



The

ROSE BYTER

Apple Blossom Computer Club
A registered Apple/Macintosh User Group

May '09
still only
\$2.00

Next Meeting

May 21, 7 PM
American Legion Hall
406 SE Oak Ave

Agenda

1. Meeting starts at 7 P.M.
2. Intro's of members and guests
3. Old business
4. New biz
5. Program: Perhaps a video about where the world is heading.
6. Questions & (maybe)Answers

KeyCue

by **Jim McClellan**
<mcclellan@charter.net>

I hope you folks are not like me in that sometimes I read about a new/improved little program that will enhance my use of a computer, so I just have to have it. There are too many problems with this to go into now, but one is that I sometimes forget what I installed.

Then later I do something on my computer and something unexpected happens. Fortunately, not often something bad. This month, I would like to let you know about **KeyCue**.

Basically what I found was that by just holding the command key down for a few seconds all sorts of keyboard shortcuts that were accessible at that point were available for my use.



iFoughto

by **Walt Pawley** <walt@wump.org>

I recently got to play with iPhoto 9 on a MacBook Pro, though "play" is not quite the right word for what was involved.

I should preface this with the statement that I'm not an iPhoto user. There are several reasons for this. First, I'm not fond of Apple's approach to marketing software in which they provide early versions for no additional price with the operating system *du jour*, segueing to a suite of extra cost add-ons once people get used to having them readily available. In the past, this technique was a sure-fire way to kill all the enthusiasm that arose around some of Apple's once very popular programs. I wonder whether that will remain true in a mar-

ketplace more "consumer" oriented than ever before. But I digress.

Another reason I don't use iPhoto is that it provides too much help for me: it tries to "manage" my pictures while hiding the fact that they're files, it tries to "manage" my camera(s), it tries to email for me, update my web site, re-book my facebook, etc. Another reason is that as one's "Library" grows, iPhoto tends to get overloaded, slowing to a crawl so that user's get into trouble by "over clicking" as an effort get something to happen ... which simply queues up all kinds of things for iPhoto to do which makes it appear to "lock up." I can manage my files, cameras, etc. without iPhoto.

The **Apple Blossom Computer Club** (ABCC) is an Apple Computer Inc., registered Macintosh and Apple][family user group. The ABCC publishes *The RoseByter* newsletter monthly which is posted to each paid up member and reciprocating user groups. ABCC participates in user group newsletter content exchange. The ABCC also maintains a WWW site at:

<http://www.abccmug.org>

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←-1 iFoughto

But this is not about why I don't like all-in-one-wonder software. The problem I had to solve was getting iPhoto to do what it was supposed to do. When first contacted via telephone, this seemed to me an easy enough task to look into, though I knew it might well be a lost cause. At least, we could tell easily enough ... or, so I thought.

I had some experience with iPhoto's peculiar means of storing data. While the logic to it has always seemed rather unfathomable to me, at least the images were stored in files in a folder tree. I could deal with that. So the MacBook Pro was brought into my presence for a look-see. What I didn't see was an iPhoto Library folder. Instead, I saw an iPhoto Library package. For the most part, folders and packages are really pretty much the same thing. However, the Mac OS does not treat them the same. Unlike folders, packages appear to most user level things as single files. There are several advantages to this new arrangement. Perhaps the biggest one is that mere mortal Mac users can't muck with contents of the package directly. I'm not certain, but I believe this change to package format occurred with iLife 7 but I'm not certain because I don't use any iLife or iWork stuff myself.

So why was I seeing a large fraction of about 7,000 thumbnails with no corresponding actual file? It was as though a digital shotgun had blown away all kinds of stuff. I must confess that I have no idea how or why this occurred. What was now important was trying to find the missing files. I attempted to do this using the data available on the internal hard disk. I did find quite a few, but very far from all of them.

So, I asked about whether there were any back-ups. In fact, there was. When the switch from Tiger to Leopard was done, a "Time Capsule" was purchased so Time Machine could take

care of keeping things backed up. [Free advice: **DO NOT** buy a Time Capsule if you simply need **2** to keep one computer backed up. Why? First of all, a Time Capsule is a combination network-accessible-ONLY hard drive and a wire/wireless router. I suppose it can make sense in a home with a few computers. But for one computer, get a firewire/USB external drive (unless you have a MacBook with no firewire). This advice comes from decades of experience both ignoring and applying the KISS Principle.] One problem with the Time Capsule is that it appears in a number of ways on the computer and it makes a difference which one you pick to work with. My initial attempt to copy the 150GB of data, so I could work with the user's data on my computers without risking the user's files, got to the 66GB point and then decided the user didn't have enough privileges to copy one of their own files, whereupon it stopped ignominiously, having wasted the better part of a day to do it (Dear Apple: this behavior is extremely stupid – how about giving us the choice to continue with what we do have privileges for?). So, I reluctantly tried copying via a different representation of the back volume. The next day, it managed to complete without apparent incident.

Now I had the files to work with in my "hard hat area." I'd like to be able to say that you can just click here, drag to there and sit back and watch it get fixed. Who knows? There may even be some magic program you can buy to do this stuff but that's not my typical approach. I first needed to get a list of all the files in the iPhoto Library. This seemed difficult at first but I found that if I selected all the thumbnails in iPhoto, hit Cmd-C, clicked over the TextEdit, converted the TextEdit window to Plain Text, and hit Cmd-V, I got a very long list with the same number of lines as iPhoto reported were items in its library. These lines seemed to be paths to the files in question.

To test that theory, I first found **3 -->**



i still Don't

<-iFoughto

one of the files that double-clicked from thumbnail to exclamation point. Then I located the file name in the list of paths to see if it was there. Yes, it was. Now I had to see if a file by that name actually existed anywhere. There were two. So, I copied one of them where the path in the list indicated it should be. At that point, I clicked over to iPhoto and double-clicked the thumbnail again. This time the full sized image appeared.

The theory seemed sound, so I boiled a pot of witch's bits into a shell script to do pretty much what I'd just done for one file, for all the files that were missing at the path in the path list copied out of iPhoto. I've clearly not manually tested that everything was recovered. I suspect that there are still a few items that are not right but inspecting 7000 items by hand is not something I care to do.

As is typical of computer activities, this took something like a week of 24/7-ish computer time and something like 40 working hours of human

<-1 KeyCue

At first, I ignored them, because I was more intent on doing something I thought was really important. It turned out that in some cases there was a shortcut that would ultimately help me accomplish something to speed up a task. Oh yeah, you need to hold the command key down until you are all through looking at what appears on the screen.

This is graphic (-->) shows a sample of holding the command key down while in.

More can be found at: <http://www.macility.com/products/keycue/>.



Backing Up Is Hard To Do 3



Every once in a great while I write a ditty about the fact that backing up your data may be even harder than breaking up.

Don't get me wrong; it's not that some procedure or other that you put in place must be difficult to do. That is not the issue. Rather it's more to do with whatever procedure you put in place, the one certainty is that it's inadequate.

If that's true, why bother to back up at all? Why indeed. We may soon arrive at an era of computing in which backing up one's data will be impractical at best. The curious thing is that this will be because we have too much of it.

Until then, it makes good sense to back up whatever data you care not to

involvement. The actual run of the script to fill the holes in the iPhoto Library took less than 20 minutes.



lose. And therein lays the real rub. It can be excruciatingly difficult to feel comfortable with your back up procedures.

First, you have to test them. This can bring on severe anxiety. It means wiping out your working repository (or at least replacing it with new equipment – safer) and using the backed up data to continue operations. If you can't do that, your backup procedure is a waste of time, effort and money.

Second, before even trying to settle on a backup procedure, it's very important to decide what sort of failures you're willing to tolerate. If the answer is, "None!" ... well, good luck with that. There is no such thing as perfect backup system. By the same token, don't assume that because you're doing "what the guy said" that everything is OK. It probably isn't.



Years ago, we used to call this type of program "freeware" or "shareware". Now we pay a relatively modest fee to use the program. The license I have

on KeyCue entitles me to free updates and upgrades until 09-2009.

Check KeyCue out and let us know with some comments in the next TRB.

KeyCue showing Mail shortcuts



Water Blogged Wump

Any trace of organization in these paragraphs is entirely coincidental

4



Future Muncies ;-)

As anyone who has been in my presence for very long knows, I'm a very messy person who piles about me all manner of flotsam that floats my way, vowing to deal with it later. Later most often comes and goes, and goes, and ... But every once in a great while, a bit of piled flotsam will squirt out of its pile into the open, grasping my attention once again. That happened a few minutes ago when a folded up page from a magazine worked its way out of the pile of crud on the table where I normally keep this laptop I'm typing on when I'm not typing on it. In 2007 a note about an electronic cancer therapy that was showing promise appeared in an engineering rag. Unlike most of the gizmos "discovered" over the time of manufactured magnets that can fix anything that's wrong with you ... according to the guy who's selling it ... this is a development by real scientists working at a real university. In other words, it's not just flimflam. I'd ripped it out of the magazine, folded it up, stuffed it into a shirt pocket, intending to stop by my oncologist and let him have it. It's even possible that I managed to leave a copy at his office – doctor's offices almost always are in a good position to copy things since they do it all the time – their offices are anything but paperless. **The basic technique is called electroporation,** which refers to the ability of an electric pulse of 2,500 V for a period of 100 microseconds being able to open pores in the walls of just about any cell and has been known since the early 1960's. Electroporation has been

used to make cells more susceptible to cancer fighting chemicals and other things. But this technique revolves around some sort of differential electrocution effect that kill the cancer cells and not normal cells. Frankly, that part sounds a bit fishy to me but it's not without some potential. Cancer cells are frequently overloaded with certain antigens in their cell walls, so there may well be a "tuning" mechanism possible. Another key part of the technique is that they use tomography to monitor the behavior of the tumor and move the pulses amongst electrodes according to how it changes. One thought that occurs to me is that this sort of thing would be great for near surface cancers but not so useful against things that are difficult to get at, like brain tumors. But I have to wonder if it might not be feasible to use inductive methods involving several antennae to produce a localized field in deep tissue. Of course, it'd be an alternating current condition, which might not do the job.

A car commercial asks that burning question, "What if your car didn't come from a factory but from the world you drive?" As it turns out, that's precisely where we get all our vehicles ... except for our 1978 Ford pickup which I'm led to believe my wife bought brand new. Even when they're new, you don't typically pick them up in Detroit and drive home. But that may not be what the commercial is alluding to. Perhaps they're under the illusion that cars "in the wild" mate, producing offspring and thus evolve to be fitter than their parents. **Perhaps we need a series on The Discovery Channel about the mating habits of automobiles.** Certainly a soap opera would be a winner: we classless society Americans sure don't think of cars as not being classless. Of course, there would be room for the seamy side: farm machinery and cars, sports cars and 18-wheelers,

etc.

Last month I wrote about IPv6, the new method for machines communicating over the Internet to address each other, and the fact that ISPs seem to be in denial that it's a necessity. Several years ago, I set my routing computer up to handle IPv6 and signed up for tunnel service. Basically, what this means is that I've been able to use IPv6 to work with my machines by using a computer out there somewhere that bridges my IPv4 address to IPv6. When I signed up for this tunnel, I was assigned an /48 address space for my equipment. That means that I had the upper 48 bits of my network's addresses fixed but the other 80 bits were essentially free for me to assign amongst my equipment – something like a trillion trillion addresses to draw on. Needless to say, I'm not likely to need that but who was I to argue. So I went on my merry way, mostly ignoring IPv6. One day, about six months ago, I noticed that there didn't seem to be any attempts by my systems to use IPv6. I didn't immediately connect this to the notion that my tunnel had failed to connect but eventually paid some attention to what was going on – or, rather, what was not going on. It seems that long before I noticed, the tunnel had been failing to connect and was very quiet about the whole thing. So, I tried to figure out why it was failing ... without much success. I then sought to find out what the tunnel broker had to say on the matter. Again, not much. **Indeed, I tried a few times to inquire of their technical support. The result of my endeavors was completely nil.** So I did some Googling and found some forum chatter about IPv6 tunnel brokers changing some things. In particular, the tunnel setup software I was using was no longer something being distributed, though why was also a mystery. I decided to see if I could get the latest one to work. Ha! There are versions that compile under

<--Water Blogged Wump

Tiger and Leopard. I happen to run my gateway on Jaguar and have no intention of “fixing” that problem (well, I might change from a Mac OS X base to Linux or FreeBSD, even on the Mac, but I’d rather not). I didn’t give up ... exactly, but I did put off messing with the problem after a spate of modifications to my configuration file were tried. They were based on what I’d seen on the forums and by using the triply verbose output of the tunnel daemon. None of it worked, so I was stuck with trying to figure out how to get the software intended for newer systems to compile on my old crap – something I’d done before for other things and found the process to be most annoying. Naturally, I put it off. Today, just for kicks, I did some more Googling about my problem and hit on an article that claimed to be able to get /64 address space. I looked at my edited configuration file and didn’t see that I’d tried 64 - several other numbers, yes, but not 64. Be darned if that didn’t do it. Everything is back to normal ... except for my local DNS which uses a different base address. I’ll have to fix that. I’m somewhat puzzled by this whole sequence of events. I would have expected that before they made the change in the size of my address space, they’d have notified me or, at the very least, the tunnel client would have complained about it specifically. I suspect the tunnel brokerage is run by teenagers.

Oh, oh! Now we’re in trouble. It seems that **scientists are concerned about the fine particles given off by laser printers having deleterious effects on the environment.** Initially they believed that these particles were toner that wasn’t being successfully filtered from escaping. But chemical analysis detected volatile stuff like paraffins and silicon oils, not toner particles. Subsequent research pointed to the fuser unit: a heater that “fuses” the toner onto the paper, it’s generally a roller made out of a power resistor and gets as hot as 220 °C – well

over the boiling temperature of water. While I really like the idea that we’re paying some attention to how using laser printers affect the environment, I have to wonder if we aren’t worried about real non-problems here. For example, the materials being found are only side issue materials in the printing process; mostly lubricants used on the mechanism, not actually intended to be consumed by the printing. They aren’t present in large quantity in the first place. Perhaps I’m simply unaware of the number of laser printers in the world. But even so, I suspect other aspects of their existence are far more problematic for us: things like smelting the metals that go into them and outgassing of all sorts of nasty volatile chemicals during plastics manufacture and molding. These are bulk processes that one can literally see the plumes of crud coming from.

Just recently some “I’m a PC ... and I’m a Mac” ads have made a big deal about Windows being easy to use while a bunch of legal copy is flashed on the screen. I suppose the point of all of that was that Micro\$hapht would need gobs of disclaimers to get away with making such a claim. **But what struck me is that Apple is apparently also belittling the use of legalese.** Very peculiar behavior for a corporation as litigious as Apple. Years ago, some time after the notion of including a users manual in the box with the computer has become de classe, I unsealed the box on a new Apple computer and was surprised to see a good sized, thick book. I assumed they must have decided to include a user’s manual with the machine. But you know what they say about the word “assume.” The book was not a user’s manual. Instead, it was a raft of license B.S. printed in what seemed like every language known to man, past and present, in print small enough to qualify as “fine” throughout the whole, heavy thing.

No doubt you’ve heard about the “energy drink” known as “5 Hour Energy.” It supposedly contains zero

sugar and four calories but nonetheless provides you with five hours of “extra energy.”

Admittedly, I’m somewhat simple minded but that makes no sense to me whatever. As I understand things, the motive power of muscles is the result of metabolizing the stuff of “calories” which is nominally various sugars and starches we get from food. The overall process is far more complex than that, but I believe that’s its essential nature. **So, where does the energy in “5 Hour Energy” come from?** There’s only one place I can think of – you. I think we refer to this sort of chemical as a drug. If the energy is coming from your body, you don’t really need to take anything to enable that – it’s a normal function. What might not be normal is not feeling like that’s what’s happening. Sounds a bit like amphetamines to me.

One of my favorite commentaries recently carried the title: Are scientists and technologists really going to be heard? The question is asked relative to the change in the country’s administration and the fact that the previous administration paid almost no heed whatever to reality in its decision making. Personally, I think they did “hear” scientists and technologists during the Bushista years. It’s just that **scientists and technologists are little different than any other group of citizens** – you can find just about any opinion you care to espouse upheld by some of their opinions. One might think, as I did at one time long ago, that the rationale required for being what I’d call a “good” scientist would demand of scientists that they use such thinking throughout their lives. As my experience grew (ie. I got older, stumbling over things new to me), I found that many humans have little trouble maintaining mental dichotomies. In fact, even amongst the most rational of humans, care must be taken to drive such thoughts out. At times I wonder whether it’s something we can live without. Put another way; perhaps some schizophrenia is neces-

5

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<--Water Blogged Wump

sary for brains to function – something akin to symmetry breaking in quantum mechanics. So, to answer the question posed above, I'd say, "Of course they will." It's just a matter of picking and choosing the scientists and technologists who support what ever position is being pushed.

There's this little exercise I do once in a while: I poke about on the web looking for generic PC hardware that might perform like a high end Mac Pro tower. Mind you, I'm not looking for fully constructed, ready to run systems. A fast, capacious motherboard – the base of computers these days – is all I'm really seeking. In the last few months, quite a few motherboards have appeared that would seem to fill the bill. Not in every detail, of course.

Motherboards in the PC world pride themselves on niggling little details of differentiation. Indeed, it's not uncommon to buy one with a set of features advertised that aren't the same as the ones that are really there. When you seek to address this issue with the supply chain at any level, the results are almost always identical: they thank you for your interest and are sorry you're having trouble; end of story. This sort of thing is becoming "normal." Worse, we're accepting the behavior largely, I suspect, because we can't get our hands on the throats of the perpetrators. But I digress, as usual. These high end motherboards have prices of about \$350 at the low end to well over \$1,000 at the high end. You can cram some of them with 8GB DIMMS to the tune of 144GB. I think that's an interesting number. It was not all that long ago that such capacity was considered a good size for a hard drive. That, and it's only 1/6 of a terabyte. The spread between RAM (main memory) capacity and external storage (hard disk drive) is narrowing, so it seems likely that anyone seriously using such memory capacity would also have a multi-drive RAID (Redundant Array of Independent Disks) system as their primary

data storage. I believe more than ever that the bandwidth limitation of transferring data between RAM and disk will force major architectural changes in computers. Curiously, it may well be the corporations with major RAM manufacturing capability that are in the best position to take advantage of that change.

In the event that you take heed of even some part of what the media presents, you have my sympathy. I'm even sympathetic to my own plight. I might be one of the most skeptical persons currently living without being simplistically contrary. It is, to some extent, an innate characteristic of mine. However, it's a cop-out to excuse my behavior entirely on genetics – I've managed to learn to be exceptionally skeptical because I've studied mathematics and, far more importantly, worked at the detail level of both hardware and software of computers most of my life. What this high degree of skepticism does for me is make my teeth grate while listening to the talking heads confidently telling us what's going on and what needs to happen. For example, one of the things I keep hearing is "**...when the economy gets back to moving again...**," as though we need to rush back to doing the very idiotic things that got us in economic trouble in the first place. The only reason I can see for doing that is to maintain the soaking of the population at large by the minority who see nothing wrong with taking \$100,000,000 bonuses for ruining the businesses at which they're employed. A couple of days ago, CNN had an interview with Homeland Security Secretary Janet Napolitano in which she pointed out that during flu season, it's normal for about 35,000 deaths to result. Less this number surprise you, it's about 1% of annual death rate. But less than five minutes after the interview, the commentator said, in essence, that DHS was expecting swine flu to kill a lot of people. So much for truth in news casting. This current virus is not the classical swine flu. Be that as it may,

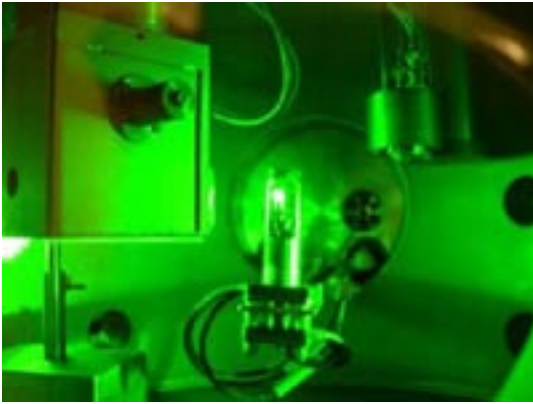
the media pundits refuse to change. After all, saying, "each five en one" is a whole four syllables as opposed to "swine" which is only one. I wonder why it hasn't been translated to Murkin as something like "swlu," but on second thought, that's probably too hard for a typical Murkin to say, even though it's only one syllable. Maybe a two syllable Murkinism would work: mexflu.

I want to write a little about "our health care system." What does this have to do with computers? I suppose that depends on one's perspective. The first thing that strikes me is that if we have a "system" for health care, it's an osmotically evolved hodge-podge ... not that such things can't work well. It just happens our hodge-podge doesn't seem to meet with a lot of our expectations. This is not a unique or unusual situation. But here's the part that relates to computers – it has to do with the nature of problem solving: **having a sound definition of a problem is a major step toward a solution.** This, of course, is precisely the sort of thing politicians abhor. Lately I've been hearing that we must reform our health care system. The news opinionators, politicians, pundits, patients, insurance companies; they all seem to think this is good idea. They all agree it's going to be expensive. Big deal. Health care is already expensive and showing no sign of becoming less expensive any time soon. Somehow I just can't see that propping up the hodge-podge with stacks of greenbacks is going to result in something I'd refer to as "reform." Of course, if you're on the receiving end of those stacks of greenbacks, the reform of the health care non-system is a good thing. Perhaps what we really need to do before chucking all our money into the pot is define what the health care system actually is before we try fixing it.

As long as I'm at it, there's one more societally infrastructural "system" that's being drowned in taxpayers' money. It's our "financial system" or our "economic system." I par-

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Super-dense material outweighs Sun's core

A material that is a hundred thousand times heavier than water and more dense than the core of the Sun is being produced and studied by scientists in atmospheric science at the Department of Chemistry, the University of Gothenburg.

The scientists working with this material are aiming for an energy process that is both more sustainable and less damaging to the environment than the nuclear power used today.

The photograph shows an experiment in which dense deuterium is irradiated by a laser. The white glow in the container in the centre of the photograph is from deuterium. Photo: Leif Holmlid.

Towards commercial use

So far, only microscopic amounts of the new material have been produced. New measurements that have been published in two scientific journals, however, have shown that the distance between atoms in the material is

much smaller than in normal matter. Leif Holmlid, Professor in the Department of Chemistry, believes that this is an important step on the road to commercial use of the material. The material is produced from heavy hydrogen, also known as deuterium, and is therefore known as "ultra-dense deuterium". It is believed that ultra-dense deuterium plays a role in the formation of stars, and that it is probably present in giant planets such as Jupiter.

An efficient fuel

8 -->

<--Water Blogged Wump

ticularly like the latter reference, but in either case, we bandy such terms around like they make sense. Listen to the pundits. They all have the answers and fingers to point at who is doing the "wrong" things. From my perspective, it seems the one thing that's certain about what's going on is that the rich are getting richer and the poor ... well, you get the point. I have no doubt that we'll not get any real resolution of the difficulties in our economy. After all, the population at large has been largely responsible for becoming victims in the "crisis." We've bought into "the game" (I just heard it referred to by that phrase by a principle architect of whatever is being done to "fix" things). Our media is replete with people parroting the notion that we need to "get the economy back on track," which I take to mean that they expect that we need to be doing all the stuff that got us into trouble in the first place. Just in case it's not painfully obvious to you by now, the primary problem we have with our "economy"

7 is that most of it has been about placing bets on things. Once upon a time, those bets were

placed on real things: people making directly useful products. But when the real things fail, the creative financial types had little trouble coming up with all manner of "products" which are created out of thin air (OK, so maybe a bit of ink and paper or some well kept magnetic fields) which they proceeded to trade like a juggler keeping a baker's dozen eggs in the air. Or is it more like Three Card Monte in which the right card is never the one you pick? In any case, you lose.

As I more than likely misunderstand the news I've been seeing and hearing, General Motors has ash-canned the Pontiac brand. My initial reaction upon acquiring that data was that it was a shame that they'd no longer be road racing. They were doing pretty well and showing signs of continuing to improve. Some time later it occurred to me that Jimmy Kimmel's late night program is associated with "The Pontiac Garage," which may or may not have anything to do with the automobile marquee, as far as I know. But I just heard an introduction message on Kimmel's show and it claimed to be sponsored by Pontiac. This seems a curious situation. I sup-

pose advertising the brand after the company has sunk might help clear inventory.

I just heard a phrase that struck me as somewhat peculiar: beauty editors are raving. The peculiar part is not about the raving. Anyone can rave. **Even blind, deaf, mute quadriplegics can rave ... though we might not notice ... which would be one of the things they might well rave about.** What struck me as odd is that there are people who edit beauty. I've been trying to imagine how that works. The only thing I've been able to come up with is that a beauty editor is someone who changes how things look. Say a house painter, or a clear cut logger, or a gardener; perhaps a woman at her makeup mirror. I suppose even the people whom the advertisement were going on about are beauty editors in the sense that their editing of printed material has the effect of creating attitudes about what makes a woman beautiful, ie. they "edit" society's notion of feminine beauty. Our herd mentality does the rest.



← Super-dense material outweighs Sun's core



So what can this super-heavy material be used for?

“One important justification for our research is that ultra-dense deuterium may be a very efficient fuel in laser driven nuclear fusion. It is possible to achieve nuclear fusion between deuterium nuclei using high-power lasers, releasing vast amounts of energy,” says Leif Holmlid. The laser technology has long been tested on frozen deuterium, known as “deuterium ice”, but results have been poor. It has proved to be very difficult to compress the deuterium ice sufficiently for it to

attain the high temperature required to ignite the fusion.

Energy source of the future

Ultra-dense deuterium is a million times more dense than frozen deuterium, making it relatively easy to create a nuclear fusion reaction using high-power pulses of laser light.

“If we can produce large quantities of ultra-dense deuterium, the fusion process may become the energy source of the future. And it may become available much earlier than we have thought possible”, says Leif Holmlid. “Further, we believe that we can

design the deuterium fusion such that it produces only helium and hydrogen as its products, both of which are completely non-hazardous.

It will not be necessary to deal with the highly radioactive tritium that is planned for use in other types of future fusion reactors, and this means that laser-driven nuclear fusion as we envisage it will be both more sustainable and less damaging to the environment than other methods that are being developed.”

Deuterium—brief facts

Deuterium is an isotope of hydrogen that is found in large quantities in water, more than one atom per ten thousand hydrogen atoms has a deuterium nucleus. The isotope is denoted “2H” or “D”, and is normally known as “heavy hydrogen”. Deuterium is used in a number of conventional nuclear reactors in the form of heavy water (D2O), and it will probably also be used as fuel in fusion reactors in the future.

OREGON KOI & WATERGARDEN SOCIETY
a nonprofit organization

9TH ANNUAL KOI SHOW
JUNE 13TH - 14TH

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