

Apparitions and miracles of the sun

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Resumo

As aparições são experiências subjectivas que, por exemplo, podem ser acompanhadas por “milagres do sol”, observados e descritos por inúmeras testemunhas. Um estudo extenso destes fenómenos revela um conjunto de características que sugerem a existência de um mecanismo subjacente, contudo, comprova-se que a hipótese de uma intervenção extraterrestre não é suficiente para explicar todos os processos, apoiando-se mais em inferências lógicas e experiências pessoais, baseadas na literatura científica relevante. De facto, as aparições são experiências complexas, mas o conteúdo das “mensagens” levanta também problemas teológicos. Além do mais, é necessário relacionar estas “experiências místicas” com as novas descobertas relativamente aos processos psicológicos que envolvem os “estados alterados de consciência”.

The Problem

The frequency of apparitions and their repetition rate at particular places did strongly increase during the last two centuries, but the number of “recognized apparitions” remained rather small. The Catholic Church became thus increasingly prudent, although an official recognition by the local bishop, pronounced in agreement with Rome, means only that a supernatural origin is *humanly* credible and that a cult is permitted. Since apparitions don’t have the same dogmatic status as *divine* revelation, related to the life of Jesus, Catholics do not have to believe that they are true. Nevertheless, there exists a problem: *we don’t have a satisfactory explanation for all apparitions, whether they are credible or not.*

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The fundamental difficulty stems from the fact that “visions” are purely *subjective* experiences. Their authenticity cannot be checked from the outside or by independent repetitions, as in scientific experiments. It happened quite often, however, that apparitions were accompanied by “miracles of the sun”. Since they could be observed by hundreds and sometimes even by many thousands of persons, they have a *more objective* status. It should thus be possible to get things moving, by applying a “lever” to these miracles of the sun. As it is usual in science, we start with a formulation of *all conceivable hypotheses*. Then we will try to find out if they are acceptable or not, by using arguments that are based on *observations and logical reasoning*. There are three possibilities.

- *The hypothesis of a supernatural origin* is the traditional one. It results directly from the statements of those who claim that they could “see” heavenly beings, usually the Virgin Mary, and that they could even “communicate” with them. Some apparitions contain also demonic elements. When apparitions were accompanied by miracles of the sun, the “seers” declared that they were *signs*, given to strengthen the belief of those who doubted. Are these experiences and statements based on a true contact with a supernatural reality or are they mental constructions? Anyway, we can collect data on “miracles of the sun” that occurred at different places. When we do that, it appears that they have always the same characteristics! There has thus to exist an underlying mechanism, and we have to wonder why this is so.
- *The hypothesis of a natural explanation* has thus be considered, at least for the miracles of the sun. An astronomic or purely meteorological explanation is excluded for physical reasons, but there would be no miracles of the sun, if the witnesses had not been able to look straight into the sun for a relatively long time. What happens then in their eyes and their brains?
- *The hypothesis of an extraterrestrial intervention* may seem to be unrealistic to those who are not aware of the real dimensions of the UFO-phenomenon. There is ample evidence, however, that it deserves serious attention. It is conceivable, in principle, that apparitions and miracles of the sun could be produced by “alien visitors”, having technical capabilities far beyond our own. We can

even imagine that extraterrestrial civilizations could be interested in performing large-scale “psychosocial experiments” without letting us become aware of their procedures, to test our reactions and beliefs in religious matters. Can this be proved or disproved?

Having read numerous books and documents, visited places where recognized or unrecognised apparitions occurred, talked to seers, observed one of them very closely during apparitions and interrogated this unusual person, I am very conscious of the complexity of this problem. I am particularly sensible to the feelings of those who pray with great fervour, since they are suffering and hope to get help from a loving God. But I am also a scientist, who has to *search the truth*, and as professor of a Catholic University, I feel responsible with respect to the Church and all humans. If necessary, it would be better to change some ideas than to dwell in illusions or deception. I hope that everyone will understand this point of view.

Miracles of the sun: facts and explanations

So-called “miracles of the sun” were observed, for instance, in Tilly-sur-Seuilles (France, 1901), Fatima (Portugal, 1917), Onkerzeele (Belgium, 1933), Bonate (Italy, 1944), Espis (France, 1946), Acquaviva Platani (Italy, 1950), Heroldsbach (Germany, 1949), Fehrbach (Germany, 1950), Kerezinen (France, 1953), San Damiano (Italy, 1965), Tre Fontane (Italy, 1982) and Kibeho (Rwanda, 1983). They have been described by many witnesses and from their reports we can extract the following characteristic features, appearing successively.

- A grey disc seems to be placed between the sun and the observer, but the brilliant rim of the solar disc is still apparent. This is comparable to an “annular eclipse”.
- Beautiful colours appear after a few minutes on the whole surface of the solar disc, at its rim and in the surrounding sky. These colours are different, however, and they change in the course of time. They are vivid and can be blue, red, yellow, green, pink, violet, etc. A large part of the surrounding sky gets coloured, but this region is irregular and changing. This can give the impression that coloured lights are ejected from the sun. When the observers

are looking away from the sun, they see that the landscape and surrounding persons are also coloured in a changing way.

- *The sun begins to “dance”*. First, the solar disk rotates about its centre at some uniform and rather high velocity (about 1 turn/s). Then the rotation stops and starts again, but now it is opposite to the initial one. Suddenly, the solar disk seems to detach itself from the sky. It comes rapidly closer, with increasing size and brilliancy. This causes great panic, since people think that the end of the world has come, but the sun retreats. It moves backwards until it has again its initial appearance. These forward and backward motions can be combined with rotations and sometimes with lateral oscillations. All these motions are, of course, unexpected and very impressive.
- Finally, after 10 or 15 minutes, the sun is “normal” again: its luminosity is too strong to continue gazing at it. But after about another quarter of an hour, the prodigy can be repeated in the same way. All spectators are astonished that *their eyes don’t hurt*, although they had been looking right into the sun during a very long time.
- Most observers noted slight local changes in the luminosity of the solar disc, as if there were changing images, but they were unable to recognize what they could represent. Some persons were more lucky, gifted or privileged, however. In Heroldsbach, the “seers” reported that they had successive visions of the Virgin Mary, without and with the Jesus-Child, the Holy Family, the Trinity and some symbols, like a cross and the letters IHS. Other persons reported also that they saw the Virgin Mary and religious symbols. In Fatima, the “seers” had similar visions at that moment.
- Coloured spheres, drifting slowly from the sun towards the earth, were observed and mentioned at several places. This happened not only during miracles of the sun, but also for some time after them. When these spheres arrived at the ground, they never left there any material trace.

The initial appearance of a grey disc, covering nearly the whole sun in a central position, suggested that it could be a UFO. We can imagine, indeed, that such a craft could come from far away and approach a given place on

Earth, by moving along a straight line that connects this place to the centre of the sun. We can also imagine that this craft is endowed with extraordinary technical powers, but it is necessary to show that these assumptions can account for what did actually happen or at least that they are not contradicted by observed facts. First of all, the disc would have to be extremely luminous, with changing colours. Even if it were a changing semi-transparent filter of solar light, its coloured illumination of the surrounding sky and the ground would require great amounts of energy. Let's assume that this is possible. We are then still confronted with a geometric problem, since the circular craft would have to form a *cone of shadow*, intersected by the ground, somewhat above its tip. This would define a circular or elliptical surface, where a perfect or nearly perfect "annular eclipse" is seen. But near the border of this surface, one should see a "partial eclipse", and nobody did ever report such an appearance of the sun.

In Fatima and Heroldsbach, there are some reports concerning apparently simultaneous observations of the same phenomena, about 5 km and even more than 40 km away from the main event. This was mentioned, since it excludes "mass suggestion". But it implies also, that the hypothesis of a screening craft has to be rejected, since its dimensions would have to be unacceptably large. A simultaneous performance by another craft or a somewhat delayed repetition of the same "show" by means of a single craft, laterally displaced, has also to be rejected. These manoeuvres would have been detectable from the side.

Searching always for more witness reports concerning "miracles of the sun", I discovered some descriptions of very similar observations, made without any apparitional context. It was thus absolutely necessary to find out what would happen if someone did engage in sun-gazing, although this is known to be dangerous. Some ophthalmologists described *retinopathies*, produced by such an imprudent behaviour, but they did not say what their patients had seen. Then I studied various kinds of *subjective effects*, generated by short or long observations of relatively intense light sources. It is well-known that there are *coloured after-images*, but there are also *motional after-effects*. The Belgian physicist Joseph Plateau studied them in the middle of the 19th century and gathered all available accounts of observations from Aristotle to about 1875 (*Mémoires de l'Académie Royale de Belgique*). Plateau warned against sun-gazing, but mentioned only that he lost his eye-sight in this way, without saying what he saw. Nevertheless, his huge

collection provided some astonishing reports that could be related to "miracles of the sun".

At this stage, I engaged in a systematic study of *after-images* (produced at the retinal level) and *after-effects* (resulting from the neural processing in our brain). Experimenting my-self with a large and powerful white electric light bulb, I saw vivid colours and noted their temporal changes. I scanned the medical and psychological literature, to get information on peculiar visual effects and I focalised my attention on the *biochemical, physiological and neurological processes* that are involved. In November 2002, I looked directly into the sun, at about 4 p.m. The sun was already relatively low above the horizon and its light intensity was attenuated, although the sky was clear. I was able to look right into the sun and was amazed to see that *the sun was immediately converted into a grey disc, surrounded by a brilliant ring*. The grey disc was practically uniform, while the surrounding ring was somewhat irregular and flamboyant, but did not extend beyond the solar disk. It coincided with its rim. I stopped the experiment, since I wanted to be prudent, but I had experienced myself the initial phase of a typical "miracle of the sun" and I could explain it.

The sun became grey, since my eyes immediately responded to its great luminosity by an automatic reduction of their sensitivity. This *adaptation* is not simply due to the bleaching of pigments in the colour-sensitive cones of the fovea, where the image of the sun is projected, but to secondary processes. Every inactivated molecule initiates a chain of biochemical reactions that allows for a strongly amplified response. The concentration of a particular type of molecules is strongly decreased and this disrupts the usual equilibrium for Na⁺ ions that are passing through the photoreceptor membrane. The trans-membrane potential is modified and this change constitutes the neurological response to the incident light. This system provides an automatic and highly efficient gain control, allowing us to cope as well with very low as with extremely high luminosities. This adaptation process is *completely unconscious*. That's why the unexpected appearance of a grey disc instead of an extremely bright solar disc can give the impression - in a context of apparitions - that this was not a natural process.

The brilliant ring can also be explained. Since the number of nerve cells that carry information to the brain through the optic nerve is much smaller than the number of retinal photoreceptors, every cell of the optic nerve collects information from 1000 to 10.000 receptors. They form a

receptor field, but the intermediate connections are organized in such a way that those photoreceptors which are situated in the central part of the receptor field provide *excitatory* responses, while receptors that are situated in a nearly equally large surrounding ring yield *inhibitory* responses. The inverse arrangement is also possible. What happens now for different parts of the image of the solar disc that has been projected on the retinal fovea? The brain will associate with every point a *combination* of excitatory and inhibitory responses. Inside the solar disc, this leads to a rather modest average, but near the edge of the solar disc, the inhibitory part of receptor fields are partially covering a region where the light intensity is smaller. The inhibition is decreased and *the averaged response is increased*. Visually, there appears a bright rim. This mechanism provides contrast enhancement and constitutes an “edge detector”, allowing us to represent an object by drawing only its contours. Since the averaging process is a statistical one, allowing for local and momentary fatigue, the brilliancy of rim of the solar disc is unsteady.

“Miracles of the sun” were observed at several places when the sun was relatively low above the horizon. In Fatima, however, the sun was at the zenith on October 13, 1917. Why was it then possible to look into the sun for a rather long time? It had been raining, and when the low cloud layer was suddenly disrupted, there could still be a high degree of humidity in the air, so that the sunlight was sufficiently attenuated.

In a second experiment, realized at 3 p.m. in December 2002, I looked at the sun during a much longer time. After some minutes, I saw impressive colours, up to 2 or 3 times the diameter of the sun. They changed, but were mainly pink, deep blue, red and green. Further away, the sky became progressively more luminous. I stopped there, since I understood that these colours resulted from the fact that *the red, green and blue sensitive pigments* are bleached and regenerated at different rates. Moreover, it is well known that receptor fields combine the responses of cones, to form *blue-yellow, red-green and white-black opponent pairs*. These neural responses are analysed in the visual cortex, where information about *form, colour and motion* are extracted at separate places. The brain is functioning like a parallel computer, but it can instantaneously keep track of everything that belongs together by means of *synchronous oscillations*. Previously, I had already established a brain-wave equation that accounts for these oscillations. In spite of separate analyses, performed in specialized areas, the necessary perceptual unity can thus always be preserved.

These highly efficient methods imply, however, that *illusions* are possible. Some of them are automatic and intrinsic to the hard-wired part of the brain, while other illusions can result from dynamic processes. Recent experiments showed, indeed, that fixed retinal images that have no precise meaning are *sequentially modified* by suppressing different parts, so that the remaining parts produce recognizable features. The brain tries to “make sense” of the enigmatic input, by comparing it with stored knowledge and some features that are actually present are eliminated. Other features may be added. That’s how reading errors can arise. For ambiguous situations, the mind’s brain offers various possibilities. These rapid and spontaneous *trials* allow us to select what seems to be acceptable. That explains why some “seers” could have *changing visions* in the solar disc. Because of statistically changing fatigue processes in individual nerve cells, the luminosity of the disc was not uniform, and some persons were particularly *gifted* to make sense of ambiguous data. We could say that they are more much imaginative and creative than common persons.

What about the motions of the sun? I didn’t see them, because I didn’t look at the sun for a sufficiently long time or my brain knew already too much. Once, after I had been looking at a passing train, I had the illusion of an opposite motion. Joseph Plateau discovered already that when we look at the centre of a spiral that is rotating at some given velocity about this point, and when we stop this rotation, we see a *reversed rotation*. It lasts for several minutes, although in reality, there is no motion at all. This is an example of motional after-effects. The “dance of the sun” is initiated, however, by a *spontaneous generation* of apparent motion. This means that some groups of neurons of the visual cortex have chosen this possibility. It is reversed, by opposing excitatory and inhibitory activities. The same concept applies also to oscillations and to forward and backward motions.

A very interesting study was recently devoted to this “zoom and loom effect”. It tends to appear when the brain is confronted with the two-dimensional retinal image of an object that is situated at some unknown distance. The brain will then consider the possibility that it could come closer, by performing an *illusory mental zoom*, where the apparent size of the object is progressively increased. These results from the fact that evolution preserved the tendency to take into account the possibility of a dangerous approach: a rapid evasive action could be beneficial for survival. When the “idea” of an approach does not lead to any real danger, the

perceived object returns to its normal place. In Heroldsbach, people were so afraid by the “descending sun”, that they fled into the adjacent fields and threw themselves on the wet and dirty ground. Subjective perceptions seemed to be confirmed by those of other persons.

After about a quarter of an hour, the sun takes on again its “normal” appearance. It became too brilliant for continued gazing. This means actually that bleached pigments have been regenerated and that secondary biochemical processes are not effective any more for some time. Dr. J.B. Walz, a university professor of theology, collected over 70 eye-witness reports of the “miracle of the sun” that occurred in Heroldsbach on December 8, 1949. These documents disclose some individual differences in perception, including the fact that one person saw the sun approaching and receding *three times*, while most witnesses saw this only two times! The “coloured spheres” that were usually perceived after the breathtaking “dance of the sun” are simply *after-images*, but they were not recognized as such, since the context of these observations suggested a prodigious interpretation. In Tilly-sur-Seules and Kerezinen, the coloured spheres were mentioned quite often, since the witnesses did talk to one another.

That the sky and ground were perceived during miracles of the sun as being coloured does not astonish any more, but I was very concerned, however, by the fact that some witnesses had the impression that coloured lights were *ejected* from the sun. They spoke even about “luminous fountains” and “fireworks”. Trying to solve this problem, my attention was attracted by a peculiar observation of one scientist. He noted in 1963 that after-images start to be blurred after about two minutes. He suggested that this could result from a *diffusion process* at the retinal level, but could not identify its nature. More recent studies of the biochemistry of retinal photoreceptors, allow me now to propose an explanation. Activated photoreceptors increase the density of Na⁺ ions in their vicinity, and these results in a facilitated activation of other photoreceptors. A large part of the sky surrounding the solar disk can thus become coloured and rather luminous when the observation continues for some time.

The final result of this investigation is that “miracles of the sun” can be interpreted without assuming an intervention of supernatural powers or extraterrestrial intelligences. Some people may claim that they knew this already, but they couldn’t prove it. Actually there is no reason at all to be arrogant with respect to those who believed in a miracle or assumed the

presence of a UFO. We were confronted, indeed, with a *highly remarkable illusion*, displaying many sophisticated and completely unexpected features.

Problematic messages

The seers who “communicated” with the Virgin Mary or Jesus are always stressing the importance of *prayer and penitence*. A closer look at their messages reveals an underlying motivation. It refers to *feelings of fear*. They can be related to a concern with salvation or damnation at a personal or general level, but usually, they focalise on the *conditional announcement of catastrophic events*: “If you don’t..., then...”

In Heroldsbach, on October 9, 1949, four girls, 10 - 11 years old, had collected coloured leaves and were playing when they heard the clock of their village church. It was 5 p.m. Spontaneously they started to pray and at that moment, they saw in the sky, above a birch-wood, an indistinct white silhouette. One of the children compared it to a nun, dressed in white, but then it seemed more plausible to say that it was *the Mother of God*. That’s the usual German expression for the Virgin Mary. During the following days, the “apparition” became more and more distinct. On October 14, one of the children asked: “Dear Lady, who are you?” She answered: “*I am the Mother of God*”. A few days later, the children asked the luminous Lady, carrying a rosary, if she had a message for humanity. She simply said: “*pray!*”. Heroldsbach is a small village, near Nuremberg and the Second World War was still very present in the mind of everyone. On October 31, 1949, one of the children questioned the Lady: “*will there be war again?*”. She replied: “*when you pray, there will be none.*”

Then, she did not appear anymore until December 8, 1949. That was the day where the “great miracle of the sun” occurred in the presence of 8.000 to 10.000 persons. It started at 3 o’clock, during a procession, but the Virgin Mary appeared already to the children at 14:30. For the first time, she was now bearing a golden crown on her head. It was “brilliant like the sun” and on her left arm, she carried the Jesus-Child. After that event, the apparitions became more and more explicit, with constant insistence on prayer and penitence! The group of “seers” was now constituted of 6 girls, all about 11 years old.

On May 15, 1950, Our Lady announced that “*the Russians will come and a great famine!*”. Over the birch-wood, where the children had initially

perceived the apparition, they saw now an agitated war-scene, with soldiers that were shooting at one another. The soldiers fell on the ground and remained there, bleeding and suffering. That terrifying vision lasted for about 10 minutes, but during all this time the Virgin Mary covered the village of Heroldsbach with her protective veil. The following day, the children saw again a fierce battle in the sky, but now, there were brown and black soldiers. The brown ones had Mongolian eyes. They were winning and went into a village. They entered the houses, dragged their inhabitants on the street and pushed them towards a place, where they were savagely killed. The children recognized the village. It was their own. These visions were interpreted (by N. Langhojer) in the following way: “when the request of the heavenly mother is fulfilled, the first vision of the Russians will be realized. The homeland will be saved, but when humanity does not listen, the second possibility occurs. Destruction will take its horrible course.”

The next day, the Virgin Mary appeared with the Jesus-Child, who said himself: “*Dear children, if you don't pray with diligence, the Russians will come and slay you!*” We have to recall that in 1949, the Russians had performed their first experimental atomic explosion and that in 1950, the US announced the construction of a hydrogen bomb. In *La Salette*, the seers reported already in 1846, that the weeping Lady told them: “When my people does not submit, then *I will be obliged to let go the arm of my son*. It is so heavy that I am not able to hold it back anymore.” The “great secret of La Salette”, published in 1873, expressed the menace and the enumeration of the faults that had to be corrected in more explicit terms.

The “third secret of Fatima”, communicated on July 13, 1917 and written down by Lucia in 1944, was finally disclosed in June 2000. Lucia saw a very intense light and a bishop, clad in white that she considered as the Holy Father. With other bishops, priests, nuns and monks, he climbed a mountain, towards a great cross, his face and stature being marked by sorrow and suffering. When he arrived at the cross, he knelt down, but was killed by a group of soldiers, using “fire weapons and arrows.” His companions died in the same way. Lucia suggested that there would be persecutions of the church, but this didn't happen. Cardinal Ratzinger proposed therefore an other interpretation. He established a connection with the attempted murder of Pope John Paul II, on Mai 13, 1981. Sister Lucia had always insisted on a “consecration of Russia”. This referred at least implicitly to the menace of Russia and atheistic communism, but why has the Nazi-

-regime, the murderous Second World War and the awful *shoa* not been prophesised?

These examples raise some obvious theological problems. In Medjugorje, the seers reported even that penitence should be more valued than charity. The central problem follows from the fact that *the general trend of these messages conveys an inadequate image of God*. Christian revelation tells us that “there exists a God, who loves us!” (See for instance John, 17. 21 and 23), while apparitions present a God of revenge and anger. This fact and the emergence of a natural explanation of miracles of the sun call now for an investigation of the true nature of visionary experiences.

Apparitions and altered states of consciousness

For all apparitions that I studied in depth, I came to the conclusion that the “seers” are not lying or consciously simulating. This follows from many details and is coherent with their religious attitudes. We have thus to accept that what they “see” and “hear” is *real to them*. They are living their mystical experiences with great courage and dedication. In Heroldsbach, the children had often to advance for many meters on bleeding knees, but they were also allowed to touch the garments, face and hair of the Mother of God. They “felt” this, as well as the Jesus-Child, when they carried it on their arms. They could “smell” suave odours and they could “taste” the Holy Communion, they got from an angel in solid and liquid form. In Fatima, the three children got also a mystical communion from an angel, before the canonical apparitions of 1917. All these sensations had - for the visionaries - *the same characteristics as real perceptions*. This does not exclude, however, that their experiences could actually result from purely mental processes.

Particular personal dispositions, the inducing power of special circumstances and the general cultural framework could favour the construction of a *virtual reality*. This term has to be defined by analogy with the concept of a “virtual image” that we see behind a mirror. The eyes receive only light that is reflected by the surface of the mirror, but this light seems to emerge from points that are situated behind the reflecting surface. As long as we are not conscious of the presence and properties of the mirror, we can make no difference between a virtual and a real image. A mirage is a similar kind of illusion. *Could apparitions be a mental mirage?* Before we can answer this

question, we have to gather facts, in order to define the apparitional phenomenon.

- While “miracles of the sun” result from real visual perceptions, involving many persons, *apparitions require no sensory input* and occur within a single individual or a small group of persons, interacting with one another. Apparitions are usually viewed as spiritual or mystical experiences, but *psychological processes* are surely involved.
- There may be some exceptions, but in general, the seers are honestly experiencing what they report. *Their mystical experiences are real*, at least at the subjective level. In their head, the seers perceive things that have for them a supernatural, but real cause.
- *Apparitions can involve different sense modalities*. Most frequently, one does see and hear, but one can also feel, smell and taste. This is equally true for hallucinations, but there is no evidence at all that apparitions result from schizophrenia or some other mental pathology. Seers are normal people, although their mental energy is strongly focalised on their apparitional experiences.
- *Apparitions evolve through different stages*. There are many well documented cases, where the initial phase corresponds to becoming aware of the presence of some imprecise, relatively distant and usually silent, but more or less luminous shape. *This ambiguous data is interpreted* by formulating the idea that it could be the Virgin Mary. This idea is shared, when there are several “seers”. Usually, this happens in an emotionally charged context and kindles then a sequence of reactions. The apparition is repeated and the initial interpretation is crystallized. Favourable echoes from valued sectors provide reinforcement, but even when the social context is partly hostile, this can contribute to consolidation, since the seers cannot admit anymore that they were wrong. Doubts are obliterated. The apparitions become more precise and detailed. The seers get “messages” and even “secrets”, to be communicated only to the pope.
- *The time course of these events is variable, but limited*. Every particular “vision” can last from some minutes to several hours. Sometimes,

it ends by a stepwise vanishing of different parts, but usually, the luminous apparition disappears as a whole, through a sudden extinction of the light or a progressive motion towards the sky, as if the supernatural being had to return to the place where it was supposed to come from. Identical or very similar apparitions can occur several times during the same day. The time and day of the following apparitions is usually fixed in advance, so that several seers and the whole assembly of attentive followers are synchronised. The total number of apparitions at some particular place can be enormous. The apparitions of Heroldsbach lasted three years, in spite of very harsh reactions from the bishop of Bamberg. The series of public apparitions can eventually be followed by private ones, leading to further elaboration of the initial “messages”.

I had always considered, like the responsible authorities of the Catholic Church, that some apparitions are true, while others are not. I simply thought that some extraordinary things can be in the “power of God”. What about *the power of the human mind*? It is necessary to find out, even for pastoral reasons! When I studied the official documents, that had been used for the evaluation of the apparitions of Beauraing, in Belgium, I was somewhat disappointed by the lack of precision and clarity in the description of the basic events. Then I found the book of E. De Greeff, *professor of criminology at the Catholic University of Louvain*. He was present during some of these apparitions. Moreover, he had carefully studied the testimonies of the seers and other witnesses. His competence and integrity are undeniable, but his conclusions were not in favour of an official recognition.

In the evening of November 29, 1932, when five children were near a statue of Our Lady of Lourdes, they saw a strange light, and the idea came up that it could be an apparition of the Virgin Mary. De Greeff shows that the children were quite emotional and that the light could actually come from a car. During the following evenings, the children saw similar lights at about the same place and their initial concept was strengthened. The four girls and one boy, between 9 and 14 years old, were interrogated, but this happened at first in a very uncritical way. When the methods changed, partially because of De Greeff, it appeared that the seers did not have identical visions and that they did not “hear” the same words or phrases. There were even some contradictions.

Every evening, before the apparition started, the five children were standing in a row and praying the rosary with the surrounding assembly. Suddenly, they fell on their knees, in perfect *synchrony*, and during the whole apparition, they prayed with a shrill voice and at an unusually rapid rate. This behaviour astonished some observers, since it is atypical of apparitions, but most observers considered that it pleaded in favour of an authentic and simultaneous mystical experience. The sudden and synchronous kneeling down could be explained, however, since they were waiting in tense expectation and could thus react as soon as one of them started to move. The end of the apparition was easily synchronized by the modified acoustic signals. Even when the “seers” were immediately separated from one another after the apparitions, to be subjected to separate interrogations, their declarations could still be relatively coherent, since they had ample opportunity to communicate during the day and to prepare - in good faith - the questions they would ask to the luminous Lady.

Then I found the book of Dr. A. Ladon, a Belgian neurologist, who collected data on the series of apparitions that developed in several parts of Belgium, after the events of Beauraing. In 1933, there were 47 persons who claimed that they saw the Virgin Mary. There were even two groups of over hundred persons who had apparently common visions. Ladon’s analysis leads him to the conclusion that this was a remarkable phenomenon of *contagion*: “a mental epidemic.” Actually, the archbishop of Belgium, Cardinal van Roey, reacted very soon. In agreement with his Study Commission, he denied the supernatural character of all these alleged apparitions with the exception of the initial ones, at Beauraing and Banneux. They were the subject of much longer examinations and negotiations, but finally recognized.

It is impossible to provide any *direct* evidence for or against the supernatural origin of apparitions, but it is reasonable to compare apparitions to one another. Some of them are particularly instructive. Moreover, it is necessary to take into account what is known today about *various mental mechanisms* that could be related to apparitions. In modern science, it is not rare at all that one has to use indirect methods. Nobody ever saw the internal structure of atoms and nuclei, but we learned a lot about it through indirect observations and logical reasoning. The decisive element is then the convergence of all these arguments. In regard to apparitions, we have to take into account the following observations and propositions.

- During religious visions and locutions those who experience them are in an *altered state of consciousness*. It is of limited duration and comparable to the state of a hypnotized person, but it can be reached by autosuggestion. This requires only that usually active control mechanisms are deactivated.
- A *false interpretation of an ambiguous perceptual experience* can be sufficient to trigger a series of reactions, where the mind tries to make sense of unusual data and tends to protect this conception.
- Freud introduced already the concept of the *subconscious*, considered as a part of our personality where some thoughts can be repressed and kept in quarantine, by powerful control mechanisms. *Unconscious processes* can also play an important role in apparitional phenomena. Reasonable doubts are eliminated by filtering, while special types of behaviour are established and become then autonomous.
- Great progress was made during the last two decades in the study of a psychological phenomenon that is even much more remarkable. It is the “multiple personality disorder”, now called “*dissociative identity disorder*.” It is characterized by the constitution of two or more distinct personalities, living in the same body with separate memories, different ethical conceptions and sometimes even with distinct manual and intellectual skills. Usually, this is an escape response to very traumatic and repeated childhood abuse, since it provides a way to cope with truly unbearable experiences, even when they reoccur. All associated memories are then isolated from those that are necessary to organize the normal life. Later on, it can happen that one of the usually hidden personalities “comes out” and *takes control of the actual behaviour*. This will last only for a limited time, and the transitions from one state to the other are always very abrupt. This “switching” is necessary, since it insures the mutual isolation of memories. Appropriate psychotherapy can help to become aware of the other personalities and eventually, it can lead to their progressive fusion.
- *Apparitions* are not multiple personality disorders, but there are some similarities. In both cases, an altered state of consciousness

appears during a limited time. It results from dissociation and requires switching. The particular state that allows for visions can even turn into “ecstasy”, where external stimuli, including those that would produce pain, are not perceived any more.

- *Other states of altered consciousness*, like drug-induced hallucinations, trances of shamans, automatic writing, out of body experiences and possessions are also comparable to apparitional experiences. The phenomenology is different, but the underlying mechanism is the same. The essential point is, indeed, that *the human mind can function in unusual ways*.
- Some persons can produce dream-like *hypnagogic images*, that are very vivid and can even be naturally animated. Other persons have the ability to produce *eidetic images*. When they have seen an image that is taken away, they continue to “see” it in front of their eyes, as if it were there. This can last from several seconds to many minutes. The scene can be life-like. The same kind of persistence is also possible for sounds, as well for music as for language. This does not result from a reconstruction by memory processes, but from *a continuation of the same neurological processes* that were activated in the brain during the real perception. The ability to have eidetic images is more frequently encountered for children and adolescents than for adults, and it is quite remarkable that the same bias exists for apparitions. Some persons seem to be particularly “gifted” for visionary experiences.

The general conclusion is that *apparitions and miracles of the sun cannot be taken at face value*. There are natural mechanisms that can explain them, but they are so unusual that we were not aware of them. Miracles of the sun result from neurophysiologic processes in our eyes and visual cortex, while apparitions involve more complex processes in our mind's brain. The “seers” are honest, but unconsciously, they put themselves in an *altered states of consciousness*. This is possible, since our brain allows for “dissociation” and for “switching” from one type of behaviour to an other. A new conception of apparitions and miracles of the sun seems thus to be emerging, but much more research is needed in this domain, especially because of its socio-cultural importance.

References:

- Altgott, C.: *Heroldsbach eine mütterliche Mahnung Mariens* (Altgott, Mönchengladbach, 1979).
- Alonso, J.M.: *Histoire « ancienne » et histoire « nouvelle » de Fatima* (in *Vraies et fausses apparitions dans l'Eglise*, Alonso et al. Lethielleux-Bellarmin, 1973).
- Angelier, F. & Langlois, C. (éd.): *La Salette. Apocalypse, pèlerinage et littérature* (Millon, 2000).
- Auclair, R.: *Kerizinen. Apparitions en Bretagne* (Nouv. éd. Latines, 1968).
- Barnay, S.: *Le ciel sur la Terre. Les apparitions de la Vierge au Moyen-Âge* (Cerf, 1999).
- Barthas, C. & G. da Fonseca, sj: *Fatima, merveille inouïe* (Fatima éd. Toulouse, 1943).
- Barthas, C.: *Fatima, merveille du 20^e siècle d'après les témoins et documents* (Fatima éd. Toulouse, 1951).
- Bassette, L.: *Le fait de La Salette 1846-1854* (Cerf, 1955).
- Bianchi, L.: *Fatima – Medjugorje* (Ed. du Parvis, 1987).
- Boncampagni, S.: *Un secolo di “soli rotandi” nelle visioni mariane* (Ufo, CUN, 50-55, Marzo 2002).
- Boufflet, J. & Ph. Boutry: *Un signe dans le ciel. Les apparitions de la Vierge* (Grasset, 1997).
- Boufflet, J.: *Medjugorje ou la fabrication du surnaturel* (Salvator, 1999).
- Boufflet, J.: *Faussaires de Dieu* (Presses de la Renaissance, 2000).
- Brindley, G.S.: *Two new properties of foveal after-images and two Photochemical hypotheses to explain them* (J. Physiol. 164, 168-179, 1962). *Afterimages* (Scient. Am. 84-93, Oct.1963).
- Carol, M.P.: *Visions of the Virgin Mary: The effect of family structure...* (J. Sc. Stud. Relig. 22, 205-21, 1983).
- Cassey, J.F. & L. Wilson: *Joan. L'autobiographie d'une personnalité multiple* (Presses de la Cité, 1992).
- Castelbranco, J.: *Le prodige inouï de Fatima* (Centre Marial de Fatima, 1972).
- Castella, A.: *San Damiano. Le messager de Notre-Dame des Roses* (Ed. du Parvis, 1989).
- Centini, M.: *Le grand livre des miracles. Les guérisons miraculeuses - les miracles* (De Vecchi, 2000).
- Chiron, Y.: *Enquête sur les apparitions de la Vierge* (Perrin-Mame 1995, J'ai lu, 1997).

- Colin-Simard, A.: *Les apparitions de la Vierge. Leur histoire* (Fayard-Mame, 1981).
- Comité international d'informations et d'études historiques.: *L'étoile dans la Montagne* (Garabandal, 1966).
- Cross, L.M. & M. Olphe-Gaillard: *Lourdes 1958. Témoins de l'Évènement* (Lethielleux, 1957).
- De Greeff, E.: *Notes sur les faits de Bearaing. Rectifications, compléments, confirmations concernant les Documents contenus dans les Notes (Les faits mystérieux de Beauraing, Desclé DB, 1933). Beauraing: Conclusions médico-psychologiques* (Etudes Camélitaines, octobre 1934).
- De Marchi, R.P.: *Témoignages sur les apparitions de Fatima* (Cova da Iria, 1966, 1982).
- De Sède, G.: *Fátima. Enquête sur une imposture* (A.Moreau, 1977).
- Dhanis,P.: *Bij de verschijningen en het geheim van Fatima. Een critische bijdrage* (Kinkhoren, Brugge, 1945), *A propos de "Fatima et la critique"* (Nouv. Rev. Theol. 64, 580-606, 1952).
- Dinzelbacher, P.: *Vision und Visionsliteratur im Mittelalter* (Hirseman, Monogr. Gesch. Mittelalt. 23, 1981).
- Dirkens, A. (éd.): *Apparitions et Miracles. Problèmes d'Histoire des Religions* (ULB, Bruxelles, 1991).
- Dowling, J.E.: *Retinal Processing of vision* (in Gregor & Windhorst: *Compreh. Hum. Physiol.* Springer, 1996).
- Eizereif, H.: *Das Zeichen des lebendigen Gottes – Marienfried* (Christiana, 1976).
- Englebert, O.: *Dix apparitions de la Vierge* (Albin Michel, 1960).
- Eparvier J. & M. Hérissé: *Fatima aux soleils dansants* (in *Les miracles*, Historia, n°spécial 394 bis, 1979).
- Ernst, R.: *Maria redet zu uns – Marienerscheinungen seit 1830* (Hovine, 1983, 1993). *Lexikon der Marienerscheinungen* (1983, Ruhland, 1989). *Zum Problem des Person-Seins* (MG & Eupen, 1999).
- Erzbischöfliche Kommission: *Was ist von den Heroldsbacher Visionen zu halten?* (Bamberg, 1950).
- Evans, H.: *Visions Apparitions Alien visitors* (Aquarian Press, 1984).
- Ewald, R.E et al.: *Sun gazing as the cause of foveamacular retinitis* (Am. J. Ophthalmology 70, 491-7, 1970).
- Faulhaber, L.: *Die Visionen von Heroldsbach* (Münchener Theologische Zschr. 1, 98-104, 1950).

- Felici, I.: *Fatima* (1952, trad. Apostolat de la Presse, 1963).
- Fernandes, J. & F. D'Armada: *Intervenção extraterrestre em Fátima* (Bertrand, 1981).
- Fiebag, P. & G.: *Zeichen am Himmel. UFOs und Marienerscheinungen* (Ullstein, 1995).
- Finke, R.A.: *Theories relating mental imagery to perception* (Psychological Bull. 98, 236-9, 1985).
- Gabriel, J.: *Présence de la très Sainte Vierge à San Damiano* (Nouv. éd. Latines, 1968, 1975).
- Getry, G.: *Kibeho ou la face cachée de la tragédie Rwandaise* (de Guibert, 1998).
- Gladstone, G.J. & W. Tasman: *Solar retinitis after minimal exposure* (Arch. Ophthalmology, 96, 1368-9, 1978).
- Göksu, C.: *Heroldsbach – Eine verbotene Wallfahrt* (Echter, 1991).
- Grabinski, B.: *Flammende Zeichen der Zeit – Offenberungen, Prophezeiungen, Erscheinungen* (Hacker, 1972).
- Green, C.: *Lucid Dreams & Out-of-the-body experiences* (Hamiosh Hamilton, 1968).
- Green, C. & C. McCreery: *Apparitions* (Oxford Institute of Psychophysical Research, 1975).
- Haber, R.N.: *Eidetic images* (Scient. Amer. April 1969, 36-44).
- Hacking, I.: *Rewriting the soul. Multiple personality and the science of memory* (Princeton Univ. Pr. 1995).
- Hallet, M.: *Que penser des apparitions de la Vierge ?* (Favre, 1985).
- Hershenson, M.: *Moon illusion and spiral aftereffect: Illusions due to Loom-Zoom System ?* (J. Expt. Psychol. 111, 423-40, 1982), *Directional Symmetry in the spiral aftereffect* (Percept. Motor Skills, 55, 1203-8, 1982).
- Hesemann, M.: *Das Fatima Geheimnis* (Kopp, 2002).
- Hoffmann, H.: *Die Wahrheit über die Botschaft von Fatima* (Rohm, 1995).
- Hope-Ross, M. et al.: *Solar retinopathy following religious rituals* (Brit. J. Ophthalmology, 72, 931-4, 1988).
- Huber, M.: *Multiple Persönlichkeiten* (Fischer, 1995).
- Hunt, H.T.: *A cognitive psychology of mystical and altered-state experience* (Percept. Motor Skills, 58, 467-513, 1984); *Relations between the phenomena of religious mysticism (altered states of consciousness) and the psychology of thought...* (Percept. Motor Skills, 61, 911-961, 1985).

Janssens, A.: L'absence de surnaturel dans les faits de Beauraing (in B. de Jésus-Marie: *Les faits mystérieux de Beauraing. Etudes, documents, réponses*, Desclé DB, 1933).

Jean-Nesmy, C.: *Lucie raconte Fatima* (Fatima éd., Desclé DB, 1976).

Joset, C.J. sj: *Dossiers de Beauraing, vol. 1- 5* (Pro Maria, Beauraing, Rech. Univ. Namur, 1981-84).

Joyeux, H. & Laurentin, R.: *Etudes médicales et scientifiques sur les apparitions de Mejugorje* (OEIL, 1985).

Klüwer, H.: *An experimental study of the eidetic type* (Genetic Psychology Monographs, 1, 71-230, 1926), *Mescal visions and eidetic visions* (Am. J. Psychol. 37, 502-515, 1926).

Kolers, P.A.: *Perception and representation* (Ann. Rev. Psychol. 34, 129-66, 1983).

Kosslyn, S.M. et al.: *The cognitive neuroscience of mental imagery* (Neuropsychologia, 33, 1335-44, 1995).

Ladon, A.: *Une épidémie mentale contemporaine – Les apparitions de Belgique* (Doin, 1937).

Langhojer, N.: *Reich der Mystik. Die Botschaft von Heroldsbach* (Arche Joseph, Heroldsbach, 1971)

Laurentin, R.: *Lourdes. Histoire authentique des apparitions, 6 vol.* (Lethielleux, 1961).

Laurentin, R.: *Multiplication des apparitions de la Vierge aujourd'hui* (Fayard, 1988, 1995).

Leeser, J. et al.: *What is a delusion? Epistemological dimensions* (J. abnorm. Psych. 108, 687-94, 1999).

Le Hidec, M.: *Les secrets de La Salette* (Nouv. éd. Latines, 1969).

Lesserteur, R.P. & Marquis de L'Espinasse- Langeac: *Notre-Dame de Tilly* (Les amis de Tilly, 1966).

Lynn, S.J. et al.: *The fantasy-prone person...* (J. Personality and Social Psychol. 51, 404-8, 1986).

Maes, R.P.: *Beauraing, observations sur l'étude de M. De Greeff* (St. Alphonse, Louvain, 1934).

Maindron, G.: *Les apparitions de Kibeho Annonce de Marie au cœur de l'Afrique* (OEIL, 1984).

Maisonnette, R. & M. de Belsunce: *San Damiano - Histoire et Documents* (Tequi, 1983).

Maxence, J.L.: *Le secret des apparitions et des prophéties mariales* (de Falois, 2000).

McConkey, K.M. et al.: *Trance logic in hypnosis and imagination* (J. Abnormal Psychol. 100, 464-72, 1991).

McLure, K.: *The evidence for visions of the Virgin Mary* (Aquarian Press, 1983).

Michael, C.R.: *Retinal Processing of visual images* (Scient. Amer. 104-14, May 1969).

Michel de la Sainte Trinité (frère): *Toute la vérité sur Fatima* (Renaissance Catholique, 1986). *The whole truth about Fatima*. 3vol. (Immaculate Heart Publ. 1989-90).

Misraki, P.: *Des signes dans le ciel* (Laberge, 1968).

Monroe, R.A.: *Journeys out of the body* (Doubleday 1972, Souvenir Press, 1998).

O'Brian, D.F.: *The chemistry of vision* (Science, 218, 961-966, 1982).

Oraison, M. & Y Chauffen: *Le tribunal du merveilleux* (Plon, 1976).

Ottaviani, A.: *Chrétiens, ne vous excitez pas si vite...* (Documentation Catholique, 48, 345-55, 1951).

Pannet, R.: *Les apparitions aujourd'hui* (C.L.D. 1888).

Penner, R. & J.N. McNait: *Eclipse Blindness* (Am. J. Ophthalmology, 61, 1452-7, 1966).

Pinon, G.: *Fatima. Un ovni pas comme les autres ?* (Osmondes, 2001).

Plateau, J.: *Bibliographie analytique des principaux phénomènes subjectifs de la vision* (Mém. Acad. Roy. Belg. XLII, 1°(1-59), 2°(1-59), 3° (1-26.), 4°(1-44.), 5°(1-35), 6° (1-45), Suppl. 1877, 1880 et 1882).

Pritchard, R.M.: *Stabilizes images on the retina* (Scient. Amer. 72-8, June 1961).

Pylyshyn, Z.W.: *What the mind's eye tells the mind's brain* (Psychol. Bull. 80, 1-24, 1973).

Rahner, K.: *Visionen und Prophezeiungen* (Herder, 1958, 60, 89).

Ramon Garcia de la Riva, J.: *Maria erscheint in Garabandal* (1978, Weto, 1983).

Ratzinger, J.: *Comprendre le sens du message de Fatima* (La docum. Cath. 2230, 677-83, 2000, dossier).

Regan, D.: *Visual processing of four kinds of relative motion* (Vision Res. 26, 127-145, 1986).

Regan, D. & K.I. Beverley: *Looming detectors in the human visual pathway* (Vision Res. 19, 415-21, 1978).

Rushton, W.A.H.: *Visual pigments in man* (Scient. Amer. 120-132, Nov. 1962). *The Ferrier Lecture: Visual adaptation* (Proc. Roy. Soc. London B, 162, 20-46, 1965).

Rushton, W.A.H. & D. MacLeod: *The equivalent background bleaching* (Perception, 15, 689-703, 1986).

Sanchez-Ventura y Pascual, F.: *La Vierge est-elle apparue à Garabandal ?* (Nouv. Ed. Latines, 1966).

Schachter, D.L.: *The hypnagogic state: A critical review of the literature* (Psych. Bull. 83, 452-81, 1976).

Scheffczyk, L.: *Die theologischen Grundlagen von Erscheinungen und Prophezeihungen* (Johannes, 1982).

Schellinck, G.: *Het wonderbare leven van Leonie van den Dijck* (Onkerzele, 1994).

Sivric, I.: *La face cachée de Medjugorje* (Psilog, 1988).

Stamm, H.: *Im Bann der Apokalypse. Endzeitvorstellungen in Kirchen, Sekten und Kulturen* (Pendo, 1998).

Stern, J.: *La Salette Documents authentiques. Dossier chronologique intégral* (Desclé DB 1980, 1984).

Thurston, H.: *Les phénomènes physiques du mysticisme* (1951, Gallimard, 1961).

Tizané, E.: *Les apparitions de la Vierge; un enquêteur s'interroge* (Tchou, 1977).

Tricot, A.: *Le livre d'or de Kerizinen* (Sainte Anne, 1977).

Turi, A.M.: *Pourquoi la Vierge apparaît aujourd'hui* (Ed. du Felin, 1988).

Toussaint, Mgr. & C.J. Joset, sj.: *Beauraing, les apparitions, le livre du cinquantenaire* (Desclé DB, 1981).

Vauzelle, Marquis de la: *Le secret de la Salette devant l'Épiscopat français* (Salmon, Tours, 1917).

Vergote, A.: *Visions et apparitions. Approche psychologique* (Revue théol. de Louvain, 22, 202-225, 1991).

Villepelée, J.F.: *Marie Martel, I et II* (Les amis de N.D. de Tilly, 1982, 1983)

von Däniken, E.: *Le livre des apparitions* (J'ai lu, 1975). *Die Götter waren Astronauten!* (Bertelsmann, 2001).

von Lichtenfels, K.: *Lexikon der Prophezeihungen. 350 Voraussagen* (Herbig, 2000).

Von Reisswitz, C.K.: *Das letzte Geheimnis von Fatima* (Pattloch, 2000).

Von Urbantschitsch, V.: *Über subjektive optische Anschauungsbilder* (Deuticke, 1907). *Über subjektive Hörscheinungen und subjektive optische Anschauungsbilder*. (Deuticke, 1908).

Wade, N.J.: *A selective history of the study of visual motion aftereffects* (Perception, 23, 1111-34, 1994).

Wagner, H.: *Mystische Erlebnisse. Licht über Eisenberg* (Mediatrix, 1986).

Walz, J.B.: *Die Muttergottes-Erscheinungen von Heroldsbach-Thurn, I: 9.10.1949-13.8.1950, II: bis 25.7.1951, III: Augenzeugenberichte vom Sonnenwunder... Wichtige Antworten auf häufige Fragen „um Heroldsbach“ im Lichte der theologischen Forschung* (als Manuskript gedruckt, Frensdorf/Bamberg, 1958).

Wetzel, F.: *Die Phänomene von Heroldsbach-Thurn ...* (Natur und Kultur, 130-145, 1950).

Wilmet, L.: *Beauraing – Banneux – Onkerzeele* (Dupuis, 1933).