WHEN it comes to the megapixels in digital cameras, consumers are inclined to embrace the age-old maxim: more is better. There may also be a little bit of "mine is bigger than yours" in the race for ever more megapixels.

True, last year the average digital camera had three, this year it's four to five, and in the future, who knows?

However, before you reject that fine-looking camera because it doesn't have the top consumer level of megapixels — now eight, as featured in Sony's F828 — there are a few things you ought to know.

The first is that pixels — the picture elements within an a digital camera's image sensor — come in different sizes, as do the sensors themselves.

Let's start with one pixel, before we look at the relative differences between five million and eight million of the little blighters, all squeezed on to a sensor.

"Think of a pixel as a bucket," says Canon's Stuart Poignand.

"Obviously a big bucket can hold more light than a little bucket, and the more pixels you're jamming into a given area, the smaller each one of those pixels is. So their light-gathering capacity is smaller."

We can also think of a pixel as a light-capturing photodiode. In combination with a filter patch (to create colours) or other microscopic electronics, it is then called a photosite.

Pixels by the million (megapixels) are created in arrays on sensors that form the heart of any digital camera.

However, different camera styles deploy not just different sizes, but different types of sensors.

With regard to sensor size, Poignand shares a formula digital camera buyers should heed: big sensor equals big pixels equals less image noise. And conversely: small sensors equals smaller pixels equals, in theory, more noise, and a higher requirement on lens performance. In her new paperback, Advanced Digital Photography, local author Margaret Brown puts it this way: "Larger sensors allow larger photosites to be used, and larger photosites can gather more light than smaller ones, leading to an increase in the sensor's effective sensitivity without the inevitable noise associated with an increase in gain in the system."

Not only do sensor arrays come in different sizes in different cameras, there are types of sensors, as well.

Most compact digital cameras use CCDs (charge-coupled devices), while digital SLR cameras tend to use CMOS (complementary metal-oxide semiconductor) chips.

"A CMOS chip is a much simpler unit to produce, manufactured in much the same way as regular silicon wafer," Poignand says.

"A CCD is very complex, using multi-voltage and a bucket-relay system for moving data from it.

"At its heart, a CCD is more analogue than CMOS. CMOS attaches digital-analogue converters to each pixel, rather than on the edge of the sensor.

"That's why it's only used in larger format cameras, because the little processing circuits attached to each pixel take up a bit of space — which is the one thing those smaller sensors just do not have."

If all that's too technical, Poignand has a far simpler expression: "Pixels schmixels."

"Pixel count is one very important part of making a good image, but it's also the size of the pixels, how much light they will collect, the image processing and, of course, the quality of the lens."
In the race for megapixels, it's apparently the lens system that has to work hardest to keep up, especially in cameras with small sensor arrays, and large pixel counts. "In cameras like the Canon PowerShot PRO1 and the Sony F828 that have such small sensors with eight million pixels on them, the lens has to perform like there is no tomorrow," Poignand says.

"Right now, lens manufacturers are working very, very hard to keep up with the pace of the increase in the number of pixels. It's almost like in motor racing — some years they blow up engines, other years their tyres wear out. Everything has to rise in balance.

"So companies with the best lens technology and the best ability to process the data that comes off the sensor are really the only ones that can produce decent pictures out of eight megapixel cameras.

"Despite the fact that eight megapixels sound like the answer to everyone's dream, there aren't too many people who can make it work."

Image processing is another area buyers need to be aware of.

Different companies have different names for their image processing.

"Canon was the first to give its processing a name — we call it digic, short for digital integrated circuit," Poignand says.

"This means one chip controls all the main camera functions.

"It makes the camera nice and quick — so you get good shutter response times, you get accurate exposure and accurate white balance, and it also controls image processing."

To summarise, a good digital camera must have a good working balance of three elements: the lens system; the processing and the sensor. Those three things have to rise in harmony to be effective.

While there is no theoretical limit to how many pixels you can get on a sensor, there are issues about how small a pixel gets before it won't receive any light at all.

"You never say never, though" Poignand says. "Every new generation that comes along, we tend to hop up one bracket in megapixels — so that trend will continue.

"The important thing is that consumers have begun to value pixel counts more than they should. That's the real issue, and it's driving a large part of the growth in pixels.

"The bottom line is that two megapixels, certainly three megapixels, is all most people need if what they do is print 15cm by 10cm pictures.

"Larger numbers of pixels allow cropping of the image without losing too much resolution."

Pansonic's Adam Roberts says: "At the semi-pro end, there is a true need for high-megapixel cameras. For the general consumer, who may never print more than 15cm by 10cm or A4, they really should examine why they want the camera, and what the main uses are going to be.'