 18, 1993, by the way: The *Pittsburgh Press* is HISTORY! The *Post Gazette* bought them out. The whole transaction shows me that the whole dispute was a ploy by the *Press* (who was making a profit to the tune of $64 million a year) to run the smaller PG out of business and take over morning distribution!)

John G. Kemeny: BASIC and DTSS: Everyone a Programmer

by Jay Hauben

Sadly, an important pioneer of the computer revolution has died. John G. Kemeny, co-inventor of the computer language BASIC and of the Dartmouth Time Sharing System (DTSS) and advocate of universal education in programming died unexpectedly on December 26, 1992. He was 66 years old.

John Kemeny was born in Budapest on May 31, 1926. His education and intellectual development in Hungary must have been very impressive, but in 1940, to escape the Nazi tide, his family emigrated to New York City. Kemeny entered high school knowing virtually no English. He graduated three years later, first in his class and accepted at Princeton University to study mathematics.

By the time Kemeny turned 18, he had finished his first year at Princeton. He was immediately drafted and sent to Los Alamos to be a "computer," one of 20 operators who used 17 IBM bookkeeping calculators to get numerical solutions to differential equations connected with the design of the atom bomb. It took two or three weeks, working three 8 hour shifts, six days per week, to get one result. The calculators were fed punched cards, which were moved manually from machine to machine. Between calculations, the plug boards had to be rewired by hand. At the end of a cycle, the calculation was summarized on a printout which had to be checked by eye for "catastrophes." If any were found, the cycle had to be repeated. Years later, Kemeny was to note that one undergraduate working one afternoon, using a 1970 time sharing computer could solve as many differential equations as the whole Los Alamos team did in a whole year. And there could be 100 other users on the computer at the same time.

While at Los Alamos, Kemeny heard a lecture by fellow Hungarian born John von Neumann who was a consultant to the "computer operation." Von Neumann proposed a fully electronic computer based on a binary number system, with internal memory for both data and a stored program. To Kemeny and the other "computers," von Neumann's machine sounded like a dream. Kemeny wondered if he would live long enough to ever use one.

After the war, Kemeny returned to Princeton. In 1948-49, while finishing his dissertation, Kemeny served as Albert Einstein's research assistant at the Institute for Advanced Study. Von Neumann was at the Institute also, working on the machine he had described in his lecture two years earlier. Einstein and Kemeny crossed paths with von Neumann occasionally and had some long conversations concerning symbol handling as opposed to number handling computers.

Kemeny finished his Ph.D and stayed at Princeton teaching math and philosophy until 1953. During his time at Princeton, his contact with von Neumann and his computer had a deep effect on Kemeny. Here was the brilliant mathematician playing around with the nuts and bolts of a computing machine and raising profound philosophical questions about the relation between humans and machines. In a *Scientific American* article, "Man Viewed as a Machine" (vol. 192, April, 1955, pp. 58-67)

Kemeny summarized lectures von Neumann had given just before Kemeny left Princeton. Kemeny framed the question of these lectures, "What could a machine do as well or better than a man?" The conclusion in 1955 was that computers calculate faster than the human brain, may eventually match the human brain in memory capacity, but have a long way to go to exceed the compactness of the human brain or the complexity the human brain is capable of dealing with. Next, based on the work of the English logician Alan Turing, Kemeny argued that a universal machine can be designed. That universal machine would need a simple code designed for it that would describe any simple machine humans could devise. Then the universal machine could do anything every simple machine could do by converting the descriptions of the simple machines into programs for its own operation. It occurred to Kemeny that "a normal human being is like the universal machine. Given enough time he can learn to do anything." (ibid., p. 63) Kemeny carried this understanding with him throughout his career of encouraging universal teaching of computer programming.

In the summer of 1953, while a consultant at the Rand Corporation, Kemeny had a chance to use the JONIAC, a copy of von Neumann's Princeton computer. He had great fun, he wrote, "learning to program a computer, even though the language used at that time was designed for machines and not for human beings." (*Man and The Computer*, New York, 1972, p. 7)

Kemeny joined the faculty of Dartmouth College in 1953 to teach math and philosophy. For six years after he got there, Dartmouth had no computer. Kemeny could however commute 135 miles each way to use the computer at MIT in Cambridge, Massachusetts. He did and therefore witnessed the coming in 1957 of the FORTRAN programming language. Kemeny welcomed FORTRAN because it made much more sense to him to teach a machine a language that is easier for human beings to learn than to force every human to learn the machine's own language. "All of a sudden access to computers by thousands of users became not only possible but reasonable." (ibid, p. 8)

Dartmouth acquired its first computer in 1959, a very small computer called the LGP-30. Kemeny facilitated the use of the LGP-30 by undergraduate students. The ingenuity and creativeness of some of

the students who had been given hands-on experience amazed the Dartmouth faculty. Kemeny and Thomas Kurtz, also of the Dartmouth math department, were thus encouraged to "set in motion the then revolutionary concept of making computers as freely available to college students as library books." (*Portraits in Silicon*, Robert Slater, Cambridge, 1987, p. 22) The aim was to make accessible to all students the wonderful research environment that computers could provide.

The work of Kemeny and Kurtz in the early 1960's took two directions. Influenced by the work of J. C. R. Licklider and John McCarthy at MIT, Kemeny understood that a time sharing system would make possible the universal access they aimed for. A team of the two faculty members and a group of undergraduate research assistants developed a prototype system. It allowed multiple users short spurts of access to the central computer from remote terminals in such a way that each user enjoyed the illusion that he was the sole user. This Dartmouth Time Sharing System (DTSS) became operational in the Fall of 1964. The value of a time sharing system is that it ended the hardship of batch processing which often required hours or even days of waiting between runs of a program while it was being developed and debugged. Time sharing utilizes the great speed of computers compared to humans to greatly enhance the efficiency of computing from the point of view of the human users.

Today's packet switching networks (e.g, the Internet) owe a great deal to the development of this time sharing system conceptually and technically. But earlier, DTSS almost got derailed. Kemeny had worked closely with General Electric during the time DTSS was being worked on. In 1966, GE and Dartmouth agreed to work on a joint development of the time sharing operating system. However GE's commercial purposes conflicted with Dartmouth's educational purposes. The story is told that GE tried to "stop the Dartmouth experiment" and the development of the time sharing system called Phase I. (See e.g., *Computer Lib*, Ted Nelson, South Bend, 1974, p. 45). But Kemeny and Kurtz, determined not to let DTSS disappear, encouraged the development of DTSS Phase II by 1969.

In addition to time sharing, Kemeny and Kurtz realized that a new computer language was needed that could be easily learned and

accessible to typical college students. Kemeny noted, “We at Dartmouth envisaged the possibility of millions of people writing their own computer programs.” (*Man and the Computer*, p. 30) They designed their language with plain English and high school algebra like commands and so that the lay user could learn a very few commands and then be able to write interesting programs. Kemeny started to work on a draft version in September, 1963. The result was BASIC, Beginners All-Purpose Symbolic Instruction Code. The first BASIC program ran on May 1, 1964 at 4:00 am. Kemeny and Kurtz made an effort to get as many students as possible using BASIC and they were available to hear about problems and bugs and to come up with bug fixes. Kemeny and Kurtz wanted BASIC to be in the public domain. Dartmouth copyrighted BASIC but made it available without charge.

The careful work of Kemeny and Kurtz to make an easy-to-learn but powerful computer language bore tremendous fruit. After its introduction at Dartmouth in 1964, BASIC spread as did DTSS to other campuses and government and military situations. And BASIC made personal computers possible. Beginning in 1975 with the success of Bill Gates and Paul Allen to write an interpreter for a subset of BASIC commands for the Altair computer, one form or another of BASIC spread to and accelerated the personal computer revolution. (See *Amateur Computerist*, vol 2 no 4, pp. 9-12)

For a while the great appeal of personal computers and their falling costs and general availability eclipsed Kemeny and Kurtz’s seminal work on DTSS and the original BASIC. By the late 1980's, 10 to 12 million school children had learned BASIC, more people than speak, e.g., Norwegian. The personal computer helped “distribute” computing, which Kemeny thought was crucial to the progress of society. But it also diminished in importance the centralized computing power and the interconnectivity of users that time-sharing made possible. Only recently, with the spread of computer networks is the value of both developments being realized. Now the power of personal computer workstations, instead of dumb terminals, coupled with the connectivity and remote resource availability is making possible the human-computer and human-human interfacing that Kemeny predicted.

From 1971 to 1980, Kemeny was the thirteenth President of

Dartmouth College presiding for example over the transition there to co-education. He continued his efforts to support a crucial role for computers in education but was unable to be a major contributor to developments like the personal computer and the various versions of BASIC. In 1979, Kemeny served as the Chairman of President Carter's Commission on the Accident at Three Mile Island. Kemeny "very much regretted" that the Commission did not recommend a temporary halt on construction permits for nuclear reactors. The investigation had found that the government regulators were too lax in their regulation. The Commission concluded, "the evidence suggests that the NRC (Nuclear Regulatory Commission) has sometimes erred on the side of the industry's convenience rather than carrying out its primary mission of insuring safety" and that the industry took inadequate safety precautions and failed to respond to known unsafe conditions. (*The Report of The President's Commission on the Accident at Three Mile Island*, pp. 43, 51 and 188)

After Kemeny stopped being President of Dartmouth and Chairman of the Three Mile Island Accident Commission, he took stock of the use of computers, especially in education. He was furious and frustrated by the slow progress of education in computer programming, although it is not clear whether he was aware of the forces like Ford Motor Company which opposed that progress. Between 1983 and 1985, Kemeny and Kurtz went back to work and produced a portable and more powerful version of their original BASIC. They called it TRUE BASIC and it is still marketed today with the intention of introducing "students to the very important art of computer programming and analytic thinking."

Kemeny had a very broad vision of the role computers would play in society. He foresaw a man-machine symbiosis that would help both to evolve rapidly. In the early 1970s he predicted that within 20 years there would be a national computer network with terminals in millions of homes, so every home would be a mini university. He also predicted there would be a National Automated Reference Library, a national personalized computer delivered news service, and, especially, greatly enhanced education via time-sharing and simple programming languages. Kemeny worked hard to implement his visions and felt by the late 1980s great disappointment in the slow progress. He died just as the

great computer networking structures that have developed in some large measure because of his pioneering work and vision, have begun to fulfill more of his expectations, but also just as a fight is being waged by those who want to commercialize these networking structures and those who want to keep them in the public domain.

Kemeny recognized that the social problems that have yet to be solved are immense. He wrote, "while computers alone cannot solve the problems of society, these problems are too complex to be solved without highly sophisticated use of computers." (ibid., p. 80) and that it is imperative that computers be freely available. "Only if we manage to bring up a computer-educated generation will society have modern computers fully available to solve its serious problems." (ibid.) He saw the computer revolution as a possible asset for society but felt "it is a major mistake to make plans for the solution of social problems on the assumption that society will in the future will be organized in exactly the same way as today. For the first time in human history we have an opportunity for significant social planning. We cannot afford to waste it." (ibid., p. 143)

John Kemeny was part of many of the seminal events of the computer revolution. He made major contributions to its foundation and he thought deeply into this revolution. His death was untimely but he has left the value of his work to help us take on the challenges that confront the progress that he contributed to.

Computers for the People:
Part V

[*continued from Amateur Computerist vol 4 no 4*)

In an article called "How We Trapped the Dinosaurs," (from *Creative Computing*, Nov. 1984, p. 193-4), Lee Felsenstein describes the early 1970s and the lessons learned from the creation of the personal computer by the grassroots computers for the people movement. He writes, "Many of us were then starting to shed our adolescent views of techno-logical development as we moved from the educational system into the lowest levels of the production system. Many of us quickly noticed that our noble managers knew less about the technology with which we were working than we knew." (ibid.) Felsenstein continues, "We also started to see that the business of Business was making money, not products, and that if they could make money with turkey products, then we would be put to making turkey products and doing nothing else." (ibid.)

"And we discovered," he explains, "that the Big Boys of the computers were not, after all, engaged in a race to get the most users at the lowest cost but were instead playing marketing muscle games to lock the biggest proportion of users to the highest cost computers possible." (ibid.)

In the face of the commercial world's reluctance to develop a low cost personal computer, Felsenstein describes how the grassroots movement took on to prepare itself for the task. He writes, "So we did the only thing we could under the circumstances, we learned as much as we could about our technology and kept alive our sci-fi dreams of a future where everyone could have a computer, and no one could be locked out of all the fun and fascinating things we knew could be done with computers.... We hadn't spent all that time learning all that stuff," he explains, "because someone had asked us to. It had a beauty all its own which we could understand and which we wanted to share with everyone." (ibid.)

When the Altair 8080 computer Kit arrived in January 1975, the Homebrewers were ready. "Then," he recounts, "with the sudden

ferocity of events overtaking the dreamer, we were in the midst of the explosion." (ibid.) Suddenly the movement to build the personal computer took off. Working together, the Homebrewers took on to produce the needed software and hardware, sharing their success and failures. The participants found themselves involved "in a kind of group sport." Felsenstein explains: "Like Athletes, they strove to do what had never been done, to exceed their known limits and to share their successes and efforts with each other in the hopes that all would gain." (ibid.)

"We ran ahead of the lumbering giants," Felsenstein writes, explaining how the Homebrewers did not wait for the big corporations in the computer industry to give them an affordable computer. He describes how the Homebrewers "frantically staked out our territory. We learned," he emphasizes, "as pioneers must, to rely on each other." (ibid.)

Felsenstein then describes what happened when IBM produced "the breadbox of incompatibility" in 1978, the 5100. IBM found they couldn't sell it. When they produced their next personal computer, the 5150 in 1981, IBM demonstrated that they had learned that they had to play by the rules established by the Homebrewers. They had to make the architecture and executive code as public as possible and to encourage individuals to write software and add-ons. Felsenstein summarizes the victory of the Homebrewers, "We didn't give the Corporate Establishment free rein in the hopes that they would bless us with innovations. We trampled all over their organized way of doing things." (ibid.) Thus the birth of the personal computer was the victory of the Homebrewers' computers for the people movement over the dinosaurs of the corporate world.

In his article "Thinking about Thinking Machines," (ibid. p. 253) Tom Stonier comments on the technological advance represented by the personal computer. He writes: "In the course of history, human ingenuity has created many a wondrous device, none so marvelous, however, as the computer. In that long road of human technology which among other things, flaked stone; mastered fire; developed speech; domesticated plants and animals; forged bronze; created those great ancient civilizations and all the technology needed for them; invented

Francis Bacon's famous trio – gunpowder, the compass, and the printing press – and then moved onwards to fashion the steam engine, balloons, factories, railways, steel, electricity, telephones, horseless carriages, airplanes, rockets, radio and television...in that long road, no invention will prove to be as profound as the computer.... Thus, the modes of production are changing once again – this time as a result of automation and the increasing use of robots.... The introduction of the computer into the productive process is therefore at least as profound as the Industrial Revolution." (*Creative Computing*, Nov. 1984, p. 252)

But as with the Industrial Revolution, so now, a curious phenomenon has developed. The skilled, experienced workers of the industrial heartland are being heaved out of their jobs and factories. The myth of the workerless factory has exploded in the face of General Motors. They can't introduce the new technology without involving workers in the process and allowing workers to obtain the technological education and knowledge that will enable today's workers to make the new machines function. Instead there is the myth that supervisors or engineers will program the machines and get rid of the workers. But the supervisors and engineers are not the skilled or unskilled workers who know how to make the machines work. The result of this attempt by management to interfere with automation has resulted in serious dislocations of workers and industry. (See, for example, a letter to the editor in the *Flint Journal*, Flint, MI, April 4, 1987, "Halt Rampant Mismanagement at Buick City.")

Computers are not a replacement for people. And if knowledge of how the computer functions and is programmed is purposely kept from workers, disasters of technological ineptitude like that which have occurred at GM and Ford will be repeated tenfold.

John Kemeny, the creator of BASIC, explains how the business world has gotten on the wrong track with computers by trying to use them to replace the workforce. He explains:

"Modern computers were invented to solve highly complex scientific problems. It was an accidental benefit, only slowly recognized by business that the very same computers were incredibly efficient bookkeeping machines. Then the drive was on to employ computers to increase productivity, to cut down costs, and to produce greater

efficiency. Companies had great hopes that computers could replace hundreds of employees. Needless to say this did not make computers popular with employees. Fortunately it has rarely been the case that computerization has reduced the existing staff; it is much more common that along with computers exactly the same staff is needed but the staff can perform better and accomplish more." (*Man and Computer*, p. 56-57)

Kemeny compares the change taking place with computers to that brought by the automobile:

"Most people grew up when no modern computers were in existence. While the same situation applied to automobiles in the early twentieth century, a fairly rapid change took place. Even if not everyone drove an automobile, almost everyone had a friend who owned one. Automobiles quickly became common on our streets, and their principles of operation were simple and easily understood. Unfortunately the average person does not have the foggiest idea of just what a computer is or how it works. And since computers are shielded from them by the high priests of the profession, all their acquaintance is from a distance." (ibid. p. 57)

Kemeny might have gone on to explain that just as in England at the time of the industrial revolution, so here in the U.S., there is a purposeful exclusion of workers from technical knowledge. Just as in England in the 1800s, so we see here,"two systems of education catered for different classes and provided education different in quality and content for rulers and ruled." (*The Computer from Pascal to Von Neumann*, Goldstine, p. 31)

This exclusion, Goldstine explains, "was going on just at the time when the Industrial Revolution was making education ever more essential to all members of society. In 1823 George Birbeck (1776-1841) founded his first Mechanics' Institute in Scotland, and similar institutes spread into England under the patronage of Henry Brougham (1778-1868). These brought to the workingman the advantages of a technological training just when it was most needed in England.... These schools are the place in which the... [*workers -ed*] learned their business – for an annual fee of one guinea. Most of these men were not middle-class; for example, Stephenson, the inventor of the locomotive, was a poor boy

who taught himself to read when he was seventeen." (ibid.) And Goldstine could have gone on to point out that Watt, who invented the steam engine was a watchmaker, Arkwright who invented the throttle was a barber, and the inventor of the steamship was Fulton, a working jeweler.

(*to be continued*)

Try This: Pascal Program (Grade Averaging)

by Tom Smith

Program Grad (Input,Output);

```
Const

Maxscore = 100; (* maxium score *)
ABLine = 90;     (* Dividing line
                    between A & B *)
BCLine = 80;     (* Dividing line
                    between B & C *)
CDLine = 70;     (* Dividing line
                    between C & D *)
DFLine = 60;     (* Dividing line
                    between D & F *)

Var

Grade: Char;
Ave1, Score, Small, Large, Gp, Sum, Count, Gpsum: Integer;
Gpa, Ave: Real;
Honors: Boolean; (* Honor student or
                    not *)

Begin
  Honors:= false;
  Sum:= 0;
```

```
Count:= 0;
Small:= 1000;
Gpsum:= 0;
Large:= 0;

Repeat
  Writeln (‘To quit enter score
           over 100');
  Writeln (‘Enter score’);
  Readln (score);
  If Score < 101 then
    Begin
      If Score < Small then Small:=
      Score;
      If Score > Large then Large:=
      Score;

      Case Score div 10 of
        9,10: Begin
              Grade:= ‘A’;
              Honors:= true;
              Gp:= 4;
              End;

           8: Begin
              Grade:= ‘B’;
                  Honors:= True;
                  Gp:= 3;
                  End;

            7: Begin
              Grade:= ‘C’;
              Gp:= 2;
              End;

            6: Begin
              Grade:= ‘D’;
              Gp:= 1;
              End;

    0,1,2,3,4,5: Begin
              Grade:= ‘F’;
              Gp:= 0;
              End;
```

```
            End;  (* Case *)

            Sum:= Score + Sum;
            Count:=Count + 1;
            Gpsum:= Gpsum + Gp;
            End;

  Ave:= Sum / Count;
  Gpa:= Gpsum / Count;
  Ave1:=Trunc(Ave);
  Writeln (‘Your lowest score is ‘,
            Small);
  Writeln (‘Your highest score is ‘,
            Large);
  Writeln (‘Your average score is ‘,
            Ave:2:2);
  Writeln (‘Your grade point average
            is ‘, Gpa:2:2);

  Case Ave1 Div 10 of
    9,10: Begin
          Honors:= true;
          Writeln (‘Honor Student !
           A !’);
          End;
       8: Begin
          Honors:= true;
          Writeln (‘Honor Student ! B
           !’);
          End;
       7: Writeln (‘Grade is ‘, Grade
            );
       6: Writeln (‘Grade is ‘, Grade
            );
0,1,2,3,4,5: Writeln (‘You have
               flunked! ‘, Grade);
  End;

  Until Score > Maxscore
  End
```

Try This:
Program in C
for UNIX Users
FGIGO

by Scott McMahon
(mcmahan@cs.unca.edu)

The curses library is a high level interface to the termcap/terminfo libraries which were originally designed for the vi text editor, but were later separated into a separate package. Various versions of curses and the termcap/terminfo routines exist in just about every version of UNIX, and they have been ported to other computers and operating systems. Termcap/terminfo is a way to store information on what a terminal can do – character attributes (normal, reverse, bold, blinking text), cursor positioning, and other things the terminal can do. Then a user program can look up the terminal type it's running on and know what it can do and what escape codes need to be sent to it to get it to do things. Curses takes this one step further by creating a high level library which allows the user to call functions like move() and have the library take care of all the details of what to do with each terminal.

Fgigo takes a file and randomly piles up the bytes in it on your screen. It comes from another, less interesting program called gigo which piled up random bytes on the screen. The name stands for 'file-garbage in, garbage out'.

To compile this program, save it in a file called fgigo.c, and give the command:

% cc -o fgigo fgigo.c -lcurses
-ltermcap

at the UNIX shell prompt. (This program is written for BSD systems. On a System V based system, you may need to link it with the terminfo libraries. I don't have a System V computer available to try porting this to.)

```
#include <sys/types.h> /* all this        junk just to open a file! */
```

```
#include <sys/stat.h>
#include <fcntl.h>

#include <curses.h>

#define BORDER
"-------------------------\
-----------------------------------
----------------"

main(int ac, char *av[]) {

  /* Variables – y is the calculated column where the symbol will drop to the bottom, and i is the iterations while it is falling. an 80x24 screen is pretty much hard wired into this.

   file is the file descriptor

   byte is the byte we're reading in

   */

  int y,i, file;
  char byte;

   /* we've got to have 2 args – the program name, and the name of the file to read, anything more or less is an error
   */

  if (ac != 2) {
    printf("usage: %s
 textfile\n",av[0]);
    exit(1);
  }

  /* we need to make sure we could open and read this file – if not, it's an error
   */

  if ( (file = open(av[1], O_RDONLY, 0)) <= -1 ) {
    printf("%s: could not open %s\n," av[0], av[1]);
    exit(1);
  }
```

```
/* do all this stuff to initialize curses */

initscr();  cbreak(); noecho();  nonl();  clear();
refresh();

/* seed random numbers – your pid is unique & pretty random */

srand(getpid());

/* print out the border #defined above */

move(23,0);
addstr(BORDER);
refresh();

while(1) {

  y = rand() % 79;

  /* we read a byte – 1 character – at a time, and stop when read returns a zero
   */

  if (!(read(file,&byte,1))) break;

  /* we only want ascii, not control characters or whitespace */

  if (!isprint(byte) || isspace(byte)) continue;

  for (i=0; i<22; i++) {

    move(i+1,y);
    if (inch() != ‘ ’) continue;
    addch(byte);
    refresh();

    move(i,y);
    addch(‘ ’);
    refresh();

  }

  sleep(1); /* can’t get a keypress in without this delay! */
```

```
  }

  endwin();

}
```

May Day in History

May 1 from Roman Times: Celebration of spring planting and fertility.

May 1, 1848: Enactment of Ten Hours Factory Act be English Parliament after a half century of agitation and struggle for shorter hours of work.

May 1, 1886: Over 400,000 U.S. workers strike for an eight hour working day. Four workers were killed by police at the McCormick Harvester Plant on May 3. The next day was the Haymarket Square explosion for which eight anarchists were framed.

May 1, 1890: Massive world wide workers' demonstration for the eight hour day.

May 1, 1891 to the present: Demonstrations in many cities around the world to show worker solidarity and to agitate for workers' causes especially shorter hours of work.

May 1, 1942: Publication of the *Searchlight*, uncensored local union newspaper of UAW Local 659, Flint, MI.

May 1, 1964: The birth of the BASIC computing language by Kemeny and Kurtz.

May 1, 1973: The birth of *Amateur Computerist* editor, Michael Hauben.

May 1, 1992: First electronic issue of the *Amateur Computerist*, vol 4, no 2/3.

Charter for Newsgroup on Usenet

[Editor's Note: In September, 1992, the Amateur Computerist initiated a newsgroup on Usenet News called alt.amateur-comp. Since then there have been almost 1000 items and responses posted there. Some of those posts were drafts and discussions of articles which appear in this issue. Following is the charter which proposed the newsgroup. We welcome your participation in alt.amateur-comp.]

The alt.amateur-comp is a conference where readers and writers can discuss the articles and subjects that appear in the electronic and printed newsletter *The Amateur Computerist*. *The Amateur Computerist* was born out of the battle to continue computer programming classes for workers at the Ford Rouge Factory in Dearborn, MI, after Ford and UAW officials ended the classes in February 1987. In our first issue we wrote: "There was an effort by administrators of the UAW-Ford program at the Dearborn Engine Plant to kill interest in computers and computer programming. We want to keep interest alive because computers are the future." ("Introduction," vol I, no. 1)

The first issue of the newsletter was published February 11, 1988 and was dedicated to the Flint sitdown pioneers who began the UAW. Articles have appeared in the newsletter from some of those pioneers who welcomed the newsletter and the computer, saying, "From the Great Wall to the Great Pyramid, from the hieroglyphics to the screen of the computer, mankind is still progressing." ("Dawn of a New Era," vol I, no. 1) The sitdowner pioneers who built the UAW believed that the problems of automation had still to be solved by the upcoming generation.

The newsletter is dedicated to support for grassroots efforts and movements like the "computers for the people movement" that gave birth to the personal computer in the 1970's and 1980's. Hard efforts of many people over hundreds of years led to the production of a working computer in the 1940's and then a personal computer that people could afford in the 1970's. This history has been serialized in several issues of the newsletter.

Most recently the newsletter has begun an online edition that is available free. We are beginning to document the progressive impact of democratic developments like Usenet News and the Internet and we plan to have a supplement dedicated to these developments. [*See Fall 1992 issue -ed.]*

The Amateur Computerist was described by Andrew Ross and Constance Pawley in their recent book *Technoculture* (Univ. of Minnesota Press, 1991, p. 125) as follows:

"When worker education classes in computer programming were discontinued by management at the Ford Rouge Plant in Dearborn, Michigan, United Auto Workers members began to publish a newsletter called the *Amateur Computerist* to fill the gap. Among the columnists and correspondents in the magazine have been veterans of the Flint sit-down strikes who see a clear historical continuity between the problem of labor organization in the thirties and the problem of automation and deskilling today. Workers' computer literacy is seen as essential not only to the demystification of the computer and the reskilling of workers, but also to labor's capacity to intervene in decisions about new technologies that might result in shorter hours and thus in 'work efficiency' rather than worker efficiency."

The newsgroup will also make available the electronic version of *the Amateur Computerist* when a new issue is published.

One of the reasons for proposing this group is that there is currently no place on Usenet that we know of where issues involving computers and workers are dealt with.

If you wish to directly contact the editors write to either: Ronda Hauben at: ae547@yfn.ysu.edu or ronda@umcc.umich.edu or Michael Hauben at: hauben@cunixf.cc.columbia.edu.

The opinions expressed in articles are those of their authors and not necessarily the opinions of the *Amateur Computerist* newsletter. We welcome submissions from a spectrum of viewpoints.

ELECTRONIC EDITION

ACN Webpage:

http://www.ais.org/~jrh/acn/

All issues of the *Amateur Computerist* are on-line.
Back issues of the *Amateur Computerist* are available at:
http://www.ais.org/~jrh/acn/Back_Issues/

All issues can be accessed from the Index at:
http://www.ais.org/~jrh/acn/NewIndex.pdf

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The *Amateur Computerist* invites submissions.
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