The PULP

HUGE this month:

General Meeting: April 19th

Pat Teevan &

iPad2 Giveaway*

See you there!

East Hartford Public Library
Main St. & Central Ave., East Hartford, CT.

Q&A Session: 7:00PM–7:30PM
Meeting starts at: 7:30PM

Contents:

Member of Association of Personal Computer User Groups APCUG

UGC

Apple User Group

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MEETING LOCATIONS
East Hartford Public Library
Main & Central Avenue
in the Lion's Room
(downstairs)

Editors Corner

I want to thank Pat for volunteering to run the April meeting, I have other obligations that night.

ATT is informing its internet users that it will be restricting user bandwidth to 150 GB/month for DSL and 250 GB/month for U-verse. There will be an additional charge if you exceed that usage. They will be sending notices as you approach that limit.

At the latest 'Pwn2Own' contest, Chrome was the only browser to survive. Apple has since released a patch.

Think your car CD player is safe? Guess again. A group of researchers have developed a a way of implanting a trojan into an audio file that when played on the car's stereo system will infect the computer system. The virus would allow someone with a nearby cell phone the ability to control functions of the car via Bluetooth including opening doors and turning the car on and off. Not practical since every car system is different.

World IPv6 day is June 8th, 2011. If you want to test your stuff before that:

http://test-ipv6.com/.

Engineers at the University of Illinois have developed a form of ultra-low-power non-volatile memory could someday provide consumers with hand-held devices that go without recharging for weeks or even months.

On the lighter side, ever wonder what a movie looks like as a barcode? To find out:

http://moviebarcode.tumblr.com/

Stuart Rabinowitz
Editor-in-Chief

Here is the appropriate copyright citation and a link to the full text. articles from "Tidbits"

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Please note that the clubs PO Box has been closed. When membership renewals go out in the fall the return address will be that of our Membership person Richard Sztaba.

A Little Computer Quiz

by Stuart Rabinowitz

The trivia and minutiae of the computer related world. The answers will appear next month or you can submit an answer sheet at the General Meeting. Good Luck.

1 As you all know this is tax month and many of you will be filing electronically, but do you know when E-filing of taxes began?

2 When Unisys was formed in 1986 it became the 2nd largest computer company in the world. What companies merged to form it?

3 What were the original names for those companies?

4 The IETF (Internet Engineering Task Force) created many of the underlying standards that make the Internet work, including fundamental routing, e-mail, directory services and telephony protocols. When did it get started?

5 In 1994 IETF approved as a standard IMAP (Internet Message Access Protocol) which enables e-mail clients to access remote mail servers without having to download the message (think Google Mail). When and by whom was the standard developed?

Bonus: What computer shipped in 1986 with 1 MB of RAM (expandable to 4 MB), 800kb floppy and a SCSI port? BTW, How much did it cost?

Answers to March, 2011 Quiz

1 What was the first gaming console to offer ROM cartridges (it was introduced in 1976)?
A The Fairchild Channel F is a game console released by Fairchild Semiconductor in August 1976 at the retail price of $169.95. The F8 processor at the heart of the console was able to produce enough AI to allow for player vs. computer matches, a first in console history.

2 Who was the designer?
A It was designed by Jerry Lawson using the Fairchild F8 CPU, the first public use of the processor.

3 In 1985 Apple introduced the LaserWriter, do you remember the print resolution, speed, & price?
A 300 dpi, 8 ppm, & $6,995

4 In 1985 a geography learning game was released, do you remember the name?
A "Where in the World is Carmen Sandiego?"

5 How about the name of the company that released it?
A Broderbund Software

Microsoft vs. OpenOffice.org -- Office Suite Standoff
Nancy DeMarte, Sarasota PC User Group

An office suite is a software product that includes a group of programs which perform typical office functions; that is, creating and working with documents, spreadsheets, presentations, and databases. Some suites include specialized programs like email or calendars. There are many office suites available, such as Corel's WordPerfect Office, Lotus Symphony Suite by IBM, and ThinkFree3. Among the best known suites are Microsoft Office and OpenOffice.org.

My original intention this month was just to compare features and compatibility between Microsoft Office and OpenOffice.org. I installed OpenOffice.org on my computer and have been testing it against my familiar MS Office for several months. In researching the history of the two suites, however, I stumbled across a story that I felt needed to be part of this article. Let's start with that.

History

Microsoft introduced its Office suite in 1992 with Office 3.0. It included Word, Excel, PowerPoint, and Mail (later to become Outlook). Since that time, the suite has expanded to MS Office 2007, which comes in eight versions that include from 3 to 13 programs and runs on both Windows and Mac platforms. MS Office 2010, its newest suite, has reduced the versions to three, including 4 - 7 programs. Because it is a commercial product with a profit goal, MS Office is expensive, although non-profits can get substantial discounts through websites like TechSoup, and businesses can get deals on volume licensing. Office 2007 and 2010 are full-featured suites with frequent updates and great customer support and security.

OpenOffice.org has a different kind of history. The origins of OpenOffice.org (OOo) began in Germany in the mid-1980's with a suite called Star Office, created by the Star Division Company. It ran on several platforms, including Windows 98 and NT, Solaris, Java!, and Linux. In 1998, Star Office version 5.0 was offered free to users. The next year Sun Microsystems purchased Star Division, mainly to get free software for its thousands of employees and to compete with Microsoft.

In 2000 Sun first offered the source code for Star Office 5.2 free over the Internet. In October, the new OpenOffice.org website went online both as a free downloadable office suite product and a collaborative project. Anyone could participate in improving the suite by submitting ideas or code. OpenOffice.org immediately became popular; the open philosophy was embraced by software developers around the world. By 2005, the free suite had reached 20 million downloads and over 150,000 registered members. It was a David and Goliath situation: big corporation versus the little guys.

All this time Sun had also continued to market its commercial office suite, Star Office, for a nominal cost to businesses, but free to educators. In January 2010, the large company Oracle bought Sun Microsystems and acquired the OpenOffice.org brand. Before that year was over, Oracle had stopped making Star Office free to educators and had introduced a new commercial product, Oracle Open Office (standard version for $49.95 for 5 users or and enterprise version for $90.00 for 25 users). Oracle is planning to offer its own office suite soon, an online product called Cloud Office, using Java FX and open document format, but not based on OOo code. It will be competing against the new rash of "cloud" office suites, such as Google Docs and Microsoft's Web Docs on SkyDrive.

As 2010 ends, the OpenOffice.org website remains intact; the suite is still a free download. But some Sun developers and many OpenOffice.org contributors are unhappy about changes that Oracle has made and worried that the company will soon remove "free" and "collaborative" from the OpenOffice.org vocabulary. Late in 2010 a new organization, this group formed the Document Foundation (TDF), to keep the open philosophy alive. They are working on a new office suite, LibreOffice, which is now offered for free download in beta. Its final version, based on the OOo code, is scheduled to come out in early 2011 with sponsorship from Novell, Red Hat, and IBM. How all of this drama will impact OpenOffice.org as a product is unclear. But the little guys are again making a stand against another Goliath.

Feature Comparison

MS Office clearly beats OpenOffice.org in features and formatting options, especially those introduced with Office 2007, such as themes, Quick Parts, picture styles, Word Art, macros, and content controls. Office 2007 offers encryption, more templates and an extensive Help system. It also has the new ribbon interface, whereas OpenOffice.org uses menus like MS Office 2003.

OpenOffice.org includes the common programs found in an office suite plus some interesting features such as font effects, backgrounds, and sounds. It is a solid office suite, especially for home and small business. Its advantages over Microsoft Office are cost (It is free with an unlimited number of installations.), its ability to work with Linux and many other operating systems besides Windows, and its open philosophy. OOo runs a bit slower than MS Office, but takes up less disc space. Because it is a collaborative, it issues fewer updates and has fewer support options, but it also is less frequently attacked by malware. Even if you have never used an office suite, you can download this efficient little suite at www.OpenOffice.org and use it without much instruction.

Compatibility

As a Microsoft Office user, I was interested in how easy it would be to save files between the two suites since I have hundreds of Word documents and Excel spreadsheets. When I created a feature-filled Word 2007 document (.docx) and saved it as an OpenOffice.org file (.odt), it did save, but there were changes in margins and line spacing, and I lost all the Word 2007 features. When I created a document in OpenOffice.org (.odt), it would not save as a Word 2007 document (docx). I had to save it as a Word 2003 document (.doc), and then open it with Word 2007 in compatibility mode.

I concluded that it's best to choose one office suite and stick with it. In short, if you are a current MS Office 2007 or 2010 user, you will probably be happier staying where you are. If you are new to office suites, by all means give OpenOffice.org a try.

Converting Slides to Digital Images

Written by Bruce Preston, president, West Mountain Systems, Inc., long-term board member of DACS and conducted the Random Access sessions at the General Meetings as well as chaired the Microsoft Access SIG.
www.dacs.org
bpreston (at) mags.net

Author's Note: This article best appreciated if read while listening to Paul Simon's Kodachrome.

By my estimate, over the last 40 or so years, I have taken about 6,000 slides. Topics include such things as family get-togethers, Formula 1 and Can-Am races at Watkins Glen, SCCA races at Lime Rock Park, bike tours in Vermont, the U.K, Western Europe, and steam locomotives in Colorado, Vermont, Pennsylvania and New Jersey. For all of these I much prefer the color fidelity and permanence of slides over prints.

Unfortunately, slides also require either setting up a projector and screen or using a hand-held viewer, and don't easily lend themselves to sharing. Years ago I had a Polaroid SprintScan 35 film scanner, but it required a SCSI adapter card and Polaroid went under without delivering drivers for Windows 2000 or XP. It was also somewhat slow taking about 2 minutes per scan. I will grant you that it delivered high quality images. My brother in law has scanned a few slides using a flatbed scanner with a light box cover, but the resolution was not great. It was acceptable for distributing by e-mail or posting on a web page, but not satisfactory for full screen viewing.

A few months ago I discovered Ion Audio's "Slides 2 PC" 35 mm Slide and Film Scanner. It is a nifty compact device that consists of housing containing a fixed-focus USB 2.0 camera, a white-balanced light source and a pair of carriers – one that can hold 3 mounted 35 mm slides, the other for 6-exposure 35 mm negative strips. System requirements are minimal – Windows XP or Vista, and a USB 2 port. *(If you only have USB 1.1 you will need to add a USB 2 card to your desktop or get a USB 2 PCMCIA card for your notebook. I tried it on my old notebook and the driver refused flatly stating that it needed USB 2.)*

Slides 2 PC comes bundled with ArcSoft's Photo Impressions 6, a consumer-friendly image capture/editing/cataloging program commonly bundled with digital scanners and cameras. The scanner appears as a TWAIN device, I happen to prefer the free (for personal use) IrfanView as I have used IrfanView for years. http://www.irfanview.com/ One thing I disliked about the ArcSoft package was its insistence upon loading an always resident module.

I don't know if the device will work with a Mac – next time Scott is around with his Mac we'll see if it recognizes it. Since it is a TWAIN device there is a good chance as long as your bring your own software.

Operation is simple; I'll describe the process when using IrfanView. Select the TWAIN source from the FILE menu, and then select ACQUIRE/BATCH. The first dialog box asks for a target folder, a root filename, the starting number and the number of digits. I created folder "\My Documents\My Pictures\VBT Tours\1972" as the folder, "VBT_" as the filename root, 1 as the starting number, and 3 as the number of digits. I clicked OK and the scanner loaded with a real-time preview. In this case of a blank white area since I hadn't loaded a slide. Note that since it is a video camera rather than a moving scanner mechanism there are essentially no moving parts within that can get out of calibration.
The carrier is hinged along the long side – open it, place 3 slides in the slide carrier or a film strip in the film carrier and close it. Slide the carrier into the scanner until you feel it click at the first positioning notch. In about a half second the image will appear, then reappear once the auto-exposure kicks in. Tap the top of the scanner and the image is captured to memory. A thumbnail appears above the preview image. Slide the carrier to the next notch and repeat the process. Reload and repeat until you have up to 12 thumbnails. Click on the first, shift-click on the last one to select them all, then click on the 'Transfer' button on the screen and they will be written to disk. Resultant JPEG images are 2592x1680, 24 bit color depth. They average about 2.5MB in size.

If you use Photo Impressions 6 as part of start up you get a configuration screen for the scanner where you may select image size, color depth, JPEG or TIFF, and specify whether you are scanning transparencies (slides), color or B/W negatives. IrfanView just uses the defaults of JPEG at 24 bit color depth.

As far as speed is concerned, on this lazy Sunday afternoon I scanned 60 slides in 33 minutes without rushing. This included taking the slides out of the Bell & Howell 'Slide Cube' and reloading them. I have yet to go into the JPEGs to rotate the images that need to be turned from landscape to portrait orientation – IrfanView can do that with a single key-press.

For those who like spec sheets:
Σ 5 mega-pixel scanner
Σ USB 2.0 interface
Σ f/6.0 four element glass lens
Σ Fixed focus, auto-exposure and color balance

cont. on pg 9

How Not to Buy a Digital Camera
- by Charles Maurer article link:
<http://db.tidbits.com/article/11362> 6 comments

Early this year, a peculiar confluence of events induced me to replace my cameras and lenses. Like any intelligent consumer, I studied camera-testing sites on the Web. Alas, those sites did not help me decide what to buy. I found myself unable to extract significant information from the reviews. In this article I am going to explain why I felt obliged to discount them, and how I chose what to buy.

Be It Resolved -- A digital camera is an image sensor built into a box with a lens and a computer. The sensor is the limiting factor, so camera reviewers concentrate heavily on sensors.

Most tests of image sensors look at resolution before anything else, yet for 50 years lens designers have been trying to convince photographers that to the human brain, minute details matter less than the clarity of those details that are easily seen. See, for example, this article (PDF) that Zeiss first published in 1964.

<http://www.contaxinfo.com/pdf_files/Zeiss-Resolving_power_and_contrast.pdf>

You can see this in the figure below. The picture on the left contains finer detail - it resolves lines about one-half as thick - but the picture on the right looks better, especially if you back away a bit from the screen. This truth holds even for enormous enlargements. Indeed, what you are looking at is the centre of a blow-up that would be 40 inches by 60 inches (1 meter by 1.5 meters) at the resolution of a 100-dpi display.

<http://www.tidbits.com/resources/2010-06/Canon_EOS_5D_Mark_II_vs_Foveon_unsharpened.jpg>

The picture on the left came from a conventional Bayer sensor. Bayer sensors require the image to be softened optically, to avoid coloured artifacts. Since a digital camera requires processing by a computer, it ought to be possible to sharpen the digital image to compensate for that blurring. I did this in the comparison below, as well as I could. The sensor on the right had no blurring filter, but any lens always blurs an image slightly, so I sharpened it a hair as well. As you can see, the picture on the left is greatly improved but if you back up to a normal viewing distance for a 40 inch by 60 inch picture hanging on the wall, the extra detail disappears and the picture on the right still looks a little crisper.

<http://www.tidbits.com/resources/2010-06/Canon_EOS_5D_Mark_II_vs_Foveon_sharpened.jpg>

Which of these images is preferable will depend on your taste but frankly, I think the differences between them aren't worth worrying about. One wins on the curves, the other wins on the straightaways. The picture on the left came from a full-frame professional DSLR with a professional lens. Its image sensor has 22 million cells. The picture on the right came from a DSLR with a smaller Foveon sensor with 4.7 million cells. These approximate the extremes of resolution available nowadays. A picture from any modern camera using a smaller Bayer sensor would probably show detail somewhere between the two and be softer than either.

(Note that to maintain the sharpness of these images I enlarged them not in Photoshop but with PhotoZoom Pro. For a discussion of PhotoZoom Pro, scroll toward the bottom of "Digital Ain't Film: Modern Photo Editing," 29 April 2010.)

<http://db.tidbits.com/article/11240>

The Olden Days -- Before the days of digital image processing, the quality of a lens used to limit the quality of an image, so photographers worried a lot about optics. Usually reviewers test lenses by plotting a piece of mathematical esoterica called a "modulation transfer function" or MTF. The MTF charts in a review show how clearly a lens images details of various size, photographed from a flat test chart. These charts ignore depth. MTF charts are a fundamental tool of lens designers, but lens designers do not use simple two-dimensional MTF charts, they plot MTFs in three dimensions. Also, when lenses bend light they can also modify its phase, so lens designers examine MTF tests in conjunction with a similar chart of a phase transfer function. If this sounds like gibberish, think of it this way. Using a two-dimensional MTF to compare lenses is like deciding on a path through mountains by distance alone, ignoring steepness and whether a route traverses peaks or valleys.

I recently saw how misleading a simple MTF test can be. I just replaced a wide-angle zoom lens with a newer and costlier model. After I bought the new lens, I happened upon a comparison of MTF tests showing it to be less sharp than the older one. The centre was comparable but the corners were worse. Much worse. Now, the corner of a lens can never be so sharp as the centre, even in a theoretically perfect lens, because light travels farther to the corners than to the centre, so that the blurry disc representing a point of light becomes larger and pear-shaped in the corners. With this new lens, however, the discrepancy seemed extreme, and I saw this myself when I photographed a flat wall. However, when I photographed the whole room, the corners were as sharp as I would expect for a lens of its angle of view. Apparently this lens does not project a flat field, it projects a curved field, so that across the image, objects at slightly different depths are in best focus. The lens is sharp enough, it just has a curved field of focus. I confirmed this by photographing the wall again, this time changing the focus slightly. This curvature of field stands out on a simple lens test but is not noticeable in normal use.

Moreover, digital images require processing by a computer, which permits the cleanup of optical aberrations. It is easy to remove most chromatic aberration, and Photoshop also allows a kind of optical sharpening with its Smart Sharpen command. After I correct the colour fringing and go to Smart Sharpen, I find that images from my new lens need 40 percent less sharpening than images from my old lens. Thus, my new

lens looks worse in a simple MTF test but actually takes sharper pictures.

The design of a lens is an intricate set of compromises. With my new lens, the designer decided to compromise flatness of field and reduce more perceptible problems instead. Flatness of field is essential for lenses used to copy documents but it matters little otherwise, since few other photos are taken of entirely flat surfaces. Thus, the poor showing of this lens in a simple MTF test does not show that the lens is bad, it shows that the manufacturer decided to make improvements that hurt the product in simplistic reviews.

Living Colour -- Colour tests are even more problematic than tests of lenses, because there is virtually nothing about colour that can be measured in the physical world. Colour is not a physical phenomenon, it is a perception formed by and within the brain. A colour is the response of the brain to various mixtures of wavelength at different intensities within a context, a context of other mixtures of wavelength at different intensities, and the further context of a history of what you have recently seen and what you have learned.

Look at the image below to see an example of this. The reds are identical physically but our perceptions of them are affected by the other colours nearby. This example is simplistic but it is not a trick. Effects of context on colour are ubiquitous. Every colour that we see is affected by its physical context.

<http://www.tidbits.com/resources/2010-06/colour-illusion.png>

A colour's historical context is just as important - i.e., the context of what you have learned to expect. Thus, you see brown bark and green leaves on the tree in front of you largely because you have come to expect bark to be brown and leaves to be green, yet if you take some bark and a leaf into a lab, you are likely to find them matching paint chips labelled red and yellow.

The idea of comparing colours for accuracy is appealing but nonsensical, especially when it comes to subtle colours like skin tones. In any picture the "best" skin tone will depend upon the other colours in the picture, plus the lighting and surroundings of the room you are seeing the picture in, and the appearance of your family and friends.

No camera on the market is capable of capturing accurate colours, because the notion of accurate colours is a chimera. Engineers devised a set of definitions and tests to form a common standard for manufacturing products, but these are largely arbitrary. They are useful, but they bear little relationship to how the brain sees colours.

On the other hand, every camera on the market is able to capture the full range of visible wavelengths, so every camera on the market can capture the information needed to produce pleasing colours. Colours are controlled by digital processing, and with products like the Asiva plug-ins it is possible and practical to convert any colour to any other, within the physical limits of your computer's display and printer's ink. (Again, see "Digital Ain't Film: Modern Photo Editing," 29 April 2010.) If your camera produces JPEGs, a computer in the camera will take a first pass at this and you may not always like the results, but you cannot possibly expect the camera's computer to balance colours blindly as well as you can balance them with a computer on your desk using your eyes. If you are fussy about colours, there is no point in worrying about the camera's capability to record them, you must expect to balance them yourself.

<http://db.tidbits.com/article/11240>

Dynamic Personalities -- As a practical matter, what limits photographic quality today is the dynamic range that an image sensor can record, the range of tones from light to dark. Nobody will notice picayune detail like the stitching of a hem, but people will be upset if a bride's gown washes out to shapeless white in the sun, or if the groom's suit disappears in a shadow.

To a first approximation, the dynamic range of sensors is proportional to the surface area of the light-sensitive cells. Among today's sensors, this varies 40-fold. Point-and-shoots have tiny sensors and, in consequence, minimal dynamic range.

Dynamic range is difficult to measure because noise differs qualitatively from one device to another. The most common objective test is to photograph an even tone, which ought to generate an even image, then measure how much the pixels vary. That variation is the noise. A certain proportion of noise is deemed to represent the weakest background that can be detected, and this defines a sensor's dynamic range. To see how problematic this can be, consider two car radios. One is staticky, the other has a clear signal but the bass booms badly, making announcers difficult to understand. If you measure the noise as deviations from a constant background, the staticky radio is noisier, yet the resonant boom of the second radio is as much noise as the static is, and unlike the static, the boom prevents you from hearing the news.

The only sensible way I know to compare the dynamic range of image sensors is to compare their images. Photograph a subject that runs from too bright to show detail to too dark to capture, then pull apart the detail in the highlights and shadows, to see what the sensor has recorded. I like to do this in my living room. I photograph a wall with a studio flash aimed in such a way that the exposure at the sensor ranges from too much on a light oil painting at one side to too little on a dark oil painting on the other. Next I convert the raw images to 16-bit TIFFs in Adobe Camera Raw, with all adjustments at zero save two: I set both Recover and Fill Light to 100. These expand the brightest highlights and darkest shadows about as much as they can be expanded. Finally, if the sensors being compared are different sizes, I resample the smaller image to the size of the larger. In addition, for the example I am going to show later in this article, I also lightened the dark pictures overall by boosting Photoshop's Exposure setting. I did this because the shadow detail in the upper image does not show up on the 6-bit LCD displays that many people use.

If the sensors being compared are different sizes... well, that brings up an interesting problem. It seems natural to compare ISO 100 of one sensor to ISO 100 of the other but for most photography, this is not appropriate. To see why, consider the diagram below. It shows an

imaginary camera that can use either of two sensors, with a lens (the circle in the middle) that can focus the image on either. It is obvious that the images on both sensors will be scaled perfectly. The larger sensor is twice the size of the smaller one in each dimension, so every line will be twice as broad. Where the lens blurs lines, the blur will also be twice as broad, and if the shutter speeds are the same, any blur from a moving subject or camera will be twice as broad as well. However, one factor will differ: the amount of light reaching each spot on the sensor. The larger sensor has four times the area, so the light hitting any one spot will have only one-fourth the intensity.

<http://www.tidbits.com/resources/2010-06/camera-diagram.png>

To compare these sensors we now have a choice. For the larger sensor we can enlarge the aperture of the lens by two stops to admit four times the light, or we can keep the shutter open four times as long to admit four times the light, or we can quadruple the sensor's sensitivity (i.e., increase its ISO speed by two stops). Enlarging the aperture is fine for taking pictures of a test chart but it changes the image optically so that less of a three-dimensional subject is in focus from front to back (i.e., it reduces depth of field). If we slow the shutter speed, the subject is more likely to move while the shutter is open and we are more likely to move the camera. Thus, to create an image of the world that is comparable optically, we need to increase the sensor's ISO speed.

In short, to compare the dynamic range of sensors for ordinary picture-taking, if the sensors are of different sizes, then it is appropriate to compare them at the ISO speeds that give comparable depth of field at similar shutter speeds. Of course, for pictures taken when conditions are optimal - when the camera is on a tripod and the subject is stationary - it is also appropriate to compare the best ISO speeds of each.

Comparing dynamic range as I do does not yield simple numbers, but unlike tests that do yield numbers, it is meaningful. For example, consider the two sensors I compared at the beginning of this article. They have just about the same difference in size as the sensors in my diagram. It happens that the best ISO speed on the smaller one is 100 and the best on the larger is 200, so let's compare these. The image from the smaller sensor is on top, the image from the larger one is on the bottom. The lower image is brighter but it is also noisier. If you look at the dark details that you can just distinguish from black in the upper picture, or from the noise of the lower picture - look at the splotches of grey in the black hair - they are just about the same, although the lower photo may show a hint more detail.

<http://www.tidbits.com/resources/2010-06/ISO100+200-darks-full-recovery+fill-lightened.jpg>

The light details in this next image are also almost the same, but in the light areas, the upper photo may show a hint more detail. In short, overall it's a wash. At their best ISO speeds, the dynamic range of these sensors is the same.

<http://www.tidbits.com/resources/2010-06/ISO-100+200-lights-full-recovery+fill.jpg>

(Incidentally, the larger of these sensors produces a 14-bit image, which is 2 bits more than the sensors in most DSLRs, including the smaller one here. This means that the voltages produced by the sensor are converted into digital numbers with greater precision. However the noise of the sensor is in its voltages, so the only effect those extra bits have on the noise is to digitize it more precisely.)

It turns out that the larger sensor's ISO 200 and ISO 400 are indistinguishable in dynamic range, so the smaller sensor's ISO 100 is also comparable to the larger's ISO 400. Neither sensor is quite so good when stopped down to ISO 200 or 800, respectively, but the difference is slight and once again they are roughly comparable. At ISO 400/1600 the larger one is better, and above that point the difference is so great that the sensors cease to play in the same ballpark. The larger one seems almost able to take usable pictures in the dark.

Ignoring the Obvious -- Although no conventional tests of image quality are meaningful, they still provide some information, and you might think that some information ought to be better than no information. Unfortunately, some information is not always better than no information. These conventional tests strike me as equivalent to blind men feeling parts of an elephant and describing it as like a wall, a tree, a snake, and a rope. If a reviewer measures something simple like the delay of a shutter, I am willing to believe it, but I see nothing credible about simple assessments of a phenomenon so complex as image quality. I am willing to delude myself about many things - my favourite delusion comes in the shower, when I am convinced that I can sing - but I see no reason to delude myself that my Blink-o-Flex camera is better than my friend's Wink-o-Flex because it gets better reviews.

Neither do I believe assessments of cameras' mechanical quality. I do not know any way to examine a camera and tell how well built it is or how long it will last. It used to be that to use a camera you wound a spring to cock the shutter, twisted a ring to focus, pressed a button that released the shutter, heard various parts whirr and click and bang, and then twisted a knob or cranked a lever to advance the film. You could feel and hear that some cameras were better than others. Also, to withstand the pressures of your paws, parts were machined from brass and aluminum, so weight was also a clue. However, nowadays miniature motors replace fingers, so the parts need little strength and must have minimal mass. This means that quality no longer comes from brass, it comes from being the right sort of plastic. A digital camera may need a metal case to dissipate heat from the electronics but any solid mass you feel is likely to be just a heat sink; it will not indicate mechanical quality.

Even play in lenses may not matter. It used to be that lenses were designed with the assumption that they would be manufactured perfectly, but today many engineers figure that it is more efficient to assume that

there will inevitably be slop in manufacturing, especially with complex lenses, so they often design optics that will tolerate some misalignment. (Most people don't appreciate how complex lenses have become. Professional lenses used to have 4 to 8 spherical elements that were ground from ordinary optical glasses, then cemented into 3 or 4 groups, which is what were mounted in the lens. Today, a lens sold in a modestly priced DSLR kit may contain 17 elements cemented into 13 groups, and 3 of the elements may be formed aspherically from an exotic material.)

I don't have any insider or specialist knowledge about makes and models of camera, so I scratched my head a lot last winter, deciding what to buy. I make big enlargements - my snapshot size is 11 inches by 17 inches (A3) - so I am after the best image quality I can get, yet I did not want a full-frame sensor, now matter how good it might be. That is because the ultimate limitation to image quality is failing to obtain an image in the first place because the camera is too heavy to bring along. Deciding not to lug the lens you need comes next. With my smaller Foveon-based cameras I am already beyond the limit of what I am able to haul on my back. I already need to leave at least one lens at home.

The next size down from full-frame is not standardized, but a number of sensors are similar enough to use the same lenses. I wanted one of those. Some of them do not have optical viewfinders and are temptingly light, but all of the lightweight models that have interchangeable lenses are based on Bayer sensors, and among sensors of this size, I prefer the devil I know to the devil I don't. I know from experience that the Foveon has an excellent dynamic range, and I prefer the nature of the Foveon's noises and artifacts to those of a Bayer sensor. The darkest Bayer tones are covered by coloured specks while the darkest Foveon tones lose their saturation. When we look at a natural scene with great dynamic range, usually we see little saturation in the deep shadows, so the Foveon's noise is more naturalistic.

Also, when the detail of a scene exceeds the sensor's resolution, the Foveon records hints and suggestions of detail that are slightly larger, while the Bayer records moiré patterns. Since the finest detail the eye can make out usually adds nothing to a scene but hints and suggestions, the Foveon's method of breaking up is more verisimilar. Finally, I dislike the blur that is intrinsic to a Bayer image. Although a Bayer image can be sharpened, sharpening tends to bring out artifacts, so I prefer to sharpen an image as little as possible.

I decided to buy Foveon-based cameras again but the architecture of the Bayer sensor offers one considerable advantage: it can be more sensitive to light. A Bayer sensor as sensitive as the one I tested above would be wonderful for taking candid pictures indoors, or to allow fast shutter speeds for sports and wildlife. If I photographed news or sports or a lot of wildlife, I would have been prepared to trade some image quality at low ISO speeds for better image quality at high ISO speeds. In this case I would have compared some cameras' dynamic range inside a camera shop. At each ISO speed I would have taken a dozen pictures of the same scene one f-stop apart, then I would have compared the underexposed and overexposed pictures on a computer.

Assessing Value -- Among today's cameras, dynamic range is far and away the most important factor limiting image quality. It is also the only optical factor that is practical to test yourself. However, a few features of a camera are also important. If you cannot see the image clearly in the viewfinder or LCD display, your pictures will be poorer. If your camera or lens does not stabilize the image optically, your pictures will be poorer. If the camera operates too slowly, you will miss pictures altogether.

You will also lose pictures if you do not have a lens with

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More information at http://www.ionaudio.com/slides2pc

Sources – I did a little web searching while wrapping up this article. The average eBay auction over the last 60 days closed at $85 including shipping. J&R has it for $79.99 plus shipping which I suspect will put it right about $85. If you like rolling the dice, from time to time a factory refurb shows up on eBay at about $65.

If you have many slides or negatives that you'd like to convert to digital, give this unit some thought. I'm very happy with it.

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April 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 *April Fools Day	2
3	4	5	6	7	8	9
10	11	12	13	14	15 1968 Data General Corp. founded	16
17	18	19 General Meeting	20	21	22	23
24 1984 Apple introduces IIC	25 1961 R Noyce patent for IC	26	27	28	29	30

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the appropriate focal length. In the days of film, sensible advice was to buy lenses with a fixed focal length rather than zoom lenses, and to buy fewer lenses rather than cheaper lenses, because you were stuck with optical imperfections. Nowadays I think the opposite is sensible. With a little time, most optical imperfections can be cleaned up. This makes cheap zoom lenses practical even for high quality work.

Of course, better lenses still make better images, which require less time to clean up, so it is still nice to have better lenses. Unfortunately, how to tell which lenses are better is a problem. The best you can "learn" from a manufacturer's propaganda is that their Super line is perfect for everybody, this Duper line is doubly good, and their Extreme line is ideal. Price lists are usually the only intelligible guide. However, I do not know any sensible way to compare lenses from different manufacturers, and the correlation of price to quality is anything but perfect. Costs of production decrease exponentially with the quantity produced, so lower-priced lenses may be dramatically cheaper for little difference in quality, and the highest-priced merchandise often sells not because it is better but because it more expensive. For example, as I write this you can buy a point-and-shoot made by and labelled as a Panasonic for $320, or you can buy the same Panasonic point-and-shoot labelled as a Leica for $700. Economists call such products Veblen goods, after the fellow who wrote a classic book on conspicuous consumption.

The only apparent indicator of value is the number of features a camera offers, but I don't think this is a sensible indicator either. To my mind, every camera on the market is embellished with useless features that get in the way. I have missed any number of pictures by getting lost in a maze of menus or misinterpreting some hieroglyph and pushing the wrong button. On my cameras I would like to eliminate every menu option dealing with image size, image quality, exposure mode, aspect ratio, rotation, sharpening, colour balance, white balance, slide-show presentations, sound, and video. I would especially like to be rid of a button on one camera that I often push accidentally, the button that moves the location of the auto-focus sensor away from the centre to some other part of the field, where I can figure out no reason for it to be. I never found any manual camera I ever owned to be so complicated to use and awkward to control as a digital camera, even my wife's point-and-shoot, because digital cameras all try to do work more sensibly done by a desktop computer. This is daft. I want a simple camera that will save images in a raw format without any processing, then let me process the pictures in a desktop computer that is easier to control.

If my view of the photographic market seems jaundiced, well, it is. However, I really cannot be jaundiced about the cameras that are available today, once you get beyond the gadgetry. I get better enlargements from my DSLRs than I used to get from 2.25" x 3.25" film.

Among snapshot cameras, one model will have a larger LCD display than another, or a longer zoom, or a smaller size, but to me all of them look similar under the hood. All of them have tiny sensors that trade off dynamic range for superfluous megapixels, and all have a long list of useless features printed on the box. From what I can see, their prices are determined not by quality but by the stage in the product's life cycle. To buy my wife's last point-and-shoot I just visited a couple of local shops and bought the model with the fewest megapixels that had image stabilization, an LCD display that was easy to see, and a zoom lens.

If you want to buy a camera that is better than a point-and-shoot but smaller than an DSLR, then you need a sensor with a greater dynamic range. You will not get this with the "prosumer" models that look like small DSLRs but do not provide interchangeable lenses. These have the same tiny sensors as snapshot cameras, so they take no better pictures. You need a model with a four-thirds or an APC-sized sensor. Nowadays sensors of this size can be had in bodies that are hardly larger than a point-and-shoot. (I myself have one by Sigma that uses a Foveon sensor, the DP2s. It can take pictures every bit as good as my Foveon-based SLRs but I can recommend it only for skilled photographers because it lacks a zoom lens, it lacks image stabilization, its LCD display is dim, and it has a remarkably awkward user interface.)

If you want to buy a DSLR, I think it's more sensible to look for cheaper models than costlier ones. With a DSLR the sensor and viewfinder matter, as does image stabilization, but not much else. Like other computerized gadgets, digital cameras are constantly improving in quality and coming down in price. If you find yourself bumping into a modest camera's limits, you will probably not be worse off selling it and buying something fancier tomorrow than you would have been buying something fancier today - and bumping into its limits is unlikely anyway.

And finally, do keep in mind that an inextricable part of any digital camera is a computer. Cameras come with built-in computers that work surprisingly well, but for top-notch pictures, no built-in computer can do enough. To get full value out of any digital camera, you need software that can optimize the digital image. Once you get beyond point-and-shoot cameras, better images do not come from better cameras, they come from better software and knowing how to use it, as I explained in "Digital Ain't Film: Modern Photo Editing" (29 April 2010).

<http://db.tidbits.com/article/11240>

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