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Stereo Perception with a Single Eye

By Charles Douglas Wehner

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Despite one or two amateur attempts at creating a separate image for each eye, it was the 1838 lecture to the Royal Society in London by Sir Charles Wheatstone that truly took the world by storm.

I have reprinted this work, complete with the original images, at <http://www.wehner.org/3d/first/> .

What the reader will discover is the astonishing detail with which Professor Wheatstone – as he then was – approaches every nuance of the minutiae of visual perception.

With almost every aspect of the phenomenon of stereopsis accurately defined, the Victorians could rush ahead – particularly after the arrival of photography – with the production of images that convey depth.

That the human mind does not just play the eyes over the object to measure the depth, but can appreciate geometrical form "at a glance" was proven by a simple and ingenious experiment by Wheatstone.

However, an aspect that has been largely overlooked is the importance of SHORT-TERM MEMORY for further enhancement of the stereoscopic impression.

There is at the core of the brain a sensory area known as the "Limbic System" that gathers impressions from all the input data and merges them into an overall "feeling".

Thus, the sound, the smell, the visual appearance, the mechanical feel and other facets of an object are all combined in the limbic system for its overall cognition. The result might be called a NOUN.

Similarly, when one decides to walk one does not consciously activate every muscle in its correct sequence. Instead, one builds up a REPERTOIRE of movements – a LEG DRIVER in computer parlance – and the learned reflex of walking need only be triggered. This reflex "software" resides in the cerebellum.

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Gnosisceptors (sensory nerves) feed back the feeling of walking to the limbic system. Thus, when our minds decide to walk, when our eyes see the movement and our balancing mechanism records the motion, and the gnosisceptors in the legs confirm the leg action, we "feel" the walking in our limbic system. Our walking is a VERB.

So the verbs and nouns of our perception are created in the brain.

It is an inevitable consequence of evolution that those animals that need precise close-up stereopsis have eyes that point forwards. Think of the preying animals, lions and tigers.

Those animals that need a wider field of view – such as birds – have eyes on the sides of the head.

Think of herd animals like horses and antelope.

A pigeon, to land, needs stereopsis in a triangular region in front and below. The cheeks of the pigeon are hollow to allow the optical axis of each eye to "sneak" past the beak, allowing a small area of overlap for precision landing.

Otherwise, the pigeon has eyes that give a panoramic view with little overlap.

This leads to obvious danger. What happens when the pigeon is on the ground? Is it vulnerable to attack by cats?

No. It JERKS ITS HEAD!

From one position it takes a "SNAPSHOT" of the scene. Then it moves its head to a position that is removed by a distance remarkably similar to the interocular separation of the human eyes.

From the new position, it takes a new "SNAPSHOT". It "knows" which image is the front one, and which is the back because its brain not only commanded the movement but also received gnosisceptor confirmation.

So it needs only REMEMBER the first image for a split-second, long enough to combine it with the second image for a "Wheatsone glimpse", and it has perceived the stereoscopic depth of its environment.

Does this only apply to pigeons?

Apparently not. When a human closes one eye, the limbic system will no longer have two images for stereoscopic evaluation of the environment. It will become dependent upon the "TEMPORAL" data in the one-eye image. That is, upon how the perspective changes over TIME.

I have made some tools for stereoscopists available at <http://www.wehner.org/3d/> or <http://www.wehner.org/ools> .

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Of interest in this context is the LEN.COM lenticular stereogram maker. This creates an image of interleaved stripes for use with lenticular plastic.

However, suppose we make the stripes HORIZONTAL instead of vertical. Suppose also, that we make a mask in the GIF process where each odd row of pixels is black and each even row transparent. As the mask slides over the striped image, the left-eye and right-eye images will be seen alternately.

Using Internet Explorer, the trick works quite well. So you can see Professor Wheatstone rocking back and forth if you slide the scroll-bar whilst viewing the introductory page at <http://www.wehner.org/3d/>.

Look closely, and it becomes quite obvious that the tuft of hair to the left of his head is moving forward and backward in space.

You can see the effect EVEN WITH ONE EYE CLOSED.

Remarkable!

Charles Douglas Wehner

Charles Wehner is an electronics engineer and technical author born in 1944. He was involved with radar, nucleonics and measurement-and-control systems – and was for many years a member of the Stereoscopic Society in London, England.

How To Connect Your iPod To Your Home Entertainment System?

By Beverly Kane

Music fans everywhere are tuning in to iPods. To get going with an iPod is not difficult. After you purchase one you can download off the computer, your favorite tunes, right onto the iPod. The flexibility of song choices and its small compact size make the iPod great for those seeking portability. Just like the Walkman's of old iPods can be used for exercising, walking, waiting in lines, simply clip it on and plug in your headphones or ear buds and go.

Now that you have taken all the time to search, find, and sort your own personal top 100 or so tunes wouldn't it be nice if you could use your iPod to play them on your supersonic, surround sound home stereo system? Or, if you are planning on throwing a party and have prepared a special song mix for it, you can simply download those tunes to your iPod and play them on your home system. Using some cables and a dock you could be on your way to enjoying your iPod tune selections at home as well.

Using the headphone jack on your iPod you can connect it to your home stereo. Visit a local electronics stores such a Radio Shack, and purchase a 3.5 mm RCA adapter cable. This is the same size as a standard headphone jack. Now you can connect your iPod to the amplifier's sound input. When you try this for the first time you should make sure your iPod's volume is set below its half way point. You will be using the stereo's control to adjust the volume. You don't want to blow your stereo's

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amplifier speakers by having your iPod volume cranked. If you need to you can always adjust your iPod volume after you have determined that it is necessary.

Curious about universal docking? The universal dock works with multiple electronics devices, just like a universal remote. You can use a universal dock to connect your iPod to your computer. A cable should have come with your iPod when you purchased it for this purpose. When you put your iPod in this you are able to sync and charge it. When you plug your dock into an electrical outlet with your iPod Power Adapter you can also charge the battery. You can also dock your iPod to your stereo or speakers using an iPod AV cable or an audio cable from the stereo and now play music using your iPod. If you want to get really fancy you can control your iPod from a distance using an Apple remote control.

If your iPod has video capabilities or a color display you can connect it to your TV and view photos or watch videos. You can do this by using the iPod's AV cable or a S-video cable.

You can also connect your iPod to your car's stereo system using the auxiliary input on your car's stereo. Take a 3.5 mm cable with stereo connectors on each end and plug it into the auxiliary input. If your car's system lacks an input jack you can use a cassette adapter.

So, while an iPod with its ability to store your personal favorite tunes, may simply seem like an improvement on the old Walkman it has many more functions that you only need a few cables to utilize.

Beverly Kane is a staff writer at

and is an occasional contributor to

several other websites, including

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Menopause, Andropause And Other Hormone Imbalances
Impair Healthy Healing In People Over The Age Of 30!