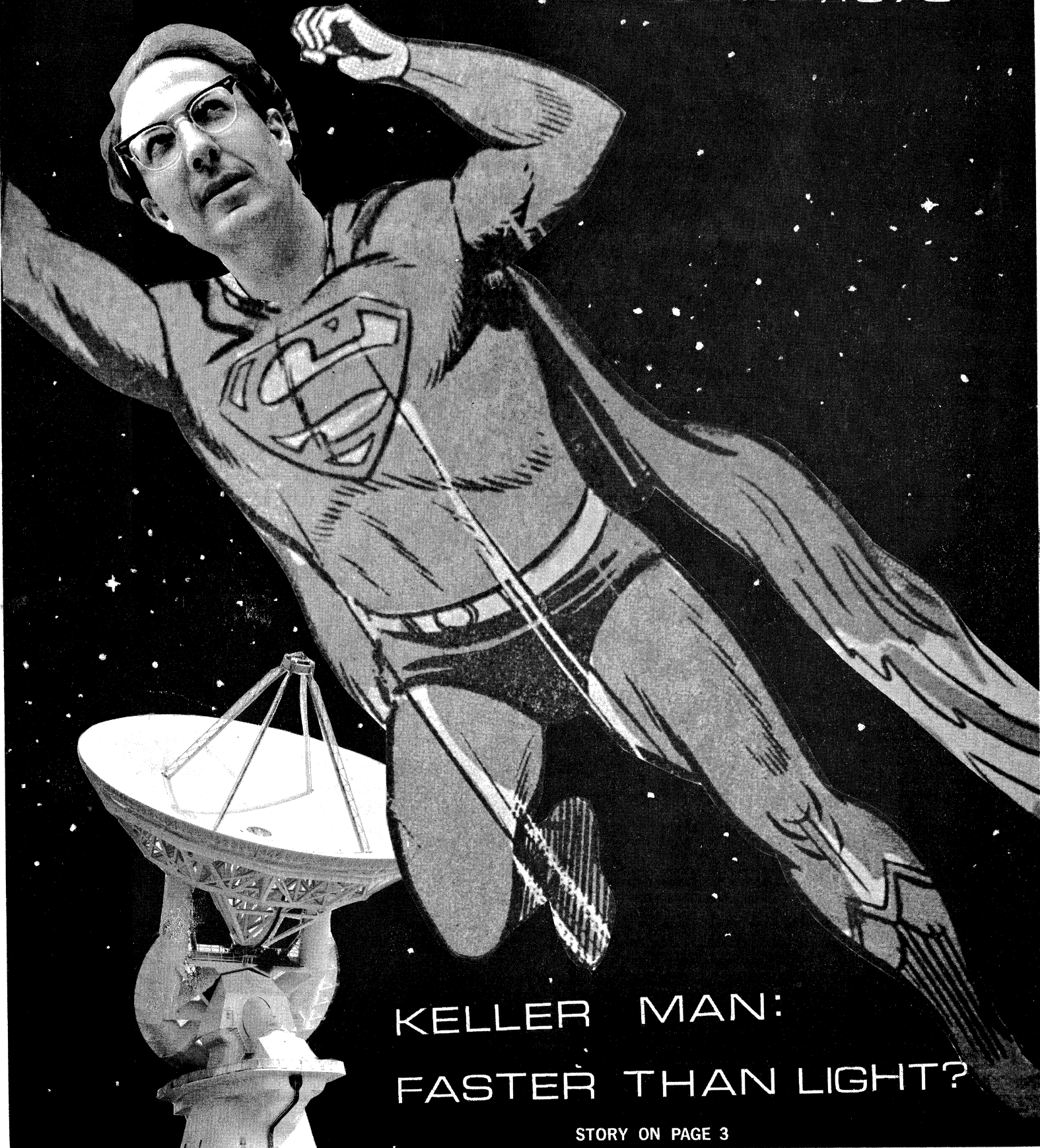


OBSERVER

JUNE, 1978



KELLER MAN:
FASTER THAN LIGHT?

STORY ON PAGE 3

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FASTER THAN LIGHT

K. I. Kellermann

There was a young lady named Bright
 Who could travel much faster than light
 She departed one day
 In a relative way
 And returned the previous night

So begin many articles on faster-than-light motion. Is it really possible? Perhaps!

In fact, during the past few years rumors have been circulating about radio astronomers having discovered things moving faster than the speed of light. Although these reports have been largely exaggerated and this is not really true, it is also not yet clearly false.

The faster-than-light stories originated from VLB observations which have indicated that the angular separation of different parts of a few quasars appears to be increasing at a rather surprisingly large rate. If the quasars are as far away as we think they are, then this angular motion corresponds to a real motion in space with a velocity several times the velocity of light. And of course everyone believes that since nothing is allowed to move faster than the velocity of light, something is wrong somewhere.

Unfortunately, things are never clear cut in radio astronomy, especially VLB work. More specifically, although the transcontinental and intercontinental VLB systems have very high angular resolution and can "see" features 1000 times smaller than the Green Bank three-element interferometer, and even more than 100 times smaller than the VLA, the details are vague.

In other words, although we can detect the presence of extremely tiny regions of radio emission, we cannot accurately tell how many such regions actually exist, nor can we unambiguously determine their relative location.

The same problem of course exists with closer spaced interferometers, such as the three-element interferometer in Green Bank, which is used to study much larger radio sources. Here the problem is solved by moving the individual antennas about so that they occupy a number of intermediate stations between the ends of the 2.7 kilometer baseline. But this is laborious and time consuming, and impossible if the source moves between observations made at the different stations. For modest resolutions one can build a multi-element

array such as the VLA. A scaled up model of the VLA, VLBA (Very Long Baseline Array) would solve the problem. But clearly there are many technical and practical problems in covering the Earth with 27 85-foot antennas. If they were all connected together as in the VLA, the cost of sending the signals back from each antenna would be about a billion dollars. One could use tape recordings as we do now for VLB work. But the problems in sorting and replaying 27 tapes, each with each other would be enormous. In fact, it would take about a year to "process" one day's worth of data in this way.

Ideally, one would use a radio link as for our 45-foot antenna. But radio links are confined to the "line-of-sight". And the line-of-sight is only a few tens of miles so many relay stations would be necessary, unless a relay station could be placed in space where it would be line-of-sight to half the earth.

But all this is for the future. At the present we use existing antennas and tape recordings and try to make the best story from incomplete data.

When the first observations were made which indicated faster-than-light motion in the quasars 3C 273 and 3C 279, it was suggested that possibly there was no real motion at all, but merely several well separated components flashing on and off much in the manner of a Christmas tree. Thus, if one component died out and another flared up between two sets of observations it might be incorrectly interpreted that a single component had moved with very high speed.

However, there were several arguments against this interpretation. Firstly, the total intensity hardly changed. Secondly, the direction of apparent motion remained constant; and finally, the intensity of both components always appeared to be equal. All of these things suggest real motion, rather than simply intensity variations in fixed components.

But then how do we explain the faster-than-light motion? One possibility is that there are two components moving close to the line of sight, with velocities very near to, but less than, the speed of light. Then because of the finite velocity of light, signals which are emitted from the approaching component reach the observer before signals emitted at the same time from the receding

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component. With a little bit a mathematics, it-is-easy-to-show-that* this can result in an apparent motion many times greater than the velocity of light. But if the apparent velocity is, say, 3 times that of light, then it is equally easy to show that the approaching component should appear about 3^2 or 9 times brighter than the receding component. (The radio signals are bunched up from the approaching component like a jet plane shock wave.) Yet the two components have always appeared nearly equal, meaning that the true velocity must be much less than that of light.

For some time now, several astronomers have questioned whether the quasars are really so far away, and consider the apparent faster-than-light motion as evidence that they are really much closer. In this case, they argue, a relatively slow actual motion can cause the same effect in the sky as faster-than-light motion of a very distant object. But during the past year, other evidence has been mounting that the quasars really are very far away.

During our second VLB experiment with the Soviet Union, we found at least one source, known as BL Lacertae, which appeared to be smaller than it was several months earlier. Since we do not believe that radio sources actually shrink, this was considered as evidence for the "Christmas Tree" mode described above. But again the data did not really fit well, this or any other simple picture, which attempts to explain the observations in terms of some simple illusion.

Now everyone knows, or thinks he knows, that Einstein's Theory of Relativity shows that nothing can go faster than the speed of light. Actually this isn't quite true. What Relativity tells us is that as an object goes faster and faster it gains mass. The more massive an object is, the more force you need to make it go faster. In fact, by the time an object reaches the velocity of light, it is infinitely heavier than the same object at rest, and you have to push with infinite force to make it go faster. Hence, the claim that "Nothing can go faster than light".

But this isn't quite true. What Relativity says, is that no ordinary object of finite mass can be accelerated up to or past the velocity of light. But photons, or "particles of light", have zero mass, so they can travel at the speed of light without needing an infinite force to accelerate them. Likewise it is theoretically

possible to have particles having what is called "imaginary mass". Again "it-is-easy-to-show-that" such particles will always travel faster than light, and in fact require an infinite force to slow them down. Physicists have a habit of naming particles even before they are discovered, and quite remarkably, often years after a theoretician invents a particle, someone actually discovers it in the laboratory. This has occurred with neutrons, neutrinos, positrons, and anti-protons, and numerous other exotic particles. Faster-than-light particles also have a name, tachyons, after the Greek word "tachys", meaning swift.

Unfortunately, it is difficult for us slower-than-light people to see things going faster than light since the light never reaches us. But if tachyons really exist, and if they have electrical charge like electrons, then when moving through a magnetic field such as exists in galaxies, they will give off radio emission, and the source of radio emission will appear to move with a velocity faster than light! Of course, it would be very exciting to really discover tachyons in space by using radio telescopes, but first we must explore the more "conventional" and "semi-conventional" interpretations of VLB results. But this will take much more extensive data than we have so far been able to obtain. In fact, our present situation is probably best described by a quotation found on the NRAO bulletin board in Charlottesville:

"We have not succeeded in answering all our problems. Indeed, we sometimes feel we have not completely answered any of them. The answers we have found only serve to raise a whole set of new questions. In some ways we feel that we are as confused as ever, but we believe we are confused on a much higher level and about more important things."

And what is so rare as a day in June?
Then, if ever, come perfect days;
Then Heaven tries earth if it be in tune,
And over it softly her warm ear lays.

--Lowell

Vision of Sir Launfal

*A standard text book phrase meaning "it is too complicated to explain".

SIMPLE-MINDED THOUGHTS OF A PHYSICIST
ABOUT MONEY

Sebastian von Hoerner

Why should a physicist think about money? Certainly not from greed: if a greedy lad should decide to study physics, he would be pretty stupid, much too stupid to pass any examinations, physics or otherwise. Why, then? Well, if you keep losing things you may start asking why. And a financial puzzle is as good as any other for a mental exercise. Finally, since I found myself unable to understand the slightest bit of all the expert-written newspaper articles about money, about inflation and the dollar crisis, I set out to look for some simple explanations of my own. If they are right, they may benefit the reader; if they are wrong, the reader's critique will benefit me.

I. The Value of Money is something completely imaginary, nothing real. The foundation of its value is either mutual agreement or power, and the value lasts just as long as this foundation. The small print on the back of the paper money either reads: "You believe my money and I believe yours", or it reads: "You believe my money or else".

Some countries tried for a while to assert that their paper money was backed up by the true value of just as much gold which you could always get in exchange for the paper. But there are two flaws. First, it was never true; this assertion was taken back in a hurry when de Gaulle put it to the test in 1966 by actually asking for gold in exchange for the U.S. dollars owned by France. Second, there is no such thing as the "true value" of gold, because its actual value, meaning what you pay for it, is defined by the demand of all those who prefer to invest their money in gold. Its value as a nice yellow metal would be much less. Quite in general: the value of everything depends on demand versus rarity and both change with time. All values are relative, and their ratios will change.

Money, actually, is much more similar to stocks than most people realize. The difference is that stocks are released by a multitude of companies, a procedure which is controlled by laws made and enforced by the superior governments; whereas the monopoly for printing and coining money is held by the governments who make their own rules and laws and have no

superiors.

Nevertheless, there is no use in complaining, because the basic trouble is the following. In spite of all this ugly uncertainty, we actually do need some kind of weightless and bulkless (and thus imaginary) token for reasonably fast transactions. Large-scale business is completely impossible with direct exchange of goods (and many goods would not keep their value either, like eggs for example); and even a direct exchange implies much uncertainty and needs some confidence, as I remember well from the black market in post-war Germany.

II. The Continuous Inflation is much like the weather: everybody talks about the weather but nobody does anything about it. Why is that so?

First, how is inflation possible? Very simple: governments may print just as much money as they like, according to rules of their own. There is no international law about it, because if there were it could not be enforced.

Second, to whose profit? Simple again. Whoever has more debts than savings will win if inflation is higher than interests. The money a debtor pays back tomorrow is worth less than the money he borrowed in the past. Thus, debtors are interested in inflation. The greatest debtor of all seems to be the U.S. government, with a 540 billion dollar deficit (2.5 times its annual income of revenues which is 220 billion dollars per year). And since governments are also the ones who print the money according to rules of their own, it so happens that possibility and profit are both at the same place.

There is another large and strong group causing inflation: the labour force and their unions, in their constant fight for higher salaries. But this gain never lasts because the producers then increase the prices by about the same factor. Since production is not increased, there is no net gain. It is only a continuous reshuffling of salaries (effective salaries or buying power) according to demand, rarity and power.

The basic trouble, again, is that we actually do need some reshuffling, preferably continuous and not in big jumps like revolutions. Not only does the relative value of all goods change with time, the value of their production and of various services changes

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just as well. Furthermore, new jobs and professions are created all the time, and their value must be found out and established. We need these readjustments of the relative values of work. It could even be called a fairly just process, if it were not for the large group of retired or disabled people, who are neither in demand nor in power. Although originating from egoism, the reshuffling must be done with some responsibility.

Third, which rate or speed of inflation? If the pressure from your present debts and their installments is your greatest trouble and is all you care about, you want a rate as fast as possible. But then your creditors loose too much money and confidence, the word gets around, and next time when you need money you will not get any. What it takes is some compromise between the wish to diminish your present debts, and the fear of loosing your future credits. Similarly, a clever second-hand car dealer of course will cheat but only up to a point: he must make a living now but without loosing his future customers. The rate of inflation is thus defined by what I might call the "trouble ratio" (of present trouble versus future plans) of the government and the groups in power. Judged by the prevailing rate, there seems to be a lot more trouble than plans.

III. The Foreign Exchange, too, is variable depending on two things. First, in the long run, the exchange between any two countries depends on their relative speed of inflation, which means on their relative trouble ratios. The amount of German mark per U.S. dollar, for example, has dropped from 4.0 to 2.8 during the last four years, which means that the American trouble ratio was higher than the German one, during these and previous years. In the very long run, however, the two trouble ratios must have been amazingly similar: "Dollar" goes back to Taler which comes from Joachimstaler, a coin made first in 1517 at the silver mines of St. Joachimsthal in Bohemia; and one taler was three Prussian mark.

Second, up to a point, exchange rates can be artificially established and maintained. Again: whose profit which way? The consumer is interested in a high value of his own currency, for buying foreign goods cheap; he wants competition in general. But the producer wants a low value, for making foreign goods more expensive than his own. This is exactly the same opposing interest as with im-

port taxes. Of course, all consumers are also producers and vice versa; but where is more power: at the producing or at the consuming end? Just from the fact that we do have import taxes you may conclude that there is also a net push for revaluating the relative value of ones own currency. And since this holds for all countries, the exchange between any two will depend on whose producers push more powerfully.

It is amazing to see how much the world is ruled by "co-existing contradictions" as I would like to call it. On the one side, good business means cheating just as much as seems possible without endangering ones own future too much, which sounds rather cynical. On the other side, however, a certain minimum amount of mutual confidence is needed for every business (no trade without trust) even with direct exchange of goods. And for longer intervals of time, the whole machinery will run only if and as long as everybody, at the top and at the bottom, feels and shows a certain minimum amount of responsibility for his doings and their results.

CONTEST NOTICE

The first National Radio Astronomer calling contest will be held July 4, 1973, during the NRAO Pulsar and Molecule Festival in Green Bank, according to the National Community of Science.

Contestants will be scored on their ability to call out a radio astronomer actively observing at the 140-ft telescope. Three strategically located experts will be judges. Several winners from the Russian and Australian Radio Astronomy calling contest will be competing in the non-USA class while USA contestants compete in the resident class. Trophies have been allocated for both classifications. Miss Fanny Starr, reported to be the top caller in the eastern United States, will probably be a non-resident contestant.

The Pocahontas Astronomical Society and the National Federation of Radio Astronomer Callers are urging members to participate. Local residents can register with Jon Moneythane.

RETURN ENGAGEMENT

An Exclusive Follow-up Interview With
Oil Heir C. Sutton

Conducted by Jon Spargo

In March 1970 with little else to guide him but persistent rumors, intrepid OBSERVER correspondent William Campbell tracked down, with unerring accuracy, oil heir C. Sutton, now known to us all as "Mr. Shep", and produced for OBSERVER readers an interview which provided us with some rare insight into the life of one of the most enigmatic breed of men, "the Oilman". With a rare display of candor, Mr. Shep exposed us to the innermost feeling of those who participate in the highly volatile oil industry as well as giving us some insight into their temperaments and daily lifestyles.

Since then Mr. Shep has graciously consented to grant us a follow-up interview in order that we may further examine, aided by the passage of time, the inner workings of this special brand of men. Again, tracking down "Mr. Shep" proved to be an accomplishment in itself since between his oil interests, ramp ranch, brewing interests, and duties at NRAO, the demands on his time, we found, are ever increasing.

OBSERVER: Well!, Mr. Shep, in the three years since we last conversed with you much has transpired. Nixon has been re-elected, the war is over, meat is up, skirts are up, Wall Street and the oil depletion allowance are down, and yet you appear to be your same old self.

MR. SHEP: Are you asking a question or making a speech?

OBSERVER: Neither, just an attempt to get the serious stuff out of the way all at once. Anyway, we remember that you were going into a new business venture. Have you?

MR. SHEP: Not yet. My plan is to start a bus route between Stony Bottom and Clover Lick. It will be called the Hogwilde Transportation Co., and our slogan will be "When you go.... go HOGWILDE!".

OBSERVER: You were going to build a house for your dogs and cats. Have you built them yet?

MR. SHEP: The dog house only. For some unexplainable reason, I'm having some legal trouble with the other one. My building permit application was returned with some very curious questions.

OBSERVER: Three years ago you had great expectations of taking a trip to Frost, W. Va. Have you fulfilled that hope?

MR. SHEP: I got halfway there, so I suppose you could say my hope was half-filled.

OBSERVER: Do you have any unfulfilled ambitions?

MR. SHEP: I've always wanted to be a procrastinator, but I haven't got around to it yet.

OBSERVER: A reliable source tells us that you use only the water from a certain mineral spring. Does this mineral water do anything for you physically such as keeping you going, counteracting a balding head, or improving your love life?

MR. SHEP: To answer number 1, something does. Number 2, none of us is perfect. Number 3, I've always been a wolf in Shep's clothing.

OBSERVER: How do you regard our permissive society, sexwise?

MR. SHEP: I think a permissive society is sex wise.

OBSERVER: How do you turn on, or off, as the case may be?

MR. SHEP: I turn on by twisting to the left, and turn off by twisting to the right.

OBSERVER: What are your thoughts on the population explosion?

MR. SHEP: Explosions can be prevented with an adequate safety program.

OBSERVER: Have you ever considered becoming a philanthropist, philatelist or philanderer?

MR. SHEP: I'm considering making a huge endowment to stamp out that last one.

OBSERVER: Do you have any sage advice for would-be oil tycoons?

MR. SHEP: Oil's my line, not sage. All I know about sage is that cowboys ride in the purple kind and you

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put it in sausage.

OBSERVER: We've been told that you are a gourmet. Does that mean you gallop a lot?

MR. SHEP: No, just horse around a little.

OBSERVER: Would you give us some advice on how to prolong one's love life?

MR. SHEP: The bridge of a sinking ship is scarcely the ideal place to deliver a lecture on the technique of keeping afloat.

OBSERVER: Are you an avid hunter?

MR. SHEP: Actually, I don't care to hunt avids, preferring squirrel, grouse and on rare occasions, San Quentin Quail.

OBSERVER: Do you believe in reincarnation?

MR. SHEP: Indubitably, my good man. A host of things have come back to haunt me.

OBSERVER: Any thoughts on immortality?

MR. SHEP: When I hear stuff like that I thank God I'm an atheist.

OBSERVER: Which of life's little pleasures would you least like to give up?

MR. SHEP: You can see that in the centerfold on any men's magazine.

OBSERVER: Do you subscribe to any underground publications?

MR. SHEP: Oh yes, "The Mammoth Cave Courier" and the "Coal Miners Manual".

OBSERVER: As an oil magnate, what opinion do you have on ecology?

MR. SHEP: Isn't there something in the Bible about oil upon the waters? Or is it bread? Well, oil is bread to me!

OBSERVER: What is your idea of a good profit margin?

MR. SHEP: I think Margin is a great prophet. He certainly knows when the end is coming.

OBSERVER: What are you doing to fight air pollution?

MR. SHEP: I intend to organize a committee to find ways to confine certain politicians to already polluted areas, and to study the feasibility of devising a speech filter for the times they escape to a clean environment.

OBSERVER: Another source tells us that you are an accomplished artist. Are any of your works on exhibit?

MR. SHEP: I am not an exhibitionist.

OBSERVER: What are your musical interests?

MR. SHEP: My two favorite pieces of music are "Rock Around the Clock" and Beethoven's

"Symphony in E Flat Minor".

OBSERVER: In conclusion, we would like to ask what is the most controversial thing in your life today?

MR. SHEP: My contumacy. Now if you'll excuse me, I must go tend my aspersion bush.

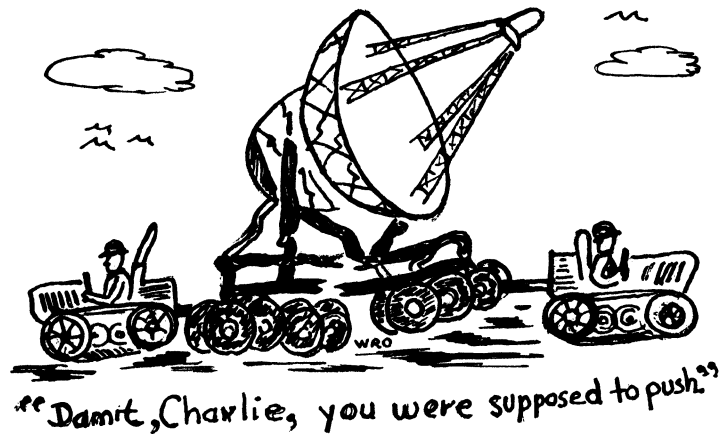
OBSERVER: What do you use aspersion for?

MR. SHEP: For casting, what else?

OBSERVER: Thank you, Mr. Shep.



Mr. Shep tending his aspersion bush
(Photo by Roy Wallace, Cameron, N.C.)



"Damit, Charlie, you were supposed to push."

SIX YEARS OF NRAO

G. L. Verschuur

They won't give me a six year pin. You have to reach double figures to get one of those. I spent 6 3/4 years at Jodrell bank and 6 at NRAO so comparisons might be interesting as I set off into another job (which is what our good editor really asked me to write about). So for what it's worth, let me reminisce and ramble a little. It's easier to do with a can of Schlitz inside one (one needs all the gusto one can get--one only goes round NRAO once in a lifetime).

NRAO was better than Jodrell in many ways. It is a more enjoyable place to work at in terms of the actual equipment around, the availability of computer time, the stimulation of one's colleagues. Jodrell was more fun in more informal ways--playing cricket or soccer at lunch time! Jodrell was also more fun during those days when the space race was still a race like when we saw the first pictures from the moon or listened to the first satellite with two men on board or some other space event, usually covered in detail by the press and TV. Without a doubt, the most exciting time I had at Jodrell was when I was the first scientist in the western world to see the photographs from the surface of the moon.

The most exciting time I had at NRAO was when I detected the magnetic field in the direction of the Orion nebula. That was the greatest scientific "high" I ever experienced. Other exciting times at the NRAO were when Staelin and Reifenstein found the Crab pulsar, and Snyder and Buhl found formaldehyde. I learnt about formaldehyde because Heiles, at Berkeley, told me over the phone that he had heard from someone at MIT who had heard from someone at NRAO, who had heard

Other good memories--observing programs. Actually, both Jodrell and NRAO have marvellous telescope operators. NRAO has no one to compare with one Jim Gibbs at Jodrell who, with a photographic memory, could recite Shakespeare. To hear him recite "The Walrus and the Carpenter" over the P.A. system at 3 a.m. was one of those "far-out" things. Yes--here Jodrell and NRAO differ. It is good not to have to observe all night long or work 18 hour days for weeks on end. I'm forever grateful to the operators here for taking over during the long night hours (not to mention the day time hours).

Reading the latest Playboy or Penthouse at the telescopes had no equivalent at Jodrell. There we heard stories by some of the operators (many of which we doubted) which made letters in Penthouse seem like nursery stories. But then, more gets done here. One can't place pennies on the rail track here, and retrieve them later, but one can throw rubber hammers at the dish to dislodge the snow. Here one can't climb through girders on the way to the focus, or stand out in the freezing cold outside the focus box (60 feet above the dish) but one can tune the feed in the comfort of the service tower. Here we can't drive the telescope ourselves, but at Jodrell it was fun to drive the Mk II and make the computer sound an alarm when the next move had to be made, even if one did sometimes sleep through it. And here there is no thrill quite like that of climbing to the top of the stabilizing girder of an upside down Mk I telescope, although going to the focus of the 300 foot is quite an effort. But then at Jodrell one didn't have to watch out for deer. They only have cows grazing in the fields there.

At the NRAO things are democratic. Jodrell was more like a monarchy! Jodrell was infested with students. NRAO isn't, except in the summer. Getting observing time at NRAO is a fair process but it wasn't at Jodrell. (Perhaps things have changed there.) So the differences are big. The most striking thing is the difference a good electronics division makes. At the NRAO a lot more progress is made, and more efficient use of the telescopes is made, because of the marvellous support staff. At Jodrell we built our own receivers, installed them at the focus ourselves, tried to debug them ourselves and it was all very inefficient, but no doubt beneficial (in some ways). And so one learnt that klystrons had a finite lifetime (during an observing run) and one had to phone Switzerland for a replacement. Here they have dozens on the shelf! We even swept our own lab at Jodrell.

And some other differences. The scientific staff here, all having graduated years ago, take things fairly seriously. It is not fair, therefore, to compare the bachelor days of the average Jodrell staff, with the local crowd. (No one in England marries while still a student.) So I have no local recollections comparable to that of seeing George Miley trip

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over a car safety belt and fall flat in the middle of the road. (Only GKM could trip over a safety belt. Try it sometime. Use a VW! Also drink a lot of beer first.) But enough of Jodrell memories. What else will I remember about NRAO?

The infighting for telescope time during the heyday of the molecular search bandwagon. Barry Turner's telephone calls. (They get longer as the years go by.) Lew Snyder's telephone calls. The fire and the clean sweep that made of my researches. Parties in the Redwood house in the days of the Pauliny-Toth's; a Pocahontas High School football game; the Elkins Forest Festival and other excursions to relieve the long stays in the residence hall. How did Sarma manage it? And the Bartow drive-in which is still the only place where I have seen a movie where two reels were out of sequence, a minor nuisance greeted only by a few token horn beeps. It is alleged by one summer student that he once saw a full reel belonging to a different movie during one feature film.

During most of six remarkably frictionless years Barry Turner and I shared an office. At all times Bill Howard was trying to put someone else in too! Most of the times he succeeded. And Barry and I agree - that things aren't like they used to be in the good old days of 1967, 68, and 69! Most agree that 1971 was bad at NRAO, but things are looking up again. The spirit of the place is a very subtle thing. I hope that as NRAO gets bigger the spirit will stay. Unfortunately, spirit cannot be commanded. And all the staff contribute to that.

I will miss a lot of things about the NRAO. I will not miss the rat race and the pressure. No matter what anyone pretends to the contrary, there is a tremendous amount of pressure here (amongst the younger scientists in particular), which is commented on by outsiders as well as insiders. It's fine, in a way, that this exists--it makes for a stimulating place to work. A sociologist would find NRAO an interesting study!

APPROPRIATE APPAREL

Now is the time when mothers put away the long pants and little boys wear shorts and Band-aids.

VOLLEY BALL

Carl Bignell

Interest in volley ball at Charlottesville began last summer when the RA purchased a ball and net. The games were played on the NRAO lawn and sometimes on the UVa courts one evening during each week. The participation was generally quite good, sometimes with so many players showing up that three teams were formed.

In fact, volley ball appeared to be so popular, that NRAO considered entering a team in some local organized competition. Last fall they joined the men's division in the City League and finished with a 3-9 record (i.e., 3 wins). After this poor showing, it was decided that we might join a mixed league, so that the team could improve its competence (really to increase its moral!) before continuing on in the men's division. In the winter we joined the mixed division which consisted of six teams; two were NRAO 1 and NRAO 2 (the players for the two teams were different). Our record (on paper at least) was better than the fall because both NRAO 1 and NRAO 2 ended up in the semi-finals (top 4 teams). However, neither team was successful in these finals. Perhaps it's worth noting that most of the games won by both NRAO teams were by default! What we lacked in ability, we had in enthusiasm.

At the end of the winter league (January) interest in maintaining a team in some organized league waned; however, a considerable number of people expressed interest in pursuing volley ball on an informal basis. The Burley School Gym was rented for this reason every Friday evening for a nominal fee from February to April. By the end of the first month, 16 to 20 people were showing up for Volley Ball. A second ball was bought in the hopes that enough people would turn up so that two games could be played simultaneously. This occurred only on two evenings.

The quality of play now encountered in these games has improved considerably since the first games last summer. This may explain the good attendance at the games this spring. The school gym is not available for the summer; however, the UVa courts beside the Memorial Gym are. There will be games every Friday evening, weather permitting, at these courts opposite the Downtowner. Everyone is welcome.

LETTERS TO THE EDITOR

Dear Sir:

Rick Fisher's driving time will certainly provoke letters; here is the first. I have, as a conservative estimate, driven twice round the world between my house in Afton and Green Bank. And no speeding ticket yet! I cannot match Rick's time (could he possibly be a better driver?) but here are some facts.

I agree with him that the north route out of Green Bank is shorter and quicker when conditions are good. To my house I usually clock 97 miles by that route, and 18 on to NRAO, so his 115 miles total is certainly ± 1 mile. My best time home is 1 hour 58 minutes. Thus my best possible to NRAO would be about 2 hours 13 minutes (± 2 minutes).

Could we hear some other claims? I believe I once heard DSH claim 1 hour 15 minutes, Green Bank-Staunton. But that was when he was a racing driver. And how long did Barry Clark take on a bicycle?

Sincerely yours,

John W. Findlay

Dear Sir:

There are one or two comments I'd like to make on Rick Fisher's article on the time of travel between Charlottesville and Green Bank. First, there is a difference in going from Green Bank to Charlottesville as compared to Charlottesville to Green Bank. I have never done the Charlottesville to Green Bank trip in two hours. Does the uphill really make a difference or is it a relativistic effect? Of course, it is now probably easy to do with all of I64 open, but here is a story of how one driver actually managed two hours before the final stretch of I64 was open.

All was well from Green Bank over the top road all the way to Afton Mountain. Then disaster. I had to keep a steady 60 mph average the rest of the way to make it, but a tortoise, in the form of a yellow line painting machine had just started down the mountain.

There was one car ahead of me (as well as the tortoise) and miles and miles of double yellow lines to cover. Panic. What to do? We were going 20 mph and then, lo and behold. A miracle. The rest area or scenic view, called Afton Wayside, loomed up. It wasn't very crowded. So, at 25 mph, off to look at the view! But it wasn't worth it. So back onto the road. In front of the yellow paint man and his tortoise! Bliss. Two hours it was. And that in a Chevelle! On another good occasion, as Rick says, using 5 mph leeway, in a TR6. Two hours again.

Now without wishing to cause alarm amongst our safety experts, I must confess that there was a good weekday morning after all that, during which all went well. No tortoises, no undue red lights and guard house to NRAO lower level doorway--1 hour 54 minutes. Never again will I try it.

And legend has it that someone did it in two hours before any of I64 was open!!

Of course, I've done it in 60 minutes. By plane!

G. L. Verschuur

1973 CALENDAR OF NATURE EVENTS

Sponsored or Co-Sponsored

by

West Virginia Department of Natural Resources

June 16	Family Trails Day Coopers Rock State Forest
July 7	DNR Cranberry Tour (Blooming Orchids) Richwood

WORK WANTED

Lawn Mowing - Flower Bed Weeding - Garden Hoeing.

Richard Oref - 456-4647

WHAT'S HAPPENING WITH THE VLA?

Barry Blaisdell

"Time Marches on and Waits for None"

The VLA is a teeming hive of activity from the early hours of daylight, five, and sometimes six, days a week. Things are happening at a hectic pace and with the anticipated consistency.

The current staffing level now stands at 26 with the addition of Ed West, Contracts Officer, and Barry Blaisdell, Administrative Assistant. Jerome Hudson is on board to help in the computer area and Forrest Wells is now on site and will have an operating office in the very near future.

The Real Estate Planning Report from the Army Corps of Engineers was received in late February, approved with comments and forwarded for Foundation approval. The central core land section is to be available in September, 1973. Construction rights on a small area of central land are to be available on July 1, 1973, for the installation and analysis of a section of waveguide.

Final design of the transporter being complete, the work on the specifications and RFP continues. The design and test of electronics system prototypes continues. The first 200M section of waveguide has been received at Green Bank and is currently undergoing electrical testing and analysis. A second 200M section is enroute from Japan. Burying techniques and testing will take place at the site during the summer. Specifications for the computer continuum hardware system are constantly being evaluated and revised in an effort to issue the computer RFP in mid-summer. The basic requirements for the central control building have been determined and effort is now pointed towards the necessary requirements for the various auxiliary buildings. Mapping work at the site, under the direction of Limbaugh Engineers of Albuquerque, is proceeding as desired and the maps of the central site core area have been received.

The VLA Antenna Procurement phase of the project is now in full gear with continuous meetings by the Technical Evaluation Subcommittee and the Business Evaluation Subcommittee in an effort to ingest the information received in the proposals. Priced proposals were received from Collins Radio Co., E-Systems, Inc., Philco-Ford Corp., RCA and Rohr Industries, Inc. for con-

sideration. The decision has been made to proceed on the basis of purchasing two antennas in the first group instead of one. This will permit us to begin tests on an actual interferometer 6-8 months earlier and will give us a better test of the prototype electronics. It has also been decided that we will proceed with a shaped reflector design instead of a parabolic design. This improved efficiency from 55% to 65% of theoretical maximum which represents a 20% improvement.

The response from interested Engineering/Architect firms to our solicitation and ad in the Commerce Business Daily numbered 78 proposals submitted for consideration. Eleven (11) firms were selected for further consideration. These firms received additional information on the VLA Project along with a request for complete data on each firm, its experience and the personnel to be assigned to the VLA. We received nine (9) detailed proposals from firms stating their interest in the project. In April Mr. Lancaster, Mr. Finks, Mr. Horne and Mr. Wells visited seven (7) firms for home office interviews and evaluation. In May Bohannon, Westman, Huston and Assoc./Cottrell, Vaughan, Rowland and Assoc. of Albuquerque, New Mexico were selected for negotiation of a contract for the E/A services. A shorter version of the firm is BWH/CVR, Joint Venture as they will be known on the Project. Dr. Richard G. Vaughan will be the E/A Project Manager.

What's happening? You name it and you can be assured it's happening on the VLA!

SUMMER SHOWER

The rain began staccato
With sharp, bright dots of sound;
Continued in legato,
Until it soaked the ground.

The sun came out crescendo
Forming colors, till we found
The shower diminuendo,
With a rainbow tied around.

--Isabelle Hooper Haight

A GREEN BANK PAPER

The following minutes were found by a Visiting Scientist under somewhat unusual circumstances, as described below. After careful and anxious consideration, the taking of full legal and fiscal advice and a detailed study of recent precedents, the OBSERVER has decided that the public interest requires that these documents be published at once and in full. Dr. Palmer writes:

"I was coming back from the Interferometer recently in rather a hurry, as the Operator was nearly out of cards. My time table of card supply seemed OK first thing, but I was misled by the ST clock in the main building, as I did not understand that it indicates approximate ST in Tucson. It may be that the clock in Tucson indicated ST in Green Bank, but I have not phoned to confirm this theory. Anyway, I just made it to the car park, stopped the diesel in front of its correct sign, applied the parking brake, and released a really ginormous SNEEZE. When I made contact with the outside world again a few seconds later, I found that the car had rolled forward, knocked down the sign, and was heading for the airstrip. After some hurried backing up, I opened the accident report envelope, but my good intentions in that regard faded away when the enclosed documents fell out of the report form. I think your readers may find them of interest."

'MINUTES OF THE DIRECTOR'S ADVISORY COMMITTEE
ON MINOR MATTERS'

Distribute to: Asst. Directors. (1 - m)
All Administrative Staff. (1 - kn)

The Chairman called the Committee to order at 1215 EST. It was agreed to dispense with all formal items, and proceed at once to a full consideration of the proposals for the improvement and up-dating of the 'public access control systems'. It was recognized that the present system did actually control public access by petrol driven vehicles quite adequately. (That is, it prevented such access.) However, some observers felt that it was rather old fashioned, would detract from the NRAO image in the seventies and eighties, and imposed significant hardship on Observers during the frequent rainstorms. These problems were not eased by stiff windows and in-

complete winders on some diesel windows. Furthermore, these difficulties bore unfairly on left-handed observers, who tended to get their writing hand dirty and wet, so that notes written within thirty minutes of a journey tended to be particularly illegible.

Proposals to install teletype links from the main building to each telescope, and then provide a covered carport at each telescope and at the main building (for three vehicles), were ruled out of order by the Chairman, on the grounds that 1) they conflicted with the Green Bank Ethic; 2) they were not minor matters, and were therefore beyond terms of reference of the Committee; and 3) the proposals were un-American, and might even be socialist, as they would tend to keep all individuals to a dull uniform level of dryness.

After full discussion, the following proposal emerged: (the committee were unable to agree to recommend any particular proposal, but decided that they should be listed in an approximate order of preference, as determined by the Chairman's understanding of the feeling of the meeting.)

a) Do nothing. (All members agreed that this was the best proposal if their own pet one was not implemented.)

b) Fix umbrella-like structures over the locks and pushbuttons at the gate. This would transfer the damp problem from the hand to the upper arm.

c) Purchase vehicles with power operated windows.

d) Fit gate and diesels with radio transponders. (Since any interference would be generated OUTSIDE the gate bar, it would be unimportant.)

e) Exchange the winder handles on the left- and right-hand front windows so that the driver could use a winder with a fully operational knob.

f) End the scandalous discrimination which allowed Works Area staff to use a push-button, while observers had to use a key. (The Committee could not agree who was disadvantaged by this discrimination, but were quite sure that it existed.)

The Chairman ruled out of order as major matters various proposals to mend the punch at the interferometer, so that it produced legible cards, or exchange it with the one at

--continued, next page--

the 300 ft telescope, which probably was not used much anyway.

The Committee adjourned at 1300 hours.

At a later meeting, the Chairman stated that he had inspected the Works Area access control post more closely, and it was NOT a pushbutton, as alleged by some members. There was therefore no evidence of discrimination, but the Committee wished the minutes to remain in the record, to emphasize how concerned they were lest any suggestions of that evil should be found in Green Bank operations.

(Editor's note: It is not clear from the documents received in this office who are the members of this Committee, or where or when it meets. There is no truth in the rumour disseminated by some non-NRAO observers, that the committee consists of disgruntled fellows who meet at the long table in the Canteen when all responsible members of staff have gone to a meeting in Charlottesville. Some commentators feel that the discovery of these minutes in a diesel is significant, and may be part of an Underground distribution system, which may have links with the Counter-culture in West Virginia. Readers are urged to call this office if they come across any further evidence of the activities of the lazy and disaffected drop-outs.)



"UNTIL THIS RAINY SEASON I WONDERED WHY DOLAN GAVE US THESE SAFETY MATS."

YOU THINK YOU HAVE TROUBLES

contributed by Virginia Van Brunt

The "Star" swears that the following letter was written by a bricklayer in Toronto, to a contracting firm for which he worked.

"When I got to the building I found that a high wind had knocked some bricks off the top, so I rigged up a beam with a pulley at the top of the building and hoisted up a couple of barrels full of bricks.

When I fixed the building there was a lot of bricks left over. I hoisted the barrel back again and secured the line at the bottom, then went up and filled the barrel with the bricks that were left over. Then I went down to the bottom and cast off the line.

Unfortunately, the barrel of bricks was heavier than I was and before I knew what was happening, the barrel started down jerking me off the ground. I decided to hang on and halfway up I met the barrel coming down and received a severe blow on the shoulder.

I then continued to the top banging my head on the beam and getting my fingers jammed in the pulley. When the barrel hit the ground it burst its bottom, allowing all the bricks to spill out. I was now heavier than the barrel and so started down again at a high speed.

Halfway down I met the barrel coming up and received severe injuries to my shins. When I hit the ground I landed on the pile of bricks, getting several painful cuts from the sharp edges.

At this point I lost my presence of mind because I let go of the rope. The barrel came down giving me another heavy blow on the head, putting me in the hospital.

I respectfully request sick leave."

NOTICE

The Craft Studio Workshop will be open on Wednesday evenings during the summer.

L. W. McPHERSON RETIRES

Carolyn Dunkle

(Writer's note: I apologize for the lateness of this article which was intended for the January issue.)

Peck McPherson, cheerful, willing, 11-year employee in the GB Electronics Division supply room retired Dec. 31, 1972.

He and his wife were wined and dined at the December division dinner and he was presented with gifts (from GB, CV, and TU employees) by boss Sandy Weinreb, the first one being a \$50 gift certificate to Fulk Sporting

of material on the subject. He ordered enough history-type books for years of reading.

On Dec. 29th we had a punch 'n pretzel gathering for him and lots of people dropped by to bid their farewells. Peck's witty comments at this gathering made it a happy rather than sad occasion.

On one of his recent visits I asked him what he had been doing. Gosh - he's been busy with several projects including making maple syrup. In addition to reading, he enjoys listening to music, getting all sorts of files in order, working on the house and property and, most of all, he enjoys talking to his wife - yes, being able to discuss anything they wish, whenever they think of it,



Goods, then a caricature drawn by old friend Neil Albaugh, and last a picture of individuals working closely with Peck put together by another old friend, Tony Miano. (See photos above.) At the dinner, Peck remarked that he had never received a cross word or had never been treated unkindly.

Although Mr. McPherson was a competent and willing worker, his forte was spinning yarns. He was king of the coffee break! For weeks after his retirement the fellows still waited for him to round them up at 9:30 (and we're all glad to see him when he occasionally drops by for this mid-morning break).

Peck really prepared himself physically and mentally for retirement. He ordered all sorts

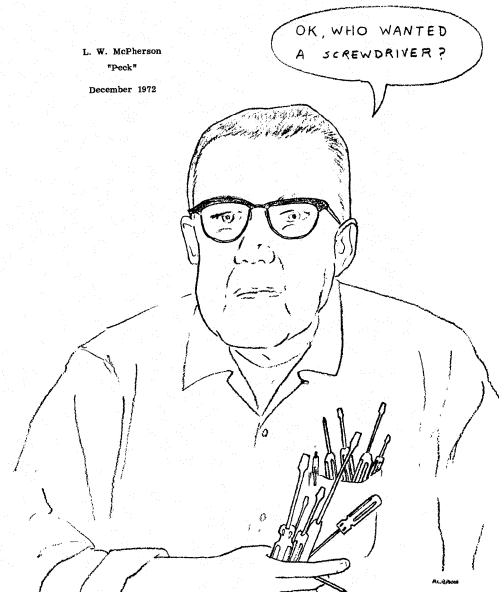
and for any length of time. Heretofore, with both of them working, they never had the privilege.

Peck says, "I think if I'm not careful, I'm really going to like retirement. In fact, I know so."

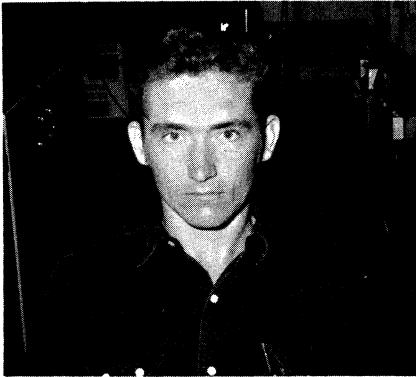
Good luck Peck . . . good fishing, good sleeping, good reading, good eating, well, good e-v-e-r-y-t-h-i-n-g.

The new freight elevator which had just been installed was ready for operation immediately after Peck's retirement. Someone put a sign over the elevator which read "PECK"... so, Peck is really still around.

L. W. McPherson
"Peck"
December 1972



NEW EMPLOYEES



William R. Lambert
Janitor
Plant Maint. - GB



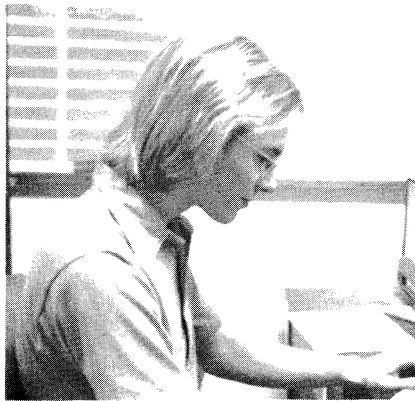
Patricia B. Brubaker
Accounting Clerk
Fiscal Div. - GB



George H. Patton
Electronic Engineer
Electronics Division - GB



Jerome A. Hudson
Scient. Program. Analyst
VLA Project - CV



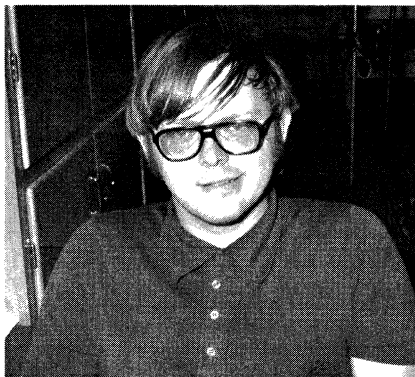
David G. Steigerwald
Co-op
Scientific Serv. - CV



Geoffrey D. Thompson
VLB Process Operator
Electronics Division - CV



F. Jay Lockman
Jr. Research Associate
Scientific Serv. - CV



Kenneth K. Nottingham
Telescope Operator
Telescope Operations - GB



Earl R. Herndon
Technician
Electronics Division - GB

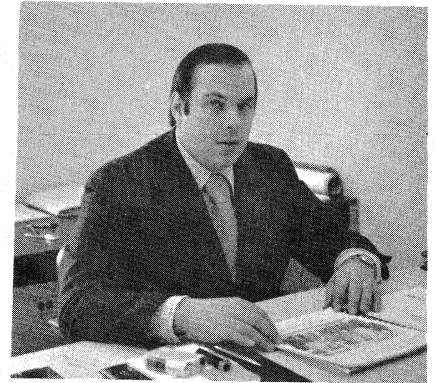
New Employees (Cont.)



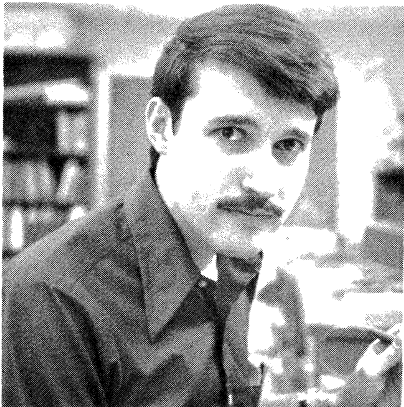
Clarence E. West
Purchasing Officer
VLA Project - CV



Frances B. Hamilton
Secretary
VLA Project - CV



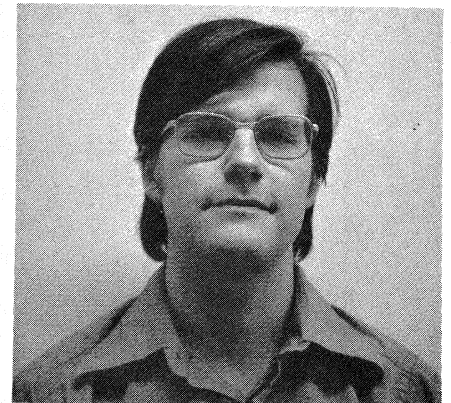
Barry F. Blaisdell
Administrative Assistant
VLA Project - CV



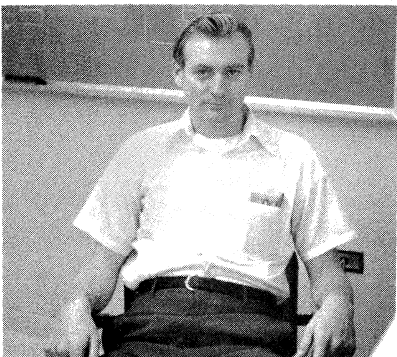
Charles M. Broadwell
Technician
VLA Project - CV



Olivette P. Hasty
Technical Typist
Electronics Div. - CV



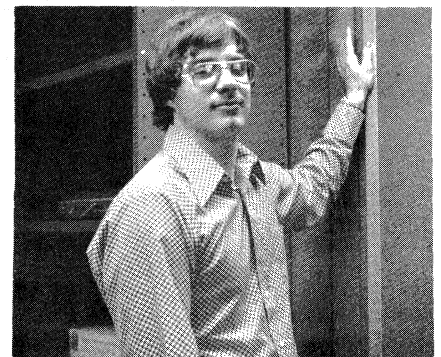
Charles E. Creager, Jr.
Technician
VLA Project - CV



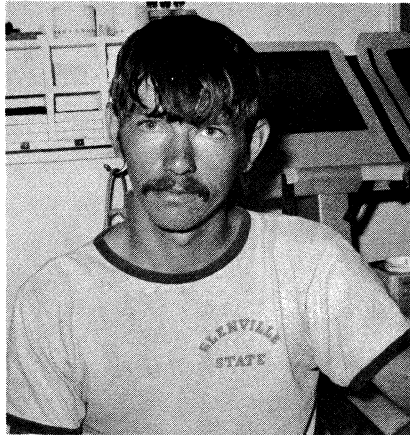
Raymond P. Escoffier
Electronic Engineer
VLA Project - CV



Josephine V. Sheatsley
Library Assistant
Scientific Serv. - CV



William E. Randolph
Scientific Programmer
VLA Project - CV

New Employees (Cont.)

Robert L. Beverage
Plant Maintenance - GB

Other New Employees (Pictures not available)

Calvin Sparks	Tech. Specialist	Tucson
William D. Gust	Administrative Aide	Tucson
Bobby L. Ulich	Elect. Engineer	Tucson
John E. McBrian, Jr.	Tech. Specialist	Tucson
Robert F. Meehan	Computer Operator	Comp. Div. - CV
Charles W. Kramer	Draftsman	VLA Project - CV

Terminations

Donald K. Poillon	Business Officer	Business Office - CV
Gregory A. Shoemaker	Computer Operator	Comp. Div. - CV
Charles W. Kramer	Draftsman	VLA Project - CV
Randall C. Shears	Jr. Technician	Electronics Div. - GB
Nidumolu V. G. Sarma	Electronic Engineer	Electronics Div. - GB
Martha L. Sanders	Library Asst.	Scientific Ser. - CV
Donald Gagnon	VLB Process Oper.	Electronics Div. - CV
Robert E. Hogarth	Tech. Specialist	Tucson

Return from Leave of Absence

Margaret L. Halliday
Virginia W. Van Brunt

FOSSIL COLLECTING FOR FUN

Ray Escoffier

Part I

Looking for a new hobby? Try something different - try fossil collecting. Here is a hobby that has more variety than the standard collecting hobbies such as stamps or coins - you have 800 million years of history to search through - but none of the competition. Moreover it gets you outdoors regularly, is easy to store and display results of your hobby, satisfies anyone with an interest of and a curiosity about life and nature, and is cheap!

Fossils are abundantly available in most parts of the country and each new area you hunt will usually produce a completely different array of fossils. Many localities will yield very well preserved, easily collected, abundant remnants of living creatures anywhere from a few thousand to hundreds of millions of years old.

To begin a discussion of fossils it is best to define just what a fossil is. A fossil is usually defined to be an object indicating the presence of prehistoric life. A shell, a bone, petrified wood, footprints, trails all represent fossils.

Fossils are classified by both age and biology and it is important to have an understanding of both to enjoy fossil collecting.

Science has divided the history of the earth into vast periods of time called eras. Each era had a more or less characteristic set of living creatures and living conditions. Eras are further broken down into geologic periods. Figure I gives a breakdown of the geologic time scale with the approximate age and duration of each era and period.

The Precambrian era (actually several different eras) are characterized by little fossil evidence of life. This period of earth history (covering 80% of earth history) must have seen the beginning of life and the evolving of that life to the point that shells, teeth, and bones were produced by living things. Only after the appearance of these hard parts were living things capable of being preserved over hundreds of millions of years of geologic time.

The Paleozoic (ancient life) era saw an explosion of life into a vast number of forms. The Paleozoic begins with the Cambrian period,

ERA	PERIOD	DURATION*	START*	CHARACTERISTIC LIFE
Cenozoic	Quaternary	1	65	Mammals, Birds, Modern Reptiles, Modern Fish, Flowering Plants, Insects
	Tertiary	64		
Mesozoic	Cretaceous	70	230	Great Reptiles, Primitive Mammals
	Jurassic	45		
	Triassic	50		
Paleozoic	Permian	55	600	Primitive Amphibians, Fish, Ferns, Leafless Trees, Brachiopods
	Pennsylvanian	30		
	Missippian	35		
	Devonian	55		
	Silurian	20		
	Ordovician	75		
	Cambrian	100		
Pre-Cambrian	-	Over two Billion Years		Very Primitive

*Millions of Years

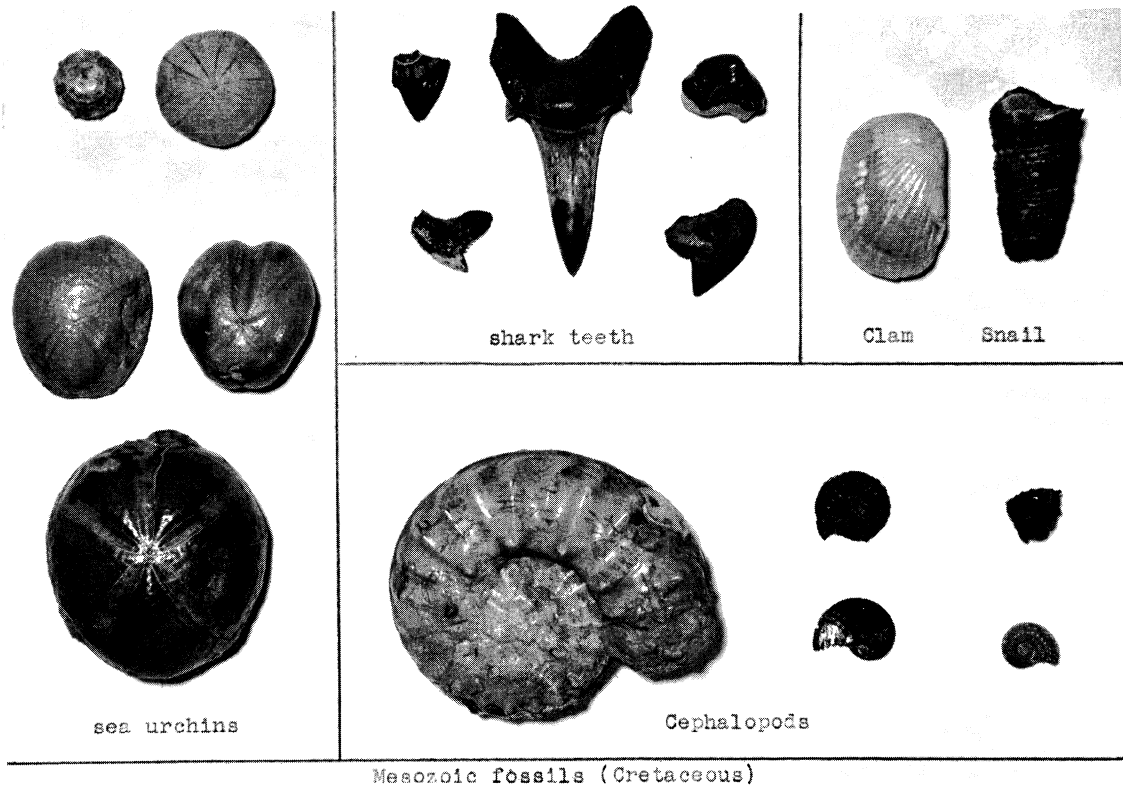
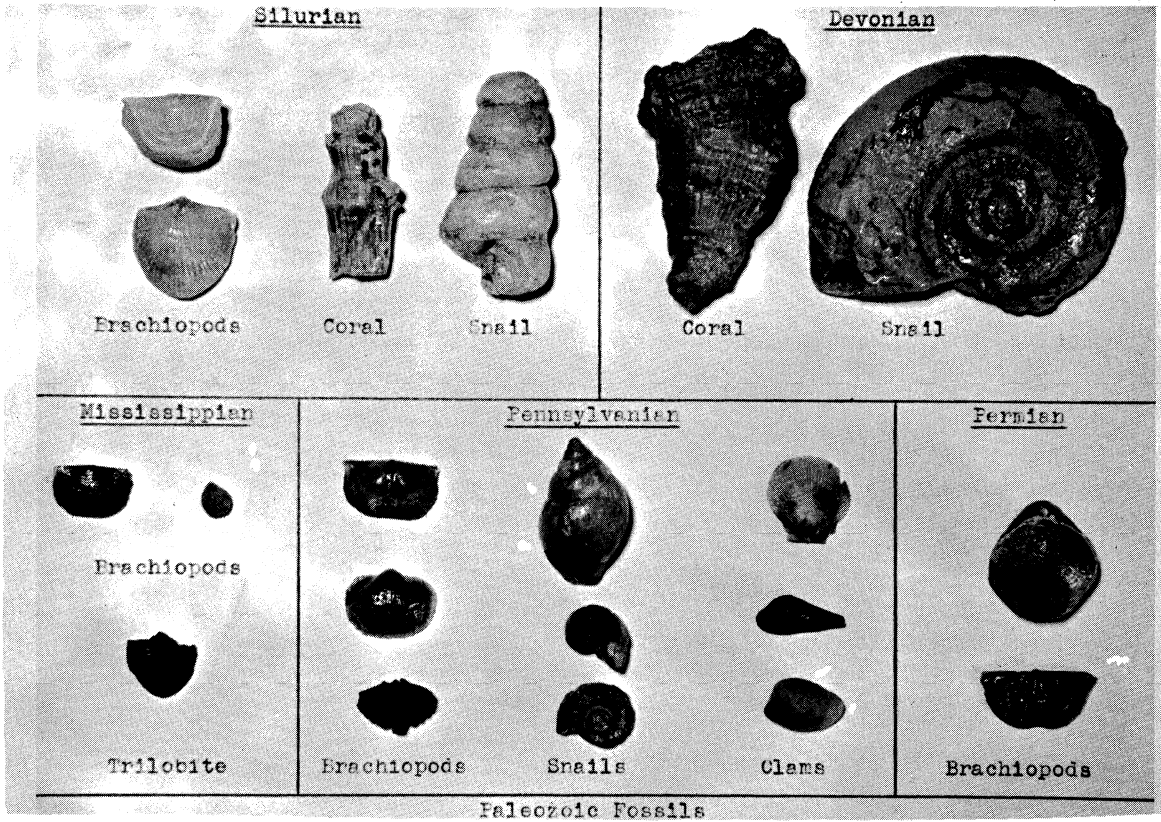
Figure I

in which only relative primitive creatures in limited variety lived in the sea, and the Ordovician with a great increase both in numbers and varieties. The Silurian period marks the first fossil evidence of both plant and animal life on dry land. Primitive scorpion-like arthropods were the first animals to escape the sea and inhabit the land.

The Devonian period saw the expansion of dry land plant life ranging from small leafless plants to 40 foot fern trees. The Devonian also marks a rapid development of first life and the first known evidence of fish-like amphibians to live on dry land. The amphibians eventually evolved into reptiles, mammals, and birds producing the higher life forms of today.

The remaining periods of the Paleozoic saw the development of reptiles, insects, and vast

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forests of primitive plants and trees.

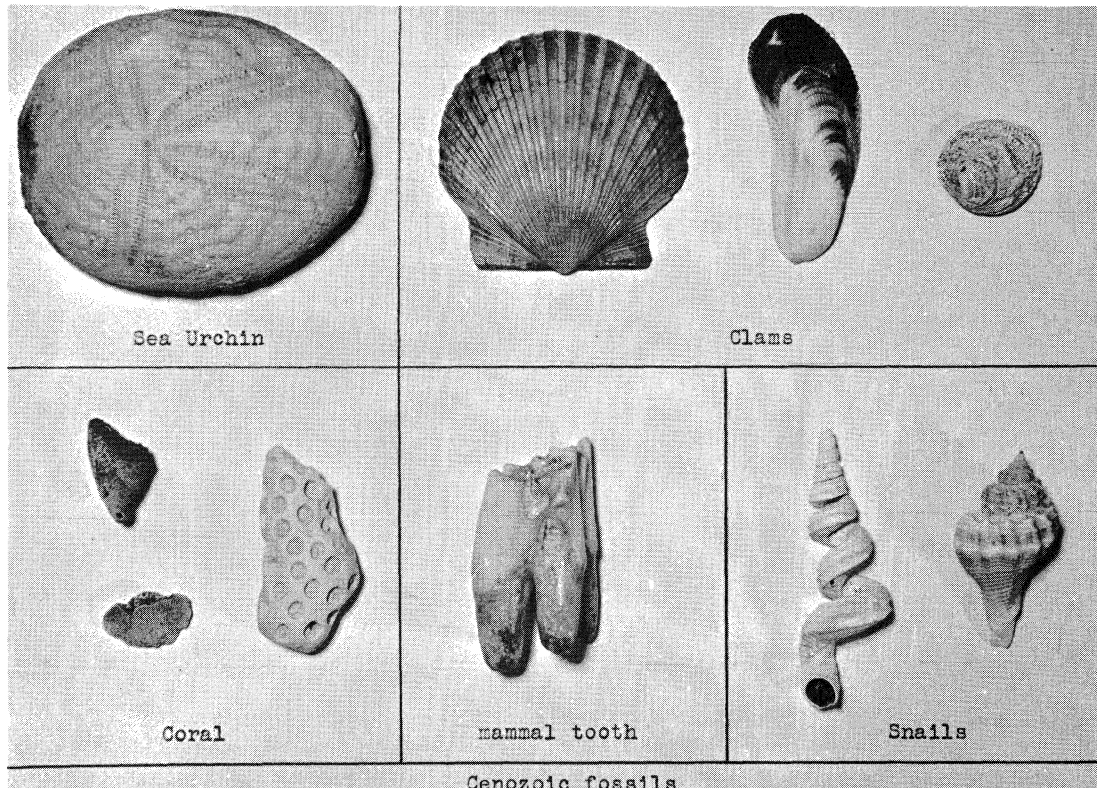
The Mesozoic (middle life) era followed as the reptiles began to evolve and to dominate the land (and sometimes the sea and air). Indeed, the Mesozoic is often called the age of reptiles. Over much of its duration the earth was ruled by the dinosaurs whose reign lasted over a hundred million years. In the Mesozoic also, the first mammals and birds appeared having evolved from smaller reptiles.

The Mesozoic era ended abruptly due to some catastrophic change in the environment and the great reptiles fell from dominance. The Cenozoic (recent life) era dawned and with it the mammals became rulers of the land. Most of the modern animals and plants known today evolved in the Cenozoic era.

During most of these hundreds of millions of years of history the level of the sea rose and fell, as did the land level, causing wave

after wave of flooding over vast areas of the present United States. Thus hundreds of feet of marine sediment were deposited in areas that today are far inland. As these sediments formed, plants and animals that lived in the sea were buried and protected from the normal forces of nature that act to return organic matter into the life cycle. Buried deeper and deeper by subsequent sediments, old sediments gradually solidified into rock with fossils trapped within. Land uplift and erosion ate away at the deposits until sediments, fossils and all, were exposed to the light of day - ready for collecting.

In Part II we shall look at fossils from the biological aspect and see some of the fossils available in Virginia.

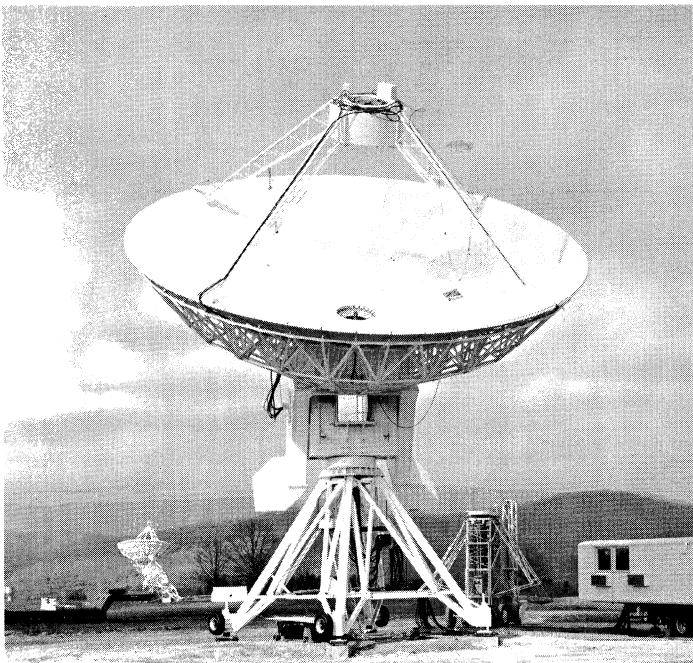


45-FT TELESCOPE

Dave Hogg

The newest telescope at Green Bank is the 45-ft, acquired from Electronic Space Systems Corporation (ESSCO) in the fall of 1972 as a replacement for the 42-ft. Although the 42-ft was used successfully with the three element interferometer, its usefulness was limited by its restricted sky coverage, and by its mesh surface, which is good to a wavelength of only about 11 cm. The 45-ft with its azimuth-elevation mount, has better sky coverage than even the 85-ft antennas, and its solid surface is set with an rms accuracy of 0.025 in, enabling observations to be made at wavelengths as short as 1 cm.

In order to take full advantage of the new telescope, there have been many changes in the associated electronics and computer programs. The front end box has receivers at three frequencies, to match those on the 85's; a new radio link, with wider bandwidth and better monitoring facilities, has been built; and the number of correlator outputs has been doubled, to 24. The interferometer computer now understands that it has to worry about a fourth telescope, and it has been taught that the new antenna moves in a different coordinate system from the other three. These improvements, representing a lot of hard work by many people, are now checked out, and the telescope is ready to be moved to the Huntersville site.



45-FT RADIO TELESCOPE

Even though the first real observation has yet to be made, the 45-ft has already created a lot of interest amongst observers, and there are more than 15 proposals awaiting observing time. At Huntersville the baseline length is 35 km, or about one million wavelengths at the highest frequency. This gives an angular resolution of 0.2 arc sec, which is in the unexplored region between that of the standard interferometers like the three element, and that of long baseline interferometers. With the 45-ft we hope to get new information about small regions of strong radio emission both in radio galaxies and quasars, and in galactic sources such as H II regions and planetary nebulae.

NOW IS THE TIME TO:

Smile
 Make hay
 Kiss brides
 Mow orchards
 Pick strawberries
 Prune evergreens
 Weed flower beds
 Enjoy the good life
 Fumigate grain bins
 Attend class reunions
 Mention Father's Day
 Look for a ripe tomato
 Take a day off for fishing
 Beat the birds to the cherries
 Drink a milkshake for Dairy Month
 Oil the squeaky hinge on the kitchen
 screen door
 Mention Father's Day again.

WANTED: BABY SITTING JOBS

Mary Jane Oref - Age 14
 Experienced Baby Sitter
 Call: 456-4647

Many can argue; not many converse.--Alcott

INSIDE NRAO

Observer Investigative Reporter

The sharp click, click of a woman's heels are heard in the hallway. She stops and knocks on an ordinary-looking office door. She whispers "Can I come in?" (pause). Behind the door a voice answers back, "OK, come on in." The door is unlatched and she enters. Others who have approached the same door and turned the knob to open it almost snubbed their noses when the door wouldn't open - it was locked. After the shock wore off they called to the people inside to let them in but they got this rebuff: "Sorry, you can't come in because we're doing confidential work." Most of these rebuffs are shrugged off. Some with a few choice words, some with incoherent mumblings and occasionally some with understandable words like, "When can you use the damn thing for science?". Sound like a little bit of narrative from Saturday Night at the Movies or Mission Impossible? Heck no. This is going on right inside NRAO. I was first tipped off about this by a high Observatory official who, for the purposes of this story, we shall call just plain Pat (this isn't his real name, of course; I have to protect my sources of information). Never to take hearsay as the gospel truth, I went about investigating this story on my own.

I kept this story from the OBSERVER up until now for several reasons that aren't even important now. Keeping all this pent up inside was tearing my guts out and starting my ulcers to seep a little. Dr. Aga (that's his name spelled backwards, you know) said that I'll never know any real relief until I get the whole bloody mess off my chest. He gave me a bottle of "green stuff" and told me he wouldn't send me a bill for 90 days so that my ulcers would be in good shape. Well, anyhow, back to the story.

Most of the people going through that locked door are always carrying something, be it a brown box about 15" x 8" x 3" with blue stripes on top or a stack of funny looking cards with holes in them or big bundles of wide paper covered with a lot of numbers. Occasionally one of them is pushing a cart with all these things on it. Understand this: having just one of these items or even all of them doesn't mean you can get in. Apparently only a select few are allowed to go through that door. There was this one fellow who got

to go in and out of there like it was his home and many times I saw him enter without any of these items. One thing was certain, the others were always glad to see him. Funny thing though, he didn't even work here. One day he disappeared as mysteriously as he appeared. How about that?

Now and then these people (you and I know most of them) came out in groups of two's or three's smiling at each other, but when they saw someone else coming down the hall they put on their "hello, how are you" smiles and their conversations dwindled away. Very mysterious stuff. This made me determined to sneak in there and to expose whatever was going on. The opportunity came sooner than I expected.

My chance came near the end of the month. The activity behind that door was greater than usual and people were going in and out of there pretty regularly. I watched and waited out of sight but pretty close to the door, from where I could see the door and all of the hallway. When I saw a couple of "them" coming down the hall I was ready. Man, was I ready. When the second of the two was going under the door frame, I leaped out of my hiding place and sprang through the door like a flash of white lightning. Surprise, surprise. Did I catch them by surprise! All hell broke loose when they saw my body hurtling into the room. I was fast but they were faster.

One female threw herself on a table and draped herself over some papers, one of the males stuck his arm into a printing machine to stop it, and another girl threw a stack of cards out the window. And during this short time period I could hear someone yelling, "Push the button, push the button." Someone did. In a few seconds the whole place filled with smoke-like stuff that smelled like perfume, and in a few seconds more I was hustled out of there like you wouldn't believe. They were too fast for me. I didn't see what was on the papers. I didn't see what was being printed. And I couldn't read the cards. The only thing I am sure of is that I haven't got a paycheck for over six months.

The great hope of society is individual character.

--Channing

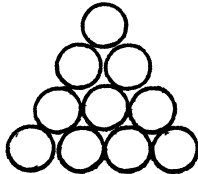
A PAGE FOR PUZZLE FREAKS

S. Donovan

Below is an assortment of puzzles, brain twisters, idiot questions, etc. Regardless of what you call them, it should be interesting to see if anyone is able to arrive at all correct answers ----- quite doubtful!

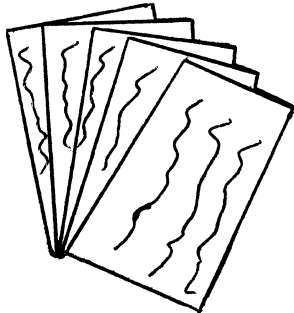
- 1. Two men were engaged in a tennis match. They played 9 games, and each man won the same number of games. Is this possible?.....(for beginner's)

2.



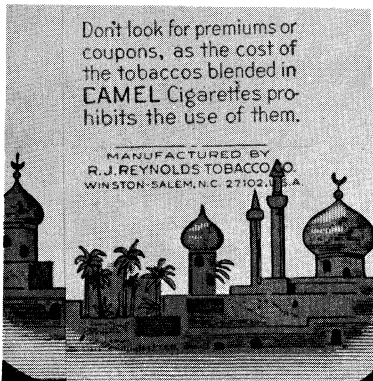
Place 10 coins as above. Making only 3 single moves, turn the triangle upside down.

3.



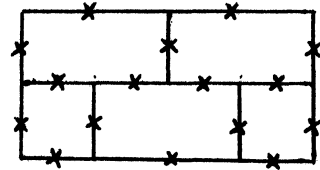
Deal yourself 25 cards at random. Turn them face up and try to arrange in five pat hands. Are the odds in your favor or not? (A good barroom hustle)

4.



There is a four digit year date hidden in this picture. Can you find it?

5.



Beginning at any point, trace a continuous line through each separate line (marked by X's). You cannot cross a line twice, nor can you cross your tracing line at all. (For pros)

Better attempt these after hours: it could possibly turn into a rather time consuming affair.

PICNIC

You are invited to a picnic sponsored by the Charlottesville Activities Group on June 16, 1973, at 11 AM at Mint Springs Park. For further details see special announcement on bulletin boards.

WEBBS GREENHOUSE

Plants still available:
Tomato and Flowers
Phone - 456-4250

CHARACTER

When wealth is lost, nothing is lost;
When health is lost, something is lost;
When character is lost, all is lost!

--Anonymous

Human improvement is from within outward.

--Froude

FLORA - A DISCOVERY

Shep Sutton

While ramp digging on Cheat Mountain recently with a friend, we noticed a plant which he had never before seen, and I had never seen in West Virginia. It is such an unusual plant that perhaps OBSERVER readers might like to know something about it.

This plant is supposed to grow in the U.S. only in northern Maine. While living there in 1960, I was first introduced to it and its properties. Intrigued, I made an investigation into its history and origin. It came from northern China and its name in the Mandarin dialect is mi' non ga' yi'. Loosely translated it means "plant of many uses", although in Maine it is simply called the fiddlestick, perhaps because of its resemblance to the fiddle bow. It truly is a plant of many uses.

The mi' non ga' yi', or fiddlestick plant, was first cultivated in the middle eighteenth century at China's Imperial Gardens during the reign of the Empress Tzu Hsu. Her reason for having it cultivated was that it would be a "boon to the peasants".

One of the major uses of the fiddlestick was for tea, made from its leaves. From all accounts, it is a most delicious tea. Because of its resiliency when seasoned, the stem made a superior bow for the bow and arrow. The root makes an excellent and nutritious food, the taste resembling that of our kohlrabi. The petals of the bloom are thick and when fried taste like pork. The Chinese used them for their "pork and fried rice". The bark, having a scent somewhat like that of a new car smell, was used in China to make perfume. Sugar can be made from the juice of the blossom. The twigs, when dried and powdered, were thought to be an aphrodisiac.

As far as can be determined, the fiddlestick was brought in to Maine in the 1860's by Chinese coolies working on the Bangor, Brewer and Aroostock Railroad.

A search was made of all available information on West Virginia plant life. There is no mention whatsoever of the fiddlestick in the publications.

We are unable at this time to furnish a photograph of this remarkable plant but the accompanying rough sketch will give an idea of its appearance.



The mi' non ga' yi', or Fiddlestick plant

GREEN BANK BOWLING

Don Hovatter

The bowling season is over and again both Green Bank teams had 100% attendance, which is no small feat considering that Cheat Mountain has to be crossed. To the writer's knowledge, neither team has missed a night in three straight years.

The record for the year is as follows:

<u>Team</u>	<u>Won</u>	<u>Lost</u>
Green Bank #1	58	86
Green Bank #2	82	62

It looks like the No. 2 team - Green Bank #1 - will have to try harder to beat the No. 1 team - Green Bank #2. (Try to figure that one out!)

Repose is a good thing, but boredom is its brother.

ENCOUNTER WITH A COMPUTER AT BERKELEY

Mel Wright*

There is always some difficulty dealing with a new system and I didn't expect that I would be exempt from this in my first essay with the computer at Berkeley.

I had written a small program with which I would try my luck on this first attempt. At the keypunch room in the Astronomy Department I found some cards and typed up my program. Now, the computer at Berkeley is in the basement of another building, about five minutes away. I took the lift down and walked across to the computer building. The morning sun was warm, the wind fresh, and the life of the university flowed by dressed in as wide a variety of costumes as one would expect to find in five well chosen continents. The computer is down in a basement - a grim place full of corridors and unhappy faces. After negotiating my way around six corners and at least fifty people, I found the input desk and submitted my job to the Beast.

Well, I didn't really expect it to work first time, but when I went back after lunch, I had only one mistake and a very simple one-- the job card was wrong. So I had only one card to repunch.

Now in the basement with the computer there is also a keypunch room. There is no mistaking this. It sounds like a machine gun nest in full swing. For each keypunch there were perhaps five people waiting. So I stood in line for the one-card-keypunch (here you are allowed to punch only one card). After a few minutes I was at the head of the queue, but-- no cards. Everybody brings their own. Cards are not supplied I learned, but could be bought at the "output" desk. I went there and inquired---I needed a number. So I walked back to the Astronomy Department and after several inquiries obtained the relevant number. Whilst back in the Astronomy Department I went to the keypunch room there, expecting to find some cards as before. But, it appeared that I had just been lucky before. So, I went back to the computer, the waning sun smiling weakly on my naive keenness to have another go. At the output desk I purchased a box of cards, tucked it under my arm and stood in line again at the one-card-keypunch. After dutifully waiting I got to the head of the line. Just as I was about to punch out my job card again, the guy

behind me said, "Well, actually you need a special card for the job card."

Reluctantly I left the line and went away, and found myself a job card. Here I was lucky again. I found a pile of job cards. One even hadn't got any punches it in already. So I got back in line; eventually managed to punch my job card. Now I submitted my perfect job. Not a single error; the right card on top; everything right....It didn't work. The reason it didn't work? -- Well it turned out that that box of cards I'd bought just spent the last money in the account number that I was using on the computer. So...no money... no job.

*Mel Wright is now at Berkeley.

OUR ENGLISH EXCHANGE STUDENT

Dorsalene Henderson

The English-American Student Exchange program at Pocahontas County High School is an excellent learning program and a very rewarding experience. Troy, Brigetta, Ronald and I were chosen as a host family. Our student was Susan Brown from Bromley, Kent, England.

Susan was in our home for three very short weeks. We all enjoyed her radiant personality and her ability to become our older daughter almost immediately.

She spent two days at Green Bank Elementary School using Early Education as her home base. Mr. Charles Young, Green Bank Elementary Principal, did a great job programming her time as a resource person in many classes. Susan commented that "The children were very interested, full of questions and showed much enthusiasm."

Easter weekend we made a very quick trip to Charleston, South Carolina. Here we toured most of the historical points of that city and visited Mr. and Mrs. Estil Henderson (Troy's brother and sister-in-law). Here again Susan came through, the star she is; she adapted to and enjoyed that family immediately.

I only hope that all families and exchange students enjoyed the visit here as much as we did.

1973 SUMMER STUDENTS

<u>Name</u>		<u>Affiliation</u>		<u>Advisor</u>
Jon E. Alquist	U	U. Northern Iowa	GB	Fisher
Tom Bania	G	U. Virginia	CV	Burton
Paul Barker	G	U. Colorado	CV	Baker
Thomas Chester	G	Kansas U.	CV	Turner
Carol Day	U	Indiana	CV	Sanders
Edward Delp	U	Cincinnati	GB	Parrish
Rosemary Kennett	G	Churchill (England)	CV	Balick
Charles King	U	Harvard	CV	Peterson
Teddy Leonard	U	North Carolina State	CV	Electronics
Roger Malina	G	U. Calif., Berkeley	CV	Backer
David R. Mosley	G	U. Arizona	CV	Sramek
Robert Pariseau	U	Princeton	CV	Roberts
Steven A. Hawley	U	U. Kansas	GB	Fomalont
Judith Rubin	U	Radcliffe	CV	Shostak
Jesus Gonzalez	G	Observatoire de Paris	CV	Brown

August 1972- COMPARISON SHOPPING - June 1973

Everyone is talking about high food prices. On this sheet is a list of products and their average prices in Charleston, W. Va. How do these prices compare with prices where you shop? If you use this sheet to compare prices, how about sending The Observer a copy? (An extra sheet has been provided for this purpose on the last page). If we get enough returns, we will publish an article in the next issue.

PRODUCT	Average Cost in Charleston, W. Va.	NAME OF STORES AND PRICES		
Peanut Butter - Jif 12 oz.	.50			
Mayonnaise - Kraft 16 oz.	.45			
Mustard - French's 12 oz.	.33			
Vinegar - Heinz 32 oz.	.41			
Milk - 2 half gallons				
Vitamin D	1.17			
Margarine				
Blue Bonnet 1 lb.	.38			
Cheese - American 12 oz.	.73			
Eggs - 1 dozen - Grade A Large	.51			
Spaghetti - Mueller's 48 oz.	.72			
Kellogg Corn Flakes 18 oz.	.37			
Tang - 18 oz.	.87			
Round Steak - Top per lb.	1.64			
Chicken legs per lb.	.77			
Pork Chops				
Center Rib per lb.	1.40			
Dishwashing Liquid				
Ivory 22 oz.	.56			
Tide Powder - 49 oz.	.86			
Oranges - each	.09			
Bananas per lb.	.17			
Lettuce per head	.28			
Potatoes per lb.	.12			
Instant Coffee - Maxim 8 oz.	2.04			
Ketchup - Heinz 26 oz.	.48			
Tomato Sauce - Hunt's 15 oz.	.25			
Cooking Oil - Crisco 24 oz.	.57			
Flour 5 lb. Robin Hood	.61			
Sugar 5 lb. - Domino	.70			
Bread	.27			
Bread - 1 lb. 4 oz.	.33			
Coca Cola - 128 oz.	1.10			
Bologna - 3/4 lb.	.87			
Ground Beef - per lb.	.81			
Steak - T-bone - per lb.	1.84			
Wieners 1 lb. all meat	.68			
Bacon - 1 lb.	.75			

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