

## **New light on Fatima**

### **Introduction**

The most important apparitions in the 20<sup>th</sup> century took place between 13 May and 13 October 1917 in Fatima, Portugal, in a place called Cova da Iria, located about 85 miles north of Lisbon. During this period a figure of a Lady appeared six times to three children: Lucia, Jacinta and Francisco and passed to them certain information which later became known as the secrets of Fatima. At the end of the apparitions about 50,000 people witnessed a very unusual display in the sky which made a lasting impression not only on the believers but also on the skeptics. It was the first ever public manifestation of an announced earlier inexplicable phenomenon.

From the descriptions provided by many witnesses and statements of visionaries we can assume that very interesting, unusual physical phenomena were taking place during the events in Fatima. These phenomena passed unnoticed by many researchers, maybe because our knowledge only at the end of 20<sup>th</sup> century is sufficient to explain them. Due to very good written documentation of the witnesses of these events we can have a good picture what has happened in Fatima. The events in Fatima can be included in two groups: apparitions of the Lady seen only by the children and the display in the sky known as “the miracle of the sun” which was observed by thousands of people.

Apparitions are well documented because interviews with the children were carried out shortly after the events which were fresh in their memories. The children were questioned individually by several persons therefore their statements are trustworthy. The second source of information about the apparitions are the memoirs written by sister Lucia. Her descriptions are very detailed, but they were written about 20 years after the events and there is no corroboration of her story.

The display in the sky has been witnessed by many people and exists statements of about a hundred witnesses describing the event. Many witnesses had higher education, and a large number, at the time of events, subscribed to the atheistic world view showing hostile attitude to any religious connections. They belong to very reliable witnesses which cannot be accused of being under “mass hypnosis”. The most important fact of all was that all the popular newspapers and periodicals in Portugal were represented. Let us look first what was observed during the Fatima events.

## **Phenomena observed during the apparitions**

Before the first apparition, Lucia noticed a flash in the sky. She thought that it was lightning and said to Jacinta and Francisco that a thunderstorm was coming, although the sky was cloudless. However the children did not hear any thunder claps that normally accompany lightning. Similar flashes of light preceded all the meetings in Cova da Iria and in Valinhos.

Lucia and other witnesses noticed, just before the apparitions, certain atmospheric changes. They had the feeling that the air had cooled off, and the sun was slightly dimmed, although it was not obscured by clouds.. After the apparitions the intensity of the sun light returned to normal.

In the statements of the visionaries and many witnesses often feature a description of a cloud which was visible above the tree where the figure was appearing. The cloud was faint and looked more like a fog and it seems that it surrounded and covered the appearing figure. After the apparition was finished it rose and disappeared. It was described by the witnesses as a cloud of smoke and was observed each time from June till October.

Among the most interesting phenomena, noticed by many witnesses during the apparitions, were the acoustic effects. During all the apparitions from June 13 onwards, strange sounds, similar to the buzzing of insects, were heard. Normally witnesses standing near the seers could hear when Lucia talked to the Lady, then followed silence, and in this silence a faint sound was heard which occurred at the same time as Lucia was listening to the reply to her questions. It was not possible to distinguish words, and the voice was similar to the sound made by a bee. In their opinion the source of the sound was in the vicinity of the oak tree.

## **Display in the sky**

Thanks to the intelligence and the presence of mind of Lucia, who, during the meeting on July 13, asked the Lady for a “miracle” for people to believe in the authenticity of the apparitions, the entire character, the scope and the impact of these events has been changed. The Lady promised that she would perform a “miracle” on October 13, so that everyone would be able to see it. This information was widely circulated in Portugal. Thanks to that fact, the display could be witnessed by many thousands of people who received 3 months notice prior to the event.

The display in the sky commenced straight after the apparition was finished. All the witnesses stated that they could watch it directly, without the need to squint. So why did this phenomenon

pass into history, as “the miracle of the sun”? Probably this was caused by the fact that the disc appeared in the sky at the position where the sun was, at a height of 42°45' above the horizon. The diameter of the disc was also presumably close to the diameter of the Sun, which is about 30 angular minutes.

The luminous disc did not shine brightly and did not blind the eyes. The disc had a distinct edge and was of silver-blue color but not like the moon. The color was clear and rich, having the opalescence of a pearl. Witnesses with a technical background described it as a disc of opaque or frosted glass, illuminated from behind, with a rainbow of iridescence on its periphery. Some of the witnesses claimed that the colors of the disc were lively and strong, and changing from white, red and blue to orange, yellow or green. Some compared it to stained glass in the church. It looked as though the periphery of the disc was more colorful and iridescent than the center and changed cyclically, according to some repeating pattern. The color changes were not random and rapid, but slow and regular. The disc sometimes looked as if it was surrounded with an aureole of flames, at other times by yellow or purple rays. At one moment the flames disappeared and the disc became dull silver-blue again. One of the witnesses noticed that the clouds, moving at that time from the west to the east, were not obstructed from view by the disc but looked as if they passed behind it.

The disc did not stay in one place, but moved in the sky. All witnesses agreed – it revolved on its axis. Some people noticed that it had whirled very quickly. In the opinion of Goncalo Almeida Garrett, a professor of mathematics only the peripheries of the disc carried out this rotary motion. The movements were not uniform, but repeated three times after intervals. There are descriptions comparing the disc to a turning wheel of fireworks, with flashes of sparks of light on its border, similar to a Catherine wheel. Apart from the whirling, witnesses noticed other movements. They describe that the disc “danced”, “jumped” or “trembled” through the almost diaphanous clouds. These irregular and arrhythmic movements caused sudden and rather accidental changes of the disc position.

The most dramatic scene happened when “the sun fell down to the earth”. The whirling disc appeared to approach the earth, and its movement was very elaborate. It looked as though the disc was spinning, descending in slow zigzags, or moving down in a spiral. The movement reminded some witnesses of the fall of a dry leaf from a tree in Autumn. When the disc

descended so low that it looked as if was touching the tips of pine trees, a panic seized some people. Next, the disc started climbing back up at a very slow, snail-like pace, all the way to its initial position. The entire display lasted about 10 minutes.

Witnesses noticed not only extraordinary colors of the disc and the clouds. They also claimed that the people, the trees, the fields and the entire neighborhood looked colorful. Some said that everything around them turned yellow, others gold, purple, blue, orange, green or metallic. Some witnesses noticed that the color of the surroundings changed with the color of the disc. The illumination was patchy and the witnesses mentioned seeing stains of various colors. The light lit the faces and bodies unevenly, and its intensity varied, namely some areas more strongly, while other less irradiated in such a way that the various elements of the landscape were covered with colorful patches or spots. The intensity and the shapes of these colorful patches varied with time, as if under the influence of air movement.

### **How the apparitions could have been prepared**

In order to carry out a scientific analysis of the apparitions in Fatima, we have to assume that they did not have a supernatural character, but they were the work of some unknown organizers. Considering the present state of knowledge, let us give some thought to what technical solutions could be used in order to achieve the effects described by the witnesses. The main purpose of these considerations is not to prove that the proposed methods were indeed applied, but to show that the events in Fatima can be explained by known phenomena which obey the universal laws of physics.

During the apparitions very complicated interactions occurred between the visionaries and the instigators of these events. From the information obtained from Lucia and Jacinta, we can infer that the seers could see the appearing figure, could hear her, and that the Lucia's questions were correctly received by the organizers, because the visionaries obtained logical responses.

From the information provided by the seers it is possible to conclude that the image of the figure could be produced using an optical projection, rather than being generated in the seers' minds as a result of hypnosis or hallucinations. This confirms the fact that the children were not in a state of ecstasy, on the contrary, they were fully conscious of what was happening around them. The optical projection hypothesis supports the observation that the children, during the apparitions,

had to lower their eyes and to rub them, since the light radiating from the figure was blinding them.

In order to produce an optical image a source of light, projection screen and the source of the image are needed. We know from Lucia's memoirs that every apparition was preceded by the coming light beam. She noticed that the Lady was always arriving from the east and leaving in the same direction, therefore the beam of light did not come down vertically, but was at a certain angle to the ground. The figure appeared only when the light stopped directly above the tree. As already mentioned, many witnesses noticed that during the apparitions the intensity of sunlight was decreasing. The lowering of the intensity of solar radiation supports the hypotheses that the optical method was used, because bright sunlight would reduce the visibility and the quality of the projection of visual images, the same as in cinemas, where the lights are dimmed during a film projection.

The fact that the appearing Lady always stood high on the top of the tree also supports the optical projection hypothesis. If she stood on the ground, for example under the tree, the leaves and the branches would obscure the optical beam coming from above. To prevent the beam from being obstructed by other people or tall objects, the image must have been placed high above them.

I have not found information concerning generation of the image, but it is plausible to assume that it was prepared using a digital device such as a computer. This device could also control the animation and the transfer of images to the appropriate converter which would modulate the light beam. Such converters are at present universally used for the optical projection of images from computer monitors to big screens.

In order for the optical projection to produce a visible image, besides the source of image and the source of light, a screen is also needed. In a cinema, light from the projector falls on a white screen which scatters light back creating an image on our retina. So let us consider what could have been used as a screen in Cova da Iria. Described by many witnesses a small cloud above the tree probably functioned as a screen for the image projection. At present it is possible to project optical images on natural or artificial clouds using strong laser light. Without the cloud the clarity of the image would be very poor, and what is worse the figure could become transparent. In such a case it could be possible to see other objects, such as clouds or flying birds, through the figure, which would have perplexed the children.

To make a cloud, water and a source of heat is needed. Since the apparitions took place on a semi desert-like area, a tree was the only substantial source of water. The cloud could be generated as a result of heating the tree with infrared radiation, invisible to the eye.

It appears from the description of the witnesses that before the apparition young shoots of the oak tree were firm and they climbed straight upwards, but after the event they became flabby and bent. If the shoots were heated from the eastern direction, this side lost more water, softened and under its own weight tilted towards the east. One witness, Maria Carreira, describes that in June the tree was in blossom and after the apparition she noticed a round area, about 16 in in diameter, at the crown of the tree, where the shoots were tilted to the east.

Lucia says in her memoirs that she could see the light beam, which at initially she regarded as lightning, coming near. We can draw a conclusion that the ray of light was not sent directly to the tree, but came gradually closer to it. So the beam moved on the surface of earth and, when it came across the tree, stopped and stayed in this position. In practice it would be very difficult to aim the optical beam from a long distance directly at the tree, not knowing how it could be affected by weather conditions. A similar method is commonly used by the air force to aim laser bombs at targets.

Examining the information provided by the witnesses, it is possible to put forward a hypothesis that lasers were used as the source of light. Laser light being monochromatic and coherent, can easily be modulated to generate an image, or to change direction of the beam. It is possible to transmit a laser light over great distances as a narrow beam. At present lasers emitting white light which consists of a large number of monochromatic waves are well established.

Assuming that for the optical projection lasers were used, a question arises: how far away were they placed? The results of calculations provided in my book<sup>1</sup> show that the source of the light could be located at a distance of 60 miles up to 600 miles from Fatima. So the lasers did not have to be in the vicinity of the apparition, but could also not be installed on other planets. So it is probable that they were placed on a low orbit around the Earth, therefore the apparitions were possible only at specific times of the day, and their duration was limited. This is confirmed by the fact that they usually began about noon and lasted not more than 15 to 20 minutes.

During the apparitions Lucia and Jacinta could not only see the figure, but could also hear her and Lucia was able to communicate with her. The children noticed at once that during the

conversations the Lady did not move her lips, which looked very odd. From this observation one could conclude that the sound was generated and transmitted independently of the image. It is relatively easy to generate the sound of a voice using a synthesizer, however the synchronization between the optical image projection and the voice system is much more difficult. An ill-matched synchronization would only make a bad impression on the seers, because it would be immediately noticeable, like a badly dubbed film.

The technique of the acoustic communication used during the apparitions is not known to us, but the voice was probably generated directly in the ears or even in the brains of the visionaries, without the use of sound waves, which could have been audible to the people standing close to the seers. There is a possibility that modulated light waves could be used as a carrier of the acoustic waves. Witnesses standing near the children claimed that when the Lady answered Lucia's questions, they could hear a sound similar to the buzzing of a bee or a fly. So it is possible that these people heard some distorted high frequency sound waves, which could be produced as a result of a process similar to modulation.

Questions asked by Lucia had to be passed on immediately, because the Lady answered them without any delay. Recipients were probably beyond the earth's atmosphere, therefore they could not pick up the sound waves directly. One should also rule out the possibility of the propagation of sound waves in the atmosphere over a greater distance, because this would result in a noticeable delay in voice transmission.

One of the possible solutions is a laser microphone widely used by spy services. The microphone operates on the principle that sound waves emitted by a person cause vibrations of objects, such as window panes, which are in the vicinity of the source of the voice. The laser light sent to such an object measures its amplitude of vibrations and in this way recovers the original sound wave which caused these vibrations. So the sound waves emitted by Lucia could, for example, cause vibrations of the tree leaves, or vibrations of droplets of water in the cloud above the tree. These vibrations modulated the laser beam which, after reflection from these objects, was received and processed by special devices.

Because only a very small fraction of the originally sent light would reach the recipients, in order to get good reception, it was necessary to use very strong lasers. It is possible that the lasers used for the transmission of Lucia's voice were also used for the optical projection and therefore the

light radiating from the figure during the apparitions was so strong that it was blinding the children.

### **How the display in the sky could have been achieved**

After examining the witnesses' statements, there is not the slightest doubt that it was not the sun which moved in the sky, but it was a kind of optical illusion.

To make a whirling and dancing disc visible at the same time to thousands of people, an image visible in a large area had to be produced. One could assume that for generating such an image an optical projection method was applied. Suppose that the image was projected on a screen positioned at a distance of 0.6 miles from Cova da Iria at a height of 0.6 miles, the diameter of the disc should be about 30 ft. To generate such an image it is possible that several lasers were used, generating strong, colorful, monochromatic light beams which were projected on special clouds, acting as a screen.

Application of lasers for the disc optical projection is confirmed by several observations.

The disc was colorful, but surface colors were not uniform – silvery in the middle and glittering in all sorts of colors at its periphery.

During the whirling, the rotary disc motion could be seen not at its center, but mainly at the rim. Assuming that the image was created by the superposition of several laser beams of different colors, it is very difficult outside laboratory conditions to obtain perfect overlap of all beams. Where the overlap was precise, observers could see a uniform, silver color, but on the periphery, where the superposition was not accurate, they saw various colors.

It is well known that when a laser beam is passing through the earth's atmosphere, due to diversified air temperature and associated uneven air densities it is deflected similar as by a glass prism. Since the air temperature varies, the beam deflection also will be continuously changing. This phenomena were observed by witnesses as shaking or dancing of the disc. It is possible to observe a similar phenomenon at night, such as twinkling stars. This observation confirms that the optical beams used for display traveled a long way through the atmosphere.

As during the apparitions, a screen was essential for projecting the image of the disc. This function in this case was also performed by clouds, however they were not natural clouds. These special, small clouds had to be continuously produced, because when one disappeared, in its

place appeared a new one. During the display the disc came close to the ground, so we could conclude that the screen created from these peculiar clouds stretched from the surface of the earth, all the way to the height of at least 0.6 miles.

Since the disc was in the same place in the sky where the sun was, it was necessary to limit considerably the intensity of the sun's rays. And for this purpose artificially made clouds were used. The blockage of the sun's rays had to be very effective, because none of the observers looking in the direction of the sun were blinded by them. The artificial clouds were probably generated by heating an area of the earth using infrared radiation. This is supported by the statements of some witnesses who testified that their soaked through clothing, after the show, was completely dry.

Many persons noticed that both the people and the landscape in their neighborhood had changed color, as if illuminated by colored lights. The colors changed non-stop through all the colors of the rainbow. What is interesting is that the witnesses observed that certain areas were more strongly and others less illuminated, and that looked like colored patches. Such a phenomenon can only exist when monochromatic light is used as the source of light, and this observation confirms the application of lasers for the optical projection of the disc.

The above scientific analysis does not give an answer to the question of how the events in Fatima were really staged. It will not be possible to establish true events and we will most probably never learn what specific technical solutions were used in Fatima. The purpose of this analysis is to establish that everything the witnesses and visionaries saw and heard is possible to explain and would be possible to stage, applying techniques based on the known laws of physics. Perhaps we are still unable to reproduce the Fatima events, but we know the technical solutions which could be applied to design similar displays..

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<sup>1</sup> W.K. Kulczyk, We are not alone in the Universe, John Hunt Publishing, Winchester, UK and Washington ,USA, 2012.