Orbs: A Load of Balls!

At last definitive evidence that orbs are not paranormal

Steven Parsons

Orbs! ….. At last some definitive evidence that they are not paranormal

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Para.Science

Recent developments in digital camera technology has finally permitted an experiment to be undertaken that demonstrates conclusively that airborne material located close to the camera & reflecting the camera flash is responsible for creating Orbs.

The evolution of digital imaging which began in the late 1990's resulted in a revolution within paranormal research. Investigators began to report a phenomena previously virtually unseen on images taken using conventional film based cameras. By common consent this seemingly paranormal phenomenon was christened the 'Orb'. Orbs are generally bright circular anomalies within an image, although other shapes such as angular & elongated forms are also found. They may appear as single or multiple anomalies & may also vary both in colour & intensity.

To date, tens of thousands of orb pictures have been offered forward by amateur paranormal investigators & lay members of the public as evidence & proof of something truly paranormal being captured by the camera. The orb debate has blighted paranormal research for (too) many years now with both the believers & the non believers each putting their respective arguments &presenting their evidence.
Proffered explanations as to what orbs actually represent vary widely; e.g. many investigators believe they are evidence of, & for, ghost & spirit manifestations. Others consider orbs to be the energetic emissions of angelic & otherworldly beings. The internet is filled with pictures containing orbs presented by paranormal investigators as evidence of some type of ghostly manifestation. Newspapers & magazines regularly publish pictures of orbs, repeating the claims for paranormality occasionally adding a celebrity endorsement just for good measure as in the case of TV star Noel Edmonds. In September 2008, he claimed that his deceased parents "Are melon sized orbs" which he described as being "Little bundles of positive energy" & went on to state that "Conventional photography can't pick them up but digital cameras can."
[*http://www.dailymail.co.uk/tvshowbiz/article-1055732/My-dead-parents-melon-sized-orbs-New-Age-Noel-Edmonds-bizarre-air-rant.html*]. There have also been a number of books written describing the supernatural nature of orbs &how by interacting with orbs one, can gain spiritual enlightenment i.e. 'Ascension Through Orbs' [*Diana Cooper &Kathy Crosswell, Findhorn Press*].

Many paranormal investigators now prefer to try & steer a middle ground through the orb problem – accepting that dust, flying insects, water vapour &other airborne particles are the likely cause of most orbs they find on their digital pictures & acknowledging the likelihood that the majority of orbs can be explained. All too often, they then go on to state that there remains a number of orbs - a figure of around 1% or 2% is usually favoured; that cannot be explained & so must therefore be paranormal. This small percentage is usually to be found on pictures they have taken! I also wonder how they achieve their statistical probability.

Para.Science has observed & recorded orbs over the past 14 years and have extensively studied the phenomenon in order to try to understand exactly what it is that they represent. Are they the ghostly forms of the dead revealed with the help of modern technology or are they something much more mundane but nonetheless intriguing. Our discoveries are revealed here & we hope that as a result of our own and others careful research and good experimentation it is now possible to solve the riddle & mystique that surround this frequently observed anomaly.

In The Beginning....

First a little history [plus some techie talk too!]. Although developed earlier the first commercial digital cameras started to appear in large numbers during the second half of the 1990's. They were expensive and of poor quality compared to their modern counterparts or even the cheapest 35mm compact 'point and shoot' cameras of that time. Around the same time, digital imaging technology allowed the production of smaller, lighter & cheaper video cameras & soon these too began to hit the high street stores in large numbers, with a feature straight out of Operation Desert Storm - night vision or Nightshot® as Sony preferred to call it. This gave camcorders & one or two still cameras the ability to see & record pictures in complete darkness. The reason for both these technical breakthroughs was the same, the imaging chip that they both used - the Charge Coupled Device or CCD.

The CCD was developed originally for use in Astronomical telescopes and spy satellites and uses the principle of many individual light sensitive photodiodes built into a silicon matrix, each photodiode or pixel producing an electrical charge when it is exposed to light.
Small & relatively simple to manufacture the CCD allowed the production of affordable consumer devices to be mass produced. Another form of silicon chip imaging device - the CMOS (Complementary Metal Oxide Semiconductor) chip is also used for the same purposes. Although the CMOS chip uses a slightly different approach to image production, for the purposes of this discussion will be treated the same as the CCD.

To all intents & purposes a digital still camera is in reality nothing more than a video camera that captures single images to its memory instead of a continuous stream of information to a tape, hard drive or memory card. Although the imaging chips were capable of producing excellent quality video pictures their use in still cameras was greatly restricted at first by the small amount of image information that the early devices were capable of registering simply because of their small size, typically around a 1/3rd of an inch across.
For a good quality TV picture the picture resolution does not need to be much above 240 lines of horizontal resolution to produce a perfectly watchable picture - this is the resolution of standard VHS videotape. In a still image this level of detail would produce a fuzzy & poorly resolved image that most people would reject as unsuitable, comparative to a computer webcam today. The resolution could only be improved by making imaging chips with more pixels and that meant an either an increase in the physical size of the chip itself with a corresponding increase in production costs or developments to the chip design. However, as with all consumer electronics, technological developments quickly allowed small high resolution image chips to become affordable for all and today we have still cameras with between 5 and 36 million pixels in a silicon matrix often smaller than the size of a postage stamp. Professional digital cameras currently have up to 36 million pixels. That may sound a lot and it certainly offers fantastic picture quality but to put it into perspective such hi resolution just about matches what is capable with the much older 35mm film technology.

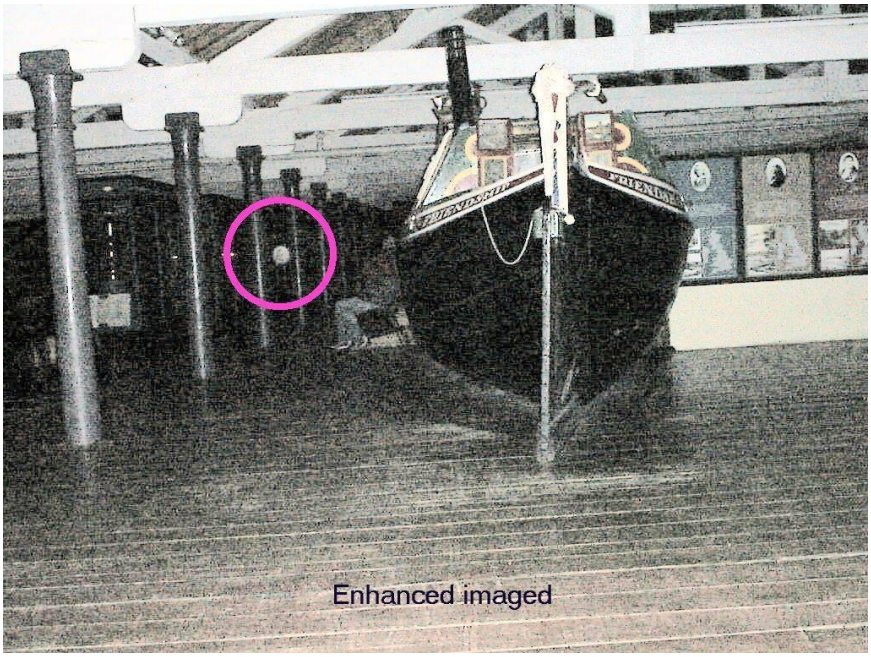
Digital photography & video also had some other problems that needed to be resolved before commercial digital photography and video became a viable proposition. One of these was the way the imaging chips respond to light. They were for example much more sensitive to Infra-Red [IR] light & this could result in strange colour casts on the photographs, nobody would be happy if Auntie Nellie had purple hair - unless of course Auntie was an ageing Punk Rocker. Special electronic & optical filtering was required to remove this colour abnormality but one day to the eternal joy of the paranormal investigator Sony launched a range of domestic video & still cameras that allowed this IR filtering to be turned off by the user, allowing the camera to see in apparent total darkness (additional IR lighting is needed, but this is invisible to the human eye). The CCD can also be made to perform in very low levels of ambient light using electronic amplification circuits & although the resultant images were grainy, the simple addition of a pair of IR LED's

(Light Emitting Diodes) below the lens meant that recently generations of innocent badgers could now be spied upon without them ever knowing! Shortly after the first Nightshot Camcorders hit the shops in the late 1990's the headlines of the Daily Blurb were filled with horror stories of these new camcorders ability to 'see through' clothing - a neat trick that only required a cheap filter over the camera's lens. But before anyone rushes out to buy one, it must be pointed out that all camcorders made since 1996 have lost this ability & also the cost of the filters has shot through the roof! Besides, that particular feature was never that good anyway.... Paranormal Investigators also realised that at last they too could capture moving images in the dark - which is of course where ghosts perform at their best! Early night vision camcorders cost more than £1,000, recent models now start at less than £300 and other manufacturers have either licensed the technology from Sony or found their own ways to allow their camcorders to also see in the dark. Some of these other methods are more effective than others & today Sony still has the best consumer night vision facility of all the various manufacturers. Indeed, this ability is good enough to ensure it used by many TV programme makers. It is worth adding at this point that since 2010, Sony have removed the nightshot® facility from almost every camcorder model except one or two costing well over £1,000 so it is now only possible for poor Ghosthunters to equip themselves with cheaper night vision models by hunting down used examples on eBay.

The digital still camera has also taken off with sales now vastly outstripping conventional film. Virtually all are small & straightforward to use. With a few exceptions they are more closely related to the earlier 35mm point and shoot compact camera in their range of functions and capabilities. These new digital cameras allow just about everyone to take a picture & with a home PC produce a decent set of holiday snaps instantly - in fact nowadays you don't even need a PC, printing direct from the camera is available on every high street. With its inbuilt flash & complex software taking care of everything, all you have to worry about these days is to keep from cutting off Auntie Nellie's head at the risk of losing her fashionable Purple Rinse!

The Early Orbs

Para.Science were probably not the first to discover the orb anomaly that was about to burst upon an unsuspecting paranormal world, but as early adopters of digital cameras & night vision video we had come across them before they became the latest craze.
During 1998, as part of a long-term investigation at Ellesmere Port's Boat Museum, we took a series of pictures using an 800,000 pixel digital camera that stored the pictures onto a removable floppy disc. The pictures were taken in the dark using flash & later, when viewing the images we noticed something unexpected & not seen before. A number of circular light anomalies could be seen.
In a sequence of three pictures taken over 10 seconds one of these light anomalies appeared to have travelled an estimated distance of more than 20ft - to say we were impressed would be about right!
During the course of that night and previously, more than 200 digital stills had been taken at the same location, but only a handful showed these balls of light.



One of the earliest Lightball images captured in 1998

The pictures were enhanced & examined using software developed & written for us, the software permitted us to undertake some basic but meaningful image analysis. The results showed that the light anomalies were not the result of any camera or imaging faults The pictures and a full description of the events were sent to Sony UK for their comments & they confirmed that the camera was not at fault - these 'Lightballs' as we christened them, could not be easily explained. A few weeks later, at a different location in an old school we came across a similar phenomenon - close to where many witnesses had reported a ghostly figure. A number of digital pictures were once again taken. Again, we discovered 'Lightballs' on some of the digital pictures - this time we were using our newly acquired Fujifilm 1 million pixel [mega pixel] camera. This time too, we also had a night vision camcorder positioned to observe the same area. Playing back the videotape revealed a moving ball of light that quickly moved into the frame. The 'Lightball' appeared to stop, then change direction rapidly before exiting the bottom of the frame.

Still taken from night vision video showing a Lightball anomaly rapidly moving out of the frame

These separate items of equipment had apparently recorded the same event & at around the same time. After careful scrutiny we felt we had compelling evidence for something very unusual taking place & beyond all our attempts at a reasonable explanation at that time.
We placed the pictures & video stills online whilst we continued to try and devise some experiments to understand what we were seeing. A group in the USA using nearly identical equipment contacted us, they also had pictures of these 'Lightballs' but no video footage at that time. It seemed a good idea for both groups to work together on trying to discover more about this phenomenon. They also found that sometimes high EMF levels were present coincident with the Lightballs and later on they also had a lot of success capturing the balls of light on night vision video. Over the next few months we shared regular email correspondence with them & we jointly set about devising various means of discovering more about these light anomalies. Some statistical studies were carried using the internet to speed up the information gathering process. We hoped to determine just how likely a camera was to produce a 'Lightball' in a picture. Many hours were spent studying the 'Lightballs' with our image software, measuring them, looking at the colour, the colour temperature, the density; in fact anything we could think of to try & learn anything we could about them. One of the things we did discover is that the 'Lightballs' seemed to be reflective; they gave off light with characteristics very similar to either the flash light on the camera or in the IR part of the spectrum - around 680nm that was used by the IR LED's to illuminate the scene in front of the camcorder. If the 'Lightballs' had emitted their own illumination we should have expected that it should be of a different colour or colour temperature to the light emitted by the camera. As the months passed, more & more paranormal investigators and groups started to use digital cameras and night vision videos in support of their own investigations. We noticed that other groups were also finding these 'Lightballs' in fact they were becoming almost a common occurrence. They gained a new name too - from the USA where groups had started to refer to them as 'Orbs'. As the number of Orbs went up - the number of theories about what they could be abounded on the Internet. Many believed that they were direct evidence for ghostly manifestations, the first stage of the appearance of a ghost. Some thought them to be a visualisation of Poltergeist activity. Others believed them to be Angels & claimed they could even tell the sex of them by looking at the colour of the Orb - naturally, Pink for a Girl and blue for a Boy! Faces were seen in the Orbs and they were said to often move about in a controlled and intelligent way responding to the investigators requests for them to perform!

With so many orbs by now being reported we were still undecided about their true nature - they were certainly intriguing but by now they were just too commonly reported & that disturbed us greatly. Surely, if they were paranormal, then how could they be so common? Was the digital imaging chip - the device that lead to development of the digital camera & night vision video, the breakthrough tool that paranormal investigators had longed for? Just about everyone with a digital camera were capturing orbs. They appeared in haunted locations, they appeared in non-haunted locations, they appeared both indoors and outside, there was something terribly wrong - this surely couldn't be paranormal, there were just too many Orbs out there!

From 1999 – 2003, Para.Science undertook a further series of studies to determine the nature of orbs & also why they appear on digital cameras. Just how many orbs? We decided to try & determine just how likely a digital camera was to capture an orb & after some thought a simple experiment was devised. We would also try to establish if any particular make and model were more or less likely to capture an orb. Using the Internet, we obtained more than 1,000 digital pictures from each of the major digital camera makers i.e. Sony, Nikon, Kodak, Fuji etc. This was easy given that makers had a different file naming protocol for their camera pictures such as MVC123.jpg for Sony for example. The digital file data - the EXIF file also allowed us to see the camera settings i.e. shutter speed & aperture & also if flash had been used. A straightforward but time consuming affair, within a month & after downloading more than 10,000 pictures we had the first results. We found that orbs appeared almost at random in every sort of location - most of which never had any association with the paranormal or had to our knowledge ever been reported as

haunted. The vast majority of the orbs did not even warrant a mention by the picture takers, either going unnoticed or ignored.
The results showed that those with a Fuji or Kodak camera had the greatest chance of producing an orb - almost 20% of the pictures taken using flash with these makes showing an orb. Those using a Canon or Nikon model stood around a 1 in 20 chance of an Orb appearing in the final picture. Orbs only ever appeared in pictures taken using the flash &we found none in those taken without flash. Later, this experiment was repeated with a larger sample (n=21,000) & taking into consideration the exact model of the camera, the results were again quite clear. Overall, the cheaper the model of camera, irrespective of manufacturer, the more likely it was an orb would be captured. Likewise, the physically smaller the camera, the more likely it would be to photograph an orb; irrespective of its cost. However, because Orbs were so common we had to face an unusual possibility - if orbs were indeed the first stage of a ghostly manifestation then perhaps ghosts or spirits were a very common phenomenon, that up until now we just had been unable to detect without digital technology.
Again, we extended our Internet based study to see if we could discover just how often orbs were being reported in association with haunted locations. This time we only looked at pictures containing orbs - more than 5,000 of them but it was quickly clear that they were just as likely to appear in a non haunted location as a haunted one. It was starting to look suspiciously like orbs were nothing more than the camera seeing something normal but in an unusual way. Already, some people had suggested dust or insects as a possible culprit of the orbs.

Others were also beginning to question the orb phenomenon - a small number of experimenters (i.e. ASSAP) had thrown & blown dust or powder in front of cameras with convincing results. We ourselves conducted similar experiments with flour, talc or other small particles. When caught in the flash they produced convincing orbs that looked exactly like those seen in many of the pictures we had looked at & taken ourselves on investigations. Outdoors, in even slightly misty conditions a flash picture could produce tens or even hundreds of orbs, although Rain produced a smaller number of orbs per picture. The experiments also produced some unexpected results; often a large quantity of powder was thrown in front of the camera as the flash was fired & a picture taken, but on the resultant picture only one or two orbs would be seen. When taking pictures of almost invisible mist the picture would be filled with dozens of orbs. We were expecting the opposite case to be true - a large amount of dust or powder should produce a lot of orbs &a few sparse water droplets should produce fewer orbs.

A series of emails to a University optical lab later & we had the answers we needed &a satisfactory explanation to this particular conundrum. Dust particles are not very reflective so few of the dust particles will reflect the light from the camera's flash back toward the image chip. Water droplets are however like minute spherical mirrors & like cats eyes in the road many more will reflect the flash burst back to the camera. The range of the flash & the angle between the particle or droplet &the lens also affected the number of orbs that were produced. To make the best orbs the particles / droplets should be physically very close to the camera where the lighting is the strongest &also they should be within 15 degrees or so of the lens's central axis. This clearly demonstrated why the number of orbs seen in a picture often bore little relationship to the actual amount of dust particles or water vapour droplets in the air.
We also wrote to several camera manufacturers & also to the makers of the imaging chips. We discovered that the way a digital device sees the world is very different from the way we see it or a film camera sees it. We already knew about the IR sensitivity of the digital chip & we also discovered that they are more slightly sensitive to UV light too. All image chips rely on software to actually construct the image from the millions of individual pixels & in consumer cameras the software is required to compress the raw data in order to get enough pictures onto the storage media or memory. The compression ratio &also the software compression algorithms varied not only from different makers but frequently even across a camera maker's own range of products.

As an example a typical 5 megapixel chip actually captures around 10% of the total image information available within a scene when compared with a 35mm camera negative. The software is required to fill in the gaps in the image by making comparisons with the information from neighbouring pixels, a process called interpolation. Thus a single pin point of light within a scene may either be ignored completely, or seen & then expanded by the software as it compares &interpolates each pixel with its neighbours; the single point source of light becoming a gradually larger &fainter circle of light. This can produce the characteristic circular orb anomaly. The image chip also has a further trick to play on the unsuspecting ghost hunter; sometimes individual photodiodes may not respond correctly to the light falling on them, resulting in it sending a signal that is either 100% on or 100% off. Again, the software would interpolate these white specs into circular orbs - Black orbs, caused by the 100% off-state of a pixel are also seen, but more rarely as they tend to blend into the background of the image more readily. The mechanisms that caused orbs to appear on digital pictures also applied to those being seen on the night vision video footage. This time the cause was the Infra Red LED's mounted just beneath the lens on every model. These acted exactly like mini headlights, sending an IR beam out in front of the camcorder. One attempt to try to capture video orbs to order took place whilst filming a documentary on ghosts for a Japanese TV company. In one particular room we could see a literal blizzard of dust orbs moving past the IR CCTV camera as we watched from the control room on a monitor. We set off armed with a night vision camcorder &two-way radio to try &capture them for ourselves. The controller talked us into the orbs as he watched them on his screen. We hunted for some time in vain for the orbs he could see. It seemed like our theory that orbs were dust was falling in tatters around us, we moved closer &closer to the actual CCTV camera that was seeing them. When we got less than a foot away from it we found our prey - the orbs were there in quantity but could only be seen close to the CCTV camera because its IR LED's surrounding the lens were not very powerful &were not capable of lighting up the dust particles more than a few centimetres away. Our own failure to see them was also compounded by us using a more powerful IR light, but one that was mounted high above the camcorder on an extension bracket thus taking the light further away from the lens axis &thus preventing reflected light bouncing back into the lens. Later when we removed this light & went back to only using the pair of IR LED's below the lens of the camcorder, we saw orbs a plenty! The moving orbs seen on the night vision video were simply the result of the camcorder capturing a moving image of the dust or water droplets as they get carried past on the slight currents of moving air that are always present within a building. Another interesting type of orbs could be seen to sparkle or flash as they passed through the picture. Again the answer was straightforward, these particles were simply of a more facetted shape & as they spun & tumbled in the air currents, different surfaces reflected the light back to the camera with more or less intensity. These early study strongly suggested that in order to produce an orb anomaly within a picture a number of conditions need to be met; i.e. the camera flash must have been used at the time of picture taking, the airborne material must be located within a few centimetres of the camera lens & the airborne material must also be within a narrow range of angles relative to the lens central axis for the material to be able to reflect the light from the flash into the lens. The result of all the studies undertaken by Para.Science & other investigators demonstrated the strong probability that orbs were simply the result of airborne dust, moisture & other particulates reflecting the light from the camera flash back toward the imaging chip, resulting in the characteristic bright anomaly.

So, that we thought, was that! Orbs were nothing more than microscopic dust &water vapour droplets reflecting back the light of the flash that was often too close to the lens axis. Orbs were in fact dust & water suffering with red eye, like those pictures of a Demonic Auntie Nellie with her glowing red eyes & purple hair!

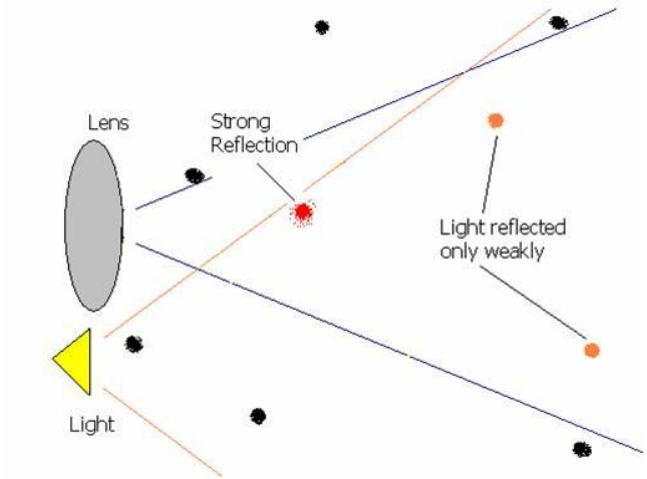


Fig. 1. In order to produce an orb, the airborne particle must be close to the camera

The initial studies by Para.Science together with early experiments by others resulted in many investigators questioning the true nature of orbs & leading to more groups subsequently carrying out their own experiments with the result that the probability that orbs are simply the result of airborne dust & other material has been widely acknowledged. However the inability of any of the foregoing studies to conclusively demonstrate that airborne matter & moisture is responsible for orb production allowed the debate between the orb believers & the orb sceptics to continue, to the obvious detriment to paranormal research & to the continued confusion of all concerned.

An experiment considered some time ago by Para.Science was the use of stereo (left & right) photography to explore the orb phenomena. Using this technique we realised that it should be possible to properly test the hypothesis that orbs are airborne matter, physically close to the taking camera. Thus, if an orb was found to be present on one picture of a stereo pair of pictures taken simultaneously & not present on the other; then the original source of that anomaly must be located within the angle of view formed between the flash & the lens in order that the flash illumination is reflected from the source & causing the characteristic bright anomaly to appear on the final picture. Also, such an object appearing on only one of the stereo pictures must be physically close to the camera as it would appear on both of the stereo pictures if it was located more than a few centimetres from the camera (normally less than 2-3cm). The actual distance being determined by the separation of the two lens axes. Although stereo photography was a well understood technique that has been used with film photography for many decades, the technical difficulties applying it to digital photography & ensuring that the resultant images were identical proved technically & practically insurmountable at that time. Those difficulties included; finding a means of ensuring that both pictures were taken simultaneously, that both pictures had identical photographic settings i.e. focus & exposure & that both pictures had identical post image processing applied i.e. scene pre-sets, colour balance, file compression etc. The use of a stereo lens fitted to a digital camera was also considered, but discounted, as firstly it partially blocked the light from the camera's built in flash & secondly the use of a single lens / image chip meant that it would not be possible to fully exclude any artefacts & errors caused by either the lens or the image chip, both of which are known possible causes of some orb-like photographic anomalies.

Launched in mid 2009, The Fujifilm W1 3D digital camera was at the time a unique digital camera comprising two separate lenses & two separate high resolution image chips; forming a matched pair of image taking systems integrated within the same camera body. The two image taking systems shared a single common flash positioned equidistant between the two lenses. Crucially, both

matched image taking systems were activated by the same shutter button & used the same focus, exposure & flash settings, thereby ensuring that the two resulting images produced for each press of the shutter were identical in every respect except for the parallax separation between the left & right pictures. This camera has permitted the hypothesis that orbs are the result of nearby airborne matter reflecting the flash light back toward the camera to finally be properly tested. The author was fortunate in being able to secure one of the first examples of this new type of camera shortly after its launch in the autumn of 2009 in order to begin a renewed investigation of the orb phenomenon. Recently several manufacturers have released their own 3D still & video cameras including Panasonic & Sony. Fujifilm have also replaced the W1 with an improved W3 model although the upgrades are largely cosmetic & offer improvements to the camera's video capabilities.

The Fujifilm W1 3D Camera

The Fujifilm W1 camera has been used in a series of experiments undertaken at more than twenty locations widely spread throughout the UK & Eire during 2009 & 2010. Locations were selected to encompass a broad representation of allegedly haunted venues e.g. castles, industrial sites, modern retail premises & also included both indoor & outdoor locations. Photographs were taken at some well known locations too, such as Mary King's Close, Edinburgh; Margam Castle, West Wales; & Wicklow Gaol in Eire to name just a few. In most instances the photography was undertaken whilst paranormal investigators & members of the public, unaware of the particular nature of the camera or the experiment being undertaken conducted some form of paranormal investigation.
This lead on one occasion to an amusing incident when a Psychic Medium at one location noticed an 'orb' on the LCD screen of the camera & promptly declared the photograph to be '***Proof' of the spirit of a young girl who haunted that location!***

The Medium (centre) declared that this orb represented the spirit of a deceased girl.

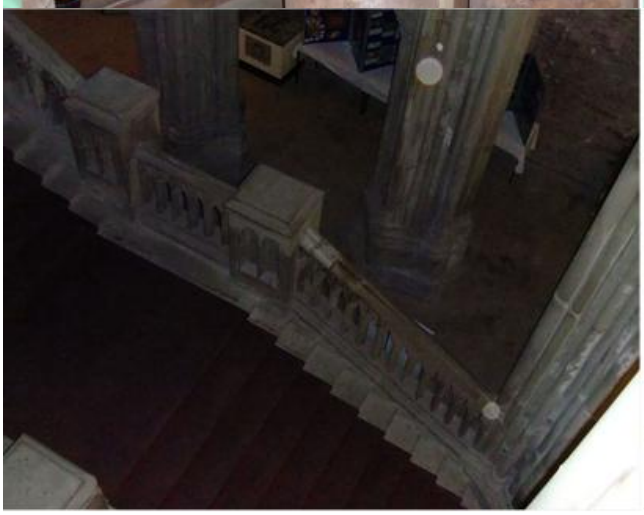
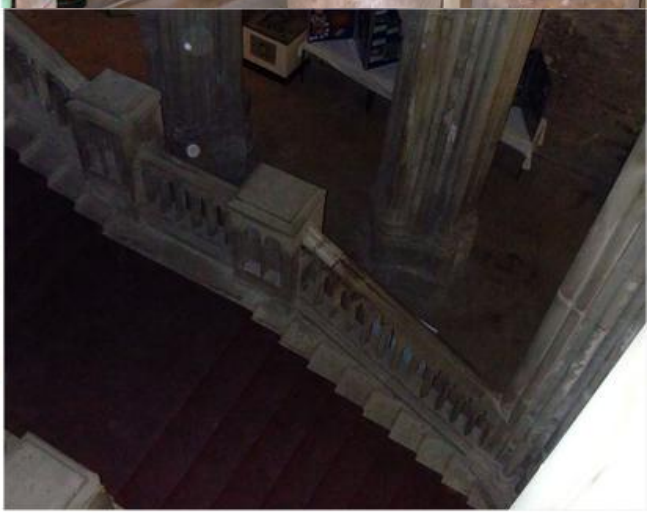
Needless to say, upon examination, the orb was found to present on only one of the stereo pictures & thus another paranormal orb bit the 'dust' – obvious pun intended!
In order to replicate the 'point &shoot' technique of most digital photography undertaken during amateur paranormal investigation the camera was only used in the fully automatic exposure & focus mode. The use of the fully automated mode also ensured that the resultant stereo pair of images were identical in terms of any software processing of the images that is applied in-camera i.e. those affecting the colour balance, scene pre-sets, file compression etc. The stereo paired images were subsequently downloaded from the camera to a laptop computer. No enhancement or manipulation of the resulting images was undertaken. Each simultaneously taken stereo pair of images was then viewed side by side &simply compared visually for the presence of orb anomalies on either one of the pair.

To date 1,870 stereo pairs of images have been taken &examined. Orb anomalies have been found on 630 pairs. In 491 pairs, an orb or orbs was seen to be present in only the left or right image but not in the corresponding second image of the pair. In 139 stereo pairs, orbs were seen to be present in both of the images (left & right) but not in a position that corresponded to the individual orb being the same object.

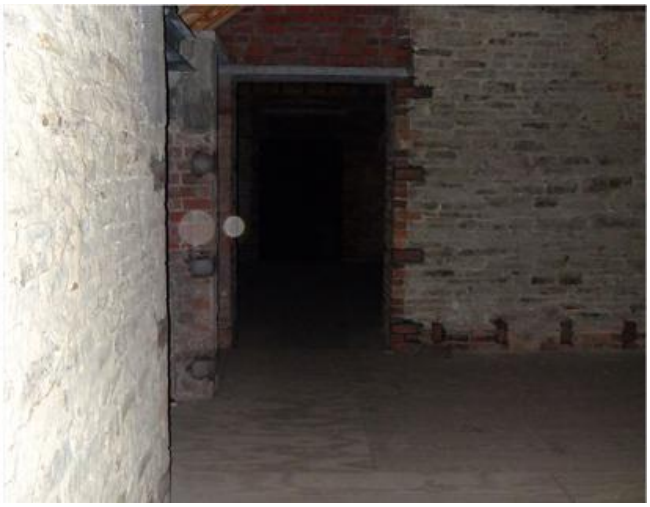
Shown below are samples of the stereo paired images, showing no corresponding orbs appearing on both left & right pictures.




Fire point

Fire point










Orbs are Normal

This comprehensive survey strongly supports the hypothesis that orbs are simply the result of dust & other airborne material drifting close to the camera & reflecting the flash illumination back toward the image sensor & provides long overdue definitive evidence that their origin lies firmly within the mundane & explainable, not the paranormal or supernatural.

Interestingly, a further four stereo pairs of images show other anomalies that are frequently offered up as evidence of the paranormal. Two are images of the camera strap; whilst two more show breath condensation as the author exhaled. As with the orb photographs these four anomalies appear on only one side of the stereo pair, again showing that they were quite normal in origin.

Stereo images show the camera strap appearing only on the right side of the pair

99% of orbs are caused by dust.....

Before concluding it is also worth bearing in mind those original statistical claims that 1% or 2% of all orb pictures represent paranormal orbs. The survey to date has captured over 600 orbs so it might be expected that we should have expected to have found between 6 &12 that were paranormal. We didn't – all 630 that we obtained in the survey were readily explained using the stereo photography technique. Statistically speaking that is 0% paranormal but 100% explainable.

So at last, it is hoped that this extensive series of pictures will finally remove much of the confusion & nonsense that has surrounded the orb &similar classes of photographic anomaly &permit psychical research to move forward from this long standing debate.

Appendix 1.

The Fujifilm FinePix W1

The Fujifilm FinePix W1 Series Real 3D a digital camera designed to capture stereoscopic images that recreate the perception of 3-D depth, having both still &video formats while. The camera uses a matched pair of lenses. The lenses are offset left-to-right by 77mm, a baseline that approximates the distance between an average pair of human eyes.

The W1 has two lenses / image CCD systems, each capable capturing images at 10 megapixel resolution &each capable of 3x optical zoom (35mm - 105mm in 35mm camera equivalent). The color LCD display on the rear of the camera measures 2.8" diagonal. It can be electronically switched between normal display &auto-stereoscopic display. In addition to its use as 3D camera the two separate image systems within the camera can also be used to take two simultaneous shots of the same scene with different settings (zoom, ISO, etc.).

In December 2010 via the Russian spacecraft Soyuz 25S, a European Space Agency astronaut used a Fujifilm FinePix REAL 3D W1 aboard the International Space Station.

Specifications (Courtesy of Fujifilm UK)

Number of effective pixels 10.0 million pixels

CCD sensor 1/2.3-inch CCD x2

Storage media

- Internal memory (Approx. 42MB)
- SD memory card
- SDHC memory card *2

File format

3D Still image:
MPO+JPEG, MPO (Multi Picture Format compatible)
2D Still image:
JPEG (Exif Ver 2.2 *3)
(Design rule for Camera File system compliant / DPOF-compatible)
3D Movie:
3D-AVI (Stereo AVI format with 2 image channels)
2D Movie:
AVI format (Motion JPEG with sound)

Number of recorded pixels L: 4:3 3,648 x 2,736 / L: 3:2 3,648 x 2,432 / M: 4:3 2,592 x 1,944 / S: 4:3 2,048 x 1,536 pixels

Lens Fujinon 3x optical zoom lens, F3.7(W) - F4.2(T)

Lens focal length f=6.3 - 18.9mm, equivalent to 35.0 - 105.0mm on a 35mm camera

Zoom

3D:
up to 3.8x (Combined optical and digital zoom)
2D:
up to 17.1x (Combined optical 3x zoom and digital 5.7x zoom)

Aperture Wide: F3.7 / F5 / F8, Telephoto: F4.2 / F5.6 / F9

Focus distance (from lens surface)

Normal:

- Approx. 60cm / 2ft. to infinity

Macro (2D only):

- Wide: Approx. 8cm - 80cm / 0.3ft. - 2.6ft.
- Telephoto: Approx. 60cm - 3m / 2.0ft. - 9.8ft.

Quick AF:

- Approx. 1m / 3.3ft. to infinity

Sensitivity Auto / Equivalent to 100 / 200 / 400 / 800 / 1600 (Standard Output Sensitivity)

Exposure control TTL 256-zones metering, MULTI, SPOT, AVERAGE

Exposure mode Programmed AE, Aperture Priority AE, Manual

Shooting modes

SP mode:
Natural light, Natural light and with Flash, Portrait, Landscape, Sport, Night, Night (Tripod), Sunset, Snow, Beach, Underwater, Party, Anti-Blur

ADV 3D:
Interval 3D shooting, Individual shutter 3D shooting

ADV 2D:
Tele/Wide simultaneous shooting, 2-Color simultaneous shooting, 2-Sensitivity simultaneous shooting

Shutter speed

Night:

- 1/8sec. - 1/500sec.

Night (Tripod):

- 3sec. - 1/500sec.

Manual:

- 1/2sec. - 1/1000sec.

All other modes including AUTO:

- 1/4sec. - 1/1000sec.

Continuous shooting

3D:

- Top-40 (max. 2 frames/sec. "S" only)

2D:

- Top-40 (max. 1 frame/sec.)
- High speed Top-40 (max. 3 frames/sec., "S" only)

Focus

Mode:

- Single AF

AF mode:

- 3D: Centre
- 2D: Centre, Multi (for Face Detection off only)

White balance Automatic scene recognition
Preset: Fine, Shade, Fluorescent light (Daylight), Fluorescent light (Warm white), Fluorescent light (Cool white), Incandescent light, Underwater lighting

Self-timer Approx. 10sec. / 2sec. delay

Flash Auto flash Effective range: (ISO AUTO):
Normal

- Wide: Approx. 60cm - 3.7m / 2ft. - 12.1ft.
- Telephoto: Approx. 60cm - 3.3m / 2ft. - 10.8ft.

Macro (2D only)

- Wide Approx. 30cm - 80cm / 1ft. - 2.6ft.
- Telephoto: Approx. 60cm - 1.6m / 2ft. - 5.2ft.

Flash modes

- Red-eye removal OFF: Auto, Forced Flash, Suppressed Flash, Slow Synchro.
- Red-eye removal ON: Red-eye Reduction Auto, Red-eye Reduction & Forced Flash, Suppressed Flash, Red-eye Reduction & Slow Synchro.

LCD monitor 2.8-inch, Approx. 230,000 dots color LCD monitor with Light Direction Control, Approx. 100% coverage

Movie recording	640 x 480 pixels / 320 x 240 pixels (30 frames/sec.) with stereo sound * Zoom function cannot be used during movie recording.
Photography functions	3D: Auto parallax control, Power management, Framing guideline, Frame No. memory 2D: Face Detection (with Red-eye removal), Power management, Framing guideline, Frame No. memory
Playback functions	3D: Parallax adjustment, Multi-frame playback (with Micro thumbnail), Cropping, Resize, Sorting by date, Slideshow 2D: Face Detection (with Red-eye removal), Multi-frame playback (with Micro thumbnail), Sorting by date, Cropping, Resize, Slideshow, Image rotate
Video output	NTSC / PAL selectable
Digital interface	USB 2.0 High-speed
Power supply	NP-95 Li-ion battery (included), AC power adapter AC-5VC (included)
Dimensions	Approx. 123.6 (W) x 68 (H) x 25.6 (D) mm / 4.9 (W) x 2.7 (H) x 1.0 (D) in. (excluding accessories, battery and memory card)
Weight	Approx. 260g / 9.2oz (excluding accessories, batteries and memory)

For further information about the Fujifilm W1 and later W3 3D cameras -

http://www.fujifilm.com/products/3d/camera/finepix_real3dw1/specifications/index.html