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GY. EGELY

HUNGARIAN BALL LIGHTNING OBSERVATIONS

(CASE 1 - CASE 278)

*Hungarian Academy of Sciences*

CENTRAL  
RESEARCH  
INSTITUTE FOR  
PHYSICS

BUDAPEST

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# HUNGARIAN BALL LIGHTNING OBSERVATIONS

(CASE 1 - CASE 278)

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## ABSTRACT

The collection contains about 300 ball lightning observation, which has been created by polling about 3.000.000 newspaper readers. Only those cases are included in the collection which contain useful information about the physical nature of ball lightning. Some of the descriptions contain a sketch of the event as well, these were drawn by the observers usually during interviews. In the appendix the cases are sorted according to their characteristic features, and the distribution of their impact sites are mapped as well.

## АННОТАЦИЯ

В материале собраны данные о примерно 300 шаровых молниях, которые наблюдались на территории Венгрии. Представленный материал составлен на основе опроса примерно 3 миллионов читателей газет. Сюда включены наблюдения, содержащие ценную информацию о природе шаровых молний. Некоторые описания для облегчения восприятия дополнены рисунками, полученными в письмах или нарисованными свидетелями явления во время личных бесед с ними. В конце материала данные сгруппированы по основным свойствам наблюдавшихся шаровых молний; приведена карта распределения мест наблюдений описанных явлений.

## KIVONAT

A gyűjtemény kb. 300 magyarországi gömbvillám megfigyelést tartalmaz, amely kb. 3.000.000 újságolvasó megkérdezésével jött létre. A gyűjteménybe azok az esetek kerültek be, amelyek értékelhető információkat tartalmaznak a gömbvillám természetéről. Az esetek egy részénél rajzok teszik könnyebbé az eset megértését, ezeket általában interjú vagy levelezés során rajzolták a szemtanúk. A gyűjtemény végén a főbb tulajdonságok szerint csoportosítva vannak az esetek, és az esetek hely szerinti eloszlása is látható térképeken.

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## INTRODUCTION

Ball-lightning is most probably the rarest natural phenomenon on Earth. Its physical nature is still unknown despite the attempts that have been made to understand its guiding principles. Up till now the experimental simulation of ball-lightning has been completely unsuccessful in view of which the only way to learn about it is to collect eyewitness accounts.

The purpose of this paper is to help research efforts in this area, and to provide a collection of eyewitness reports. A great deal of effort has gone into this work; a publicity campaign has been organized in order to find those who have observed the phenomenon, and it has been brought into the focus of interest bearing in mind the potential observers of the future.

The mass media have extensively been used for this purpose. Long articles were published in all four national papers on the usual properties of ball-lightning. Previously published observations (in *Nature*, *Naturwissenschaften*, *Journal of Technical Physics*) were used to describe the major features of ball-lightning. A description was given of the usual size, its relationship to storms, its occasional interactions with different objects so that those who had seen such a phenomenon but could not identify it - would realize that the phenomenon they had seen was ball-lightning.

At the end of each article there was a request to the readers to write a detailed account of their observations.

The letters that were received in response to the request were carefully analysed and if inadequate data had been given or there were internal inconsistencies several questions were asked of the observer. This method was chosen rather than a questionnaire because the primary aim was to gain information on the physical nature of the phenomenon, and important individual details might have been lost by the statistical evaluation of a questionnaire.

When the observations arrived, some of the most interesting cases were published again in order to provide feedback and further encouragement to those who had not so far responded.

The newspapers which published articles on this topic were the following national daily papers.

Népszabadság	3	articles,	circulation:	750,000
Népszava	2	articles,	circulation:	270,000
Magyar Nemzet	2	articles,	circulation:	180,000
Magyar Hírlap	1	articles,	circulation:	55,000

In addition, an article was published in "Vasárnapi Hírek" as well; this is the only Sunday paper in Hungary (300,000 copies).

## VI.

Eleven county dailies (estimated circulation 500,000 copies) published articles on b.l. as well, mostly in the western, stormier part of the country (Hungary has 19 counties).

There were 7 radio reports as well (there are 3 radio channels) each of them about 5 minutes long.

Collection of the observations started on 30th April 1986, and was terminated on 15th September 1986, but it is planned to continue again next year. 282 letters containing 331 descriptions were sent in altogether - most of them ostensibly being BL observations; only 2-3 of them being (chemical) plasma phenomena.

The most frequent type of observation is when during a summer storm, a shining sphere "floats" into a room, it goes round the walls, and leaves the room through the same or another window without doing any damage. This is so frequent an observation that only those containing several useful data are listed in this selection. Observations without data were discarded, and the observers were not asked further questions. Sometimes second-hand observations had to be omitted from the collection, since they lacked the place and the year of observation, and the observers' name and further data, despite the reliability of the person who communicated the event. A few brief samples of these "stories" are given here:

An assistant professor of mechanical engineering (Gy. Ludwig) told the following story:

"A friend of mine, a teacher, told me that during a summer storm ball-lightning floated into the classroom through the open window of the classroom. It moved slowly, so when it was not far from him, he threw his gold watch into the fire-ball. The ball-lightning exploded immediately, and he found the gold watch to have melted".

An artist told the following story:

"When I was young I read that ball-lightning entered a room, and when it passed along the keyboard of a piano, it pressed the keys, so the piano gave an audible sound".

A librarian wrote the following story:

"I have read that a bunch of keys was melted and fused by ball-lightning. The keys were on a night table beside the bed of a priest, in Miskolc".

These, and dozens of similar observations could have been correct, but lacking important data, were omitted even from the statistics.

Some types of observation data could be considered as reliable, like the distinction between horizontal and vertical movement, accounts of permanent damage to the environment, size of the ball-lightning. There were problems with the determination of shape, time and rotation. Sometimes a poorly edu-

cated observer wrote about "egg shaped" form, but drew a regular ellipsoid; most of the observers could recall only the decade of the observation, and they were sometimes unable to recall whether the axis of rotation was vertical or horizontal. Sometimes velocities or diameters were given indirectly, that is in relation to the size and speed of something.

Most of the observations are incomplete: only a handful of them contain full information on ball-lightning, i.e. describe it from its formation until its termination. Nevertheless, the reports were included in this collection if at least a part of the observation contains useful, relevant information.

One exception has been made, however. All the cases involving biological effects were included because relatively little information has been collected on this aspect so far.

This survey contains about 300 observations. Most of the cases took place in Hungary, but some of them were observed by Hungarians living abroad.

As the primary purpose of the paper is to provide a source for further research, most cases are not commented on. Some remarks are added to those which are relevant to the multidimensional model, described in G. Egely: Energy Transport Problems of Ball Lightning. KFKI report 1986-13/D 54. pp.

At the end of the present paper is a short statistical evaluation of the collected data, viz.

- the decade of observation,
- distance from the observer,
- the month of observation,
- life-time of BL,
- size of the BL,
- average velocity of the BL,
- colour of the BL.

Besides these, there is a list of cases made up according to the given effects, e.g. interaction with objects, electrical effects, personal injury/biological effects.

The observations are all first-hand unless otherwise indicated.

The critical point in the case of surveys like this is the reliability of the information.

Most of the observers had had no higher education in physics, but there is no noticeable factual difference in the descriptions. Educated people wrote longer letters with more data: usually there was no need for further questions in their case; whereas several additional questions were asked of those who had no higher education. In the latter cases "cross questions" were always added, as a means of checking the internal consistency and the integrity of a given observation.

### VIII.

Due to the relatively high population density of Hungary, most of the cases were observed by more than one observer, thus the observer's error could be reduced. Most of the observers recognized that although the event had happened years ago, it is firmly imprinted in their memory, due to the curiosity of the event.

There are some quite unusual observations as well. These were not discarded because the observers described an internally consistent series of events. As long as the mechanism of BL is not understood completely, any preconception is harmful, even if a given observation contains bizarre effects. There is no special order in the collection. The letters were numbered after the verification had been completed. This case number is always used for reference purposes. If a person has observed more than one instance of BL during his/her life, the instances have been noted as a,b,c,...,etc.

The most devastating cases are shown on a geographical map of Hungary marked with their case number. Further cases, which caused less destruction or smaller electrical effect are marked by a white arrow, without the case number.

Other cases - those without any damage - are not shown on the map in order to avoid confusion.

Sketches which illustrate some cases were provided by the observers, but they were redrawn to achieve better contrast and so that they would be on a similar scale.

The last observation of the collection is the oldest known observation in the Hungarian language. It has more value in literature and history than in physics, nevertheless its data (1724) puts it among the earliest descriptions in the world.

In principle, based on the number of observations, one can estimate the frequency of the formation of ball-lightning. There are, however, several factors which lead to a decrease in the number of collected observations; these are the following:

A) Population factor. Not all parts of the country are observed. The whole territory of the country cannot be under observation continuously because there are relatively sparsely inhabited areas (in the hills, and some farmland areas, whereas e.g. along the shores of lake Balaton the population density is very high during the summer period). Estimated overall loss ratio is about 90 %.

During storms, people are usually in a room, where they can observe only 10-25 % of the neighbouring area.

During the night few people are awake to watch (but night is short during summer) this loss is ~ 25 %.

During storms the visibility is reduced to about 100-200 m, thus far distant

## IX.

ball-lightning observations are rare during storms, causing ~ 10 % per cent loss rate.

The other influencing parameters are basically human factors.

B) Response factor. Definitely not all individuals responded to the calls, they were mainly young high school pupils (age 14-18), soldiers (age 18-20), pensioners (over 60 years) and educated middle-aged professionals, who understood the importance of the data collection.

C) Access factor. This factor means the ratio of the population that reads the earlier mentioned newspapers in which the call for BL observations was published and listens to the radio programs that were broadcast. There are some groups who do not read anything, or just a little. University students living in hostels usually have little access to newspapers, people interested in arts and humanities tend to be less receptive to natural phenomena. While it is not easy to estimate this factor, based on the circulation data one may estimate about 3.5 million readers (and listeners) altogether (assuming 2 reader/copy): 35 per cent of the country's population. (Hungary has a population of approx. 10.5 million.)

Based on the above considerations, one can estimate that about 1-5 per cent of the actual BL events have been reported.

It is worth noting that the number of reported BL events were 16 in 1986, which is ~ 40 % of the events having been reported in the 1980s. Even though 1986 was unusually arid, there were no severe electric storms.

## ACKNOWLEDGEMENT

The author is indebted first of all to those who responded to the calls, and took the time to describe their observations.

Special thanks are due to Mrs. ÉVA JÉKY of the public relations department of the Central Research Institute for Physics, who helped to arrange the publication of the articles, and to those journalists who edited and knocked these articles into shape, viz.

PETŐ GÁBOR PÁL	of Népszabadság,
FARAGÓ ISTVÁN	of Népszava,
BUZA PÉTER	of Magyar Nemzet,
N. SÁNDOR LÁSZLÓ	of Magyar Hírlap,
TÓTH ILDIKÓ	of M.T.I. (Hungarian Press Agency),
GÁL ÁGNES	of Vasárnapi Hírlap,
JÓNÁS ISTVÁN	of Hungarian Radio

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Case 1. Markó János, Tatabánya (INTERVIEW)

He had his summer holidays in the village of Sirok in 1959. He was alone at home when a great storm broke out with lightning, thunder and rainfall. A shining formation of the diameter of a soccer ball jumped out of the radio. It had the shape of a ring about 1 cm thick<sup>1</sup> and was shining with white colour. He glanced at the radio exactly at the moment of the ring's jumping out<sup>2</sup>. The object rolled round the wall of the room, it did not make any noise or damage. As it reached the open door, it rolled out through it and disappeared in the rain. It had been visible for about 30 seconds. The ring was permanently circular and perpendicular to him. He could never see its flat side<sup>3</sup>. The storm ceased in a couple of minutes. The observer claimed firmly the ball lightning to have the shape of a ring because he could see through the middle of it<sup>4</sup>.

Comments

1. Second penetration site.
2. There was no damage done to the radio; it means that the ball lightning had not been "created" within the radio, but beside it. When the 4D electron beam passed along the radio set, the observer noticed the "appearance" of a ball lightning.
3. The beam has been hollow, that is, the common segment with the 3D space has been an internally hollow sphere. When the outer radius of the ball is larger than the inner radius only by some centimeters, the light emission is restricted to a rather thin shell. This thin shell will appear as a circle for an observer, and it will remain a circle regardless of the position of the observer (or observers). If the observed object had been really a circle, its shape should have been an ellipse from a different angle of view.
4. The appearance was noiseless, therefore the beam penetration must have been gradual.

Case 2. Zalán Jenő, Felsőszéplak

In July of 1954, in Felsőszéplak, during a heavy summer storm a soccer-size, shining yellow sphere came into the kitchen from the opening of the chimney of an old, long, country house. According to the observer it went round the iron chest, then through the wall<sup>1</sup> and came out in the room of the other family at the bed of their child, who woke up suddenly. Then it went out into the yard and vanished with an enormous explosion. Although it passed a few cms away from the observer's face, he did not feel warm.

Comment

1. It might have been another ball lightning, this observation is not a definite proof for the harmless wall penetration.

Case 4. Varga Jánosné, Pásztó

She was sitting with her parents in the glazed porch during a great thunderstorm in 1940. This porch was 3 m wide, 5 m long, 3 m high and three of its walls were made of glass, the 4<sup>th</sup> one was the wall of the house. During thunders and lightnings they perceived a white shining sphere of 16 - 17 cm diameter above the upper window. It disappeared above their heads. They sought where it came inside and found a regular circular hole of 10 cm, there was no crack whatsoever on it<sup>1</sup>. They did not hear any noise, neither did they feel warmth.

Comment

1. The beam evaporated the glass. Similar observation. Weather, Vol. 28, pp. 161, Apr. 1973.

Case 5. Szabó Jenő, Vértesszőlő

He observed the following event between 6 and 7 o'clock in the morning in the last week of June in 1930. It was raining all night, but it stopped in the morning. It was misty and there was still thunder and lightning. He noticed a shining streak at a pole supporting electric wires<sup>1</sup> about 30 - 35 m away from him. A soccer-size sphere jumped out at once<sup>2</sup>. It revolved fast and in the meantime thick pearls were dropping off it in the shape of an umbrella<sup>3</sup>. The whole phenomenon lasted about 4-5 seconds then it disappeared with a soft crack<sup>4</sup>.

Comments

1. First penetration site, the effect of electron accumulation was observed.
2. The actual formation of the 4D ring took place, but only one penetration site was observed, the other was far away (some kilometers).
3. Beam instability, filamentation in 4D, it appears in 3D as small balls leaving the large ball.
4. Beam instability at the first penetration site.

Case 7. Bogdányi Bertalané, Farkaslyuk

I saw a ball lightning in a cloudy but calm night in the mining plant of Farkaslyuk in the summer of 1937. The glowing, hissing fireball, much bigger than the moon, appeared above the crest of the mountain of Cserna. It began to roll down among the trees, but as if it was going round about them<sup>1</sup>. Then it turned into several, smaller, glowing fireballs<sup>2</sup> and it was glittering like a huge sparkler on Xmas trees<sup>3</sup>. Then it became a long fiery smoke<sup>4</sup> and again a glowing fireball<sup>5</sup> which disappeared without leaving a trace behind on the slope of the hill. I did not see it any more. I was fascinated by this phenomenon the duration of which was between a few seconds and one minute.



#### Comments

1. The beam passed around the trees, because the scattered beam electrons repelled the 4D beam.
2. Beam instability due to an object penetrating the beam.
3. The effect of the unusually intensive electron scattering.
4. At that place the local electric field was quite intensive, and it led to a distortion in the beam penetration angle.
5. The beam reunited.

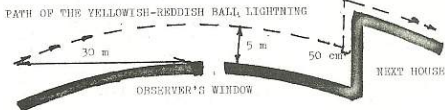
#### Case 8. Kókai Jánosné, Kiskunfélegyháza

A storm passed over the city in the summer of 1979. She was sitting with her husband and daughter in the room, facing the window from which one can look onto the street. The storm had already been abating. There was no thunder when at the same time they all noticed a small, ball-like, shiny fireball about 2 m height leave out the road. The small fireball stayed motionless in the air for 10-15 seconds, then tiny sparks sprang out of it and it disappeared like a bubble. Luckily there were no cars going on the road.

#### Case 9. Gáspár János, Miskolc

It happened in the summer of 1983. The weather was sunny, warm, shining all day. By 9 p.m. the sky got abruptly cloudy. The rain began to fall accompanied by thunder and lightning. The shower stopped after about 15 minutes all of a sudden. Then I opened the window to let fresh air in the room. The window is on the 7<sup>th</sup> floor of a ten-storey building. I went to the window after about 15 minutes and looked out of it. At that moment I noticed a hand-ball-size object shining with strong yellowish light on my left. It was 30 m from me but came closer to me at a high speed. It did not change its shape or colour, it preserved its regular sphere-form all the time. When it got in front of me it was 5 m away from me, I did not experience heat radiation or sparkling but it emitted a low hissing sound<sup>1</sup>. There were colour streams inside the sphere, various shades of red and yellow were mixing with each other. The sphere did not stop, not even for a moment. Then it was already moving away from me at a high speed. But the neighbouring house, which was situated 6 m farther out than ours, got into its way. The sphere was getting nearer and nearer to the wall of that building, I believed that it would crash into it. But then it did a strange thing. All of a sudden it flung to the left, went ahead straight and disappeared from my sight because the other house covered it. I had seen the phenomenon for about 8 seconds at about 600 m away from the fortress of Diósgyőr.

# CASE 9 DIÓSGYŐR



## Comment

1. The beam is "hot", its electrons do not have uniform energy. The slight difference causes some difference in the ionization energy.

## Case 10. Papp Sándor, Tényőfalu

It happened on an August day, a big shower passed over the village. I went with my grandfather and grandmother into the room to shelter from the storm. We were startled by a shiny, enormous crack that took place in the yard. At once we perceived with horror that a head-size shining, flashing ball climbed in through the window, because it was open. It went round the wall in the room and we heard a rustling sound as if sparklers had been burning<sup>1</sup>. It knocked off all the pictures from the wall<sup>2</sup> and after going round left the room through the other window leaving a faint brown stripe on the whitepainted wall. Arriving at the yard it advanced towards the plow, then a big flash came and it disappeared at the harrow not far from there. It left a trace on one of the teeth of the harrow as if it had been welded<sup>3</sup>. When we had a look around the yard we noticed that the end of the red marble drinking trough beside the well had been broken off. Grandfather said that the lightning had struck it<sup>4</sup>.

## Comments

1. The crackling sound is the consequence of the beam electrons' scattering on the air molecules. When the current of scattered electrons is higher than a threshold value, the acoustic emission will be similar to that of an arc welder.

2. The iron nails attracted the beam (electrostatic influence) and the scattered electrons. The electrons collected on the nails and the wall repulsed the electrons accumulated on the pictures - thus they were pushed off from the nails.

3. The electron beam was attracted to the sharp metal object, and melted it partly. Then it blew up due to instability.

4. The observed BL was spotted at the first penetration site and it had come into existence on the stone (marble).

Case 11. Papp Gézáné, Budapest

I have seen a ball lightning together with my husband in our kitchen. We live in Kispest, in the settlement of Vekerle near Petőfi square. The square is surrounded by two-storey houses that have lightning-conductors. The church is also nearby, its iron plate conducting lightning is buried in our garden. In the summer of 1969 a great shower passed over us, it was terribly thundering and lightning. The table was in front of the open window and I was standing there, while my husband a bit farther away. After an enormous clap I went away from the table because of fear. Then my husband told me that the lightning was running up and down in the corner. There is a ventilating aperture opening separately from the window, the lightning must have come through it, because it knocked against the corner slantwise opposite to it. The lightning was not a spherical one, but long-shaped, about 6-7 cm long, like a spring<sup>1</sup>. My husband noticed the hissing. It disappeared from our sight after a few seconds. I was afraid that the TV and radio had broken, but there was no damage. But the flat above us was left without electricity, and the refrigerator was put out of order in another flat<sup>2</sup>.

Comments

1. Elliptical BL, because the beam penetration is not perpendicular to the 3D space.

2. Most probably there were other BL-s as well, or the observer's electrical appliances were unplugged, while the neighbour's ones remained connected to the electric network.

Case 12. Keleti Miklós, Budapest

It happened in my flat in the summer of 1980. I was sitting in the arm-chair next to the open window in the flat on the top, i.e. on the third floor. The roof above us is partly covered by sheet-iron. On that day a distant lightning could be seen and it began to rain. It was knocking on the sheet-iron roof. The window and the door of the hall was open. Opposite to me there was a big, two-winged door open at that time. On the right side of the door-post there was the cable of the TV antenna vertically. On its right side, 5 cm away there is an electric switch and directly beneath it a wall-socket. I had just stood up to close the window because the rain had fallen into the room. It was about 2 p.m. then and the thundering and lightning was going on. A blinding white lightning was to be seen followed by a shrill clap. It is possible that the lightning had struck our building, but it had struck close

anyway. I wanted to go towards the door when I saw the following phenomenon. A small light-ball of about egg-size was moving in front of the socket. It grew bigger and bigger, at the end it became similar to a balloon of 15-20 cm diameter<sup>1</sup>. This ball was moving away from the plane of the wall, it was floating inside an imaginary circle of about 60 cm diameter and was swinging in all directions as if bumping into an invisible wall, it was moving abruptly to the right and left<sup>2</sup>. Its colour was yellowish or rather a kind of orange and it seemed to be semi-transparent opaline. Its behaviour was similar to the whirling of the cloud zones one can see on the TV when they show the satellite pictures in the weather report. The whole phenomenon had lasted for about 20-25 seconds. The light-ball returned to the socket, almost stuck to it and grew smaller quickly. At last it shrivelled up like a balloon going flat and disappeared in the same way as it had appeared<sup>3</sup>, almost being absorbed in the socket. During the whole phenomenon no warmth or air motion or sound could be perceived. I told my neighbours about this case. The following day I perceived transmission faults on both channels of the television. Both TV wires were torn above the TV set, they may have been turned by the lightning. One 2 cm wide element of the antenna was cracked in a zig-zag form 35 cm long. Near the antenna a lot of tiles were missing, they had been broken into pieces some of which could be found in the attic, some in the rain-pipe<sup>4</sup>.

#### Comments

1. Most probably a first penetration site was observed. (The charge accumulation took place at the place where the roof was damaged.) The gradual volume increment is rare, but not exceptional observation. Its cause is not quite clear, most probably a larger diameter, (invisible) looser beam contracted along a thin initial beam. The beam diameter grew as more and more electrons joined the nucleus. At the initial stage, the beam just barely matched the stability criterion.

2. This could be due to the following reasons:

- a./ uneven scattering,
- b./ uneven outside electromagnetic field.

3. This BL must have been a low energy one as most of its current could flow through the grounded electric wires, and it had a low intensity light emission as well.

4. Most probable impact and accumulation site.

#### Case 13. Pusztinger Sándorné, Budapest

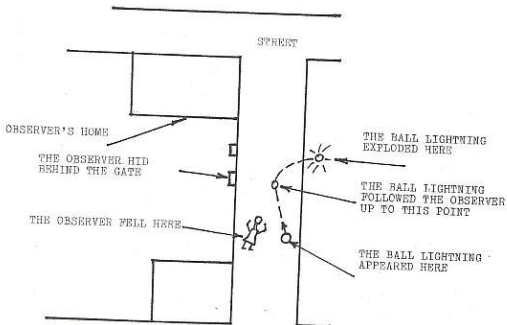
It happened in the summer of 1923. A storm was coming so I was running home along Szőnyi alley. The sky became overcast all of a sudden, it was thundering and lightning and after a few moments I heard an enormous crack without flashing<sup>1</sup> and I fell over as if somebody had pushed me off my feet. Lying on the ground I saw "the sun" on the ground approximately 3 meters away from me, it was about the size of a soccer or a bit bigger, its colour was

sometimes reddish, sometimes yellowish. It was approaching me slowly, sparkling on the ground. Paralysed with fear for a few moments I was just watching "the sun" approaching me then I jumped up but was unable to run away. After moving backwards 3 or 4 steps I reached to a gate and hid behind the concrete pillar of it not losing sight of "the sun". A lightning flashed then it thundered again and at this moment "the sun" bounced once<sup>2</sup> and then descended to the ground again in a curve. On the ground it fell apart into millions of "pearls". It began raining heavily so I ran home. After the storm it was shining again and I decided to go back to that spot. The ditch was full of water and there were puddles on the road, too. I wanted to look for the pearls but I got there only to find burned, black grass instead of the "pearls". It looked as if it had not been raining then as the ground was dry on that spot in a circle of about 60 cm diameter. In the middle of the dry circle I could see a greyish wire bunch. Feeling much disappointed I wanted to raise it but it became dust as I touched it.

Comments

1. Most probably second penetration site, because the characteristic streak lightning impact was not observed.
2. Effect of the ambient electromagnetic field.

CASE 13 BUDAPEST



Case 14. Juhász László, Gyöngyös

In May, 1953, 8 cooks worked in the kitchen of the State Sanatorium at Kékestető. At 10 o'clock a.m. a heavy storm came and they noticed a fire-ball of 30-40 cm diameter rolling along the corridor leading to the kitchen. The fire-ball had a long tail (aura), it avoided everything, even the enormous cast-iron stove, nobody was hurt<sup>1</sup>. It covered the distance of 25-30 m during about 4-5 seconds. After its passing by some strange smell could be felt<sup>2</sup>, then the ball-lightning descended to the boiler-room and disappeared without making any noise<sup>3</sup>.

Comments

1. The metal cauldrons were not grounded. There was a large amount of scattered beam electrons (aura), and they were accumulated on the surface of the cauldrons. The repulsive effect of these electrons repelled the beam.
2. This smell is usually due to ozone and NO.
3. The beam was attracted by the grounded piping.

Case 15. Salla Istvánné, Várpalota

In June, 1964 we were working on night shift when a heavy storm broke out. It was raining cats and dogs and did not stop thundering and lightning. I was standing behind a large French entrance window, watching the storm. Suddenly, I noticed a bright-coloured ball of a soccer's size rolling approximately 50 cm above the ground. It was not rolling smoothly, it was somehow jumping and darting while rolling along<sup>1</sup>. It had beautiful colours, the various shades of blue, yellow and purple<sup>2</sup>. I was watching it as it covered about 5 m, then I lost sight of it and I could not go out to follow its route because of the bad weather.

Comments

1. This jumping movement is a characteristic feature of BL observations. The 4D beam approaches the ground - or any object having the lowest electric potential. When the object is quite near, the beam scattering becomes enhanced at the object. Due to the uneven distribution of the scattered electrons, and their temporary accumulation on the surface, the beam is repulsed. This procedure could be repeated several times. If the object is grounded the repulsion might not take place.

2. "Hot" beam, there is a nonuniformity in the beam electron energy.

Case 16. Paulányi Attiláné, Budapest

We lived on the 4<sup>th</sup> floor of a block of flats at Rákospfalva. It was a hot summer day, and in the afternoon a heavy storm broke out with much rain-fall. It was thundering and lightning but it passed as quickly as it had come. As the air in the flat became warm and humid I opened the door and windows to get some fresh air. The sun was shining brightly again, the storm seemed to have ended. We could hear thundering from the distance. I was combing my mother's hair standing in the draught between the door and the window. Suddenly, I noticed a yellowish circle of 60 cm diameter rolling into the room through the door<sup>1</sup>. The curve of the circle sometimes seemed to collapse, it changed<sup>2</sup>. Very frightened, I stared so hard at it that even today I can see it roll slowly towards the window and disappear at the wall<sup>3</sup>. It was one and a half meters away from me and the whole phenomenon lasted about 20 seconds. I perceived no heat radiation, it did not do anything, made no noise, it just came in then went away. My mother saw nothing because she was sitting with her back to it.

Comments

1. Hollow beam.
2. Beam distortion due to uneven electromagnetic field distribution.
3. The beam terminated at the other penetration site.

Case 17. Katona István, Hatvan

At 5<sup>15</sup> a.m. on April 30<sup>th</sup>, 1986 I saw a ball-lightning when I was going home from night-shift. It was flying horizontally at a great height, which I couldn't esteem. The fireball was pulling a long tail<sup>1</sup> after itself. It was sparkling and hissing. I could not have mistaken it for a rocket because I fought in the 2-nd World War, then I did my military service with the border-guards but I have never seen a rocket flying horizontally. I watched the phenomenon for about 4 or 5 seconds then it disappeared without a sound. I had already seen a phenomenon like that about 20 years before.

Comment

1. The "tail" is the consequence of spark emission, it is due to the unevenly distributed sparks. In the case of low velocity, the spark distribution is uniform (provided there are no objects nearby). As the velocity is increased the sparks and streamers emitted by the ball-lightning will appear at the rear of the ball due to aerodynamic reasons.

Case 18/a. Tanyi Józsefné, Pápa

On a July afternoon in 1971 at about 5 o'clock p.m. a storm was coming. I went into the room to shut the window. I was just about to turn away from the window when I saw a bright ball of one meter diameter approaching me. I felt paralyzed and I thought I was going blind as it was coming nearer and nearer. I already felt it coming quite near to me when it exploded with a great crack, and fell apart into bright pieces. The whole phenomenon lasted about 2 minutes. My mother and brother and my one-year-old son were staying in the kitchen. My husband was standing at the door of the room and he saw the same phenomenon, and heard it exploding, too. According to him the ball's edge was glaring bright<sup>1</sup>, its inside was less bright, like a rainbow, almost translucent. From a greater distance it looked like that to him. Afterwards my husband and my brother went out and found the railway seemed welded on that place. (We lived near the railways at that time.)

Comment

1. Hollow beam.

Case 18/b. Tanyi Józsefné, Pápa

(She heard it second-hand, one of her acquaintances told her)

He was sitting in his kitchen during a summer storm. The door was locked but there was no key in the lock. Suddenly he noticed something bright crawling in through the keyhole. Then it turned into a ball, went round the kitchen like a bright ball, then disappeared hissing through the keyhole.

Case 19. Mednyánszky Aranka, Budapest

I went with my sister to pay a visit to Cinkota in the summer of 1955 when it began to rain and we together with our hostess went to a closed, stone-floored verandah. The entrance door was left open because it was just a light rain. We were sitting in the middle of the verandah opposite each other. Suddenly we heard a tremendous crash, much louder than a thunder following a lightning and through the open door a fire-ball of 15 cm diameter flew into the verandah onto the stone-floor in front of our feet. It was moving, sparkling intensively for one or one and a half minutes, then it began shrinking and disappeared. I do not remember any traces left on the stone-floor of the verandah. It was quite near to our feet but we could not feel any heat. From the neighbouring houses people rushed into the street after the explosion to learn what had happened. We told them everything.



Case 20. Horváth Mátyás, Ózd

It was a Wednesday afternoon in the summer of 1953. I was reading in front of the window. It was shining brightly, there were no clouds in the sky. We decided to go to the cinema, and at about 5 p.m. my wife told me to begin getting ready. I put the book into the bed and went up to the mirror in the corner to comb my hair. At this moment a ball of a soccer's size flew into the room through the open window. I turned round at once and took sight of the ball 1 m away from me on the book which was lying on the bed. It seemed to revolve around its own axis, then a low crackling, sparkling sound could be heard and the ball disappeared. The whole phenomenon lasted 5-6 seconds. I looked at the book but I could not notice the slightest trace of the ball on it. The bed on which the book was lying had a steel-wire mattress. The flying speed of the ball was similar to that of a blown-up air-ballon: which is hit and then floats almost weightlessly. It was translucent, like soap-bubbles lit by sunshine.

Case 23. Miklós Endre, Budapest

We saw the lightning-ball in a wooden bungalow situated 200 m away from the beach at lake Velence in August, 1964, at about 4 p.m. It was a muggy summer day. After 1 o'clock suddenly a storm broke out, it was like a cloud-burst, as our company had to take shelter in the small 4 x 4 m room of the bungalow. We left the door of the verandah and the door of the room open to be able to watch the magnificent storm. Suddenly a bright ball of the size of a watermelon appeared and rolled over the frame of the door along the wall of the room, onto the iron bed, then it went round the room. It left the room at the same place it had come in without any noise, hissing, or burning. We were sitting at the table absolutely paralyzed and we tried to hide our eyes because there was blinding brightness in the room. I do not know how long it lasted, maybe it took only a few moments but it seemed a long time to us. All of us saw the same thing, experienced the event same way, so it is sure we were not cheated by visual illusion. We could not see anything in the garden, it did no damage.

Case 26/a. Merk Ferenc, Balatonakarattya

I was a student at Pápa in 1929. It was a cloudy, dim day, we were going to have dinner. The door of the kitchen was open just as well as the door leading from the kitchen into the room and the window of the very same room facing the garden. As soon as we had sat down to the table a brightly shining ball of 8-10 cm diameter rolled into the kitchen. We were very much frightened while the ball was rolling towards the door of the room. Instinctively, we were watching its way and saw it going towards the window. It rolled up

the wall one meter high<sup>1</sup>, went out of the window, rolled down the wall, then getting to the ground it disappeared noiselessly.

Comment

1. The upward movement, followed by a downward movement has no relation with the change in BL density. This density is meaningless for the 4D model.

Case 26/b. Merk Ferenc, Balatonakarattya

In 1946 my mother lived at Enying in a new house on a hill surrounded by ditches. I had brought the electric wires to the house from a distance of 600 m. Once I visited my mother who was just ironing. Groups of cumuli were floating and the air was warm and muggy. I was sitting near the table and I was talking with my mother. Suddenly from the wall socket into which the iron was connected one or two sparkles appeared which turned into a ball of 5-6 cm diameter and it rolled along the electric cord to the iron, then onto the clothes to be ironed and then along the table and on the tiles of the kitchen towards the room. The door of the room was open. I was much taken aback; I pulled out the electric cord from the socket and looked into the room to see what this bright ball was. It was rolling slowly on the floor towards the wall facing the street. Reaching the wall it suddenly became even brighter and then disappeared without any noise. On that spot in the room where it disappeared the wall was damaged 40 cm high<sup>1</sup>, 1-2 cm deep. My mother was sitting at the table numb with fear. I asked her what the matter was she told me her hand felt numbness and seemed freezing. The lightning-ball damaged only the wall.

Comment

1. A rather unusual case, because the material damage did not cause beam instability at the site of the damage. The beam started to explode most probably at the other penetration site.

Case 28. Patkós Zsigmond, Szolnok

At the beginning of the 1970's we stayed on our farm at Dévabánya. My brother and mother, our neighbours saw that phenomenon, too. It was summer there was a thunderstorm that day so we withdrew into the building whose window looks southwards. As it began raining we caught sight of a light-phenomenon. We could not guess the distance of it, it may have been a few kilometers away. We noticed it and we were watching the brightly glowing ball in the sky for 5-10 minutes. Its colour changed from yellow, orange and reddish-yellow into bluish. It was moving slowly from East to West in the sky. The phenomenon suddenly disappeared when the rain stopped.

Case 30. Bäumler Rezsőné, Budapest

In the summer 1929 we spent our holidays at Balatonalmádi. One afternoon a heavy storm broke out. It did not stop thundering and lightning. I wondered whether the lightning struck the Balaton, too, so I went up to the attic to watch the storm from the window there. Suddenly I took sight of a large ball stumbling on the water. It looked like a huge soap-bubble. I called my father to have a look at it, and he told me it was a ball-lightning.

Case 31. Bakó Mária, Tiszavid

In the beginning of the 1960's I was living at Hajdunánás in the flat of one of my acquaintances. One afternoon a heavy spring shower began. It was lightning much. We went to bed in the evening. By that time the rain had already stopped. My landlady switched on the radio which was above her bed at the window which looked onto the yard. I was lying in the bed at the other window which looked onto the street. Suddenly the radio crackled and there came the ball-lightning into the room. It stopped at the bed where the landlady was lying and we stared at it. The room was brightly illuminated by it. It did not sparkle, it was just very bright and of an oblong form. It may have been about 30 cm long and 5 cm wide. One of its ends seemed to have the shape of a ball. It went out just as it came in. It did no damage to the radio.

Case 32. Törzs Ferenc, Szirmabesenyő

In August, 1946 I was going home from a hill. I was in a hurry because a thunder-cloud was approaching from behind the hill. It was reaching me but the worst of it was still behind me<sup>1</sup>. 150 m in front of me I caught sight of an orange ball of a diameter of 50-60 cm falling to the ground off a wooden pole. Its movement was like that of an air-balloon, I mean as slow as that. Reaching the ground it bounced twice or three times 1 m high then disappeared. I do not remember hearing any noise though that may be only because of the thunder. I have no idea how the ball got onto the pole. Its light was not glaring, one could look at it. The whole phenomenon did not last long. The wooden pole was about 50 m away from the road and I could notice no damage on the pole from this distance.

Comment

1. Most probably 2nd penetration site.

Case 34. Koczó György, Budapest

In the beginning of the 50's I was living in a suburb of Budapest, in Ujmajor. Ujmajor consisted of 2 long rows of houses and one stable. The distance between the two rows was about 150 m. There was a draw-well from which all people living there got water. It happened on a nice, quiet summer evening, at about 9 o'clock p.m. It was already almost dark, and I went for water to the draw-well. The woman next door to me was just going back from the draw-well when I got there. I drew up 2 buckets of water and I set off back to my flat. On the right-hand side there were the straw-stacks of the state farm. On my half-way home on my right I noticed a lot of ball lightnings rolling 2 m high above the ground<sup>1</sup>. I do not know how many of them were there. Their size varied from that of a table-tennis ball to that of a man's fist. Their colour was that of the red-hot iron. There was no storm, no thunder, no lightning that day. It was frightening to see these ball lightnings rolling in the air between me and the row of the straw-stacks. Their speed was rather slow, approximately that of a slowly passing bicyclist. I can not guess their distance even today, but well do I remember the sight as they were slowly passing me. I had been staring at them until they disappeared at the end of the row of the houses. I think they must have been quite near to me, because if they had been near the straw-stacks they might have set them on fire. After half an hour the woman next door to me came round to us and asked "Have you seen them, too?"

Comment

1. Most probably second penetration site. The group of BL-s are the fragments of a larger BL. The parallel movement of all lightnings is described in several reports. In this case there is an equilibrium between the repulsive effect of the electron beams, and the attractive force of their magnetic field.

Case 35. Janyik Mihály, Várpalota

This case happened in the autumn of 1962. I was sleeping in my bedroom. I woke up at about 11 p.m. The light was on in the room, and it was something very unusual at that point of time. My grandmother was standing near the window and pulling aside the paper which covered the window. She was watching the road. She was praying and crossed herself. I told her to go to bed, but she paid no attention, just went on crossing herself and stared at the road. I asked her what she was doing and told her again to go to bed. She just glanced at me hissed, then beckoned to me to go to the window. I got up and went to the window. I was so surprised at the sight that I could hardly move. There was a sparkling, reddish-yellowish coloured fireball of 50 cm diameter about 2 meters above the ground and 2 meters away from the window. It was very near to the wall so I could watch it thoroughly. It did not move but I could see it vibrating<sup>1</sup>. Its beams were quite short and were glittering silver and

and white<sup>2</sup>. First I thought it was a visual illusion. As the light was on in the room I thought it certainly was the light reflected in the window-pane. So I went to the other side of the window. But the sight was the same from this direction, too. The fireball was floating peacefully at the same place. It had no connection with the ground, it did not touch the ground. I watched it carefully so I am absolutely sure of it. I could not see any sparks at the end of the beams. I was surprised to see that this glowing, sparkling ball was not emitting enough light to illuminate the house opposite us, though it was only about 8 meters away from ours. I definitely remember that there was no rain or any other moisture that day. It was dry autumn weather. I could watch this phenomenon for 30-40 seconds<sup>3</sup>. When I went back to the other side of the window I could see nothing any more but darkness. Next day I had a look at the wall below the window but I could not see anything extraordinary there.

#### Comments

1. The vibration might have had two different causes:
  - a/ vibration due to plasma oscillations, which is an experimentally observed, high-frequency 3D phenomenon;
  - b/ uneven current distribution in the 4D electron current.
2. High current corona discharge, local ionisation channels.
3. Most probably a second penetration site was observed. The BL might have a longer lifetime than the reported period.

#### Case 36. Csizmann Attila, Tokod

In front of our house there is a high-voltage transmission line. During a summer shower a bright ball of bluish colour appeared above one of the pylons due to a fortunate accident. It was floating 50 cm above the china insulator. As I was watching it, I noticed it began to move slowly and its movement became more and more fast. The surprising thing about it was that it was moving in the most improbable direction. It was moving against the prevailing west-ward wind. The wind was blowing from the west while the ball was moving west-ward. The direction of the line was also east-west. So it was moving above the line away from the pylon against the wind<sup>1</sup>. I cannot define the duration of my perception, but the movement of the ball appeared very slow. The distance it covered above the line from the point of its emerging to the point of its disintegration was approximately 50 m. The strangest thing about it was its movement. It looked like a balloon drifted against the wind. Its diameter must have been approximately equal to that of the china insulator, i.e. 30 cm. Nothing happened except that it emerged, drifted and disappeared. I do not remember any noise though I heard thunder from the distance.

Comment

1. This observation also underlines the fact that BL is not an internal energy source phenomenon, because if so, then it would be airborne in that case.

Case 38/a. Szilágyi Elemérné, Veresegyház

On a summer evening in 1948 a sudden thunderstorm came and while it was thundering a rustling, purple ball of an apple's size came in through the window. It rolled across the room below the ceiling. It gave a rustling sound. The ball disappeared through the electricity box. It did no damage except for the fact that it frightened us much.

38/b.

On a Sunday afternoon in 1959 we were sitting in the yard when there came a sudden storm. While it was thundering, a bright white sparkling ball of 20 cm diameter passed the well. My 5-year-old niece ran after it to catch the bright ball. Luckily the ball disappeared among the bushes within a few moments.

38/c.

I did not see this case personally. It happened to one of my acquaintances in Szeged in 1926. One Saturday afternoon it darkened threateningly and my acquaintance, a widow with her 16-year-old son went into the bedroom because of the storm. Her son was lying on the sofa near the bed. After a great crash a ball-lightning came into the room through the open window and killed her son. She could not give a detailed description of the lightning.

Case 39. Ács József, Vaskút

I saw a ball-lightning at 4 a.m. on 12<sup>th</sup> February, 1986. I woke up at dawn to hear that our dogs were barking<sup>1</sup> but not as usual when a stranger comes to the house. I was just on the point of getting up to silence them when I noticed a ball-lightning floating slowly towards the bed of my wife. While it was floating above the bed it looked like a crawling white dog to me. As we used to have a white-black dog at that time, I thought that it had managed to get into the room somehow and now it wanted to climb onto the bed. I kicked towards it in the air but it turned out it was not a dog. I could not hear any noise I just felt terrible pain in my toes. Two of them were injured rather badly. Then I heard our horses in the stable behind the house bolt, prance and neigh so with much difficulties I went out into the stable to make them silent. I could hardly put on my slippers. I had a bad ache in my toes. When I returned from the stable we discussed with my wife

what this phenomenon could have been. First my foot swelled and had a greenish colour then it became purple between my toes, in the end two of my toes turned black and half of my big toe turned black, too. My toes still do not bend well. The nail of my big toe is still parted from the nail-bed. I did not dare to turn to a doctor because nobody beleived my story except the members of my family.

Comment

1. The unusual reaction of animals is frequently reported. This is most probably due to the high frequency acoustic emission which has a higher than 15 KHz frequency. This frequency range is not audible to human ears, but animals can detect it.

Case 40. Dobó Ferenc, Budapest

During the summer in 1938 while we were hoing maize a great storm broke out. We took shelter in an empty stable. There everybody found a place for himself. Several of us sat down on the edge of the manger, and we talked swinging our legs. It was a very heavy storm, it was lighting permanently as if there was something to make it work continuously. Suddenly in the middle of the storm a fire-ball of the size of a head came in through the open door. It struck the opposite wall then one of the men sitting on the edge of the manger. Then stopped giving light. The man dropped to the ground and died without a word. He turned blue and black, the doctor said he had been burned. My wife was sitting near to him on the edge of the manger but she was not injured at all. None of the others present was injured, we did not feel anything. The whole phenomenon lasted as long as it takes for a ball thrown into a stable to reach the opposite wall then strike a man.

Case 41. Bagyánszki József, Budapest

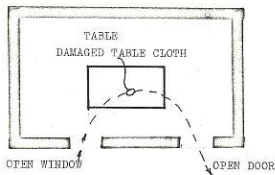
On 14<sup>th</sup> July, 1914 when I was 12 years old I worked with some bricklayers. A house was being built and about noon a heavy storm broke out, it was lightning permanently. Such a strong wind was blowing that the scaffolding began to move. I was so frightened that I climbed down and escaped. As I was running under the scaffolding I noticed a girl of about 16 standing 2 meters away from the house. I was a few steps away from her when suddenly a light blue flash pierced the darkness. I looked up, heard a tremendous thunder and noticed a ball of a soccer's size to fall onto the scaffolding. It collapsed with a tremendous crash and I ran into a wooden stable which was about 30 m long. The wind was so strong that it blew the roof of the stable off. After the storm passed I went back because I knew the girl was under the ruins. Two other men came and I asked them to help to save the girl. Somebody called the ambulance, but by the time it arrived the girl was already dead. The ambulance men pulled off her blouse and we could see a wide burn line starting from her nape. Her

back was full of burn brands like the roots of a tree. It seemed very strange to me because I could not feel heat or hear a blast though I was only 3 steps away from the ball. I cannot imagine how it could burn the girl.

Case 42. Szirmai, Budapest

It happened at about noon, on 29<sup>th</sup> June, 1930, in Óbuda. I remember the date exactly because I got my university degree on that day. Our house was situated between two brick-works, the door and the window of the room /both on the same side of the house/ were open. It was shining brightly, it was very hot, the air was still. Suddenly I heard a tremendous thunder. Something flashed on the open window and the following moment a small fiery ball of an egg's size rolled across the table. It singed the tablecloth and left the room through the open door. I stared at it and could not move. I waited for something to happen but nothing did. Late in the afternoon a heavy thunderstorm broke out. I preserved the tablecloth for a long time but later on both the house and the tablecloth were destroyed.

CASE 42 BUDAPEST



Case 43. Csélfai Mihályné, Budapest

One afternoon in the summer of 1956 there was a heavy thunderstorm, it rained cats and dogs. I saw a red-hot ball-lightning of a man's fist's size fall onto the bar of the second floor of the neighbouring house, then onto the bar of the storey under it, then onto the top of the garden wall between the two houses. Then it rolled into our yard that was covered with stone. There it sprang twice and disappeared in the canal. It gave a crackling sound just like the sound of a welding torch. Its colour was that of red-hot embers though it had a black outer shadow, a black halo.



Case 44. Packl Ferencné, Budapest

On that memorable day there was a heavy thunderstorm with frightening thunders. While I was standing in the hall I heard a tremendous crash and I fell at full length. As I looked up I saw a white ball of a table tennis ball's size appear on the peg fixed on the wall of the hall. This peg was made of metal, and it was similar to a lightning-conductor. When a storm broke out we usually turned it upwards, and it was connected to a grounded wire. This ball rolled down on this wire and burned it. Then it suddenly changed direction and walked out through the door.

Case 45. Tasi János, Füzesabony

In 1975 I was watching the rotation of the wheel of a wind-wheel situated on top of a hill with a 7x5 telescope. Then I was watching other parts of the hill. As it was rather rainy at that time one could see the clouds' edge reach the top of the hill. I saw a glowing, orange ball a bit bigger than a soccer emerge from these clouds. Though it was 3 or 4 km away from me I could see it quite clear through the telescope. It appeared within a moment, it did not change its shape, it did not sparkle or flicker. It was descending slowly, with dignity towards the ground. I could watch the phenomenon for about 15-20 seconds. It exploded like an air-balloon 4-6 m above the ground, emitting light. On the spot of the explosion I could see some steam-like white fog appear, which was drifted away by the wind.

Case 46. Ticska Istvánné, Budapest

My mother told me about this case one week after it had happened. She was sitting in the corridor when a storm broke out, it was thundering and lightning. It was just a quick shower, the wind was blowing slightly. She did not go into the house she was watching the storm and as soon as it had passed the sun shone brightly again. Suddenly she noticed a bright, rainbow-coloured ball rolling down on the tiles of the neighbour's house-roof. Its size was approximately that of two fists taken together and it seemed as if it was going to roll across the yard into the house. The yard was gently descending in front of the house but it went on rolling and she heard it hissing. When it got to a patch grown with grass it disappeared with a crack but the grass turned yellow on that spot as I could see it a week later.

Case 47. Ormos Józsefné, Gyál

It happened at about noon, in the end of June, 1979. The sky was clear, no clouds could be seen anywhere. I could suddenly hear the blast of an explosion. I looked that way and I saw a glowing ball of a large air-balloon's

or a beach-ball's size descending from the height of a tree from above a house<sup>1</sup>. Its colour was similar to that of the sun at sunset. Suddenly, something may have touched it because it disappeared with a crash within a moment<sup>2</sup>. We ran into the house where it had disappeared as we knew there were only two children at home. The little boy was sleeping in the room, the girl was in the kitchen. She told us that while she had been reading in the kitchen she had noticed a glowing ball springing into the hall through the open door. It had exploded the next moment. The nylon curtain hanging on the door was not damaged at all. We could see no trace left by the ball. This ball was not glowing on its surface but inside<sup>3</sup>.

#### Comments

1. Typical second penetration site observation.
2. The termination took place at the second penetration site.
3. The observer noted the difference between the light emission from the sun (surface) and that of the ball lightning (volumetric radiation).

#### Case 49. Rédei János, Budapest

In the early autumn, 1976 I was waiting for my train at Nagykáta. It was 14<sup>15</sup>. The sun was shining brightly, there were no clouds in the sky. I walked across the rails, looking southwards. There can be found the westward air-channel where the planes are flying. I was watching that. Suddenly I noticed a white, glowing ball of a soccer's size at a great altitude. I looked round whether other people standing nearby could see the same phenomenon or not. They did not seem to notice it. I began watching it again. Its position seemed stable. As far as I could judge it, it divided into two parts, it forked, then both parts began to move from their original position southwards at a fantastic speed<sup>1</sup>. I could not observe any atmospherical statics in their track. They seemed to disappear horizontally I could not hear any noise. A bit later an IL-18 airliner was flying at about the same altitude.

#### Comment

1. In this case, after the beam fell apart, the electrostatic repulsive force was much stronger than the attractive magnetic force. Thus fragment rings or beams repelled each other.

#### Case 51. Ducsai Lajos, Prügy

a./ On a hot summer day in 1934 several people gathered to dance in Mályi. There was a small cloud in the sky, and sometimes we could see lightnings flashing. Suddenly after a loud crash a ball lightning came in through the open window, and it threw one of the guys out of the room into the yard, while several of them were knocked off their feet, then it rushed

round the room, it attracted a fork to itself then disappeared. Nobody was hurt, and we went on dancing. The whole phenomenon lasted 3-4 sec.

b./ In May, 1936 during a summer thunderstorm suddenly it stopped raining and a ball-lightning descended from the sky into our yard then it headed for the garden. There it broke two young fruit-trees into two, then jumped over the back-fence, rolled onto the corn-field, and went springing on the ears of corn. It went round the field jumping like a ball, then returned into the yard and exploded with a crash.

Case 54. Tóth Kálmán, Budapest

In the summer of 1938 I was walking along Sziv street towards Lővölde square. It was a hot, cloudy afternoon. I noticed a blue-coloured snake one and a half meters long, 5 cm wide moving 40 cm away from the wall and 1 m above the ground<sup>1</sup>. Its movement was similar to that of a snake. When it reached the house No. 17, it went into the doorway. Then it left through one of the doors facing the yard, came back through another door and then it curved into a ring<sup>2</sup>. As the two ends of it were approaching each other it disappeared with a crack.

Comments

1. The snake-like appearance was due to the small beam inclination angle to the 3D space.

2. The severe distortion is due to inhomogeneous electromagnetic field distribution.

Case 55. Oláh Sándorné, Leninváros

I saw the ball-lightning one late afternoon in the summer, 1973. It was very hot all day and suddenly a very dark cloud was approaching us from the west with a strong wind. It seemed strange to me, it did not look like other occasions when it was going to rain. There is a transformer station with a lightning-rod near our flat. Suddenly I saw a lightning and at the same time I heard cracking and frequent banging. I had never heard such a noise before. It turned dark. Then suddenly I could see a small light-ball of a nut's size rolling from one corner of the bathroom into the other at the flash of a lightning after a tremendous crack. As we were just having our flat painted we kept the fridge in the bathroom, and the ball rolled under it. We were watching the light-ball with my son, but it lasted only for a short time. After it our neighbours told us there was a similar light-ball in their flats, too. One of my neighbours had a brood-hen with chicks, and some of the chicks perished. In another flat the light-ball knocked the dishes off the cupboard. My neighbours were in the flat, but they were not hurt. Nobody felt heat.

Case 56/a. Turula Kálmán, Budapest (INTERVIEW)

It happened in the village of Csömödör, at 10 o'clock one night. It was a beautiful summer night and we were going from one village to another on a horse-carriage. As we were passing the fence of the grave-yard we noticed a yellow disc of 50 cm diameter appear on top of the fence. It was rolling in the same direction we were going. The horses bolted, snorted, reared. The ball was moving at the speed of the cart, sometimes it moved upwards then downwards and when the horses began galloping the ball took up the same speed. As soon as we had reached the edge of the grave-yard and there was no more fence, the ball disappeared with a crack.

56/b.

It happened at Lipseszentadórján /Zala county/ in 1933. The weather was sunny, nice, and we were setting up stalls for Ascension-day. Suddenly there came a black cloud with much thundering, lightning and rainfall. Everybody looked for a shelter. I was running along the pavement looking for a shelter, too. Suddenly I noticed a red-hot disc of 70-80 cm diameter on the telephone-cable. When I stopped it stopped, too, when I went on it followed me. At last I found a wine-cellar near a house and I stepped into its doorway. After 5 minutes the storm stopped and I could see the damage it had done. The church was about a hundred meters away from me and the ball-lightning may have been up the tower as it had struck the 2 m high iron cross, which fell onto the ground, but it had not touched the bells<sup>1</sup>. At that time 3 teenagers had been ringing the bells to make the storm pass. The boys had been knocked over<sup>2</sup> but it had not done any damage to the bells. The ball-lightning may have rolled down on the bells'rope. The bells'rope had slipped through a hole and the ball may have come through it, too. The boys told us that they had felt as if a great force had been pushing them to the ground, but they had not been hurt. The ball-lightning broke the cubic stone floor made of concrete. It made a dent of 15 cm diameter and 5 cm deep in the stone. The dent was approximately of the shape of a cone. The surface of the dent was smooth, no debris could be seen. Then the ball went into the church's inside. The church is 5 m x 10 m. There it avoided the Holy Eucharist, the cross, the chalice, but struck a woman who was just putting flowers into the vases. The boys said it had disappeared near the woman's mouth and the woman had fallen over at the same time. She had a pair of boots on. The ball lightning tore off the sole of her left boot, and threw it away. It ripped her heel, and tore her clothes. She lived for another hour, then died. While still alive she was showing towards her lungs, so as to say she had a bad pain there. During all that time there was a very thick smoke in the church so the boys could not see what had happened to the ball-lightning though as a matter of fact, they were so much frightened they hardly could pay any attention.

As we carried the woman out of the church other people came there to tell us what damage had been done elsewhere. Some 50 m away from the church at a

house other things happened during the same time. We do not know whether after or during the events in the church but approximately at the same time. In this house there was a radio operating with battery. The village had no electricity at that time, only the village notary had a phone. The radio had a 20 m long antenna pulled through a hole drilled in the frame of the window. According to the witnesses something threw the radio out into the street together with the frames of the two windows. These were found on the bridge over the 50 cm deep ditch. The other window's frame was also drilled through and the ground wire was pulled through the hole. Two women living in that room were just listening to the radio. They were not looking towards the window just noticed suddenly that the radio with the window frames flew out of the window. They were much frightened. One could feel heavy, grey smoke there, too.

#### Comments

1. The grounded metal object attracted the beam.
2. The scattered electrons accumulated on the body of the boys repelled them, and this force pushed them to the ground.

56/c.

It happened in a mill. I transported grain to the mill and had to wait for my turn. We were 4 or 5 in the mill. It was about 11 p.m. The weather was very nice that day there was no thunder to be heard. The mill worked with an internal combustion engine which made much noise, so I cannot tell whether there was any thunder in the neighbourhood. We did not light a lamp, we were sitting and talking in the darkness. The door of the room was open. Suddenly a bright, yellow ball of 50 cm diameter floated into the room. It did not touch either the ground or us. Sometimes it ascended, sometimes it descended. Sometimes it went under the table, sometimes it rose as high as the attic. So did it float. When one of us moved it moved, too, at the same time. Then we saw it moving towards the stove and it clung to the vent-hole of the stove. The vent-hole was 5 cm diameter. Then the ball became smaller and smaller and disappeared in the end. Next morning the miller told us that the top of the chimney was cleft<sup>1</sup>. We did not hear the explosion, I think because of the noise in the mill.

#### Comment

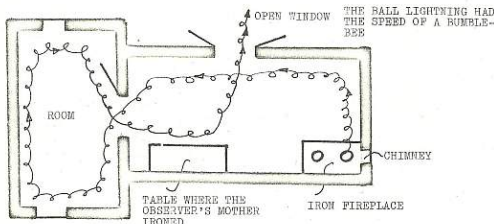
1. The beam moved into the stove, as the local electric potential was low there, but it was repelled soon to the chimney, where it exploded.

#### Case 57. Põzõ Ernõ, Baja (INTERVIEW)

One hot summer afternoon in June 1939 my mother was ironing in the kitchen with all of the windows and doors open because of the hot-spell. My mother told me it was certainly going to rain as it was too hot. I remember only one dark cloud in the sky. But no storm came. After a few minutes a crack

could be heard and a yellow light-circle of 20 cm diameter appeared from the iron stove which was standing in the kitchen<sup>1</sup>. The cooktop of the stove was taken off, so there was a hole of 20 cm diameter on it. This circular light moved around the flat. The two ends of the circle sometimes did not meet. Its speed was approximately that of a bumble-bee moving around the flat. It went into the next room then came back and touched my mother working with the electric iron. She felt something going through her body through the iron. She exclaimed<sup>2</sup>. The lightning left the room through the open window and I could see it for another 20 m, as it rose higher and higher, then disappeared. My mother's mouth was distorted. The doctor told us it was facial neuralgia but she recovered within two days.

CASE 57 LOCATION: SZÖREG



THE OBSERVER WAS NOT SURE OF THE DIRECTION OF THE MOVEMENT IN THE ROOM.

Comments

1. Hollow beam, grounded.
2. The beam was attracted by the grounded metal electric iron.

Case 58. Lénárd István, Budapest (INTERVIEW)

In the middle of the 40's a tram was running in Baross street and I was a tram-driver there. Once it was thundering and lightning much while I was standing on the platform of the tram waiting for the set-off. Suddenly I heard a great crack and after a short time a red-hot circle<sup>1</sup> floated slowly towards me. It came in through the left-hand side door of the platform. At that time tram platforms were open. I avoided the floating ball as it passed 1/2 m away from me. I was much surprised to experience that it was neither hot nor cold. It floated towards the front of the carriage and there it exploded. It emitted

a sound similar to that of a cracking air-balloon. I saw the disc for about 7-8 seconds and it was of approximately 20 cm diameter. After finishing work I noticed with surprise a hole of 5 cm diameter on the front of the carriage I found it at the place where the ball-lightning had touched it. The hole in the one and a half mm thick steel plate was a regular circle<sup>2</sup>. No soot or seam could be seen there.

#### Comments

1. The ball-lightning is frequently reported to be a flat circle. A radiating sphere cannot be distinguished from a radiating circle. (The setting sun looks flat also.)
2. The steel evaporated because of the beam. The beam hit the front apron because it was grounded.

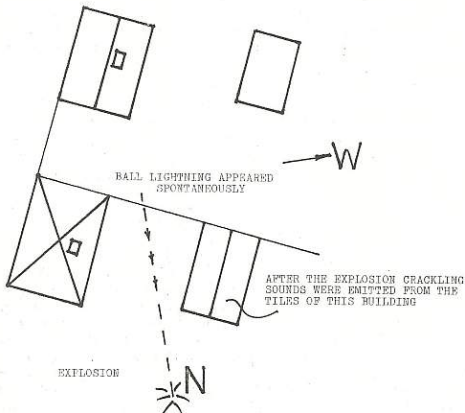
#### Case 59. Viski Béla, Szokolya

It happened between 5-6 p.m., in April of May 1969. It was lightning in the distance. Thundering could be heard first quite near then far away. At the same time I noticed a fire-ball of 100 cm diameter appear<sup>1</sup> 40 cm away from me and 200 cm above the ground. It existed for 1-3 seconds then it exploded. After the explosion low cracking<sup>2</sup> sound could be heard from the neighbouring houses. It appeared without any previous signal. It did not grow. It did not come from anywhere it had just appeared out of the blue. Its colour was light orange. After its appearance it became a bit lighter then exploded. Its shape was a regular circle, and it had a definite outline. It appeared above a pillar of a fence, but it is possible it was away from that. It was 3 meters away from the corner of one building and 10 m away from another near, low building whose tiles gave a cracking sound afterwards. There were some cumuli and veil clouds in the sky, but the air was stifling.

#### Comments

1. Second penetration site.
2. The crackling sound was caused by the electrons scattered after the beam had fallen apart. It is associated with a weak blue light as well (St. Elmo's fire) but it is not visible at daytime. The discharged electrons leaving the tiles caused the crackling sound.

CASE 59 SZOKOLYA



Case 60. Welsz Antalné, Budapest (INTERVIEW)

We lived in a one-storey house at 10 Aszódí street, Budapest, in 1953. After a summer thunderstorm I was in the room with my grandmother and younger sister when a ball-lightning came in through the window and went whistling around the wall, at a height of one and a half meters. A stone of 10-15 cm diameter fell out of it. The stone was black, smooth approximately of a ball's shape. The stone remained in the room<sup>1</sup>. It fell down near the socket. We noticed that the electric wire had burned down, and there was no electricity in the flat<sup>2</sup>. We preserved the stone for years. Later on we lost it when we moved. We had never seen such a stone before in the neighbourhood. There were flowers in our garden and there were no stones in the ground at all. It is sure it was not of iron. It was a stone.



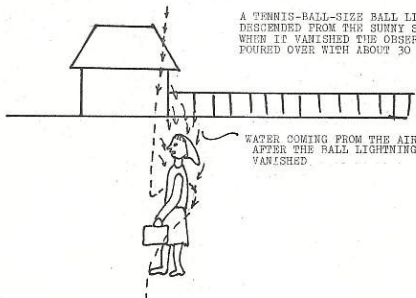
Comments

1. This stone was lifted off most probably at the other penetration site.
2. The wires were burned by the beam electrons, after the beam explosion.

Case 61. Csapó Gézáné, Ujronafő (INTERVIEW)

I was just going home. It had been lightning and thundering half an hour after a summer storm. The sun was shining brightly then, I do not remember any clouds in the sky. I was about 10 years old. I caught sight of a light red ball 30 cm away from my head. It descended to my hip, then perhaps it stopped for a moment. Then it got behind my back, went around me, then rolled into the ditch on my right. By that time it reached the ground. It was 30 cm away from my body throughout this time. It disappeared in the bottom of the ditch. I could not feel any warmth or hear a sound, it did not change its form. It did not hiss reaching the ditch. At the moment when the ball disappeared 3 bucketful of water was poured onto me, I think, from the sky. It was not raining, the water was pouring just inside that circle the ball-lightning could be seen in. The water pouring onto me was quite warm like summer rain. There had been no rain in the ditch. It was just a bit wet around it as it is usual after rain. Then some women came to me to ask whether I had been hurt or not. They were glad to hear I had not been hurt, and dried me.

CASE 61 LOCATION: HAJDUBÖSZÖRMÉNY



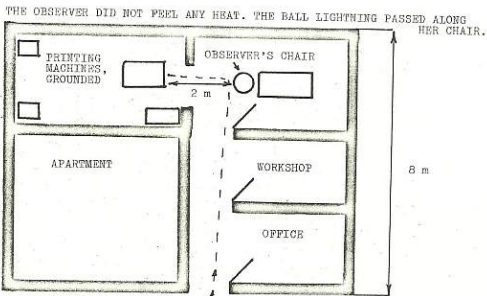
Comment

1. This case is similar to the previous one. This could be explained by the multidimensional model, although several details are to be cleared yet. Hallucination is unlikely, because there were several witnesses.

Case 62. Tóth Szabó Józsefné, Üröm (INTERVIEW)

I was working sitting at a table in a printing office in the beginning of the 40's. In two rooms' distance from me there was the open door of the building. It was raining and one or two lightnings flashed, too. All of a sudden a fireball of 30-40 cm rolled in through that open door which was about 7 meters away. It passed 2-3 cm away from me, then it turned at right angles and headed for the workshop behind me. The flurry of the ball-lightning may have lifted up my skirt a bit as it passed<sup>1</sup>, I think. But I did not feel warm. It headed for a machine which was not working at that moment and knocked against it without any noise. At this moment the whole - about one and a half meter high - iron framework of the machine (it was a small-size high-speed printing machine) began glowing red-hot for about 5 seconds. I remember it very well because I was watching the route of the ball after it had avoided me and I was much surprised to see it. The machine had a grounded electric engine. No spark could be seen, no sound could be heard, and then it ceased glowing without a sound. We could not find any damage or trace of magnetic

CASE 62 ÜRÖM



THE PRINTING MACHINE BECAME RED-HOT WHEN THE BALL LIGHTNING TOUCHED IT.

effect on it, though I must admit we did not examine it at all. I was alone in the room. The equipment was destroyed in 1949, so it does not exist anymore.

#### Comments

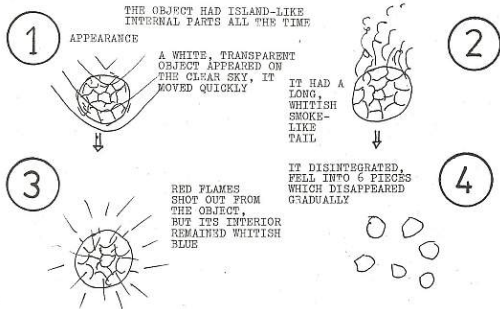
1. Most probably it was not the wind, but the beam, which repelled the scattered electrons which had been accumulated on the skirt.

2. The machine was heated by the beam electrons, but only when the beam fell apart. Otherwise the destruction had to be localised. Therefore the most likely scenario is the following: the beam became unstable when it touched the grounded machine. The beam electrons were not scattered far away, but were collected by the machine, and fed to the electric wires. This heated the machine and the wiring as well.

#### Case 63. Feth Ferencné, Nagyvenyim (INTERVIEW)

At 5<sup>30</sup> a.m. on 19<sup>th</sup> March, 1986 we caught sight of the following phenomenon. A bright translucent object appeared in the sky not too high parallel to the electric cable. It looked like glass, and was pulling a tail. Then it seemed to stop for a moment, its tail came off, and the object itself began to glow but its bottom remained translucent and bright. The whole sight could be seen for about 30 seconds. That morning the sky was clear, there was no wind blowing, the stars in the sky could still be seen. One moment before its appearance we saw a great white flash of wedge-shaped light and that trans-

#### CASE 63 NAGYVENYIM

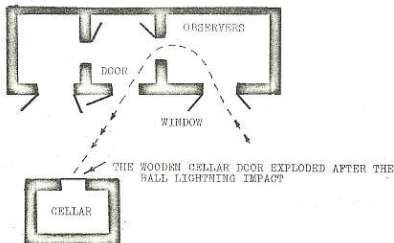


lucent white object appeared from its peak. Its tail was snow-white and it seemed to be of smoke. The object was translucent and seemed to be made up of small figures; the edges of these figures were more white than the centres of them. After its tail had come off, it kept its original form and colour. Its burning was a beautiful sight somewhat similar to that of a sparkles, with the difference that this object emitted the beams from itself and its beams were red-hot all around, while next to the object itself bluish-white light was glowing. Maybe it was the centre that did not burn, but in the end it fell into several pieces. During 30 seconds this object covered 200 m. We think its centre may have been approximately of a soccer's size, but we can not esteem it exactly. After having fallen apart its centre gradually disappeared.

Case 64. Gyenge Lászlóné, Alsózsolca (INTERVIEW)

I travelled with my parents to Nagyberezna (Carpathian-Ukraine) in 1940. As soon as we had arrived a storm was just going to break out. Our host warned us that ball-lightnings could frequently be seen there<sup>1</sup>. They opened all the doors and windows so that we could see it after the storm had broken out. Our host asked us to withhold even our breaths till it disappeared. The ball-lightning came soon. A ball of a soccer's size appeared with much light and a tremendous crash, it was glowing in all the colours of the rainbow. It was moving quite fast and the ball's surface seemed to be full of flashing needles<sup>2</sup>. It came in through the window, went across the hall, then went back into the yard. Then it went up to the door of the cellar and broke it up. The door of

CASE 64 NAGYBEREZNA



the cellar was made of wood and was strengthened by iron bars. The most strange and interesting thing about it was that the door was cut into shavings<sup>3</sup>. Most of it was turned black, but it did not burn totally. Nagyberezna is situated in the mountains, mountains are all around it.

#### Comments

1. This remark underlines that at some places ball-lightnings appear more frequently than at other ones.
2. Ionization channels caused by the scattered beam electrons.
3. The beam heated the wood, and the generated gas and steam caused an explosion of quite a uniform power distribution.

#### Case 65. Mézes Ferencné, Dorog (INTERVIEW)

During a summer storm in 1937 a fireball of a soccer's size came in through the window. It was extremely bright and disappeared within a moment through the door. We were guests at a family then. I remember exactly the following phenomenon. There was a clock on the wall near the door, which was working with the help of two lead-weights hanging on a chain. When the storm passed we noticed the clock lead stopped. We went up to the clock to wind it with the chain and we saw the lead-weight hanging on the chain lengthening in our hand to our great surprise. It looked like a long cucumber<sup>1</sup>. The clock may have stopped when the lightning had passed it, because it still said a quarter to two. We had been talking for a long time and were just about to leaving; it was 7 o'clock by our watch. Then our host tried to wind the clock. The chain made of small steel-links also lengthened, and its original brown colour turned grey. As we have not met this family again I can not give any further information on the clock.

#### Comment

1. The lead-weight might have been recrystallised in the strong multi-dimensional electromagnetic field of the beam. This recrystallization may take place if the field intensity exceeds a threshold value. The consequent crystal structure is not permanent, only temporary. Most probably at least a part of the original object became an at-least-4D crystal, with different mechanical properties. This was observed when the rewinding was attempted. Magnetic anomalies could have been detected as well. The shiny appearance and quick movement of BL is associated with high energy beams. These anomalous solid state phenomena have been reported only in the case of high energy BL observations.

Similar case. A. Keul: Naturwissenschaften, Vol. 68., pp. 134.

Case 66. Csikesz Józsefné, Budapest (INTERVIEW)

At about 3 or 4 p.m. in June, 1969 I was watching a storm coming when a round, red lightning of 30-40 cm diameter and of a plate's form sprang off the rails opposite our house. A tremendous crack accompanied its appearance. Opposite the spot of the ball-lightning's appearance there is the middle room of our flat, and above that there is a TV antenna on the roof. One could smell something burning in the flat. We found the chandelier broken and its splinters scattered all over the floor, the wires in the Bergman-tube burned down, the cover of the electric distributors flung open. The tiles were broken around the TV antenna on the roof.

Case 67. Füzy Géza, Hegyeshalom (INTERVIEW)

At about 5 p.m. on 11<sup>th</sup> May, 1970, a ball-lightning struck our flat. The sky was almost clear, there were only some cumuli in the sky, a few drops of rain fell and only one thunder could be heard. It destroyed our house which had been built only 6 years before. No one was hurt but great damage was done. I was standing about 15 m away from the house with my back to it. Others told me that a light came from the sky and a thunder could be heard at the same time. All the doors and windows were locked. After the explosion most of the tiles were thrown off the roof. All the electric wires burned, some of the chandeliers and lamps were broken, the TV exploded, one part of the bathtub melted in the bathroom (which was otherwise locked up) and some clothes stored there were singed. In one of the rooms my husband and my grandchild were sleeping, but they were not hurt. The windows were broken, and the shutters were damaged, too. The electric meter was found in the neighbouring yard later on. At the moment of the explosion a flash of fire leapt up the sockets in several houses of the village.

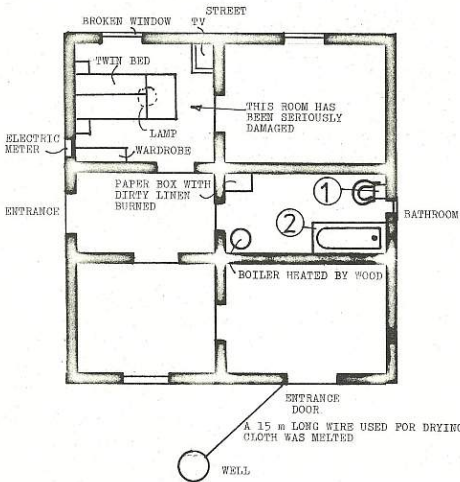
In our larger room even the wardrobe was broken. This wardrobe was made of thick pear-wood. A burned spot of 3-4 cm could be seen on the sleeve of one dress made of synthetic fibre. Though I could not follow the route of the ball-lightning, its track can be seen exactly in the photos. After the TV-set had exploded its parts caused damages on the wall and the splinters can be seen on several parts of the wall. You can see the traces in the photos.

Case 68. Verecký Antalné, Komárom (INTERVIEW)

On 18<sup>th</sup> June, 1966 at half past six in the morning a heavy storm broke out, with lots of lightnings. We were just getting up when after a tremendous thunder the chandelier began sparkling and a 70 cm long, 20 cm wide yellowish-red ball-lightning appeared. It flashed from the floor to the ceiling, then to the TV-set and then to the sockets. Afterwards it rolled into the other room where it crushed the side of the illuminating sofa. Then it went into

CASE 67 HEGYESHALOM SEE PLATES

DOORS AND WINDOWS WERE CLOSED  
DURING THE INCIDENT



1

THE WATER TANK OF THE WC WAS TORN OFF

2

TWO LEGS OF THE CAST-IRON BATH TUB WERE BROKEN AND AT THE CORNERS CRACKS DEVELOPED.

THERE WAS AN EXTENSIVE DAMAGE IN THE PIPING, IN THE CELLAR AND UNDER THE BATHROOM AS WELL.

the kitchen and broke the radio into pieces, then getting to the top it cracked what we thought to be another lightning. The outer cable of the TV antenna was wound up. This cable got into the room through a hole drilled in the window's frame. Inside the flat the antenna cable burned though there was no flame only glowing and much smoke. There was much dust, too, because wherever the ball-lightning touched the ceiling and the sockets much plaster came off in large patches. The electric wires had to be changed in the whole flat. In six houses on both sides of our house the electric meters burned down together with those in the opposite row of houses. When the ball-lightning blew up, the blast of the explosion flung the door of the cupboard open, and all the cups and small plates broke into pieces.

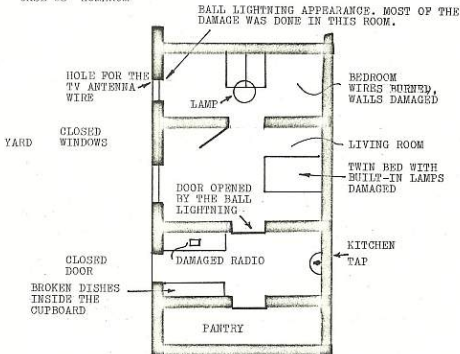
Some persons were injured as follows: Burned blisters of a pin's size appeared on my daughter's skin but later these disappeared without any trace. As a consequence of the explosion our hearing was 50 % damaged (I mean, mine, my husband's, and my daughter's). My eyesight was damaged because I was watching the phenomenon from the beginning to the end. I could see only fiery circles for half a day after. The capillaries - on my thighs which were uncovered at that time - burst on an area of about two palms.

The material damage caused by the ball-lightning was about 12 thousand Ft.s. The rafter in the attic (where the antenna was) was destroyed, it was chopped into pieces of a match-stick size. The TV-set fell into pieces but later we could have it repaired. The colour of the ball-lightning was yellowish-red. The speed of its jumping was quick enough and where it touched the ceiling and the floor, a territory of about 6-7 m<sup>2</sup>, they became covered with as many small holes of 2-3 cm diameter as possible. There were some damages in the next flat, too. The biggest patch that came off the wall was at the socket. It was about 30 cm diameter. The water-tap was not damaged but was sooty and smoky as the ground wire of the radio was connected to it and that burned down. The traces of the ball-lightning can still be seen on the cupboard on which the TV set stood and on the sofa. Both were singed. When it happened all the doors and windows were shut, except for the door leading from one room into the other. The door leading from the rooms into the kitchen was shut - and it was flung open by the lightning. The electric voltage was 220 V.

Someone saw the event from the outside. He had just seen off his guest to the railway station and wanted to return across the garden. He saw the ball-lightning hitting the rails then thrust up to our TV antenna. Afterwards it got through the ceiling by the antenna wire, into the flat.



CASE 68 KOMÁROM



THE RADIO WAS GROUNDED TO THE TAP. THE GROUND WIRE MELTED. THE NEIGHBOURING HOUSES WERE 25-30 m AWAY.

Case 69. Medve János, Gyula (INTERVIEW)

The observation took place at about 3 p.m. on 29<sup>th</sup> April, 1986, in Gyula.

Preliminaries:

The weather was humid and warm that day, then at about 12 o'clock dark clouds began gathering in the sky. Soon a heavy thunderstorm broke out, with hail-stones of the size of peas. While it was raining one could hear frequent thundering and see lightnings far away.

Just before the observation the clouds were situated in the sky as it is shown in the sketch enclosed. On the spot of the observation there were dense, dark but not whirling clouds in the sky, whereas above the office-building there were low, dark thunder-storm clouds. Immediately before the observation there were no lightnings; the only lightnings that could be seen were about 5-6 km away.

The observed process:

The observation can be divided into six separate stages, as shown in the enclosed sketch.

Stage 1.

An approximately circular light spot of 4 m diameter could be observed in the sky at the point marked in sketch A. It lasted about 3-4 seconds. It had a cold, bluish light. Its outlines were rather blurred<sup>1</sup>.

Stage 2.

In stages 2-3 the outlines and position of the membrane-like light-spot did not change<sup>2</sup>. In stage 2 the luminosity of the surface grew at a great speed centrally in the directions marked with arrows. The light itself was uniform and cold<sup>3</sup>. It lasted approximately 0,5 - 0,8 sec.

Stage 3.

In the beginning small, then gradually growing, approx. centre-directed island-like light-spots appeared on the surface, still definitely membrane-like. The luminous intensity of the "islands" was considerably greater than that of the other parts of the surface bordered by the outer contour. In the middle there was an open gap of 0,7 - 0,9 m diameter<sup>4</sup> which showed itself in this stage as a definite dark outline on its left-hand side, whereas its inner edge was crumpled so that one could see a slight bulge from the place of observation<sup>5</sup>. In the initial stage the "islands"<sup>6</sup> did not move at all and they did not considerably change their position later, either, though they accumulated in radial direction so that one could experience a powerful inner spasmodic shivering or shaking. It lasted approx. 1,5-2,5 sec.<sup>7</sup>

Stage 4.

Suddenly a sphere of 45-50 cm diameter burst out of the previous stage and approached a 20 kV transmission line pylon at a great speed<sup>8</sup>. This stage already had a warm light, its colour was orange-red, with a slightly whirling surface. One could see a strong, black outline on its left-side<sup>9</sup>. It was translucent, whereas directly above it on the spot marked in the scheme a dark, orange-red superficial configuration appeared which was whirling stronger than other parts. It existed only for a very short time (for less than 1 sec.).

Stage 5.

In the next moment the sphere's diameter shrank by 10 cm within a short time without any noise. Small bulges appeared all over the surface<sup>10</sup> but no spark-like formation was emitted, and the luminous intensity of the surface increased considerably compared to stage 4. Its colour was lighter than before, similar to a white glowing. This stage lasted 5-8 sec. and covered the path marked in the sketch.

Its speed was the highest in stages 4-5, while it was approaching the 20 kV line, then it was floating above the insulators and slowly covered 10 m distance among the cables. The duration of the movement was 5-8 sec.

#### Stage 6.

After covering 10 m distance moving away from the pylon (it was impossible to assess whether the ball-lightning touched the cables or went through them from the place of the observation) it exploded with a tremendous crash and a ball of 8 cm diameter came into existence<sup>11</sup> which was glaring with a white blinding light. This ball shot red-hot cylindrical fire-tails of 2-3 cm diameter on a spherical surface of approx. 10 m. One could observe a whirling, smoke-like sight on the centrally-directed ends of the fire-tails, which lasted 0.5-1.5 sec., then disappeared. A sound-effect could be perceived only during the 3<sup>rd</sup> and 6<sup>th</sup> stages - both of the same scale.

At the moment of the explosion the electric light went out because it is supplied by this cable. The central transformer station is situated one and a half km away from the place of observation. At this station the 20 kV wire has a fuse for 200 A and 1 sec.

The ball-lightning caused the explosion of the insulator-case of the upper wire. According to next day's observation a lustrous, white coat could be seen on the wire 5-8 m long, which was less visible on the occasion of the on-the-spot inspection and disappeared totally after a few days.

The bundle of aluminium cables which happened to be near the ball-lightning lengthened considerably, it hanged down lower than the others. When being repaired the cable had to be shortened by approx. 2 ms. The cable got lengthened uniformly whereas the other cables were not lengthened at all<sup>12</sup>.

#### Comments

1. Second penetration site, large beam diameter, relatively small uniform electron density.

2. The observer stressed that the shiny object had been membrane-like, but he has seen it in a circular form, never the flat edge. This remark is quite frequent, a light radiating ball or a circle membrane is indistinguishable.

3. The beam self-constriction becomes more enhanced.

4. A hollow beam has been formed with a smaller diameter.

5. Non-uniform beam structure.

6. The islands are filaments where the local electron current density is higher.

7. The hollow beam turned into a small-diameter solid beam.

8. Ambient electric fields made the beam move towards the utility pole.

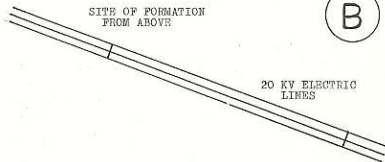
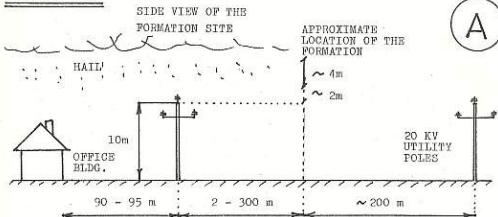
9. The surface has been darker at that point, for a very brief period due to a local instability.

10. The beam diameter shrank again due to electron losses, and the rays were caused by the scattered beam electrons.

11. Start of the beam instability.

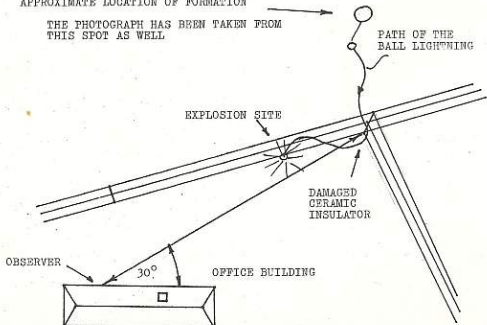
12. Similar effect to that of case 65.

CASE 69, GYULA

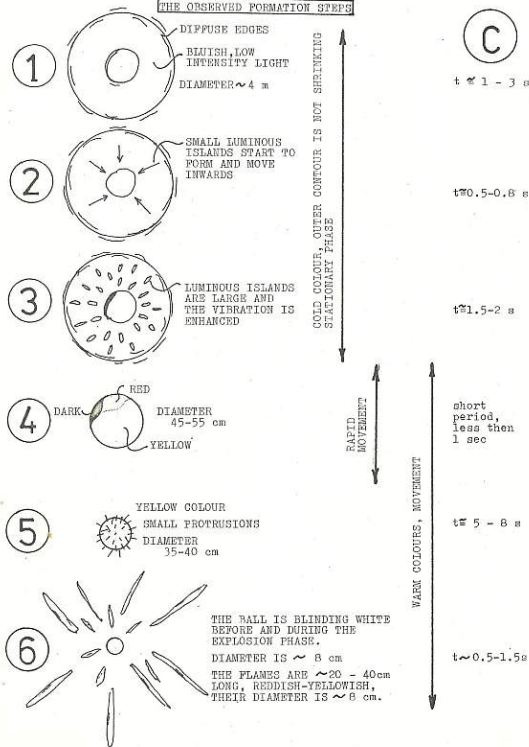


APPROXIMATE LOCATION OF FORMATION

THE PHOTOGRAPH HAS BEEN TAKEN FROM THIS SPOT AS WELL



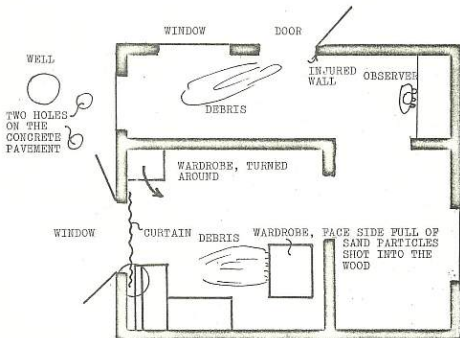
THE OBSERVED FORMATION STEPS



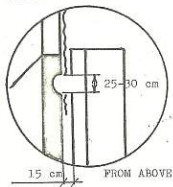
Case 71. Tamás Endre, Budapest (INTERVIEW)

At about half past 10 a.m. on 30<sup>th</sup> July, 1983 I was working in my week-end cottage on Szentendre-island, which is situated in the Danube-bend. Thundering could be heard from far away, but the thunderstorm must have been rather a long way off, because only slight murmuring could be heard. I was standing in one of the corners of our small cottage and I was just drilling when I heard a tremendous crack, and the impulse pushed me to the wardrobe. As soon as I had regained my balance I felt another impulse again 4-5 sec. after the first one accompanied with another crack. In the house I could hardly see through the dirty air, the air was full of dust. Debris was creaking under my feet all over the floor. I rushed up to the attic at once to see if there was a fire there, but I couldn't see any. As soon as the dust had settled I could look round. The house was damaged rather badly. Some pieces of slate were missing from the roof and the front part of the roof was ruined completely, i.e. the pieces of slate slid off the roof. (This part of the slate-roof had been built only a bit of time before.) In the house I noticed the following damages: there was a hemispherical or conical hole of about 20 cm diameter in the wall not too far from the window. There was a regular circular hole in the plastic curtain which was in front of the wall. I found a regular circular hole burned in the back of the sofa only a few cms away from the curtain. The wardrobe in the corner of the room was turned, twisted but the mandoline on top of it remained unmoved and was not damaged at all. The vertical side of the polished wardrobe standing at the opposite wall of the room looked like a piece of sandpaper. It was shot all over with rough grains of sand coming from the coat of plaster. Some plaster was missing from beside the aluminium window-frame, the debris was thrown all over the corridor. Outside the house there was a manual push-well made of foundry-iron and there were 2 holes each of a man's fist size approx. 1 meter away from it in the concrete groundwork. Both were approx. hemispherical. Other particular damages were not done, in spite of the mess. I should have seen a lightning strike from the spot I was standing, because there were no doors there only the openings for doors therefore I could see every part of the flat. But I'm sure I didn't perceive any light, not to speak of one strong flash of a lightning. It may have been a ball-lightning because I found regular circular burnt holes on the curtain and the sofa. 24 hours afterward suddenly my temperature rose to 40 °C and I was taken to hospital. One of my testicles swelled so that it had to be operated on. I do not know whether there is a connection between the ball-lightning's visit and my illness. Nevertheless I was in a rather critical condition. There was no lightning-conductor on our house.

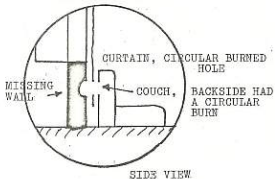
CASE 71 SZENTENDRE ISLAND



ENLARGED PORTION



ENLARGED PORTION



THERE WAS A SULPHUR-LIKE SMELL, DUST AND DEBRIS IN THE BUILDING AFTER THE EXPLOSIONS. TILES FROM THE ROOF WERE SWEEPED AWAY BY THE EXPLOSIONS.

Case 72. Jánossy Mihály, Budapest (INTERVIEW)

In 1960, at Lake Balaton during a heavy storm the window was open. Then a long, bright, snake-like thing came into the room very quickly and then left the room through the same window. After its disappearance I noticed that the bulb in one of the lamps was burned out.

Case 73. Moldvai Jolán, Budapest (INTERVIEW)

In 1960 I and one of my acquaintances got into a storm at Kékestető. We did not dare to stand under the trees in such a storm so we were crossing a meadow. Suddenly a snake-like sparkling, hissing, red figure appeared in front of us during the continuous thundering. It covered 4-5 m when it disappeared with a great crack.

Case 74. Ézsöl György, Budapest (INTERVIEW)

A ball-lightning of a tennis-ball size went into a flat during a thunder-storm. It was seen by several witnesses. Around the ball-lightning a red-coloured aura could be seen. It went round the walls and singed them, then left the room through the same window.

Case 76. Névtelen, Budapest

It happened in a small house with a garden on a sunny afternoon. I was sitting alone in the corner near the window. I was sewing with my head down. Suddenly I noticed something coming into the room through the window. I looked up and saw a white, gloomily glowing light-ring floating silently above the square dining-table in the middle of the room. It was not of a ball's shape, it was definitely of a ring's shape of 1 meter diameter. The ring itself was of the thickness of one arm, and its outline was glowing with a white, gloomy light. This phenomenon was floating above the table for a few seconds then it rose slightly vibrating, it turned into an ellipse, it became thin, then lengthened and flew out of the room through the keyhole or the door like a long white smoke-snake. Our door led into the hall and the door of the hall was open so that we could get some fresh air from the garden. A few seconds after it had left the room I heard a great crack from the garden. It did not cause any damage.

Case 82. Csekély Miklósné, Szekszárd

In 1916 a ball-lightning came into the flat. The sky was bright and clear. The larder beside the kitchen had a big, open chimney. The ball-lightning came in through that then it came into the kitchen through the open door of the



larder. My sister was in the kitchen at that time. She had a small axe in her hand. She saw only a shining strap of the ball-lightning but then she could not let the axe go, and felt as if she had been struck by electric current. The ball-lightning went along the wall of the kitchen upto the ceiling leaving a singed trace behind. It broke through the wall into the room, went towards the floor and disappeared. It passed right beside the writing-table but did not light the papers and documents lying on it. In my father's opinion it left the room either by the telephone-cable on the ground-floor or through the open window. The building had very thick walls. The partition-wall which the ball-lightning broke through and left a hole of 10 - 15 cm diameter in it was also quite thick.

Case 83. Szabó János, Mocsá

In May, 1974 I was in the field in the open air. The rain had just stopped, it was thundering somewhere in the distance when I noticed two air-ball-like balls glowing red 30 m away from me. They were just crossing the road towards the trees and bushes. They were light-red, their shape similar to that of a soap-bubble. One of them was of 80-100 cm diameter, the other a bit bigger. They were moving at the speed of a walking man. I was watching this phenomenon for about 30 seconds, then they disappeared among the bushes. Afterwards I heard a soft crack from among the trees and bushes. I could not find any trace of destruction on the spot where they had disappeared.

Case 84. Tóth Istvánné, Budapest

I was waken up at night by the storm. I turned off the radio because of the thundering but I forgot to disconnect its antenna. Suddenly I heard a loud hissing sound just beside me and I saw a light flashing on my pillow. I was wide awake within a moment and then I saw a dazzling, hissing strap of light rushing across my pillow. It zig-zagged from the socket towards the radio hissing loudly. Its sparks may have been approx. 10 cm long. The wire of the radio burned down at full length and I was so frightened that I grasped the radio and pulled the wire out of it. I could hear a bit of a sound from the radio. It started "speaking". It gave a sound like a sigh. Then I turned it on as it operated from a battery, too, and the radio worked. There was no other electrical disorder except the fact that the wire burned down.

Case 86. Paál Rózsa, Budapest (INTERVIEW)

It happened in Budapest. A thunderstorm was nearing but it did not break out yet. I was looking out of our room on the third floor onto the street which was completely deserted except for one pedestrian passing our block of flats. Suddenly a bright object rolled towards the pedestrian. Its colour

was yellow. One meter behind the pedestrian's back the light-ball split, both halves got round the pedestrian on a one and a half meter diameter circular course. It was moving together with the pedestrian for some steps' distance. It took up the pedestrian's steps' rhythm as well. Its separation and reunion lasted approx. 4-5 seconds. After getting reunited it rolled on in front of the pedestrian and then disappeared at the corner of the street. The whole phenomenon lasted 20-25 seconds. I do not know if the pedestrian perceived at all what was going on; by all means he kept on walking.

Case 87. Tavi Jenő, Keresztespuszta

It happened during the summer in 1950. The weather was fine so all the doors and windows of the flat were open. The ball-lightning came in through the hall. I was in the room. I noticed a bright yellow ball of 10-15 cm diameter about 120 cm above the floor floating towards the room. It came into my mind that it could not be anything else but a ball-lightning. My wife opened the door of the other room but I told her to shut it at once. In spite of this the ball-lightning managed to get into the other room, went round and left the room without causing any damage to anything.

Case 89. Miklós Györgyné, Budapest (INTERVIEW)

The following case happened during a thunderstorm in July 1938. A ball-lightning of a tennis-ball's size appeared near the store after a tremendous crash. Its inside was blue surrounded by a pink aura. The whole ball appeared to be purple. As it was moving across the room it stopped for a moment on the top of the table then floated onto the verandah and then out into the open air. As a consequence of it all the fuses blew as well as the electric meter, there was no electricity in the house. I have had a bad head-ache after every storm since then.

Case 97. Takács Viktor, Rábaszentmihály

One summer afternoon in 1938 it was shining brightly. There was only one cloud of a sheet's size in the sky. All the doors and windows were open, and the guests were just saying good-bye to their hosts. As soon as they got to the gate one of the guests noticed a ball-lightning. They all looked in that direction and saw a ball of 40 cm diameter floating in front of the window facing the street then the ball-lightning went into the room. It was glittering in all the colours of a rainbow. The guests and hosts headed for the hall. They saw the ball leaving the hall floating approx. one and a half meters high and then it disappeared somewhere around the pigsty. Then they heard a tremendous crack from that direction and they got there to find that both pigs had perished in the pigsty.

Case 98. Kracsevszky Rné, Dunavecse

I had to take my daughter to the doctor on a stormy afternoon in 1973. When the doctor went to the glass-case to take something out of it I saw a light-ball coming in through the window after a flash of lightning and a thunder. The doctor told me in a low voice not to move. The ball-lightning came towards me, stopped opposite me and after a long time it began moving again, and went round us. When it was standing in front of me its light was almost dazzling but in spite of the fact that it frightened me much I did not experience anything else. Its diameter was approx. 20 cm, and it stopped about 30-40 cm away from me. After moving round us it left the room silently through the open door. It had a short tail which was similar to candle-light. After it left the room we heard a tremendous crash. Afterwards the doctor shut the door and the window, too.

Case 99. Avédik Lajosné, Lőkősháza

After a heavy thunderstorm it was becoming calm in the summer, 1934. An old lady living in our one-story block of flats ran down into the yard to get some rain-water into a wash-bowl. I was watching her from the protruding, glass-covered porch and noticed a bright ball of a tennis-ball's size rolling down the tiles of the roof into the rainwater-pipe. The woman with the wash-bowl suddenly cried out loudly because the ball-lightning was springing on the surface of the rain-water in her wash-bowl. The woman threw the wash-bowl away. At the same time the caretaker was sweeping the large puddles in the yard with a long-stick broom. A metal scraper was fixed to the other end of the broom. After rolling in a puddle the bright, small ball sprang onto this scraper. The caretaker was so much frightened that he threw the broom away and ran away. Having divided into two parts the ball was springing for a while then it burst and disappeared.

99/b.

(It happened to her grandmother)

In 1978 they were just having lunch when a ball-lightning bounced into the room, and went round the room springing on the nails of the pictures hanging on the wall. One after the other all the pictures fell onto the floor. My great-grandmother exclaimed "A wandering thunderbolt"! Then she took a silver spoon and threw it out of the window with all her strength. The bright ball glided after it with a hissing sound, and disappeared outside the house. I do not know what happened to the spoon.

Case 100. Bakula János, Szarvas

In autumn, 1929 dark clouds were gathering in the sky, then a storm broke out, it was raining cats and dogs. I took shelter in the open corridor

of a building together with 12-13 people. This corridor had 8-10 pillars. My mother was sitting on a bench with another woman in the middle of the corridor. Suddenly there was a bright flash of lightning, we heard a tremendous crack. My mother was pushed onto the ground together with the other woman. At the same time a red ball appeared on the rafter, then it rolled downwards on one of the pillars. It appeared at the middle of the building and rolled slowly from the middle pillar to the farthest one. A bicycle was set against this pillar and a workman had his hands on it. He had just asked how much the bicycle was. Just as he uttered his question the ball got to him and he died at once. Half of his body was burned. I do not know what happened to the ball. It was of 40 cm diameter and its colour was red. It made a hole in the roof and - as we noticed it later - it lit a sunflower's head in the attic. The rafter was damaged a bit at the point where the ball appeared. The tremendous crash accompanying its appearance was heard even in the next village.

Case 101. Ihász István, Szentes

In July, 1932 we were travelling by car to Kőszeg. It was a rainy afternoon. Suddenly a glowing orange ball appeared 10-15 m away from the car on the right-hand side. Its diameter may have been about 100-150 cm. The car was going rather slow, at a speed of about 30 km/hour because of the rain. The ball-lightning, which we perceived, was passing along parallel with the car for 4-5 minutes. Then it disappeared without any noise. During the time of our observation it was only raining, there was no thunder or lightning.

Case 102. Solti Alfrédné, Budapest

In my childhood I had already heard of ball-lightnings, because one had gone into the house of my parents' neighbour and had knocked off everything including the dishes and bowls hanging on the wall and then had disappeared through the open window. Therefore we always locked up the house during thunderstorms.

As an adult I was waiting for a train on the platform at the railway-station in Veszprém. After a summer thunderstorm an orange-red sphere of about 25 cm diameter appeared. It rolled along the platform evading all the iron-legged benches as if it had been repulsed by them. It disappeared at the other end of the platform to our great astonishment. We simply lost sight of it. It was hissing and sparkling all along its way. It did not do any damage, we felt no warmth. We could not utter a word for fear of it.

Case 103. Kovács Gizella, Kisujszállás

I was just going home at 7 p.m. in December, 1966. The ground was covered with snow, the trees were covered with hoar-frost, the sky was starry, no clouds could be seen anywhere. As soon as I reached our street I glanced at

the wood, and noticed a sphere-like object of about 50 cm diameter. It was glittering with beautiful colours. Purple and yellow were mixed in its colour, but it did not shine brightly. It was floating towards the houses. When I got to our house it descended evading the branches of trees onto the yard of the house behind us. It was about 15 m from me. It was floating there near the ground for some time then ascended askew but straight. I was watching it until it disappeared.

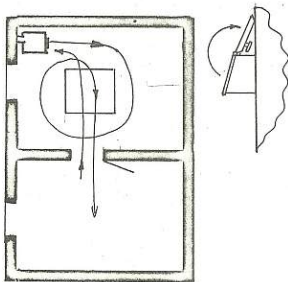
Case 104. Csonka Ferencné, Kiskunhalas

In summer, 1978 there was a heavy thunderstorm and I told my son to switch off the TV as it was lightning so heavily. At that moment a shining sphere of about 20 - 30 cm diameter appeared in front of the TV-screen. It was floating 30 - 50 cm away from the screen. I pulled my son backwards. Both of us were watching this phenomenon totally enchanted. It lasted about 1 minute, then suddenly disappeared without a sound just as it had come before. Its light was not very strong, we could look into it.

Case 105. Vörösmarty Jenő, Budapest (INTERVIEW)

During a July thunderstorm in 1912 at Dab my relatives were just going to have lunch when the door of the iron-stove standing in the corner suddenly was flung open. The axis of the door of the iron-stove was horizontal, and it remained stabile after having been flung open. Through this door a regular white spherical object of 15 - 20 cm diameter flew into the room. It went round the room very quickly. The room was 4 x 5 m large and 4 m high. All the doors and windows were shut except for the room leading to the next door. The ball-lightning went in through this door. The other room was larger, 5 x 6 m. It returned from the other room soon, then floated above the people sitting in the middle of the room. It disappeared through the door of the stove without noise. The ball-lightning was 1 m away from the wall all the time they could see it. The following things happened to the people in the room: a two-year-old girl who could already speak turned deaf and mute for a year. Her 30-year-old mother became deaf for a half a year and could not speak for a month. Her 34-year-old father could not speak for 3 weeks but could hear all the time. They had neither running water nor electricity in the house. The house was built on plain terrain. The people in the house did not feel warmth and the whole phenomenon lasted 3 - 4 seconds.

CASE 105 LOCATION: DAB



Case 106. Barszul Endre, Székesfehérvár (INTERVIEW)

We were just working on the amplifier of the radio-transmitter station in Székesfehérvár, when accidentally we short-circuited a 8 kV direct-current supply unit with a 100  $\Omega$  resistor made of a 500 W iron-wire which was rolled on a chamotte cylinder. The iron-wire turned red-hot, then began glowing white, and after it had been burned a fireball ascended to the ceiling then exploded there. It took 3 - 4 sec. for it to get to the ceiling.

Comment

This is not a ball-lightning case, but a chemical oxidation. Consequently the hot plasma moved upwards, and only upwards. When all the evaporated iron became oxidated, the luminous phenomenon disappeared. Plasma models are applicable for this case, the energy is derived from the oxidation of the evaporated iron.

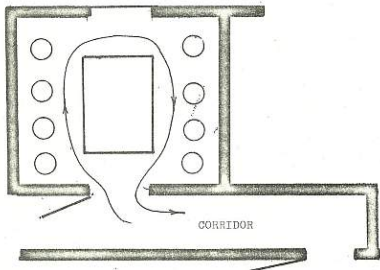
Case 112. Kaska Gyuláné, Budapest

In June, 1957, eight of us were sitting together in the school-staff's room at Hajdudorog. During a thunderstorm a ball-lightning came into the room through the open door. It came from the open corridor, then turned near the door and went round the room clockwise. Then it went back onto the corridor and it went out through the door. Before its turning up we saw a light-

ning flash and heard a thunder nearby. The ball-lightning was an about 30 cm long, oval object, floating 30 cm high above the ground all the time. It did no damage. It was moving whirling and it was glowing but its light was not blinding. It looked like a steaming shred of a cloud; its inside was dense, the material getting thinner and thinner towards its edge.

CASE 112 LOCATION: HAJDUDOROG

TEACHER'S  
ROOM IN A  
SCHOOL



Case 114. Patterman Bóláné, Gödfelső

It happened in the summer of 1960. It was a fine, sunny day. We lived in a house with garden then and I was just ironing with an electric iron in the kitchen. Suddenly I heard a rustling sound and saw a sphere-like, glowing object approaching me moving very quickly, whirling as a hurricane. It got near me within 1-2 seconds, went round me, then flashed on the brass water-tap and disappeared with a crack. I felt as if some wind had touched me on my knee otherwise I was not injured. This phenomenon came into the kitchen where I was working through the open door.

Case 115. Szőke Terézia, Keszthely

In 1960 my father came home from the fields totally drenched, so he wanted to change clothes. As he entered our large room a firelike phenomenon resembling a fireball appeared out of the electric switch. It was tottering towards the windows, it went round the room. It evaded the open door of the

wardrobe, and floated along the room about one and a half-two meters above the floor, then left through the open door, went across the ball then into the yard. It disappeared there among the flower-beds, about 5-6 m away from the house.

Case 116. Nagypál Jenő, Budapest

In August, 1955 I stayed at a hospital. I was not sleeping during the night because I had a very bad pain. All of a sudden a thunderstorm broke out. As I was watching the storm suddenly I caught sight of a strange phenomenon. Among the whirling clouds a bright spot appeared, then in its middle a yellow-white ball cropped up. It was floating towards the ground. It looked just like the full-moon seen from a great distance, except for the fact that it was descending at the speed of a rather old lift, and while moving it changed its shape to a certain extent, inasmuch as it turned from a sphere into an egg-like shape. It resembled the yolk of an egg, I mean, its behaviour did. As it was descending among the clouds sometimes it could be clearly seen, sometimes not. I could not follow its route for a long time, because only the upper windows could be seen through, the lower ones were dyed white. I could watch it for about 30 seconds.

Case 117. Fehér Antalné, Szolnok

In October, 1980 we, I and my father, caught sight of a strange phenomenon while travelling by car. We saw a red-hot ball much larger than the sun approx. 500 m high above the ground. At the first moment we thought it to be the sun then we realized it was already 9<sup>30</sup> p.m. We were gazing at it for some minutes but had no idea of what it could be. Then suddenly it disappeared and we did not see it any more.

Case 118. Pohin Tiborné, Budapest

During a summer storm in the fifties I and my mother saw the following phenomenon. Our flat was on the 2<sup>nd</sup> floor and the kitchen window was looking onto a park. We stayed in the kitchen during the storm and I was watching the lightnings through the window. Suddenly I noticed a glowing sphere approaching me. It was coming from the garden and floated as high as the kitchen-window was. It was of about 1 m diameter and glowing white, revolving round its axis, hissing. It came nearer and nearer to the open window and it seemed to be coming straight into the kitchen through the window, but immediately in front of the window it exploded with a tremendous crack. I jumped backwards, away from the window and noticed my mother gazing at the phenomenon. She was frightened very much.



Case 119. Rafinger András, Budapest

The following case happened at the end of the summer in 1970. The weather was fine. I was just hoeing the ground round the stocks of my peach-trees, when the tree next to me began burning all of a sudden. This tree was quite a tall one, and the ground under its boughs was dug up deeply. The tree caught fire within a moment. I was so frightened at this sight that I rushed back to the house in full flight. I was not hurt and later on I could not perceive any trace of the fire on the tree either. I do not know how long the whole phenomenon lasted because I ran away.

Case 120. Szing Ferencné, Baj

At 10<sup>45</sup> p.m., on 26<sup>th</sup> April, 1986 I saw a ball-lightning. It happened on a Saturday night. We were at our friends' and I was just waiting for my husband in the yard when I heard a tremendous crack and immediately after the crack a red-hot sphere of a small ball's size appeared. It was moving fast, leaving a bright trail. It passed 3 m away in front of me. As it was passing along, a strange, strong, blue light flooded the yard. After it had passed the air was hissing for a few seconds.

Case 121/a. Ehman Béláné, Pécs

At about 7 p.m. one evening in winter, 1970 I and my husband were just crossing the promenade in Pécs. It was already dark, the sky was cloudy, the temperature was about 0 °C. As we were walking, talking to each other, suddenly we felt very warm as if the sun had been blazing. At this sudden hot-spell I undid the buttons on my coat and took off my cap, too. As I looked round I noticed a bright sphere of 50 cm diameter floating approx. 3-4 m above us. My husband also caught sight of it. Both of us were just staring at it for about 1-2 minutes. Then it suddenly disappeared, the warmth abated and it began snowing. The snowflakes were larger than usual.

Case 123/a. Drégely Lászlóné, Budapest

It happened at about 9 p.m., after a rain on a pleasant evening in June, 1954. We were sitting in a country-cottage with my husband. I was sewing, he was reading. At that moment suddenly a blue-purple sphere of 10-12 cm diameter rolled silently into the room from the door-post. It rolled round the room along the electric wire nailed to the wall approx. 80-90 cm high above the ground. This electric wire may have been the ground wire of a radio. The wire left the room at the window through which the ball-lightning came in. It was glowing with a faint light just like the light on the gas-cooker. It floated round the room rather slowly, slightly tottering upwards and down-

wards. Within a few seconds it was half-way round the room. Being frightened I asked my husband not to move. He also noticed the motion. He was just about to turn a page over, the page was quivering in his hand, between his fingers. The ball-lightning rolled onto his elbow, then it began rolling to and fro along his arm, neck, ear and head, as if it had been hesitating. My husband did not see it (as it was moving on his body) he felt only a slight aching in his arm. It must have been rather unpleasant. Soon the ball-lightning went on its way smoothly. It left the room through the window and disappeared. The whole phenomenon lasted approx. 1 minute.

123/b.

At 1 p.m. in June, 1957 I was just drawing with my head bent down in front of an open window. The sky was dark with clouds, it looked like rain. It had already rained that morning. Our flat was on the second floor in an old-fashioned block of flats. Opposite our flat there was the brown tiled roof of another three-storeyed block of flats built in the thirties. At that time 8-10 pigeons were on that roof. I could get a good view of all these as I was looking out of the large window of the studio. As I was drawing with my head bowed, suddenly a bright object appeared on the edge of the field of my sight. It was so big that I did not dare to turn my head towards it directly, I was just gazing at it awry. A huge elliptic, glowing, golden object appeared outside, above the street in the air. It was approx. 3-4 m away from the iron frames of the studio-windows. It was symmetric to a vertical axis. Its light was blinding, as if you had looked into dazzling sunlight. Its length was  $2\frac{1}{2}$  - 3 m, and it was about 120 cm wide. It had appeared near to our window but soon it was drifted towards the opposite house. Then I noticed it began descending and got nearer and nearer to our window. At that moment it exploded with a tremendous crack. I cannot give an adequate description of the noise it made, as it was a strange mixture of different sounds at the same time, such as the blast of an explosion, a harsh crack, and an ear-splitting sizzling sound as if a huge piece of meat had been dropped into hot oil. I was completely deaf and paralyzed for some minutes. I recovered my senses to find myself alive and standing. Slowly I began to hear again, but I still could not hear the key turn in the lock when my husband arrived. Even my own voice seemed to be rather distant for me. None of the pigeons died, but the tiles on the roof of the opposite house were destroyed so badly that the roof had to be re-built. The coat of plaster on our house fell down onto the street. When I closed my eyes I saw this phenomenon again and again, and I could remember that the object had a wire-like extension ("tail"), winding from its lower part towards the ground, similar to the chalaza of an egg. Its outlines were not clear and sharp but rather ruffled. Its colour resembled the colour of the yolk of a cottage-egg. This colour is sometimes called cadmium-yellow, it is not exactly orange. Weeks after this incident I was still hard of hearing. The ball-lightning's visit lasted about 1 minute.

Case 124. Takács Mária, Budapest (INTERVIEW)

On Saturday afternoon in the end of May, 1924 the sky darkened as if night had fallen. I was 15 at that time. There was not much rainfall only a storm and it was lightning permanently. I and my younger sister were doing needlework sitting at the table in the middle of the room. The window was open. Suddenly a bright sphere of a football's size jumped into the room through the open window. Its appearance was accompanied with a tremendous crash. It was 1 m away from me, and it started for the stove in the corner. I do not know what happened to it later on, because I fainted, fell onto the floor, turned blue and stiffened. My 7-year-old sister was not hurt at all, she ran to our parents at once. I regained consciousness by 12 o'clock on the following day but I still could not speak. The local doctor could not heal me, I fainted frequently. I felt as if my heart had been on the point of jumping out; I was always groping around the cardiac region. Two months later I was taken to a hospital in Pozsony, where a famous Czech heart-disease specialist treated me. I stayed half a year at the hospital. The diagnosis was cardiectasis and nervous shock. There was not much hope for my staying alive. In the end my life was saved but I could not totally recover from my illness. I have always been having bad heart-aches throughout my life, though I had to do much manual work in the fields and in other jobs. Even today my heart sometimes convulses as if it was going to jump out. My speech has become so quick that often it is difficult to understand me. There is one more interesting symptom I have as a result of the stroke of lightning: I am very sensitive to electricity. Once, for example, I was shocked by the electric iron. I had a repairman have a look at it, but he did not find it faulty. But then I held the electric iron in one hand, and his hand in the other, and at that moment he felt the electric current, too.

Case 125. Szántó Gyula, Gyöngyöstarján

One Sunday in May, 1955 it looked like rain. It was about 3 p.m. A whirling fireball appeared in the room coming from the direction of the stove-pipe. Its appearance was accompanied only by a slight thunder. I was lying on the bed watching it. It was a beautiful but frightening phenomenon. It was not brighter than the full-moon, its light was not blinding. This phenomenon lasted about 60-70 sec., so I could watch it thoroughly. Small, protruding light "tails" appeared on the surface of the sphere. These tails were pointed. It was moving permanently 160-170 cm high above the floor. Then it suddenly cracked like a bulb and disappeared.

Case 126. Varga Sándorné, Budapest

It happened during a thunderstorm in July, 1946. On top of the chest-board there was a radio-set. During storms we usually grounded the radio by connecting a grounded wire to the antenna on the roof. I had just grounded the radio on that day, when there was a lightning followed by a tremendous crack. The lightning may have struck the antenna on the roof. The antenna on the roof was a wire stretched out between the roof and a tall tree in the yard and it got into the room through a side-window. After the crack a bright ball appeared on top of the chest-board in front of me. Its diameter was about 20 cm, its colour was similar to a yellow flame. It hopped along the edge of the chest-board four times and disappeared without making noise before I could count up to 4. I did not smell anything at all.

Case 128. Radnai Béla, Budapest

I worked as a doctor at Szentlőrinc-káta in the summer of 1957. There was a tall chestnut-tree in the yard, about 15 m away from our house. There was a well with an iron chain about 10 m away from the tree. A metal clothes-line was stretched out between the well and a thick branch of the tree. Dark clouds came whirling when we went into the house to have lunch. We were having lunch near the window looking onto the yard. I was sitting opposite the window. All of a sudden a lightning struck the tree. (It did leave a trace behind - one thick branch of the tree and a part of its trunk died.) Approximately one second after it an almost regular sphere of 30 cm diameter appeared and began slowly billowing along the clothes-line towards the well. Its colour was yellow like that of the sun, but it was not dazzling. After covering about half a meter it disappeared with a crack like a soap-bubble. This phenomenon lasted about 1-2 sec. To my great surprise soon after it another bright sphere turned up near the left-hand-side pillar of the well. It could be seen for an even shorter time than the previous one and it disappeared with a crack just like the first one. Afterwards we found the links of the iron chain of the well stuck to one another. (We managed to separate them later on.) Burned brands could be seen on the cement ring of the well where the chain was hanging down. It makes me think the ball-lightning's route continued in this direction.

Case 130. Pap Zoltánné, Budapest

In the summer, 1970 I was washing clothes with my washing machine in our small kitchen. The sky darkened, it began thundering. I shut all the windows except for the one in the kitchen. I had just switched off the washing-machine and was reaching out for its cover when a bluish-grey object of an air-balloon's size came hissing into the kitchen through the window. I ran out

of the kitchen. The sphere went round the kitchen, left through the window and a tremendous crack could be heard soon afterwards. I did not go back into the kitchen for a while. My son arrived soon and he noticed we had no electricity in the flat. Two fuses had been blown. My son threw them out. Both were still hot. In the evening we switched on the television, it cracked and did not work any more.

Case 131/a. Kriesfalusi János, Tata

In August, 1938 my brother sent me to the garden. It happened at Pilismarót. It was about 7-8 o'clock in the evening. Frequent flashes of lightning could be seen far away, from the direction of Dobogókő. I was just crossing our neighbour's yard when I heard a hissing sound from behind. Turning round I caught sight of a sphere of a tennisball's size moving along the axis of the yard about two and a half meters high above the ground. Its colour was yellow like flames. It moved at the speed of a slowly-running man as far as the middle of the road, then began tottering, turned round and started moving backwards along the same route. After passing above my head it went on for 7-8 meters, then turned eastwards and crashed into the iron wheel of the draw well. Only a slight cracking sound could be heard. This phenomenon lasted about one and a half minutes.

131/b.

In September, 1950 I was working in an office when a storm broke out. It began raining heavily and lightning within a few moments. By that time my boss had arrived to my office. He was totally drenched. The office was built North-East. In its western corner suddenly an orange sphere of a football's size jumped out flinging open the cover of the electric wires' box. Its centre, which was about two fists' size, that is approx. 10 cm diameter, was solid. Its material got thinner and thinner towards the edges. The box was 40 cm below the ceiling of the three-meter high room. After jumping out of the box the ball-lightning went 40 cm northwards then stopped, and began floating to and fro for 10-20 cm. We were watching it paralyzed with fear. Then all of a sudden it headed northwards moving slowly at the same altitude as before. At the corner of the room it turned east and began floating to and fro for 10-20 cm again till it struck the electric meter, which was in the very same corner 120 cm below the ceiling, with a tremendous crack. Both of us were much frightened. We thought the ceiling was falling down. Examining the electric meter we found a burned brand of a pea's size on the side of the fuse-board (the fuse had been fixed on it). The wall was black with soot round the electric meter. We fixed the cover of the electric box and found no trace of the ball-lightning there. Jumping out of the box the ball-lightning left no trace, it seems. The whole phenomenon lasted three or three and a half minutes. My boss told me he had already seen a similar phenomenon when he was a beginner.

That case happened in a stable. I myself remember four or five men who told me a story similar to mine.

Case 132/a. Juhász Pál, Budapest (INTERVIEW)

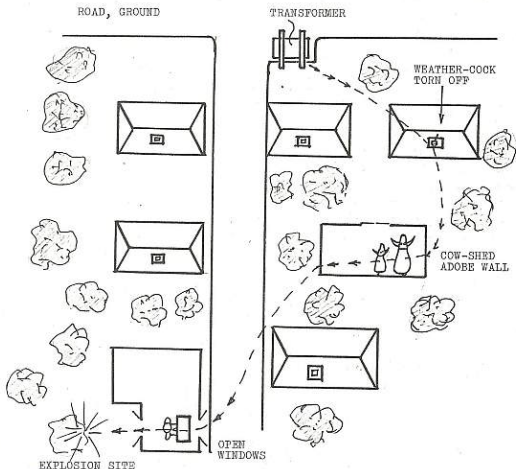
In the summer of 1940 I was near the mine at Lyubóháza in the forest. I heard distant thundering, saw lightnings far away, and the wind also began to blow. I started for home because of the threatening storm. Suddenly I saw a ball-lightning strike a tall, lonely oak-tree standing on a clearing. The tree was cut practically into shavings. The ball-lightning was dazzling white, its diameter was about 30-40 cm, and it was moving fast downwards. It was glaring like sun-light. As soon as it had reached the top of the tree a tremendous blast and crash could be heard. The crown of the tree almost completely disappeared, only a stump of its one and a half meter diameter trunk was left behind totally cut up. The oak-tree was about 30 m away from the rails used by the mine. I could follow the ball-lightning's route for about 2 seconds, because then it crashed on the tree.

132/b.

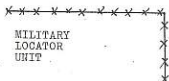
It happened in the summer of 1954. I was in the army, I did my military service as a private in a locator and communications unit. We were drilling near to a village called Mezőcsát. One hot, sultry summer day it was so hot that the condensators had discharged several times already in the morning. The police arrived to the spot and asked me to help them to investigate one case. They knew I had already seen a ball-lightning, I had dealt with such things, that's why they turned to me. A ball-lightning appeared on top of the 5 kV transformer-station while the sun was shining rather hot. The ball-lightning did not do much damage, it did not burn the electric wires, the fuses did not blow. It knocked the iron weather-cock off the roof of a nearby house and then broke through the adobe wall of the farm building next to it. I arrived 20 minutes after the event to the spot. According to the eyewitnesses' description the following had happened: the ball-lightning appeared first on top of the transformer-station, then knocked the iron weather-cock off, then broke through the cow-shed's wall. The hole in the wall was of about 7-8 cm diameter. Then it killed a cow and a calf by breaking through their bodies. Burnt holes of 5-6 cm diameter could be seen on their bodies. The holes were regular circular ones, the skin of the animals round the holes was singed but no other wounds could be seen. I saw both of them. The ball-lightning may have left the cow-shed through its open door and started for a house approx. 50 m away. The doors and windows of this house were wide open, the host was just sitting at the table with a metal case in front of him. The ball-lightning penetrated his body at his breast-bone and left through his back. He died immediately. A slightly burned brand was on his shirt, but that was all to be seen. Then the ball-lightning left the house through the back-door,

CASE 132 MEZŐCSÁT

PATH OF THE BALL LIGHTNING



THERE WAS A ~ 5 cm HOLE ON THE WALLS OF THE COW-SHED, ON THE COWS AND ON THE MAN. THE MAN AND THE COWS DID NOT BLEED.



CORN FIELDS

CLAY SOIL, MUDDY, SWAMPY LAND. THE WEATHER WAS HOT AND SUNNY.

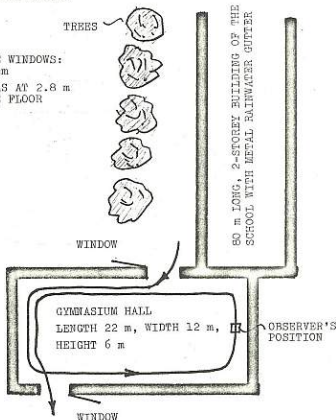
went into the garden and exploded with a blast at the foot of a sour-cherry-tree. The tree was destroyed, too. It covered a distance of 200-250 m from the transformer-station to the tree moving in zig-zag line at a rather high speed. The 4-5 eyewitnesses of the case told me that it had been a bit smaller than a football and had a bright, dazzling light. Most of them claimed to have seen orange and blue light.

Case 134. Szakács Ödön, Budapest (INTERVIEW)

I was working as a sports teacher at Kecskemét, in 1928. The ceiling of the gymnasium was at 6 m height. The windows were on the two side-walls above the wall-bars. One day at the beginning of October I stayed with the boys in the gymnasium because it was thundering and lightning outside. The windows were open on both sides. We were practising drills, and I was just giving a command when a bright sphere of 60-70 cm diameter accompanied with fizzling sounds jumped into the hall through one of the windows and rolled round it a few times 1 m below the ceiling. It was moving along the side-walls, its light was gently streaming onto the walls. Its outlines were dazzling brightly,

CASE 134 LOCATION: KECSKEMÉT

THE SIZE OF THE WINDOWS:  
80 x 200 cm  
THEIR BOTTOM WAS AT 2.8 m  
HEIGHT FROM THE FLOOR





its centre was pink. It left behind a trail of small, sparkling lights. It did not move very fast, we could watch its route. Then it went out through the other window and disappeared. The whole phenomenon lasted approx. 3-4 sec.

Case 135. Rafinger András, Budapest

One day between 5-6 p.m. in the end of July, 1977 I was going home. The weather was ordinary, there was no wind or storm or clouds, no special phenomena. I was walking down the sloping path when I noticed a light-wheel twice or 3 times larger than the sun rolling from East to West. Its light was also similar to the sunlight. While moving from East to West it revolved clockwise round its own axis. I could see it for 2-3 sec., as it was moving fast. It gave no sound and no smoke could be seen anywhere, therefore it cannot have been a rocket. Anyway, during the war I traced the route of several tracer-bullets and other bullets both daytime and at night. All these left a light-trail behind similar to a cigar. In contrast the phenomenon was of a regular circular shape. I was about 150 m away from it and it was about 300 - 400 m high above the ground.

Comment

The observer has sent two separate letters, case 119, and 135.

Case 136. Dénes Andrásné, Budapest

We lived in Budapest near the railway line to Szolnok in the summer of 1954. The rails were about 25 - 30 m from our house. After a summer thunder-storm we heard a hissing sound getting louder and louder. Going to the window we caught sight of a bluish sphere above the rails. It was approaching our house. First we considered it to be a new sort of railway carriage. But, as it turned out soon, it was only a light-ball flying along above the rails accompanied with the above-mentioned rather strong hissing sound. It was flying with dignity at a moderate speed above the rails. Its centre was of 50 cm diameter, but the light was scattered extensively. We were too frightened even to be able to utter a word. After its disappearance the air smelt singed and rich in ozone in the neighbourhood for a long time. The following day we looked round the spot where it passed by but it left no trace behind. Three of us saw the event and each saw the same.

Case 137. Bosznai László, Törökszentmiklós

In June, 1940 I was playing football with my friends at Püspökladány. It was already getting dark. The weather was dry. Suddenly we heard a blast, saw sparks among the ceramic insulators up the nearby electric pylon and at the same time we caught sight of a red sphere of 20 cm diameter. It was fairly

glowing but not as much as iron glowing white. It was moving away from the pylon, went into the next house through the opening of the window and disappeared. This house was still being built at that time that's why there were only openings for doors and windows. The phenomenon lasted approx. 5 sec. Soon afterwards some of us climbed into that house through the window but we did not find anything special.

Case 139/a. Erdős István, Siklós

In the summer of 1965 a ball-lightning struck the Calvinist church and vicarage at Siklós. At about 8 p.m. after a storm a sphere of a ball's size descended onto the top of the tower. As soon as the sphere had reached the metal lightning-conductor on top of the tower it exploded. The blast of the explosion was a bit louder than that of a hand grenade. The 28 m long lightning-conductor burned down, its remnants were scattered over the neighbourhood. At the same time the electric wire insulated with PVC, which had been recessed in the wall of the church, was torn out. Neither the chandeliers nor the other lamps in the church were damaged. The church is supplied with electricity from the vicarage. In the vicarage the electric meter was tossed out of its case and the electric wire originally in the walls of the corridor was torn out, too. Neither the electric wires nor the lamps were damaged inside the rooms on either side of the corridor. The lightning-conductor was on the northern side of the tower, whereas the vicarage is situated south of the church. Nobody can explain how the electricity conducted by the lightning-conductor on the northern side of the tower could reach the electric wire between the church and the vicarage, situated south of the tower. After the lightning had struck the conductor the air smelt as if gun-powder had exploded. The roof of the tower is covered with tiles. The explosion damaged none of the tiles. As I had already mentioned it was only the lightning-conductor that burned down.

139/b.

Some old people claim that a ball-lightning struck the same church in 1802, too. They say all the nails in the benches were struck out and the two iron bars the pulpit is hanging on melted. But there was no fire just as there was no fire in the other case, either.

Case 140. Szűcs Józsefné, Csokonyavisonta

A ball-lightning went into our neighbour's house through the window. It went round the room then left breaking through the brick-wall above the door. The lady who lives there had a bad pain in her legs for a long time after this incident. She could walk only with walking-sticks.

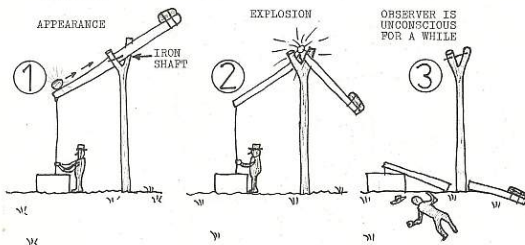
Case 141/a. Hadházi Pál, Sóstófürdő

In August, 1936 I was getting water shadoof at broad daylight. The weather was fine that day. A ball-lightning descended onto the top of the sweep of well and began moving slowly towards its middle. The iron part fixed in the forked upright of the well must have been cut into two by the ball-lightning as the sweep of well broke into two and both parts fell onto the ground. I myself fell onto the ground, too just beside the broken sweep of well. I do not know where and how the ball-lightning disappeared as I could stand up only minutes after the event though I was not hurt.

141/b.

In the end of August, 1939 I saw 4 suns in the sky. All of them had dazzling light and were arranged along an oblique line.

CASE 141/a

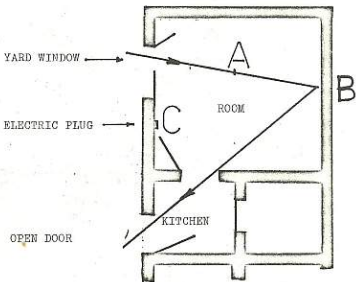


Case 142. Jancsó Péter, Budapest

I am an engineer dealing with heavy-current electricity. I had already heard about ball-lightning before I saw it. Therefore I was watching it without fear. It happened on a summer day in 1980. It had already rained that day, the vegetation was still wet enough, the humidity of the air was high. We lived on the ground floor of a house at that time, the level of the floor was only a few cm higher than the ground level in front of the house. I was just walking from the kitchen into the room, when I met our "visitor". There was a slight draught of air between the open entrance door and the open window. The ball-lightning came in through the window. It was moving slowly,

at the speed of a slowly walking man. Its colour was light yellow, its diameter was approx. 12-14 cm. It did not move straight, it was slightly tottering. It seemed to revolve round its axis. It stopped for a moment at point "A" (see figure) approx. 2 steps away from me. At that moment I exclaimed: "Oh, it is a ball-lightning". My wife was in the kitchen then, she heard my voice and the sound which accompanied the ball-lightning, too, but by the time she came into the room the ball-lightning disappeared. After my exclamation the ball-lightning speeded up, it struck the wall at point "B" (see figure) and was flung back with a loud fizzling sound. It sounded as if a pail of water had been dropped into hot oil or fat. Then it left the flat via the door of the room and then the entrance room. I turned round quickly, consequently I could follow its route and also could catch sight of a spark which appeared from the wall-socket (point "C" in the figure) at the same time. The speed of the ball-lightning was similar to that of a stone thrown away with full strength.

CASE 142 BUDAPEST



Case 143. Szalai István, Kiskunfélegyháza

I saw the following case at 6<sup>15</sup> a.m. on a Monday in the middle of the eighties. I was going to work. It was still dark, the stars could be seen in the sky. There were no clouds in the sky, one could see clear. As I reached a spot where the light of the street-lamps was overshadowed by the trees I perceived something moving in the sky. I looked up and saw a strange phenomenon. 4 bright points arranged approx. along the curve of an imaginary semi-

-circle were moving at a fantastic speed first from west to east then turned southwards and got out of my sight. It took place within a few moments. It was strange that the point in the middle changed its position extremely fast. Their light was white. I cannot estimate their sizes but as far as I can judge, this phenomenon was approx. ten times larger than an aeroplane considering the distance. No sound accompanied this phenomenon.

Case 144. Kajdi Gyula, Budapest

When I was young, in 1924, on a summer day a heavy storm broke out. I and my friends were waiting for the rainfall to stop in the staircase of a house. The storm did not last long, and as soon as it stopped we stepped out to the street. We were walking barefoot since the water on the pavement was warm. As we were passing along the fence of a hospital we heard a crackling, fizzling sound from behind looking back we noticed a bright, yellow sphere of 8-10 cm diameter jumping along the road towards us. We were frightened very much and got paralyzed with fear. It reached us, began jumping around us, then jumped onto the top of one of the bars of the iron fence. It rolled round a few times on top of the bar, afterwards it jumped onto one of the branches of the nearest tree in the garden of the hospital. Then it jumped onto another branch and we lost sight of it. We observed that the leaves of the tree began moving while the ball-lightning was jumping among the branches. The macadam road was still wet. When the ball touched the water on the road it fizzled but did not steam. It was jumping 0.5-0.2 m high. When it touched the ground it stopped for a moment and wriggled. The ball was moving fast, the event took place within a few moments. We do not know where it came from as it appeared behind us. When the ball disappeared, we noticed a well-dressed man in the street. He had also been watching the phenomenon. He turned out to be a doctor from the hospital. As he saw we were much frightened he told us, "You know what it was? It was a ball-lightning."

Case 145. Kovács Sándorné, Mencshely

It happened in the middle of August, 1970 or 1971. There was a heavy thunderstorm in Budapest, there was no storm like that neither before nor after that. People were walking in knee-deep water in the streets. The subways were flooded. Early in the afternoon it began to rain in dazzling sunlight. By the time we had gathered the toys with my little sons in the play-ground it was already thundering, lightning, raining heavily. We went into the flat. I shut all the doors and windows. Our feet were muddy but I did not want to go to the bathroom so I brought a bowl of water into the room and we began washing our feet. My two sons were sitting with their back to the window so as not to be able to see the lightnings and not to be frightened. To my great astonishment after a great flash of lightning and a tremendous thunder

a fireball of 15 - 20 cm diameter appeared on the floor 30 - 40 cm away from my elder son. It was rolling to and fro on the carpet and after a minute or so it exploded 10 cm away from him. It was similar to the electric discharge accompanied by light sound effect caused by a short-circuit. We did not feel warm, and could not perceive any smell. My son was shocked. He began screaming, shivering, could not utter a word. The doctor advised him to take tranquillizers for a few weeks. Fortunately the event had no other consequences except that later on the children began shivering at the very moment a cloud appeared in the sky. They were 5 and 3 years old respectively at that time. The ball-lightning exploded near the elder one.

Case 146. Bán Attila, Vác

In the end of the summer, 1971, we were watching television (Benczur-type) with my mother while a storm was approaching. As the lightnings had already begun to disturb the TV transmission my mother told me to switch it off. As soon as I had stepped away from the TV-set, I had not enough time even to sit down, when the TV got switched on again on its own together with the light and the radio, which had not been working before. (The light was that of a small reading-lamp.) I was frightened very much and my mother was astonished, too. The whole phenomenon did not last longer than 1-2 minutes. Then we noticed a sharp and strong light rolling round the walls. Afterwards everything got switched off. There was total darkness in the house. My mother went out to have a look at the electric meter only to find all the fuses blown.

Case 147. Váli Benjáminné, Budapest

One morning in June, 1937 it was rather cloudy and sultry but quiet. At about 7 a.m. we saw a light flashing then we heard a tremendous crash. At the same time the tiles on the roof rose upwards then fell back onto their places accompanied with noise similar to a rapid scale passage played on the piano. I can still remember the noise as it was very strange. We were all in bed at that time except for my father. He noticed that our cock in the chicken-yard was rather restless and its voice reminded him of the alarm signals usually given by animals in the case of danger. He went out of the flat and noticed at once that the radio antenna stretched between the chimney of our house and that of the next house was sparkling. The bundle of sparks destroyed the antenna and moving along the antenna wire it came into the flat in spite of the "automatic" lightning-conductor that could be found on the window frame. At that time the electric wire was led outside the wall fixed with small glass rings onto the wall. Therefore the ball jumped onto the electric wire where the two wires crossed and went on as far as the electric meter. The electric wire burned down completely. Then the electric meter was

blown up and all the bulbs blew, too. It ripped the glass rings off the wall and the tank of the toilet was broken off, too. The ball came in through the kitchen-window whose fragments were scattered both inside the kitchen and outside a few meters away in the yard. The doors of the cupboard standing opposite the window were ripped off, too. The pocket-watch in the cupboard was turned upside down but it was not thrown onto the floor. Smoke and dust whirled in the air soon. Our house was a one-storey one next to a small church which had a lightning conductor on its tower. So we had never thought of the possibility of being struck by a lightning before. This event was strange also because neither before nor after it had there been lightning or thundering.

147/2.

The signal of the cock may be of some interest, too. It shows that the cock had already perceived the strange phenomenon in the open air. It may have thought the ball-lightning to be a bird of prey circling over the poultry-yard. We do not know how and where the ball-lightning disappeared.

Case 148. Czigli Istvánné, Budapest

I was working in a spinning works during a thunderstorm in the summer of 1976. A bright sphere of about 3 cm diameter jumped into the room through a broken window. It jumped along all the drawheads of the spinning machine. It jumped onto each of them, then over the pass between the two machines and went on jumping there. Then it left the room through another broken window. The whole phenomenon lasted only a few seconds.

Case 149. Máté Emil, Dunaujváros

In the summer, 1949 it was already getting dark when a storm broke out. The weather had been hot and sultry all day before. I was watching the lightnings and listening to the thundering in the outside corridor when a red-hot dazzling fireball of 20 cm diameter appeared crackling and vibrating above the water-pipe of the neighbouring house. It appeared above the front side of the house. The whole phenomenon lasted about 3 minutes then it disappeared without leaving a trace behind. I was about 25 m away from the spot of its appearance. The fireball was 7 m high above the ground. It was floating 10 cm above the upper opening of the tin water-pipe. The following day I examined the water-pipe but found no damage on it.

Case 150. Halmi Károly, Budapest

On 5<sup>th</sup> May, 1977 I was spending my holidays in the Trade Unions' resort-house at Galyatető, in the Mátra mountains. At 3 p.m. dark clouds gathered in the sky and a storm passed over us. I was looking out of the window of my room on the second floor. I was watching the clouds moving towards mountain

Kékes. The distant mountains could already be seen when I caught sight of a ball-lightning descending from the dark clouds. It covered approx. 2 km within, 25-30 sec., and descended about 150 m during this time. Its colour, though I could see it only through the clouds, was that of the steel heated upto 800°C. Its diameter seemed to be twice longer than that of the setting sun. As it is very difficult to estimate the size of a glowing, bright object from such a distance, the following day I was watching the size of the cars coming towards hostel "Vörösmarty". (The phenomenon appeared in the hostel's neighbourhood.) The following day it was sunny and clear. The diameter of the ball-lightning was greater than that of the cars, so it must have been approx. 5 m from 6 km distance. It was sparkling and it may have been revolving, too, as it seemed similar to a wheel of a car scattering mud in the street. Nevertheless it seemed to be rolling, jumping, downwards on rocks. After about 25 sec. it burst like a soap-bubble.

Case 151. Antal Károly, Izsófalva

I saw a ball-lightning in the flat of my parents in 1972. It happened in the beginning of June. At 5 p.m. I was sitting in the sitting-room reading a newspaper when a ball-lightning came in through the open window. It was floating above the table and began describing circles moving towards the wardrobe. After a minute or so it left the room through the window. The doors of the room were shut. The sky was clear, no clouds could be seen anywhere. It was a hot summer day. The ball-lightning was white, sparkling. It was of a tennis-ball's size. It had a light blue shade round its edge. It smelt sulphuric as if a match had been lit. I did not move while it was in the room.

Case 153. Julow Judit, Debrecen

At Easter in 1973 we went to Szamosujvár and a few days before that we visited a little village near to it. We saw the following case there. A young mother was breast-feeding her few-month-old baby during a storm. She was sitting on a chair. Her mother-in-law was standing at the door. At that moment a ball-lightning appeared outside. It broke through the corner of the house. A black burned brand could be seen from the roof to the ground. The ball-lightning got into the room, went up to the nursing mother and killed her. By contrast, neither her baby nor her mother-in-law was hurt. Her husband soaked to the bone arrived home from the fields a few minutes later.

Case 154. Csucs Béla, Budapest

It happened in the beginning of the 1950's. One afternoon a bright ring appeared on the horizon. It rolled along the horizon, following the terrain. It could be seen for a minute then exploded (i.e., I could watch it for a minute, but it may have existed before I noticed it). It appeared approx. 6



km away from me. Its diameter was about 1-1.5 m. As far as I can remember its regular circular shape changed while moving along. When it reached a hill it seemed to get dented. Passing the hill it regained its original circular form again.

CASE 154 LOCATION: RÁKOSKERT



Case 155. Kovács Zoltán, Győr

In 1928 I and my family spent our holidays in Győr at my grandparents. It was drizzling. We were standing in a large 10 m x 10 m room. The windows were open. Suddenly we caught sight of a light-ball floating in through a window on the first floor. It was of a tennis ball's size. It covered a semi-circle above our heads and then disappeared near a bulb of our wooden chandelier. This chandelier has been preserved up to this day. My grandfather, who was a teacher of physics by profession told us: "You see, it was a ball-lightning". No other phenomena accompanied the ball-lightning. The bulb did not burn out either.

Case 156. Peer Tiborné, Budapest

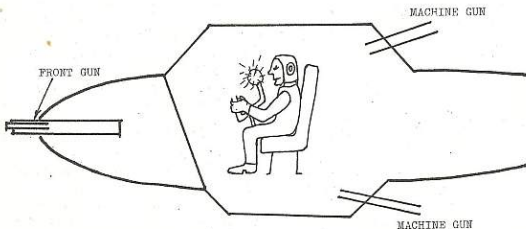
In 1970 we lived in a flat on the third floor. It was a hot summer evening. The air was rather humid. The window of the room was wide open, the curtains were drawn aside. I was alone at home. It was about 8 p.m. Suddenly a storm broke out, I could even hear distant thundering. I shut the entrance door and the window of the kitchen, then went into the room. I was just about to shut the window there, too when a golden ball of about 15 cm diameter flew into the room through the still open window. I stopped. The ball was floating about 2 m high above the floor as far as the middle of the room. It stopped 1.5 m away from me in the air. It was dark in the room because of the storm so I could watch the ball glowing and vibrating beautifully in the air for about 10-15 sec. Then it got smaller and smaller, first of a nut's size, then of a pea's size, finally totally disappeared in the air before my very eyes. It was not until this moment that I dared to move. I felt as if millions of ants were swarming on my body. I shut the window, sat down on the sofa and began thinking about what had happened. Then I fell asleep and was sleeping till the following morning. I did not even get undressed.

Case 157. Kósa Árpád, Hajdusámson (INTERVIEW)

I did my military service as a pilot during World War II. Once we had to fly into - then above - the clouds because of the fighters. While I was flying in the cloud a dazzling ball-lightning of an ellipse shape and a man's head's size appeared in the cockpit and jumped onto the half-horn-like part of the steering column. I kept on grasping the other part of the steering column and waited for something to happen. The ball-lightning was there for about 3 minutes then "changed its mind" and began jumping from one protruding metal part in the cockpit onto another. Then it flew into the machine-gun fixed onto the front-part of the plane and left the plane through the machine gun's barrel. A slight crackling sound could be heard from the earphones. My aeroplane was a Junkers 88, it had two engines and was completely made of metal. The ball-lightning had no effect on the electric instruments of the plane. The cockpit was locked up, I mean all of its windows were shut at that moment. I was the pilot and an observer was sitting beside me. A telegraphist and a machine-gunner were seated behind us. The surface of the ball-lightning was smooth, as far as we can remember. The steering-column was made of metal, namely of an aluminium alloy and its half-horn-like part was coated with an ebonite-like plastic material. The ball-lightning was approximately 25 cm away from my hand, and 45-50 cm away from my face. I had a pair of lined leather gloves on my hands. I felt no warmth either on my hands or my face.

CASE 157 CROSS SECTION OF THE JUNKERS 88 BOMBER

THE AEROPLANE HAS A 4-MEMBER CREW. ONLY THE FIRST PILOT IS SHOWN, WHO REPORTED THE EVENT.



Case 158. Gál Katalin, Budapest (INTERVIEW)

In August, 1932 I was working in the garden and did not notice the coming storm. The thunderstorm broke out all of a sudden and I took shelter in the doorway of the building at the end of the yard. I was watching the rainfall and the lightning from there. There was a wooden pole standing in front of the fence. A street-lamp was fixed on it. The street-lamp was an old-fashioned one, it had a tin-cover and its bulb was fixed into a china bulb-holder. Suddenly an orange sphere of 15 cm diameter appeared on the top of the pole. It was slowly revolving. I did not see it going up to the pole, I caught sight only of its sudden appearance. It stayed on the top of the pole for a few seconds then began moving downwards in a spiral. Reaching the ground it disappeared with a tremendous crack. I do not know whether the bulb had melted or it was blown up but only the bulb-holder remained intact. The following day an electrician came along to repair the electricity. I told him what had happened. He told me it must have been a ball-lightning. Its trace could still be seen. Some slight burned spirals could be seen on the pole. I am sorry I cannot remember which way it was revolving, which way the spiral was spinning.

Case 159. Pap Lajosné, Etyek

At the end of May in 1982 a heavy storm broke out. I switched off the radio and the TV-set and listened to the portable radio instead. The window was open when I heard a tremendous thundering, the light went out and a red fireball of 50 cm diameter rolled in through the window and began moving clockwise towards the TV and radio-set in the corner. Tremendous crackling could be heard, I thought the window had been broken into pieces. I lit a candle after a few minutes because the electricity did not work any more. And then I saw the window had not been damaged at all. The following morning we could see the damages done: 5-6 slates, fell off the roof, the wire of the TV antenna in the attic was burned at several places, and some pieces of slates fell down into the attic. The wire of the TV-antenna was lying on the radio. The radio itself was badly damaged, too. According to the repairman the radio was damaged even worse than the TV-set. The TV-set was connected to the antenna. In this room of the flat the electric wires burned down, the fuse blew. The electric wiring in the other parts of the flat was not damaged at all.

Case 160. Binder Józsefné, Budapest

We were in the fields in the spring of 1929, when a heavy storm broke out. A pylon was about 4 m away from me. I heard a tremendous thundering and a lightning struck the pylon. I was paralyzed with fear noticing a fireball

of 1,5 m diameter revolving fast 0,5 m high above the ground and 2 m away from me. I could not feel either warmth or air movement. It did not last long, only a few moments, then disappeared leaving no trace behind.

Case 161. Szabolcs József, Tamási

At the end of the 1920's during a summer thunderstorm I and my parents could see a ball-lightning. Next to our flat there was a cable-railway which conveyed coal to the neighbouring settlement. One late summer afternoon a heavy storm broke out. A lightning struck the cable-railway. Its 100 m long section which could be seen from our corridor seemed to be fiery for a moment. The lightning must have struck it somewhere nearby because the flash of lightning was immediately followed by a tremendous crack. A few moments after it a ball-lightning appeared. It came along the corridor, then into the kitchen through the open door. Afterwards, without doing any damage, it went into the iron stove through its open door and disappeared. It did not set anything on fire, it did not crackle or explode, it did not destroy anything. There was no fire burning in the stove, it was not warm either. The ball-lightning did not emit any heat and I do not remember if there was a short-circuit or not after it. The air smelt rich in ozone, but it may have been a consequence of the lightning that had struck the cable-railway. The ball-lightning was of 12-16 cm diameter. It was glowing brightly. It changed its shape plastically. We could see it for 5-8 sec.

Case 162. Makovics Kálmánné, Balatonkenese

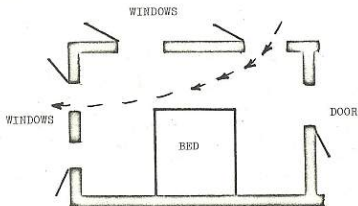
A lightning struck the crown of a branchy poplar 20 m away from me at Lake Balaton. It happened in summer during a thunderstorm. Then a fireball of 10 cm diameter appeared in the crown of the tree and after jumping in zig-zag from one branch onto another it reached the ground. It left a fiery trail behind and then it disappeared after having reached the ground. I went up to the spot where it had disappeared only to find a small nut-size hole in the ground grown with low grass. The hole was not deep, it was near the surface. The grass was smoking and singed round the hole. The air smelt heavily of sulphur.

Case 164. Szárföldi Józsefné, Budapest

I was working in the bedroom between 9-10 a.m. on a rainy day in June. The windows of the room were open, the curtains were drawn aside. I was just making the bed which was in the middle of the room when I heard a strange buzzing sound. I noticed a bright, blue cylindrical object of a 0,5 litre bottle's size float into the room through its window facing north. The bright phenomenon was moving clockwise away from the window, passed me quite slowly

then left the room through its other open window facing west. It did not do any damage, it did not crash into anything. I did not feel warm. My aunt came into the room to ask what that buzzing sound had been, but she could not see the bright phenomenon any more.

CASE 164 LOCATION: MARTONVÁSÁR



Case 165. Füleki Andrásné, Örményes

I was riding my bicycle along the street in the summer, 1980. The weather was stormy, it was lightning. I caught sight of 3 spheres beside the road 30 m away from me on a spot with trees and bushes. Each of them was of 20 cm diameter. They were 20 m high above the ground, one above the other. It seemed as if they had been pulled downwards with ropes. They burst like soap-bubbles on the ground. During their explosion the air got hot for a second. I felt as if I had been passing a fire. I am sorry to say but I did not examine the spot of their disappearance.

Case 166. Halász Istvánné

It happened on a moonlit, clear, quiet evening at about 9 p.m. in October 1946. The 18-year-old son of our neighbour went to sleep to the cow-shed. There were 5 cows and 4 sheep there. His bed was fixed above the cows, it was raised high. After a short time he woke up with a start to see that the animals jumped up to their feet. He noticed a fireball of 30 cm diameter with a 10-20 cm long tail floating above the manger. Much frightened he began shouting: "Help, mother, help !" I heard him shout, went round to their house, woke up his mother and we ran to the cow-shed. After lighting a lamp we saw that the halters of all the animals were torn, the animals were shivering,

snorting and some of them reared up with their fore-legs into the manger. We do not know how it could occur but the cows did not give any milk for days. The boy could not utter a word for half a year. It was not until then that he began to speak but only in a low voice.

Case 167. Kresztyankóné, Lipták Csilla, Rétság

I stayed at my parents' at Gődöllő in August, 1984. I stayed there with my two daughters and the two children of my brother were there, too. The children were playing in the yard. I was just pouring water into an air-pool so that they could bathe in it. The temperature was about 30°C above zero and there were no clouds in the sky. It was about noon when a dazzling object appeared high in the sky. I can estimate neither its size nor its distance. It may have been at 20 m or 3000 m altitude as well. I called my brother and asked him what it was but we could not figure out. As I had already read an article on a ball-lightning and the damage it had done in a house I thought it might be one. 5 minutes after its appearance it seemed to be falling swiftly downwards. It got nearer and nearer. I was frightened very much and I pushed my brother's son, who happened to be nearby, into the hall. It must have dashed on the ground somewhere in our yard as it had been directly above us. As a matter of fact we could not find any trace of it. No damage was done in spite of the fact that we were frightened very much. The air smelt smoky and unpleasant after this incident.

Case 169. Raport Ferenc, Gyula

In June, 1958 I was sitting in the study of our student hostel 2 m away from the open window. The weather was fine. I looked up and glanced at the block of flats 10 m away, opposite the student-hostel. I noticed a lightball on its vertical water-pipe at my eye-level. It was a bright, yellow-white fireball of 20-25 cm diameter. It exploded with a tremendous blast in the next moment. I was astonished by the light and sound effect. My fellow-students who did not look out of the window could hear only the blast of the explosion. I did not notice any damage done to the water-pipe.

Case 170. Horváth Béla, Zalaegerszeg

I was doing my military service in a reserve troop in the summer of 1931. One day we were drilling in the shooting ground. Suddenly a storm broke out. We took shelter in the building from which we shoot. It was thundering and lightning. A flash of a lightning was followed by an extremely loud crack and a bright object came in through the door at the back wooden wall of the shelter. After a while it divided into several pieces. Some of its pieces were approximately spherical; they went rolling round among us on the floor

then disappeared through the open wall of the shelter. One of the small pieces struck my leg then disappeared. When it touched me I felt a medium strong hit. This piece was of about 30 cm diameter and it looked like pink spun candy. The caretaker's office was about 20 m away from the back wooden wall of the shelter and there was a wooden pole supporting electric wires between the two buildings. A radio-antenna was fixed on it. When we heard the first loud crack the lightning had just struck that antenna. Otherwise neither the people nor the shelter were injured or damaged at all.

Case 171. Dobos Alajos, Budapest  
/second-hand/

On 25<sup>th</sup> April, 1952 a heavy thunderstorm broke out at Pápóc. During the storm a ball-lightning jumped out of the oven in a house 400 m away from the Rába river. Mrs. Horváth was sitting at a table in the middle of the kitchen. Her husband stayed in the room next to the kitchen. The door leading into this room was open. There was an oven for baking bread in the room, but its door opened into the kitchen. The combustion area of the oven was connected with the chimney. Her husband saw a huge fiery ball, which he thought coming through the chimney. It went round the kitchen, then jumped onto the table and exploded there. Mrs. Horváth died because of the explosion. Nothing was badly damaged in the kitchen except for one leg of the table which was ripped into pieces. The event is described here as related by a neighbour. Lightnings strike quite often that neighbourhood, because tall poplars and poles are standing along the dike of the Rába in the plain.

Case 172. Martosi Béla, Tószeg

We were waiting for a train at the railway-station in Szolnok late at night in the summer of 1980. I was standing near a pole, I was about 1.5 m away from it. Suddenly I looked back and noticed a slightly lengthened sphere of 15 cm diameter 2 or 3 meters behind me. Its colour was yellowish white. It was flying between me and the pole at a gradually increasing speed. Its speed may have increased as high as 50 km/h. Then it was passing above the freight-cars which were standing on the rails. It evaded their tops, sometimes rose, sometimes descended. Then I lost sight of it. The wind was not blowing during this observation.

Case 173/a. Moldvai Antal

At August, 1940 we had much rainfall. There were lots of storms that year. I climbed on top of a straw-stack with the help of a ladder when a storm broke out. I covered myself with straw so I was sheltered from the rain. The tall trees along the river Szamos were struck by lightnings one

after the other. A lightning struck even the river. At the back of our garden, where the Szamos was flowing, 3 tall nut-trees stood about 6 m away from the bank of the river. The storm had already subsided when I noticed a dark-yellow object floating on top of the crown of the nut-tree on the right. It kept moving up and down. I cannot estimate how long it lasted but I think it lasted more than a few seconds. Suddenly the sphere divided into two and the smaller one settled on top of the next nut-tree. Then both exploded approximately at the same time. During the explosion I felt warm even on top of the straw-stack which was 20 m away from the nut-trees. The bark of the two nut-trees was broken all along their trunks and both of them died in the very same year. Their top parts got black.

173/b/1.

I did my military service at the anti-aircraft artillery in the end of July, 1951. Our headquarters were in the castle of Szigetvár. At four points of the fortification heavy machine-guns were placed to ensure the safety of the headquarters.

A heavy thunderstorm broke out one day, and a lightning struck the machine-gun on the south-west bastion. After a few moments a light yellow object of 60-70 cm diameter appeared on the barrel of the machine-gun. The whole machine-gun was covered with canvas. The sphere "walked" up and down the gun then it disappeared in its barrel just to come out again at its lock. Afterwards it disappeared again with a crack.

After its disappearance an officer and I went up to the machine-gun at once. Fortunately the ammunition was stored in a safe entrenched case. The upper part of the canvas covering the machine-gun disappeared without a trace but its lower part covering the platform of the machine-gun was not damaged at all.

173/b/2.

The barrel of the machine-gun, which can be replaced very easily, was damaged, too. Its inside felt smooth since it had melted, the rifling had disappeared, in the lock of the machine-gun the firing device had melted into the lock's case. The machine-gun could not be repaired. Lots of its parts had to be replaced with new ones, because their bedding was damaged, too. A temperature about 1200 °C above zero must have caused the barrel and the lock to melt because they had been made of chrome. Neither the platform nor most parts of the gun were damaged, a fact that shows that an enormous quantity of energy must have effected an extraordinarily small area.

Case 174. Kovál Sándor, Tiszaszűly

We were threshing corn in the farmers' cooperative at Tiszaszűly in the summer of 1956. I was the mechanic with a Hoffer tractor. The threshing ma-



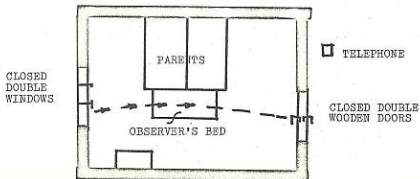
chine was a 48 inch one. The tractor was standing approx. 8 m away from the threshing machine and they were connected with a strong wire-cable so that in case of a fire the threshing machine could be pulled out of the straw-stack with it. The length of this wire cable was about 10-12 m. It had been fixed onto the front shaft of the threshing machine and onto the back shaft of the tractor with the help of two metal pegs.

When this case happened the engine of the tractor was in 1<sup>st</sup> gear because the threshing machine was being repaired. The metal peg had to be taken off the shaft and the repairman threw it away. A heavy storm broke out and we went under a tent 20 m away from the machines. Suddenly a hissing, dazzling sphere of 20 cm diameter appeared right above the exhaust-pipe of the tractor. It did not strike at once. First it seemed to be floating in the heat-current of the exhaust-pipe for a few seconds then it rolled onto the front left wheel and afterwards onto the wire-cable. It rolled along the wire-cable twice then burned a hole of 2 cm diameter and 5-7 mm deep into the peg lying nearby. Then we lost sight of it. After its disappearance the air smelt rich in ozone, a fact that made us all astonished. The thundering or crack that may have accompanied it could not be differentiated from all the others we could hear at that time as it was lightning and thundering all around us.

Case 176. Horváth Sándorné, Dunaujváros (INTERVIEW)

One summer morning in 1939 we, I mean my parents and my sister and me, were still in bed. The weather was fine that day. Suddenly we caught sight of a yellow, bright sphere of a football's size on the metal-handle of the double window. It rolled across the room about 100-200 cm high above the floor. It passed 1/2 m away from me. Having rolled across the room it went to the door and disappeared at the door-handle. In the moment of its disappearance our telephone rang once in the next room. When it was passing me I did not feel anything special. I did not do any damage. Our telephone was fixed on the wall outside. We heard it ring one moment after the ball had disappeared at the door. Maybe it managed to get through the door.

Case 176.



Case 177. Varga Jánosné, Tiszadob (INTERVIEW)

In the summer of 1966 I had to get up during a night as my baby was crying. It was a silent, moonlit night. I noticed something glowing in the yard. I went up to the window and caught sight of a strange phenomenon emitting light. An object, approx. 60-80 cm long and 2-3 cm wide was moving along floating horizontally. It looked like a bright snake or a piece of rope. Its colour was white like a white-coloured bulb. It was moving fairly slowly, approx. at the speed of a walking man. Unfortunately I could not watch it for a long time. I saw it passing before the window then along the yard. Afterwards I lost sight of it. It was moving about 1 - 1 1/2 m high.

Case 178/a. Borbély Sándor, Hajdunánás (INTERVIEW)

At night on 22<sup>nd</sup> April, 1986 the ambulance was taking a patient with sprained shoulder from Hajdunánás to Debrecen. Two persons were sitting in the ambulance-car, namely Médi Sándor, the driver and Berencsi László, a male nurse. The sick person got into the car at 22<sup>10</sup> then the ambulance headed for Debrecen via Hajdudorog. At Hajdudorog they overtook a yellow-coloured "Nysa" microbus while crossing the town. After leaving Hajdudorog they caught sight of a large fireball approx. 100-150 m away from the right-hand side of the road and about 30-40 m above the ground. It was approx. the same size as the ambulance-car, i.e. was of about 4 m diameter. Its colour was orange, its shape similar to a sphere surrounded by a round ring like a halo. The fireball had 3 flames, two on the edge, one in the middle, and latter was moving to and fro between the two extreme ones. These flames pointed upwards, towards the sky. The ambulance-car slowed down to a speed 40 km/hour so that they could watch that strange phenomenon. The yellow "Nysa" microbus slowed down, too. Then the strange phenomenon began moving at the same speed as the two vehicles did, and accompanied the ambulance-car as far as Hajduböszörmény, moving steadily along the right-hand side of the road at a constant altitude. Then it speeded up all of a sudden and descended at a forest-belt. It emitted such a dazzling light at that moment that all the branches of trees covered with leaves could be clearly seen as if it had been broad day-light. After it had landed all light disappeared at once. The witnesses thought they had seen some kind of military aircrafts. They were watching the ball-lightning from Hajdudorog to Hajduböszörmény (that makes approximately 19 km). Both the ambulance-car and the yellow NYSA bus slowed down so that they could see the phenomenon for about 15 minutes. The length of the observation's period can be estimated fairly well if we consider the distance and the speed of the cars.

The three "flames" or "tails" of the ball-lightning were of a strange yellow colour, and as I had already mentioned, the one in the middle was moving permanently. The colour of the middle one was vague enough, sometimes it merged totally into the halo sometimes it get reinforced.

178/b.

His sprained shoulder having been fixed in the hospital the patient was sent home with the same ambulance, so the three of them set off again to Hajdúnánás. At Józsaafalu they caught sight of a fireball again. It was approximately of the same size as the previous one of even a bit larger than that. It had 6-7 "flames" compared to the other's three. Its light seemed stronger than that of the previous one, but its colour was the same. They saw it first near the village then in the village, too. It was flying lower than the previous one, at an altitude of 10-15 m. It flew across the village so quickly that they could hardly follow its route. After the ambulance had crossed Józsaafalu driving at a speed of 60 km/h, the fireball began to follow the car again moving at the speed of it. By this time the persons sitting in the ambulance-car had been astonished so much that they did not dare to use even the radio-set. Then they decided to stop but not to get out of the car just to see what was going to happen then. After they had stopped the fireball slowed down to 5-10 km/h but it did not stop. They could not hear any noise. All these happened on road No. 35 near a high-voltage cable. The fireball slowly passed above the high-voltage cable without making any noise but emitting so much light that one could clearly see screws and the bundle of wires on the pylons. Then the ambulance-car set off again at a speed of 70 km/h towards Hajdúböszörmény. The fireball followed them, and then descended at the very same spot where the previous one, and then no light could be seen any more. The landing was a slow descension. Their journey went on without any further difficulties, they did not see anything similar to these phenomena any more.

The distance between the graveyard of Józsaafalu and the high-voltage wire is about 6-7 km. It took them approx. 10 minutes to cover this distance, and then they stopped.

In both cases the sky was overcast with clouds but it was not raining either before or after the observations. There was no thunderstorm nearby. The halo surrounding the ball-lightning did not cover evenly the surface of the sphere; it resembled much the rings round the planet Saturnus.

Both ball-lightnings moved at a steady speed though they accelerated considerable when they got near to the villages. In the second case the halo was much smaller than in the first one and it could hardly be seen. We estimated the second ball-lightning's diameter to be 10 m, and the thickness of its halo was about the half of its width, i.e. it was not thin but rather thick. In the second case the "flames" or "tails" of the ball-lightning did not protrude, they were within the halo, though clearly marked. Sometimes they faded, sometimes they flashed again.

We did not check on the spots of the ball-lightnings' descension in either case because it is prohibited to stop with an ambulance-car transporting a sick person.

We could not smell anything special.

CASE 178, LOCATION: THE ROAD BETWEEN HAJDUDOROG AND HAJDUBÜSZÖRMÉNY

FIRST OBSERVATION

BALL LIGHTNING WITH  
AURA AND 3 FLAMES



HAJDUBÜSZÖRMÉNY



RAILWAY LINE

YELLOW NYSA

AMBULANCE



SECOND OBSERVATION  
ON THE WAY BACK

BALL LIGHTNING WITH  
AURA AND 7-8 FLAMES

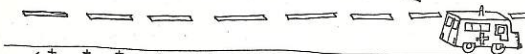
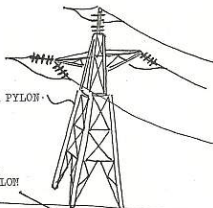


LAST HOUSES OF JÓZSA



ELECTRIC POWER PYLON

THE AMBULANCE CAR  
STOPPED AT THE PYLON



{ + + +  
GRAVEYARD OF THE  
VILLAGE }

Case 179. Pásztoi Margit, Budapest (INTERVIEW)

In the summer of 1973, György Zégács painter, who had already a heart-stroke before, felt sick again. He was taken to the hospital in Kutvölgyi street where he had been treated on the previous occasion, too. The doctor who treated him was Dr. Emil Schultheisz. The diagnosis was heart-stroke and arrhythmia, that is, the blood supply of the heart was very poor. The painter was unconscious when taken to the intensive care ward of the hospital. Suddenly a storm broke out and a ball-lightning floated into his hospital room through the open window. It jumped along on the iron bars of the beds then went up to the bed where the painter was lying unconscious, with an electrocardiograph fixed onto his body, and touched him. He came to his senses at once, felt a burning twinge of pain in his ankles and wrists then sat up on his bed all of a sudden and asked the nurse sitting next to him what had happened. The nurse answered that nothing had, then fainted. She may have fainted because of the sight or because of the explosion of the ball-lightning. The painter recovered so fast that he could leave the hospital within a few days. He had no more troubles with his heart after this event. The doctor who treated him told us that no electric shock could be used to improve the patient's arrhythmia because he had not only an arrhythmia but a heart-stroke, too, at the same time. Although the patient was in a crucial state he did not dare to risk the application of electric shock because it may have caused even the healthy heart-muscles to stop. The ball-lightning provided just the adequate dose of an electric shock so the patient recovered practically in the following moment. Unfortunately the case-sheet was lost later on. After the fortunate accident some photos were taken of the burned brands which appeared on the spots where the electrocardiograph had been fixed onto the patient's body. Unfortunately these photos have also disappeared.

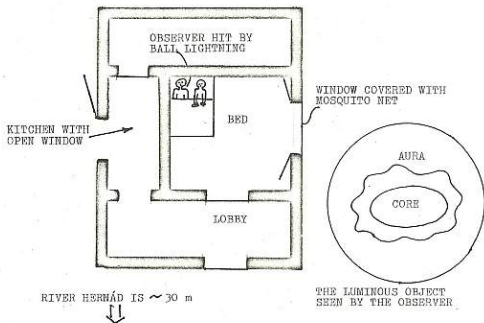
György Zégács died in Vienna in 1978 in a car accident. After his meeting the ball-lightning he had no problems with his heart any more.

Case 180. Munkácsy Ferenc, Hernádkak (INTERVIEW)

Our family was staying in my week-end cottage on the bank of the Hernád in July, 1985. At night it was rather humid though it was wet all the time because of the water nearby. The window was open so that we could get some fresh air but there was a plastic mosquito-net fixed on it. All the 6 members of my family were sleeping except me. After the TV-programme had ended I fell asleep, too. I woke up at about 1 o'clock in the night to feel something like an electric-shock. My whole body became stiff, dumb. I woke up howling loudly. My wife and son and my daughter-in-law were woken up by my howl. My daughter-in-law began shouting and asked what that bright, floating object was in the middle of the room. Looking in that direction I also noticed an

object of a football's size 1 m below the ceiling. It was dazzling, its outline was vibrating, otherwise it did not move. I sat up in the bed holding my wife tightly and tried to hit that bright object but my fist could not reach it. I was shouting loudly: "There it is !, There it is !" The bright sphere was moving slowly towards the door of the hall. My son wanted to switch on the light but he was too frightened to find the switch in the room. Then he opened the door and the bright sphere simply disappeared through it. It may have crossed the hall and left the house through the open kitchen window. When it left the room I felt as if some air of high pressure had left the room because I heard a crack, too. The colour of the ball-lightning was white as the dazzling sun. No inner centre was visible. On its surface the very same phenomenon could be seen as when a stone is thrown into water and waves begin vibrating round the spot it fell into water. The whole phenomenon lasted 5-6 seconds. We could not find a hole on the mosquito net after the event.

CASE 180 LOCATION: HERNÁDKAK



Case 182. Kemény József, Budaörs

I saw a strange phenomenon at about 2 o'clock at night in February, 1978. It happened one day before the earthquake in Bucarest. At the above-mentioned point of time a gradually strengthening light could be seen through the bedroom window. It got so strong that one could read by it. Then its

source appeared, too. I can describe it only with the help of a simile. It looked like permanently scattering sparks appearing during electric welding or sometimes in consequence of the arcing of the current connector of trams. Its colour was also similar to that of the sparks. However, in this case each spark was of a table-tennis ball's size (3 cm diameter). There were lots of them, it looked like a flood of sparks or a flood of fire. They were passing parallel with our street from West to East, 3-4 m high above the ground. Their stream was 30-50 m wide, and some meter high. The phenomenon did not last but 15-20 seconds, then I lost sight of it. I must add that the direction of the fireballs' movement did not correspond with the direction the wind was blowing from the North - North-West. It was a strong, stormy wind, that's why I was wide awake, I could not sleep. I am sure their movement was not being influenced either by the wind or the gravitation while I was watching them first lying on the bed then standing at the window. The speed of their horizontal movement may have been about 30-40 km/h that is 10 m/s.

The chimney vent was shut as well as the doors of the stove. It did no damage to the electric network, nothing burned off. I was not injured in any way. No damage was done to my health. There were no thunderstorms in the neighbourhood at that time.

Case 183. Pákozdi Katalin

Early in the afternoon in the summer of 1940 dark clouds gathered in the sky and a storm broke out with much rainfall. I stayed at home alone as my mother had to go away. The door of the kitchen and that of the sitting-room remained open as well as the small window of the sitting-room. It thundered a few times and I saw a few flashes of lightning, too. It had nearly stopped raining when a bright light appeared above our yard. A fireball of a football's size (i.e. of approx. 30 cm diameter) came into being out of this light. It began moving towards the door on the threshold of which I was sitting. Reaching the door it lengthened like a cigar-shaped air-balloon and after crossing the kitchen it went towards the room. I was following its route eagerly and saw it change its shape several times. It was a sphere but sometimes it changed its shape plastically. When it passed near me I felt neither cold nor warm. It seemed to me as if small, glowing grains of sand were inside it. Finally it may have left the room through the small window at the back of the house. It did not crash into anything. I have never seen such a phenomenon again since then.

Case 184. Bonta Lajosné, Tiszaluc

Clouds began to overcast the sky one hot summer day in August, 1984. I was lying on the sofa between 8<sup>30</sup> and 9<sup>00</sup> p.m. when the dog began whimpering in the yard. I looked out of the window and noticed a spark-shaped ob-

ject flying among the branches of the plum-tree. The plum-tree was about 4 m away from the window. The spark-like fireball floated away within a few seconds. This sphere was of about 3 cm diameter and floated 2.5 - 3 m above the ground. After a few moments two other ball-lightnings both of a table-tennis ball's size appeared approximately at the same height where the first one had been. They were moving 10 cm away from each other, parallel with each other in the same direction as the first one had floated away. I was a bit frightened then but I was unable to turn away from the window. Then after a few more seconds three small red fireballs appeared at the same height as the previous ones. They were 30 cm away from one another. They formed an equilateral triangle. Two of them were 15-20 cm away from each other, and the third one was 30 cm away from them. Then I lost sight of them, and I could not see anything like them any more as no other fireballs appeared.

Case 185/b. Simon Ferencné, Zalaegerszeg

One hot summer day in 1940 I and my mother were working in the fields. While working we noticed 4 or 5 big spheres near to one another in the sky. The size of each of the lighting balls was approximately the same as that of a bike's wheel, i.e. 80-100 cm. Their colour was yellowish red. They were about 1000 m away from us. I am sure I was watching them for about 5 minutes, then they disappeared all of a sudden. I still remember that day very well because my mother beat me badly as I was watching the sky all day instead of working hard.

185/c.

One summer evening in 1969 I was sitting in my garden. I looked up to the sky and noticed a bright yellow elliptical object high in the sky. It was moving slowly eastwards then suddenly changed its direction and began moving westwards. It speeded up very much. The whole phenomenon lasted about 5 minutes. It was very strange because it changed its direction without turning round.

Case 186. Regeny Istvánné, Hidegkut

We spent our holidays in Tachov near Plzen in Czechoslovakia in the summer of 1960. I was in a flat on the first floor during a storm. I saw a dazzling pink sphere of a ball's size running round the square down. During the time of my observation the chandelier in the room got switched on on its own. The sphere disappeared at the grated manhole of the drains in the square.

Case 187. Nagy János, Csabrendek (village)

In July, 1982 we left Csopak by car and set off for home. It was about 3 p.m. As we were driving across Balatonfüred we saw a storm approaching



from the direction of Tihany. It began thundering and lightning. A great storm broke out accompanied with such a heavy rainfall that we had to stop. We could see enormous flashes of lightnings about 10 km away in the direction of Nagyvázsony. One of the lightnings did not strike in a zig-zag but straightly. It had a glaring light. As soon as the lightning had struck the ground, an enormous sphere flew up to the air from the ground. Its colour was similar to that of the lightning. It had a glaring light. Its shape was a lengthened ellipse. This phenomenon recurred threetimes. It was a frightening but beautiful sight. The observation took place in 20 minutes. Afterwards it stopped raining and we continued our journey to Csabrendek on the dry road.

Case 188/a. Pnikovics István, Mélykut

I and my two elder brothers were sleeping in the bedroom of our house in the summer of 1936. The room faced south. The window was open because it was hot and sultry. I and one of my brothers were still talking at about 11 o'clock at night when a thunderstorm broke out with heavy lightning. We could not fall asleep because of the storm so we began counting how many seconds each lightning had flashed before the respective thunder could be heard. We wanted to determine the distance of the storm on the basis of this. Suddenly a white-yellow sphere flew into the room through the window beside our bed. It began zigzagging towards the bent pipe of the stove standing opposite the window. It went round the pipe several times then went zigzagging out of the room through the very same window. It was moving about 1,5 m high above the floor. The whole phenomenon did not last but a few seconds. We were frightened so much that went to our father and told him what had happened.

188/b.

Our father woke up because of the storm and told us it may have been a ball-lightning. He told us he had already seen a ball-lightning at the turn of the century. That one went into the chimney of the neighbouring house and blew it up. The roof of that house was covered with reed but there was no fire.

188/c.

I saw a ball-lightning again in 1976. It was getting dark. The ball-lightning appeared in the air over the horizon. It zigzagged covered 100 m distance, and then vanished. Afterwards the storm subsided so I saw no similar phenomenon then.

Case 189. Balázs Péter, Várpalota

I saw a ball-lightning in the mountains of Sály in the summer of 1982. It was a summer afternoon, the weather was fairly good though a bit cloudy. A light-pink coloured sphere of a fist's size was moving towards the ground from the sky. It was moving along a spiral of about 1,5 m diameter. The ball-

-lightning struck a plum-tree. It broke a branch of an arm's size. I found it strange that it did not strike the upper branches of the tree but one of the lower ones, which was only about 1 m above the ground. The tree was approximately 4 m tall. A car was standing about 20 m away from the tree but the ball-lightning did not strike it.

Case 190. Kamotsay István (sculpter), Budapest (INTERVEIN)

During a storm in the summer of 1960 I and my mother were looking out of the window. Suddenly we noticed a bright, bubble-like sphere of 35 cm diameter. It started flickering towards an acacia in the park. As soon as it had reached the acacia it disappeared with a tremendous crack. A part of the bark of the acacia also disappeared. The pieces of the bark were scattered within a circle of about 2 m diameter, some of them penetrated into the ground. I found it interesting that the sphere was practically tottering as if an air-balloon had been drifted by the wind.

Case 192/a. Csörgő Sándor, Aba

I was working at Előszállás in the summer of 1942. It was raining cats and dogs one day when we finished working so we had to go into one of the offices. We were sitting in the room, I mean the 6 of us, with all the doors and windows shut. While we were talking suddenly a small fireball of 1 cm diameter appeared. It began jumping to the left and to the right among us. It was hissing and cracking, it touched the wall, the ceiling, the tile stove and other objects in the room but it avoided all the persons. It lasted only a few seconds. It disappeared as suddenly as it had come. It seemed to blow up near the stove and then it vanished. It did no damage.

192/b.

In the middle of the 1970's a ball-lightning went into the Catholic church at Besnyő. It happened during a wedding ceremony. The ball-lightning killed one of the guests.

Case 193. Técsi Katalin, Budapest

It happened in 1935, at Gyula, One summer morning we woke up because of an approaching storm accompanied with thundering. My parents, my brother and I were still in bed, though wide awake. The cable of our telephone was led into the house at one of the upper corners of the bedroom window. A golden-yellow glowing sphere of about 25 cm diameter appeared after a tremendous crack at that corner. It rolled round the ceiling and disappeared at the very same point it had previously appeared. The whole phenomenon lasted only a few seconds. We know of no damage done.

Case 196. Pirker Jolán, Pápateszér

One cloudy summer afternoon I was going home on my bike. I was in a hurry because a storm was coming. I could not get home as the storm was too near, so I went into a house. I sat down in the kitchen near the wall which separated the kitchen from the room. The fourteen-year-old daughter of my host was sitting beside me, near the stove. As soon as the storm had passed this girl opened the door so that we could get some fresh air. She began screaming when she caught sight of the ball-lightning. She was the first to notice it. The ball-lightning was an extraordinarily beautiful sphere glittering in all the colours of the rainbow though these colours were less bright than those of a rainbow. Its shape was similar to a big ball. I was not frightened at all, I was just staring at it. First it went up to the girl, then turned round and came quite near to me. It was approximately as high above the ground as my knee. It stopped for a moment and I saw it was revolving very quickly. It lasted only a short time, i.e. 1 minute, or so. Then it walked out of the kitchen as smoothly as it had come in. The sun was already shining when it happened. The storm did much damage. There was much rainfall and the wind tore up trees by the roots.

Case 197. Sima Imréné, Kaposvár

At the end of July, 1948, at about 3 p.m. a heavy summer thunderstorm broke out. We lived at Hódmezővásárhely at that time. I and my husband were sitting talking in one of the rooms facing the street, when suddenly they heard sound like crying from the verandah and in the following moment a light jumped out of one of the bulbs of the wrought iron chandelier above us. This ball-lightning was of about 3-4 cm diameter. It went round the chandelier 3 - 4 times at a distance of 30-40 cm. Then it disappeared at the same place it had come out of. All the bulbs of the chandelier burned out but no other damage was done. We went onto the verandah to see what had happened. We had a nice 8-month-old dog /a puli/ it was her who had been whimpering desperately. She was running round the verandah for about 10-15 minutes then she laid down being totally exhausted. She was very tired for a long time afterwards. Later on the dog was always very much afraid of storms and several times she began running round. She remained sterile all her life. She never sought the company of male-dogs neither did the males look for her. By contrast, she had pregnancy every year. that is her breast swelled, she was looking for a place to whelp. Its maternal instinct was fully developed, so she had to take a chicken or a kitten or a doll to have something to fondle.

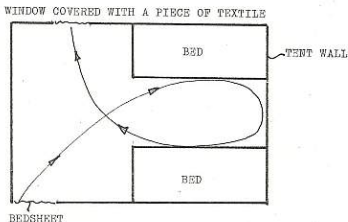
Case 198. Virág László, Budapest

There was an extraordinarily great storm at Lake Balaton in the summer of 1983. I was watching the storm from the verandah of my house situated on the southern shore of the Balaton about 200 m away from the lake in an oak-forest. The verandah is totally sheltered from the wind. During the storm which lasted about half an hour accompanied with thundering and lightning I noticed a bright yellow sphere flying in front of me in the street. It was not moving at a high speed. It flew onto the iron bar of the gate about 14 m away from me. The bar was of about 8 cm diameter. The ball was of an apple's size, of about 6-8 cm diameter and it seemed to revolve. It came silently and disappeared silently, too. 8-10 seconds later another sphere similar to the previous one appeared in the garden of my neighbour 30-40 m away from me. It also stayed on top of an iron pillar for 2-3 seconds and then disappeared just as the previous one had done. I do not know how it got on top of the bar because I did not see this one flying. I did not examine the iron bar of the gate thoroughly but as far as I remember there was no trace to be seen on its coat of paint.

Case 199. Puskásné, Hidvégi Mária, Veszprém

In the summer of 1945 we stayed in a refugee camp in Lower Austria. We lived in a tent made of cardboard. Its door was a sheet, its window a 20x30 cm piece of cardboard. This window could be opened upwards so that we could air the tent. The tent itself was about 3x4 m. There was a two-decker wooden bed and some berths to lie down on in the tent. The camp was in a mountain-side. The Dráva was flowing below whereas a big rock was above us. In that neighbourhood it rained almost every afternoon and the rain was usually accompanied with frequent thunderings and lightnings. When it rained we usually stayed in bed waiting for the storm to pass. One day in July during a storm the sheet on the "door" made a fluttering movement and a red sphere of about 30-40 cm diameter came into the tent. It had the colour of the setting sun. It went round the tent clockwise, then went up to the "window" opposite the door. (the window was cut in the back-"wall" of the tent) and disappeared and did not injure anybody. I saw it together with my mother and brother. Soon afterwards the rain stopped and it began shining.

CASE 199



Case 201. Leitner Sándor, Budapest

In the summer of 1966 one morning I was at Rákospalota together with my younger sister and her daughter. There was an old type large iron transformer opposite us on the other side of the street. Suddenly a short summer thunderstorm broke out. There was only a little rainfall but it was lightning frequently. One of the lightnings struck the transformer with a tremendous crack. Then a glowing sphere of 50 cm diameter appeared for a moment. It jumped from one leading-out wire onto another and made them glow with a red-purple colour. In consequence of this the wires snapped, one after the other. The wires sprang back as if they were stretched springs. My younger sister remembers this case in the same way as I do.

Case 202. Molnár János, Budapest

I was warming in the kitchen on a rainy, stormy day in May, 1958, near Kőszeg. I was leaning my back against the door of a large kitchen oven the fire was burning in. A fellow soldier of mine was standing next to me. He was cooking something. The entrance door was on our left. Suddenly one of the cooks entered the kitchen. As the draught waved his apron we caught sight of a yellow object near his leg. The object accompanied him into the kitchen from the approx. 4 m long corridor which was leading onto the open air. The next moment I heard a loud crack like a shot and I found myself and my fellow soldier sitting on the floor. According to the cook a ball-lightning slipped into the room beside his leg when he opened the door. Then it bumped into

the side of the oven and after floating for a short time it swang through the grating of the oven door I was leaning against. It passed between my legs. The it disappeared with a blast. None of us was injured seriously.

Case 204. Renter Kamilló, Pécs

A ball-lightning was observed at the clinic of the University of Pécs in 1928. It was the duty of the clinic's night watchman to go round the building during his working hours. As he was passing along the eastern side of the building a ball-lightning rolled out of the gutter, it cracked and knocked the watchman off his feet. The building had lightning conductors which were installed according to the regulations. The ball-lightning may have passed along the gutter of the eastern tower of the building then rolled down the drainpipe and reached the ground. The night-watchman was not injured seriously.

Case 205/a. Dr. Kerék László, Szombathely

In June, 1936 we were working in the field and I, together with other children, was in the field, too. We took shelter in a barn during a summer thunderstorm. There were about 30 of us. After a great crack a glowing ball of an orange's size rolled in on the brick floor of the barn. We, I mean the children, began to chase the orange-coloured phenomenon with a wooden pitchfork. The adults were just staring at us and could not even move being paralysed with fear. We could not catch the rolling orange. It went zigzagging out of the barn at the southern corner of the building where the ground wire of the lightning conductor was. It left behind a hole of a fox-hole's size in the ground.

205/b.

I saw a ball-lightning for the second time at Kőszeg on 19<sup>th</sup> July, 1984. I have got a garden with chestnut-trees on one of the hills the height of which is 259 m. Besides the young trees there are two trees which are 100 years old at least. The taller one is 37 m tall, the diameter of its trunk is over 4 m. This is the tallest tree on the hill and it had already been struck by a lightning before. The following case happened at about 5 p.m. after a storm. It was already shining after the storm had passed when a ball-lightning of about 10 cm diameter chopped off a branch of a man's waist's diameter at a height of 12 m. (I could get 1 m<sup>3</sup> wood out of the branch.) The ball-lightning did not descend vertically along the trunk of the tree but fell off from the height it had struck the branch at. It melted the wire fencing and blew up 3 wooden posts of the fence and cut them up into small shavings. It happened about a quarter of an hour after the storm had passed. I went to the entrance door of my weekend-cottage to look round when my neighbour invited me to see him. In the very next moment a wasp stung me so I ran back

into the kitchen to do something about my wound. It was at that moment I noticed the ball-lightning flying towards the tree from the North-West. I heard a great crack and saw the branch fall onto the ground wrapped in a bluish cloud and I could feel the ground tremble under my feet. If the wasp had not stung me I would have been walking under the tree just when its branch was falling onto the ground. The ball-lightning had come from the direction of the mountain range. It was billowing slightly just as a ball does when it is springing so it did not crash into the top of the tree but into one of its branches 20 m lower. It melted the wire-fence 1,5 m away from the trunk of the tree, it chopped the 3 wooden posts into shavings and then disappeared in the ground covered with lawn.

Case 207. Huzi Gyuláné, Seregélyes

In the summer of 1958 the sky cleared up, the sun began shining brightly after a thunderstorm. I and my husband were enjoying the fresh smell of rain, leaning against the doorpost and watching the children playing. Suddenly we heard a great crack and from that direction a bright sphere of ~ 8 cm diameter approached us and flew into our kitchen between us. It went up to the oven door of which opened up and it slid in. It may have disappeared through the oven. It did no damage at all.

Case 208. Birkás Lajos, Nagyszénás

In July, 1983, at about 3 p.m. a heavy storm broke out. A dark cloud was coming from South and in this dark cloud there was a light spot. In the middle of this light spot a sack-like greyish blue cloud could be seen. I was standing by the window watching this cloud. It was moving at a great speed and at first it had already passed over us then it turned round. All of a sudden I noticed a golden-yellow bright object of 100 cm diameter fall onto the paved road near the right-hand corner of our house. It crossed the road awry. After a blast of explosion approx. 15-20 cm small balls appeared from the big one and they rolled around radially in the slippery alley. The small ones were of a ball's size (approx. 10 cm diameter) whereas the big ones were of 30-40 cm diameter. It was raining permanently. As soon as the balls had rolled off the paved road onto the ground they disappeared with hissing, cracking or rather rattling sounds. At the spot of their explosion some steam appeared. As soon as the rain had stopped I went out to look round there. There was only a hole of a plate's size to be seen with some clods around. The ball-lightning was a beautiful sight.

Case 211. Szilágyi Lajosné, Budapest

In July, 1950 a heavy thunderstorm broke out with frequent lightnings. I ran home and shut all the windows and doors. We had a double door as entrance door so I shut them both. The outer door was a wooden one, the inner door was one with glass in it. Then I went up to the oven and began cooking something. At that moment I heard a terrible crack from the direction of the entrance door. I turned there being much frightened and saw a 30 cm long light band coming in through the keyhole. Its outline was bluish-pink. It rose as high as 2.5 m and became spherical. It was of an orange's size. It floated to the right hand side wall and it began moving towards the oven frequently bumping into the wall approx. 20-30 cm away from the electric wires. Sometime, it lengthened in one or in the other direction. It looked rather loose. I was afraid of it and as it was coming closer and closer I decided to hit it with the wooden spoon if it came closer. But suddenly it floated to the middle of the room, and stayed there for about half a minute. Then it rolled again to the right-hand side wall and went towards the door along the wall. Then it descended, lengthened again and left through the very same keyhole it had come in through before. Then I noticed the rain pouring onto the door so I opened it but I found the lock totally cold and the lightning left no trace on the door either.

Case 212. Angeli György, Budapest (INTERVIEW)

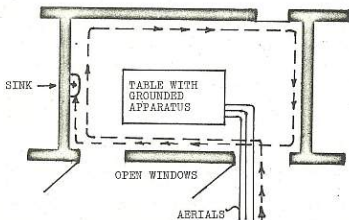
I worked at a military telecommunications research institute together with my two colleagues in 1951 in Budapest. Our job was to test short-wave antennas. Our laboratory was on the second floor of a two-storey building which had a flat roof. The antennas, fixed onto the flat roof, had to be tested by us. At least 6-8 wires led from the antennas on the roof into the laboratory which was rectangular, about 8 m x 4 m. The windows were on the southern wall of the laboratory and the antenna wires came into the room through the left-hand-side window.

It happened on a quiet, slightly humid, faintly sunny afternoon in September. All of a sudden we noticed a fireball coming in along one of the antenna wires. In the laboratory it descended to the point where the wall and the floor met without touching either the wall or the floor. Then it went round the room clockwise one and a half times then exploded under the siphon of the water-tap situated on the short, right-hand-side wall. When this phenomenon appeared all of us jumped onto the table covered with measuring instruments. I am sure it went clockwise, what is more, I remember it revolving round its axis which was vertical or nearly vertical. But I do not know exactly whether it was revolving clockwise or anti-clockwise. The ball-lightning consisted of an orange coloured centre of about 8 cm diameter which was



surrounded with a 20 cm thick light yellow aura. The inner centre gave a strong but not glaring light whereas the outer part's light was noticeable, too, but rather faint. The whole incident took place within 8-10 seconds. The speed of its revolving round its axis was very high but I cannot estimate its revolution per minute. There was no storm within a circle of 5 km's diameter in the neighbourhood because if there had been one we could not have used the antennas. It is very likely that there was no storm farther away either and no weather front was approaching because that can be perceived even from a 50 km distance. During the testing of the antennas we did not perceive any atmospheric neither before nor after the appearance of the ball-lightning. The laboratory was packed with electronic devices, safety ground wires, wall-sockets. It did no damage neither did it leave any burned trace behind. None of us could feel anything strange or was injured. I do not remember whether it disappeared with a crack or without it under the tap.

CASE 212



TOP FLOOR OF THE COMMUNICATION RESEARCH LAB.  
THE AERIALS WERE INSTALLED ON THE FLAT ROOF ABOVE THE ROOM

Case 214. Kovanecz Istvánné, Miskolc

In the summer of 1954, a heavy thunderstorm broke out in our neighbourhood. It went on during the night, too. Suddenly I was waken up by a tremendous thunder. I beat on my elbow and to my great astonishment I noticed a golden sphere of a tennis ball's size within an arm's length above my head. I was staring at it for a few seconds and then it exploded with a great crack. My little son who was sleeping next to me woke up but fell asleep again soon afterwards. The air smelt like burned rubber in the room and I thought the electric wiring may have burned down. One resistor burned down in the radio

set and another part of the radio may also have been damaged. The next day we found the wire of the radio-antenna cut into two in the yard. Both parts of it were almost pointed and they seemed to have been gilded 3-4 cm long on both ends. Both the door and the window were shut in our room. My bed was next to the window. There was a small vent in the window frame for the radio-antenna. The key of the door was in the keyhole. My son and I were covered with a synthetic counterpane. Its case was synthetic and it was filled with synthetic material, too.

In the forties in the very same yard, I mean in the yard of our house, the door was open at our neighbours' during a summer thunderstorm. A ball-lightning went into their room, went round and left through the same door. Is it likely that ball-lightnings are attracted to our neighbourhood ?

Case 215. Kujáni Gáborné, Szekszárd

We rowed to the middle of Lake Balaton in a boat with my friends in the summer of 1931. There were about 10 of us. We enjoyed it very much but then the sky began getting overcast rather fast. It began lightning and it seemed as if night had fallen. Not even the shore of the lake could be seen and it was at that moment that the following event took place. A ball-lightning began moving along the horizon. It lit up the mountains and after running clockwise round the lake it went back to Keszthely or somewhere near to it. It may have struck the lake or something else. Its velocity was pretty high.

Case 216. Mészáros Mihály, Tiszarof

I helped my parents with some work in the yard of our house in the summer of 1941. Suddenly we noticed a glowing ball between to, fork-like branches of one of the trees. It was not a regular sphere and it changed its colour, too. Small flames like tails stuck out of it then they drew back again. My grandfather went up to the tree and tried to push it off the tree with a pitchfork. He pricked it and the next moment it exploded and disappeared. The pitchfork got quite warm and the branches round that particular spot were singed. It was sultry and hot that day but there was no storm neither before or after the event.

Case 217. Miltner György, Budapest

We were spending our summer holidays at Lake Balaton in the summer of 1985 when a heavy storm broke out. It became so dark within a few moments that the vehicles could run only with their lights on at 5 p.m. It was then that I noticed a glowing sphere moving slowly from the direction of the lake towards the shore. Reaching the shore it speeded up and it began moving in

a zig-zag. The first ball-lightning struck the ditch in front of our house but we found no trace of it after the storm. The next one bumped into the cables above the railways, it exploded and disappeared in the form of a spark-flood. Then we saw one more ball-lightning. That one disappeared similarly. Soon it began raining cats and dogs but we did not observe any extraordinary phenomenon during the rain.

Case 218. Nagyné, Ricsai Edit, Gyomaendrőd

We, I mean I and my brothers and sisters, were still in bed in one summer morning when a thunderstorm broke out. After a flash of a lightning a glowing sphere of 20 cm diameter jumped out of the wall-socket but it disappeared right away. I could see it only for 1 second but I still remember it very well. It was accompanied with a tremendous crack as if a lightning had struck somewhere nearby. I was the only one of my four brothers and sisters who saw it because the beds of the others faced the other side of the room. They could hear only the thunder.

Case 219. Pekár Józsefné, Tatabánya

It happened a few years ago. Two red-coloured spheres of 25 cm diameter came into the hall through the keyhole of the entrance door. They were moving 50 cm above the floor then slipped out of the ball through the same keyhole and headed for the neighbouring house. There they struck the radio and exploded.

Case 220. Hendrik Lajos, Lábatlan (INTERVIEW)

a.) Once in the summer of 1952 a thunderstorm was going to break out. One could see several flashes of lightning in the whirling clouds and could hear the distant thundering, too. Suddenly a greyish, reddish, bluish coloured, transparent sphere appeared accompanied with a strong hissing sound that can be heard when arch-welding is being done. The sphere was of 25-30 cm diameter and it was only 3-4 m away from me. The hissing sound lasted about 2 seconds and then the sphere ascended towards the sky and disappeared with a loud crack. It had a look at the spot where it had appeared for the first time and I found a small "crater" in the clayey ground which was burned as if it were ceramics. The "crater" was of 1.5 cm diameter and 0.5 cm deep. Its inside was rather smooth but its shape was not like a regular spherical calotte but looked rather like a star. Its inside was very hard, like ceramics, it was brown-coloured but with transparent glass-like "walls". It is a pity I did not preserve it.

b.) We were working on the load distribution station (of 120 kV Voltage) near Tokod-Dorog in the summer of 1956. There are always lots of storms

in that area and a storm was about to break out again, it was lightning. The ball-lightning appeared just like in the previous case. It appeared between the building of the switch hut and the transformer, near the switch hut, above the ground. The transformer was working because it provided the energy for our work. The ball-lightning was seen by 8 colleagues of mine, all electricians. Its diameter was about 70 cm. After a few seconds the reddish sphere moved towards the transformer and crashed into its side. There it exploded together with the transformer with a tremendous crack. The oil from the transformer poured forth onto the ground and caught fire. The fire had to be put out. Lots of people helped us with it. But I forgot to have a look what traces of the possible damages done by the ball-lightning to the transformer could be seen on the remnants of the exploded transformer. In this case, the phenomenon was followed by a hail.

c.) In the summer of 1972 we did some mounting work in East-Germany. Once as a storm was approaching we took shelter under a roof. We caught sight of a whirling, reddish-bluish, colourful sphere of 100 cm diameter, 1 m above the ground and 20 cm away from us. I told my colleagues it was a ball-lightning. They claimed it could not be but a dust-cloud because no lightning could be seen only a hissing sound could be heard. After a while it crawled among the electric wires hanging there and exploded with a loud crack. The wires began glowing white and the aluminium melted and dripped onto the ground with a spark-flood. The electric wire did not begin glowing all along its length only a part of it and it was only a small part that melted. The wire was an uninsulated, 35 mm<sup>2</sup> area one made of aluminium. After the rain had stopped we had a look at the place where the ball-lightning appeared. The ground on that spot was burned and flat like a pancake. Its colour was brownish red but no "crater" could be seen. I wanted to know whether it could be magnetized or not so I tried to magnetize it with a magnet. Yes, the magnet stuck to it quite strongly. The ground around which had not been touched by the ball-lightning could not be magnetized. The magnet was on the side of an electric torch and we tested the attractive force by hand only. The magnet attracted the ceramics-like, pancake-shaped piece of material fairly strong. This case happened also at the beginning of a storm. The ground was brownish-red so it is possible that it contained some iron. But I am absolutely sure that the magnet did not attract that part of the spot which had not been touched by the ball-lightning.

d.) In July, 1976 we were mounting a polypropilane manufacturing factory near Pozsony (Bratislava) in Czechoslovakia. During a storm our team was working in the building of the new packing workshop when the characteristic ball appeared without any preliminaries. At one point in the air we saw something vibrating and then it turned into a colourful sphere of 60-80 cm diameter. Everybody was just staring at it, completely paralyzed. It did not touch the ground and no hissing sound could be heard. It happened at one of the open sides of the building and then the strangely whirling sphere slowly

went away. It moved towards the lightning conductor of the still empty containers and disappeared there accompanied with a hissing sound. The air was fairly warm when it happened.

e.) I was still living in the Great Hungarian Plain when I saw once the damage done by a ball-lightning. A bluish, flashing lightball ascended into the chimney of our neighbour and then it blew up the iron stove. I did not see that particular ball-lightning but saw the pieces of the blown-up stove.

Case 222. Sályi János, Pécs (INTERVIEW)

It happened in clear, bright, sunny weather in July, 1972. At noon most of the workers of our factory were having lunch but several of them stayed in the factory-building. Suddenly they caught sight of a bright sphere of a football's size rolling along the lightning conductor. It was accompanied with a hissing sound and was coloured transient between pink and yellow. It had come through the long glass window on the roof. Then it vanished in the water-pit at the outer corner of the building next to the lightning conductor with a tremendous crack. Afterwards the air felt rich in ozone. The water disappeared from the pit, leaving no trace behind. Though already totally dry the pit was still steaming after half an hour. The phenomenon was seen by about 30 people for approx. 8-10 sec. The velocity of the bright sphere was about 3-5 m/sec. The sound it emitted was similar to that of a supersonic plane, that is it was a hissing, whistling sound. The pit had originally contained about 120 l water since it had not been full, only upto its 2/3 part. My colleagues examined it thoroughly but no water was splashed on the walls, all the water evaporated. It is sure, it was steaming even a long time after the event. None of my colleagues felt either any heat radiated or perceived an impulse. The windows did not vibrate though some people had a bad ringing in their ears because of the blast of the explosion. One of my colleagues, called Béla Trischler was just looking out of the window when the ball-lightning fell into the water-pit and he saw not only the steam but also that some leaves of grass round the pit caught fire and burned down eventually. The ground cable was not damaged at all. At the corner of a building near the pit there were the shop-foreman and a few other colleagues of ours sitting. They did not perceive anything.

Note: The evaporation of 120 l water brings about approximately  $200 \text{ m}^3$  steam, that is a cube with 6 m long sides. It is necessary about  $2.8 \times 10^8$  Joule energy to turn this amount of water into steam. If we regard the diameter of the ball-lightning at 25 cm, the energy density is  $3.4 \times 10^{10}$  Joule/m<sup>3</sup> or  $3.4 \times 10^4$  Joule/cm<sup>3</sup>. This is approximately 100 times more than that effectuated in plasma.



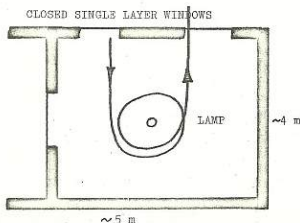
Case 223. Mendőly Ádámné, Budapest (INTERVIEW)

At the end of October, 1932 I and my mother were walking home from the cemetery near to Csökölly (village) in Somogy county. At about 6-7 p.m. it was already getting dark when a heavy storm broke out with thundering and lightning. It had not rained much yet, only one or two pails of water could be felt and seen, the road had not been wet yet when a bright, regular spherical blue object of about 25-30 cm diameter appeared and approached us. It was already quite near to us when we began running away with my mother but it kept on coming after us. We could not run away no matter how hard we tried to. When we stopped it stopped, too. Then we began running again without looking back. We could see this phenomenon for about one and a half minutes and we were very much afraid of it. It was as near as half a meter to me but I could not feel either warm or cold. Its colour was not glaring but it was not transparent either, it looked rather solid. Both of us were frightened much and ran into a house nearby. It did not follow us into the house.

Case 224. Darvas Béláné, Budapest (INTERVIEW)

We lived at Torbágy in an adobe house in the summer of 1971. A heavy storm broke out and my two sisters stayed at home during the storm. It had already begun subsiding when a yellowish-white bright sphere of 8-10 cm diameter appeared at one of the windows. The sphere had a dull light. It moved twice round the electric bulb hanging in the middle of the ceiling then left the room through the other window. It was moving counter-clockwise while it was in the room. It is sure it left the room through the glass of the window

CASE 224 LOCATION: TORBÁGY



/it was a single glazed one/ because we were watching it moving away outside then we lost sight of it. It was about 1 - 1 1/2 m away from us while moving round the lamp but we did not feel warm. It did not smell at all. I seem to have heard some hissing sound but my sisters do not remember this sound or simply they did not notice it. The ball-lightning moved as freely and easily as if it had been an air-balloon but it was moving only horizontally and along a regular circle round the lamp. It did no damage and did not cause any electric breakdown in the flat.

Case 225. Tarcsa Mihályné, Jásztelek

On 12<sup>th</sup> August, 1986 there was a heavy storm at night. It was lightning from 11 p.m. but no thundering accompanied the flashes of lightning. All the lightnings had a rather strange white colour. It was about 1 o'clock at night when I carried my little son to his room. It had stopped raining by that time but it was still lightning. This room was lit the least of all by the lightning. As we stepped into the room the air in it felt humid, sultry and hot since all the windows and doors of the room were shut. I laid the child on the bed then started for the door. Suddenly I saw a light flash, the room was lit by white light, but I knew it could not be a lightning. I heard a strange, hissing sound from the direction of my left hand, what is more something felt quite warm near to my hand I looked down and saw a sphere of 10 cm diameter floating 30-40 cm away from my arm. It was about 1 m high above the floor. It was surrounded with a white aura of about 20-25 cm diameter. The light of the aura was not as bright as that of the sphere. As I was going out of the room it followed me. I ran up to the switch to turn on the light but by the electric light I could not see the sphere any more. It disappeared without a trace. It was not until much later that I noticed that something strange could be smelt in the kitchen. My hand felt as if it had been burned by something in spite of the fact that nothing could be seen on my skin. This feeling of burning spread more and more in my arm later on. I had craching and ringing in my ears and I felt dizzy. I went to see a doctor but he could not diagnose any particular trouble.

Case 226. Szegedi Jánosné, Békés (INTERVIEW)

In the summer of 1952 we lived on a detached farm near Bélmegeyer. One day a summer thunderstorm broke out accompanied with much thundering and lightning. I was riding home from our field on my bike. I was 150 m away from home when a great yellow light appeared around me. I stopped and felt I was in the light for 1-2 minutes. I could not see out of it. I felt secluded in a yellow ball-glass. As soon as that phenomenon appeared around me I jumped off my bike and stood there paralyzed, unable to say a word. After 1 or 2 minutes that ball-like cover burst and disappeared without a trace. My neigh-

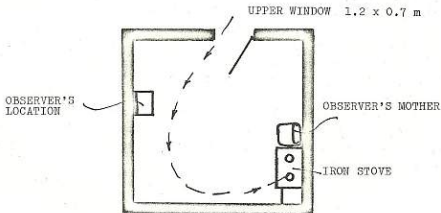


bour, Mrs. Kiszely saw the case, too. She was standing in front of their farmhouse. She saw me, riding on my bike and then saw me disappear totally be seen from the outside. I was in the sphere all my height /my height is 160 cm/. After the phenomenon disappeared I jumped on my bike and rode home. My legs were also inside the "bell-glass" but I did not feel anything special in my legs either.

Case 227. Dr. Gyárfás Ágnes, Miskolc (INTERVIEW)

We were sitting in the kitchen of our house at Edelény in the summer of 1955 on a cloudy afternoon. There were three of us, my daughter, my mother and me. A faint wind fluttered and pushed slightly the upper window and then a ball-lightning walked into the room through that window. It went round the room as high above the floor as the window was. When it got to the fireplace it silently disappeared near the stove-pipe. It had a bluish, reddish colour. We all definitely remember seeing it revolving round its axis while moving round. It was of a water-melon's size, i.e. approx. 30 cm diameter. It did not hurt us, we were just astonished. Its axis was horizontal and it moved counter-clockwise. It was revolving rather slowly, its movement was similar to that of a well-directed air-balloon. It spent about 15 seconds in the flat according to our estimation.

CASE 227 LOCATION: EDELÉNY



Case 229. Szabó Edit, Brighton (London)

I met the red fireball in the Strand, in London, on 29<sup>th</sup> December, 1977 at 7 p.m. I was walking along the Strand with my head bowed watching the pavement. I had not got yet only as far as St. Mary's where the pavement is about 4 m wide and there were no other pedestrians there at that time

only the usual traffic was going on in the road when a red-hot fireball of a football's size dashed silently onto the pavement right in front of my feet. It was glowing like glowing embers. It was zigzagging in front of me from one side of the pavement to the other at a great speed. I stopped for a moment and closed my eyes just to find out whether it was only a visual illusion or not. When I opened my eyes again the red fireball was standing right in front of me. I evaded it instinctively but hardly could I step one or two it was zigzagging again in front of me from one side to the other at a great speed. It prevented me from walking on, I stopped again, closed my eyes, and began thinking hard what to do. After a few moments I opened my eyes again and then the red fiery ball was right at my feet again. I thought I should step on it but I was afraid of it. Then it began moving along the pavement straight as a dart and I lost sight of it within a few moments. I was running after it for a while to see whether it was going to ascend into the air or not but it could not be seen any longer. My meeting the red fireball lasted about 2-3 minutes. It did not emit any sound. I do not know if it emitted heat or not because I was wearing boots.

Case 230. Somogyi Istvánné, Enying (INTERVIEW)

I woke up with a start on the night of 20<sup>th</sup> July, 1986, to see a strong flashing light flood the room through the shutter of the window. I got up to find out what it was but by the time I looked out of the window, the strong, flashing light disappeared. As far as I could see it, it was vibrating and beaming. At the same time my son's TV-set went wrong in the next room. He tried to switch it on several times but in vain. He called a TV-radio mechanic and told him there was neither picture to be seen nor voice to be heard on it. The repairman came 3 days later, switched on the TV-set, and it worked. Nothing was wrong with it.

The strong light-effect lasted about 2-3 minutes. If I remember well it was at about midnight. There was no thunderstorm at that time but a strong wind was blowing. I did not switch on the light after the phenomenon had disappeared but I am sure there was no electric breakdown in our house (except for the above-mentioned TV-set).

Case 231. Váradi Ilona, Budaörs

I spent my childhood in Transsylvania on the Bölönyi estate. A creek was flowing near our house. The creek was flanked with tall poplars. One summer day a thunderstorm broke out. My mother was sitting near the kitchen door with my 3-year-old younger sister in her lap who was crying desperately so as not to be taken into the house and not to be put into bed. My mother promised her not to, but she began screaming whenever it thundered and pressed herself tightly against my mother. Suddenly a tremendous blast and a crack

could be heard and somebody shouted at us from the neighbouring house to tell us that a fireball flew into our room from the poplars. My mother jumped up being frightened much and she shouted she had forgotten to shut the windows. She went into the room together with the people who had already gathered from the neighbourhood at our house. The floor was ripped open and grubbed up along a zig-zagged line. At its end there was a pile of burned pieces of wood. As it was still raining my mother went up to the window to shut it. There was a small sofa below the window where my younger sister slept. My mother knelt onto it and the sofa crumbled under her. It had turned almost into dust in its middle even its copper-wires had burned down.

Case 232. Hegedűs Etelka, Budapest (INTERVIEW)

In the summer of 1935 we lived in a manufacturing plant in the vicinity of tall chimneys. One day dark clouds overcast the sky and a summer thunderstorm broke out. I ran into the hall and watched the approaching storm from there. Suddenly a red ball-lightning appeared after a thunder. It came in through one of the windows and headed for the piano near the window of the room. It burned the electric wire of the lamp standing on the piano then went round the room clockwise. It made the paintings hanging round on the walls move and then left the room through the other open window. It did no other damage. I did not feel anything special except being frightened. The whole phenomenon lasted about 5-10 seconds. The ball-lightning may have been of a football's size.

Case 233. Mágyel Józsefné, Debrecen

In the summer of 1969 a heavy thunderstorm broke out. It was thundering and lightning. I was sitting in the kitchen near the open door when a bright sphere of a table-tennis ball's size, so to say, "ran" into the kitchen. When it reached the shut door of the dining room it began revolving, then within a moment it headed for the electric cooker on the opposite side of the kitchen. It made some full circles above the cooker and then left the kitchen in the same way as it had come in through the open window. The whole event took place in a very short period of time.

Case 234. Keifer Mária, Budapest

My mother told me the following story: she lived at Dunaujváros in the sixties and a ball-lightning happened to roll springing along the ridge of the house. That fireball of a football's size gave a hissing sound. It began cracking when near electric wires like a TV-set during storms. My mother was standing in front of the house. It swang onto the ground in a curve and crossed the wood with one-meter-long jumps. Miraculously it evaded all the trees. It was

about 100 m away from my mother when it exploded with a loud blast. It did not set anything on fire. The explosion flattened the woman living in the neighbouring house against the wall. The sky was clear during the event. No cloud could be seen anywhere.

Case 235. Biczó Ferenc, Budakeszi

I am an electric mechanician by trade. I live in a one-storey house at Budakeszi. The following case happened to me in 1974. After an ordinary summer thunderstorm which was accompanied with lightning and thundering I opened the window of our bedroom. (Maybe the sky was already azure blue again.) I sat back to my desk near the window to work on something. After about 20 minutes I noticed a sphere in the window. Its diameter was about 10-15 cm. It looked like a vibrating faintly lightning white lampshade. It came in floating slowly through the open window and sometimes stopped for a moment. I was frightened. I sprang up from beside my desk and backed towards the door, but I could not turn my eyes away from the ball-lightning. It floated 1, - 2 m into the room then changed its direction and headed for the metal-framed book-shelf on the wall above my table. As soon as it reached the welded steel framework of the book-shelf it disappeared at the tip of one of the steel bars. Its discharge was in no ways similar to the electric discharges described in electrotechnics. There were no sparks, no crack, no smoke and no ampere smell. It took place without doing even the slightest damage. The whole phenomenon lasted no longer than 30-60 seconds.

Case 236. Szathmáry István, Szolnok

Somewhen around 1955 I was sitting together with someone else in the south-facing room of our flat at Karcag. As far as I remember there was neither a shower nor a thunderstorm that day and though the doors and windows were shut it was not cool. I think it happened in autumn or spring. There was a 1.5 m long bronze lustre hanging in the middle of the ceiling 2 m away from me. A vibrating orange-coloured sphere of about 40 cm diameter appeared at its lower pointed end. It floated onto the chair nearest to it emitting a low hissing sound and kept on vibrating above the chair for a few seconds while seemed to be revolving at the same time. Its short presence ended with a hollow crack. Its sound was neither earsplitting nor sharp. It left no trace or smell behind.

My father told me after this event that he had already met a ball-lightning twice in that room. Both ball-lightnings appeared near the ceiling above the telephone in the corner and both disappeared within a short time. One of them crossed the room, floated in front of the picture hanging on the opposite corner and then left the room. It left no trace on the picture. My father was watching the guest motionless being afraid of getting the air to

move lest the ball-lightning should approach him. There were lots of wires in the walls of the room and they, being already over 30 years old, were in a bad state. There were also a telephone and a radio antenna in the room. The walls of the building are built of brick and adobe whereas the walls separating the rooms are built exclusively of brick. Its roof has a slate covering, and there was no lightning conductor on the roof at that time. The ball-lightning limited its visits to this room, it has never appeared in the other rooms of the building.

Case 237. Martin Rezsőné, Sopron

In the summer of 1984 we had a fine sunny day. I think it happened during a hot-spell as we stayed in the room with the windows shut. Our son was playing football in the sports-field 100 m away from our house. It was early in the afternoon. Suddenly we saw a bright object hit the wall at the corner of the window. It was accompanied with a sound which we did not find particularly loud. My husband ran out to find out what it may have been but could not find any trace whatsoever. We thought somebody may have thrown a petard at the wall and that may have hit the wall but we could find no trace of it, no evidence. When my son came home he asked us if we had been shooting out of the window because a crack similar to a shot could be heard in the sports-field from the direction of our window.

Case 239. Dohányos János, Békéscsaba

The weather was rather stormy and rainy in the summer of 1943. It happened then that a ball-lightning appeared in our yard between the well and the house. I was staring at it being astonished very much. I could watch it for half a minute then it suddenly disappeared. Its diameter was about 50 cm. It was floating slowly in the air 5-6 m away from me about 1 m high above the ground. Its colour was glowing yellow like that of an oil lamp.

Case 240. Fazekas Károlyné, Karlsbad

I lived in one of the buildings of the Haas & Czejk China Factory a few kms away from Karlsbad in the summer of 1945. The house was situated in a narrow valley near a stream. There were high, wooded mountains on both sides of the valley. Sudden storms occurred quite often there. They were accompanied with so loud thundering that I had to stuff my fingers into my ears and there were always lots of lightnings flashing all around during storms. Once when the storm was already abating I looked out of the window, which was otherwise shut at that moment, and was astonished to see a white sphere moving about 20 m away. It was approaching our house, floating 2 m high above the ground. As it was getting nearer and nearer I realized that

it was a glaring white, transparent, phosphorescing sphere of an air-balloon's size. It disappeared in the immediate vicinity of the window.

Case 241. Urbán János, Budapest (INTERVIEW)

I and three of my colleagues went sailing on Lake Balaton in the 70's. Our sailing ship had a metal trunk and thin steel wires instead of ropes. Suddenly a storm broke out and during the loud thundering a lightning struck our sail mast. A white sphere rolled down the mast at quite a great speed along the steel wire which fixed the horizontal mast of the sail. It rolled along that wire quickly then fell off the end of the horizontal mast into the water and disappeared with a crack.

Case 242. Molnár Dénesné, Budapest

My uncle was an air force officer and his father lived near Lake Balaton. He usually spent his summer holiday at his parents'. Once in the second half of the 30's my uncle told me the following story after having returned from one of his flights. He was flying on a double-winged open plane with someone else. The plane was piloted by a pilot trainer and my uncle was sitting behind him being his trainer. The sky was cloudy but it was not raining. Suddenly a fireball of a watermelon's size (i.e. of 30 cm diameter) jumped in through the window on the right. It jumped along the metal instrument board and left at the plane's back part to the left.

Case 243. Kovácsné, Boroszlai Ágnes, Szolnok

I was listening to the radio in our room at Fegyvernek in 1955 when I suddenly noticed a bright ball in the middle of the room. It was floating slowly towards me one meter high above the floor. The radio was near the wall. I was sitting beside the radio. The ball disappeared in the radio. I heard a tremendous crash at that moment but no harm was done. My mother who was ironing in the kitchen ran into the room being frightened much and asked whether anything was wrong with us. My sister who was in the next room was frightened so much that she sat down onto the floor. The radio did not go wrong. The diameter of the sphere was about 1.5 cm. I do not remember whether there was a thunderstorm or not and whether the window was open or shut. It is more likely that there was no thunderstorm because we did not use to listen to the radio or to iron when it was lightning nearby. When it was lightning I was usually watching it and tried to estimate how far it had struck.

Case 244. Tátrai Istvánné, Budapest

One spring afternoon I stayed at home with my mother. We lived at Esztergom at that time. A storm was coming. My mother's friend took shelter in our house and we were talking in the kitchen. There was much rainfall accompanied with heavy thundering and lightning. My mother sent me into the room to shut the windows. As soon as I had opened the door of the room, which is opposite the windows, I saw a silvery sphere of 10-12 cm diameter floating slowly horizontally into the room through the open window, the curtains of which were also drawn aside. It moved about half a meter away from the window into the room when it fell into pieces with a low crack. It was falling down like a sparkler and vanished. Then I called my mother and we began examining the floor but could not find any trace of burning.

Case 246. Galassy Lászlóné, Budapest

I was teaching in one of the classrooms on the first floor in the primary school in Béla street, at Rákosszentmihály. We were just about to finish the school-year. The classroom window looking onto the wooded garden was open. Suddenly a short thunderstorm broke out. Then we noticed a cigar-shaped bright object of a finger's breadth come in through the window and glide 1 m high above the floor along the wall of the classroom. It disappeared at the iron grid of an air hole. We lost sight of it. No harm was done, except for a dim grey stripe it left on the wall. The children were not frightened, what is more, they found the bright phenomenon very interesting.

Case 247/1. Gazsó János, Budapest (INTERVIEW)

A heavy thunderstorm broke out in the vicinity of Szabadság Hill at night, on 13<sup>th</sup> June, 1986. I woke up with a start in the night to hear my small, portable digital alarm clock, which usually use during my journeys, ring. It had a strange, unusual ring I had never heard before. It was a faint, cracking, peeping sound. Since I was sure I had not set the clock for that point of time, the whole thing struck me as strange and I got up. I went into the hall. It seemed to be even stranger to catch sight of a light source in the electric distributing box. There are the magnetic fuses, the 0 wire, the ground wire and the phase wire in that box. I saw a dim light vibrating and flickering in the shut, plastic, ivory box. It went on doing so for about 2 minutes then the phenomenon vanished with a faint crack. But it kept on raining and after 10 minutes or so the phenomenon reappeared. It had a bit stronger light than the first one. It disappeared with a faint crack just like the first one after a few moments. A few days after it I took the lid off the box and noticed that a few of its plastic parts burned. The strange thing about it was that an aluminium wire insulated with PVC burned, too, but not at its full

length only a 4 or 5 cm long part of it. I removed the remnants of the PVC and changed the wire. The rest of the plastic parts burned and melted in a strange way, too, because there was no soot to be seen, i.e. it cannot have been an ordinary chemical oxidation. No harm, no trace of a spark could be seen on the aluminium plate connected to the ground wire with a metal part. The phase wire which had been charged at that time was not injured at all. Only the 0-wire burned down together with some plastic parts that happened to be near to it. But these plastic parts were in no way connected to the charged phase wire. (See plates at the end of the paper.)

Case 248. Schneider Jánosné, Szeged

In the May of 1929 my father wanted to set off the another town during a storm at 3 o'clock at night but the thunderstorm prevented him from doing so. He was sitting beside my bed in our smaller room. There was a radio-antenna stretched across the room. It came into the room through a bore-hole in the lintel above the door. Suddenly we caught sight of a long, bright ribbon-like object coming through this bore-hole. The object became larger and larger till it became as large as a bike's wheel (of approx. 80 cm diameter). This big sphere was passing along the antenna wire towards my father's head. It pressed my father's head down and soon afterwards it exploded with a tremendous crack. As a result of it the radio fell into pieces, the wooden door was pricked, the alarm-clock began ringing and the oil-lamp went out. The shop next door to us was full of smoke and it caught fire. My parents rescued us through the window. Our house was damaged.

Case 249. Szilágyi Györgyné, Budapest (INTERVIEW)

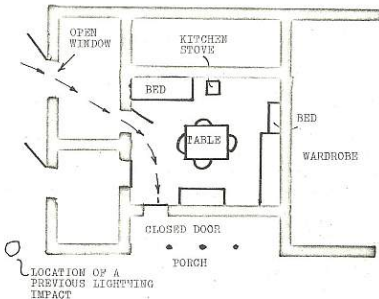
I was on my way home from my work-place at Batthyány square at about 4<sup>30</sup> in the afternoon on 24<sup>th</sup> July, 1986. When I entered the metro there were only two escalators working, the one in the middle did not work. When already moving downwards on the escalator I caught sight of a strangely shaped bright bundle at about my knees' level. Its light was less intense than that of the sun, its material was about as dense as milk that is it was not transparent. The bundle of light flashed for a few seconds above the full width of the escalator. It was motionless. Then it disappeared as if it had never been there. I am sure I was not dazzled by a visual illusion but I do not know what this phenomenon was. While I was waiting for my train down in the metro I noticed a bright point of a spark's size (of 1-2 cm diameter) passing from the direction of the rails towards the pillars at about 150 cm high above the ground. It could hardly be noticed. I could not follow its route because my train arrived and the crowd rushed onto it.



Case 250. Petkó István, Budapest (INTERVIEW)

In the spring of 1950 I was working for the Hortobágy State Farm when a heavy thunderstorm broke out. It was lightning so heavily that my parents, my wife and two children, as well as me were lying under the table in the middle of the room. All of a sudden I noticed a sphere of a large air-ballon's size tottering at the door of the large room about 120 cm high above the floor. It is difficult to say what colour it was exactly as it seemed to be white and pink at the same time, what is more it seemed to change its colour. It stopped and trembled, vibrated for a while then headed for the door leading onto the verandah then it vanished. We did not feel a warm at all. Its disappearance was so sudden that we could not observe it. The entrance door was shut and neither a trace of burning nor any harm could be seen on that. The whole event lasted 15-20 seconds. I have never seen such a heavy thunderstorm as that one was in my life neither before nor after. The light of the ball-lightning was dimly glaring as if a high power bulb had been put under a bell-glass made of opale glass.

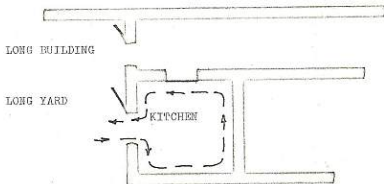
CASE 250 LOCATION: HORTOBÁGY



Case 251. Milovits Lórántné, Zalaegerszeg (INTERVIEW)

We lived in Debrecen in 1937. Our kitchen was looking onto a long yard. During a summer thunderstorm the kitchen window was open and I was watching the shower standing quite away from it. Suddenly a white sphere of 8-10 cm diameter rolled into the kitchen through the window. It went round the kitchen floating in the air at the level of the window sill, but it did not touch the furniture. It left as silently as it had appeared before. I was standing in the middle of the room staring at it. Its movement was counter-clockwise. The whole event took place in 3-4 seconds. The light of the sphere was rather dim like that of an opale glass bulb. It covered about 5-7 m in 3-4 sec. I do not remember any smell or sound.

CASE 251 LOCATION: DEBRECEN



Case 253. Lázár Jánosné, Kecskemét

We were working on a farms near Kunszentmárton in 8 July, 1925. There was a building 5 m wide, 8 m high and 20 m long on one of the farm. There was a threshing machine stored in that building in winter. However, during the harvest the building was empty, so it was open at its front and at its back side, too. Suddenly the sky became overcast and a thunderstorm broke out. I and my sister took shelter in the building mentioned above and stayed near its entrance facing East. Both of us noticed a colourful cumulus come into the barn pulling small tails behind itself. It was gleaming in all colours of the rainbow. It was rather cigar-shaped and its tails could clearly be seen. When it got above our heads it pressed us down to the earth though we were leaning against the wall. Except for being frightened much we were not injured, and were unable to stand up for a few minutes. Its centre was of about 20 cm diameter and its "tail" was about 40-45 cm long.

Case 254. Dudán Józsefné, Budapest

In the summer of 1956 I was admiring the lightnings of a coming storm striking around the mountains from the kitchen window of our family house at Máriabesnyő. The window was open. The upper part of the window-frame was about 30 cm above my head. The storm was coming nearer and nearer and then it began pouring accompanied with a gale. My mother asked me to shut the window. All of a sudden I caught sight of a glaring light, better to say I could not see anything for some moments. I turned towards the inside of the kitchen and told my mother I could not see anything. She was trembling and told me to stay where I was. My younger sister was playing at the opposite side of the kitchen. Then I regained my eyesight and my mother told me she had seen the glaring light, too, that is a regular yellow sphere of a football's size came into the kitchen above my head. It went round the kitchen 1 m below the ceiling then disappeared again above my head through the window. It did not crash into anything and did no damage either.

Case 256/a. Kósa Kiss Attila (Romania)

I was working at the well of a sewage purifying farm in a plough-land in the summer of 1977. A thunderstorm was coming, therefore we took shelter in a round-shaped building of two meter diameter. Then we heard a crack. At the very same moment sparks flashed nearby and a lightning struck a pylon supporting high-voltage cables. A few moments later an astonishing event took place just beside me. There came a regular spherical, electric, blue-coloured object floating into the room through the open door. The moments following its appearance seemed to be quite long. It bumped against the cement floor then sprang up flexibly and tottered out of the room through the unglazed window. My colleague standing behind me saw the ball-lightning, too.

256/b.

I saw another ball-lightning on 12<sup>th</sup> June, 1986, in the afternoon, near Nagyszalonta. There was a swiftly growing thunder cloud with a dark band of rainfall below about 5 km away from me in the south. Purple lightnings were flashing and finally one of them struck a pillar. As a result of it a whitish-blue light-ball appeared or rather separated out of the spot which the lightning had struck. It was descending tottering slowly, then it became flat, lengthened and finally vanished before reaching the ground. The whole event took place within 3-4 seconds.

According to my experiences both ball-lightnings appeared during a so-called local thunderstorm (which is confined to a small territory) and not during a front-thunderstorm. Both of them appeared when the thunder-cloud had already been fully-developed.

(The observer is a meteorologist by profession.)

Case 258. Horváth István, Szekszárd

I lived at Gyöng in 1959. That summer was particularly stormy and rainy in that neighbourhood. The following case happened to us. At that time I lived in digs. One day a storm was coming with heavy lightning. My landlady, who was much afraid of lightnings, went down to the pumping station in the cellar of the building. It had no windows because it was in the middle of the cellar. There were a pump, a bathtub and a chair in that room. She did not switch on the light, she was sitting there in the dark. Suddenly a bright light flooded the room then an explosion could be heard. After the explosion my landlady ran out of the room. An electrician was called immediately. He said that the electric network worked all right but he noticed that all the boxes at the electric distributors had been tossed out of their places. When they looked round in the attic they noticed that several wooden rafters looked as if they had been drilled through, but no debris could be seen anywhere. The bore-holes were brown inside. The wooden rafters did not catch fire. According to my landlady the light flashed only for a moment in the room. The explosion was also heard by several of our neighbours who were just staying nearby.

Note: A ball-lightning may have drilled through the rafters since the tiles on the roof were not damaged and at the moment of its explosion it flashed for a moment in the cellar.

Case 259. Zakoránszky András, Kaposvár (INTERVIEW)

The following case happened at Taszár in June, 1937. It was rather gloomy that day but no lightning or thundering could be seen or heard in the neighbourhood. In our house we had a large room and a small one which served as an office. I and my mother usually slept in the large room whereas my elder sister slept on a sofa in the office. I remember falling off my sofa and seeing the nails of the parquetry on the ceiling conduct a purple, yellow and blue light. The plaster was falling off the ceiling and both my mother and I were covered with debris. We heard my sister crying for help. She cried "Help, I am choking!" I broke the glass of the office door and carried her out of the house into the open air. When it began dawning we caught sight of the following: the plaster on the ceiling of the room fell off but the ceiling of the office was not damaged at all. The gilding trickled off the gilded picture on the wall. The tablecloth on the top of the small safe in the office caught fire but fortunately there was a glass of water on it which fell over and the water put the fire out. We had a large mirror beside the wall in the room, on the top part of which the silvering melted. What is more it cut the legs of two armchairs into small shavings like matches. (The armchairs had iron wheels on their legs.) The piano in the large room was not

damaged at all. When the doctor arrived he told us my sister had some burns and a concussion of the brain. On the left side of her body a red stripe of a cotton thread's width ran from her armpit to her foot. Fortunately it had no lasting effect on my sister's health, she had a long and healthy life. The ball-lightning may have slipped in through a vent in the wall of the office. There was a church with a lightning conductor 50 m away from us. My mother slept in an ordinary bed which had a copper-wired mattress and my bed was of the same kind.

Case 260. Tárnok Lászlóné, Pécs

In the summer of 1930 we took shelter from the thunderstorm in a small pub in Huszár street in Pécs. The pub was 5 m x 6 m large, it had a window and an open door. Suddenly I caught sight of a large yellow boundle of light whirling into the room varying its shape all the time. As soon as it reached the electric meter on the right-hand-side of the room it cracked and began sparkling. A strong light flashed, then the electric lamps went out and in the dead silence everybody was silently watching the yellow sphere which could be seen fairly well in the dark. It went round above as with a slow whirling motion and then it left to our great relief through the same door it had previously come in. Though it was passing right above our heads, we felt no warm and nobody was hurt only frightened. We went up to the electric meter to see what had happened to it but even its remnants could not be seen anywhere.

Case 261. Karancsi Ilona, Hódmezővásárhely

In the summer of 1970 a sudden thunderstorm broke out. The house we lived in was a typical farm-house of the Great Hungarian Plain. There was a garden in front of the house, at full length. The garden gate had a roof and sidewalls as well. Me, my sister and a friend were watching the storm from below the gate. Suddenly we saw some leaves and branches of the trees in the garden catch fire but no burned brands could be seen on their surface. It lasted only for a few seconds and then a fireball rolled along the garden or rather along the pavement beside the garden towards the gate. It passed us and disappeared without a trace. The gate was not damaged, the ball seemed to have slipped through a vent on the gate. After the storm we learned that a lightning had struck the house next to our neighbours'. We were frightened but unharmed. We had felt as if something had pushed us. The event lasted only a few seconds.

Case 263. Krizsán Pál, Békéscsaba

We were working in my parents' plough-land in the country near Békéscsaba on the bank of Körös channel. Old willows skirted the dam. Our plough-

-land was right beside the trees. At about 5 p.m. dark thunder-clouds were gathering in the sky. A storm was coming so we stopped working. My father had already set off for home. I was busy collecting our tools when I noticed a ball-lightning on the trunk of one of the willows. The sight was marvellous but frightening at the same time. It was like a fireball. It was glowing white. Its diameter was about 30 cm. I was so paralyzed at the sight that I could not go up to it. The phenomenon lasted about one minute then disappeared. I saw neither flames nor smoke. I had a look at the tree on the following day but I found no trace, not even a burned brand on it.

Case 264. Horváth Lászlóné, Budapest (INTERVIEW)

I stayed in our house in Sopron in the summer of 1946 when a sudden summer thunderstorm broke out. All the doors and windows of the house were shut. I, myself, being much afraid of lightning was crouching in the corner of the room. One lightning followed the other. Suddenly a whitish-yellowish sphere of 10-12 cm appeared on the handle of the kitchen window. Its centre was yellow surrounded with a white aura. It left the handle and went into our large room through the open door then headed for the window. I lost sight of it at that point. Its light was similar to that of a 100 W opale bulb. Its outlines were rather blurred and though it was definitely spherical it was not a regular sphere. The air smelt rich in ozone after it had left the house. It caused no electric breakdown. I could follow its route for about 2-3 seconds. No damage could be seen on the windows, either. It was floating about 1,5 m high above the floor. It did not change its height, it was moving straight at a regular speed and was not vibrating. I am sure the windows were shut.

Case 265. Kaposos Zsigmond, Budapest

In the spring of 1950, in March or in April I was at the tuberculosis sanatorium at Mátraháza. I was alone on the terrace since it was rather chilly. The rain had just stopped. I was leaning against the bar of the terrace watching the landscape. As I was looking at the Kékes, I noticed a wonderful fireball on the crowns of the trees on the hill side. It was about 100 m away from me. It went rolling on along the crowns of the trees following their varying height. I think its diameter was about 2-3 m, but my estimation is rather poor. It kept its regular round shape while passing along. I saw some bundles of light all round its outline. Some of them were longer than the other ones. The whole sphere was vibrating. The length of the light-bundles was changing while the fireball was moving along. I saw it for about 10 seconds. It was moving quite fast on the hill side. I smelt a strange smell at the same time, the air felt more fresh than before, it smelt like ozone. As soon as I had lost sight of the fireball I heard an explosion, a crack, and saw a glaring flash of light at the same time.

During this event the air felt even much richer in ozone than before.

Case 266. Postás Jánosné, Békés

On a sunny afternoon in 1914 our neighbour, Bálint Mohácsi and his wife were coming home on a cart from the plough-land. They saw a fireball proceeding beside the cart 50-100 cm high above the ground. It followed them for a while then disappeared in the direction of the grave-yard.

Case 267. Sallai Sándorné, Tiszaberek

On summer day in 1959 I and my two children ran into my parent's house because a storm broke out. One of the windows was open in the room where we stayed. During the permanent lightning and thundering suddenly a bright, yellow sphere of 15 cm diameter came into the room through the window. It went round the lustre. It left the room through the very same window.

Case 268. Gazdag László, Szekszárd (INTERVIEW)

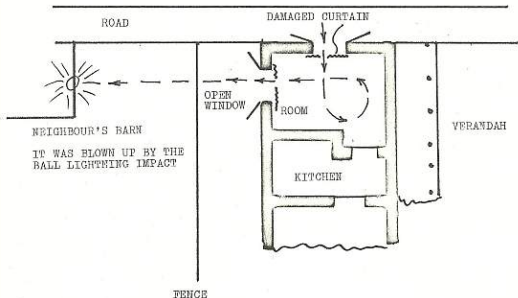
In the end of the fifties a long line of people was waiting in front of the department-store called Bartina. The people in the line suddenly heard a crash and a hissing sound. There was a ball-lightning rolling quickly down along the lightning conductor of the church on the opposite side of Béla King square. It was of a football's size, it had a reddish-yellowish colour and gave a hissing sound. It was pulling a tail behind itself. No smoke could be seen, nothing caught fire. It left no noticeable trace on the wall of the church. As soon as it had reached the ground it disappeared with a tremendous crack as if it had blown up. It had looked like rain before. Just before the appearance of the ball-lightning it began raining, but no lightning could be seen in the neighbourhood.

Case 269. Lutter Tibor, Budapest (INTERVIEW)

In the summer of 1951 I went to the patronal festival of Koronác with my uncle who was the chief engineer of Rába machine factory. At about noon thunder-clouds were gathering in the sky so we withdrew into the L-shaped guest-room. Both windows of it were open. We were seven in the room. Suddenly a bright, silver-coloured "cumulus" came into the room through one of the windows. Its appearance was accompanied with a hissing sound. It went round each of us. It burned one hole of a ball's size in both curtains, i.e. on the spots where it came in and went out. Then it went to the neighbouring house about 30 m away from us - and struck the stable. At the moment of its striking the stable a loud explosion could be heard. The stable blew up and caught fire as well. The walls of it were built of adobe. It

had a reed-thatch. By the time the local fire brigade arrived the whole building had already burned down. Even its walls had completely been destroyed. The whole event lasted only a few moments. The ball-lightning had not a glaring light, its light was not too strong. There was no electricity in the village at that time so no electric effect could be perceived at all, of course.

CASE 269 LOCATION: KORONÓC



Case 270. Varga Péterné, Budapest (INTERVIEW)

a.) In the summer of 1963 a heavy storm broke out over Badacsonytördemic, which is a village at Lake Balaton near Nemesgulács. The following day one of my class-mates invited me to their house because a ball-lightning "had visited" them the day before. In the afternoon I went to see them and saw the following there: the entrance door, about 2-3 cm thick, and the window of the room had been drilled through by the ball-lightning. They told me that a red sphere of about 5-7 cm diameter had pierced through the wooden entrance door, then it had crossed the hall and had gone into the room through the open door. It headed straight for the window of the room. It passed through the window leaving a regular round hole of the same diameter as the one in the entrance door. Though they had a double-glazed window the outer one was open so it burned a hole only in the inner one which was shut at that time. There were regular round holes of the same diameter on both the door and the

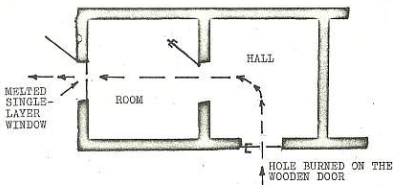


window. They told me the whole event had taken place within a few moments and the ball-lightning had had a red colour and had seemed to be rolling in the air. It did not change the height of its motion while moving along since both holes could be found at the same height. The glass of the window was neither broken nor cracked.

b.) In 1976, one of my acquaintances, Kiss Lajosné, who lives at Nemesgulács, told me the following story: A storm was just going to break out while she was ironing. Therefore she unplugged the electric iron so as to prevent any trouble. Soon after she had unplugged the iron a fiery "snake" jumped hissing out of the socket. It was about 10-15 cm long and 2-3 cm wide. The socket was right beside the door-post. That door led into the room. The "firesnake" went into the room through the open door but did not burn anything. It disappeared after a few seconds.

c.) Once in the sixties a heavy storm broke out also at Badacsonytördemic. Her brother and some friends were watching the storm from below the eaves. Suddenly they caught sight of an irregular, potato-shaped red light-object, which appeared above the council-house. It appeared above the roof and then began descending towards the ground. It floated across the ditch beside the road and the bushes lining the ditch. It melted the sand on quite a long section, leaving behind a few cm thick brownish-coloured, melted material on a 70 cm long, 10 cm wide patch as it was passing above the sand. They were watching it from 20 m distance. As soon as the rain had stopped they went to have a look at the melted sand. The whole patch was covered with a solid glassy material. One could fling a piece of it away as if it were a ball without breaking it.

CASE 270/a



Case 271. Hellebrandt Jenő, Szigetszentmiklós

I recieved a football as a birthday present on 21<sup>th</sup> May, 1966. I and my friends were just playing football with the new ball when a storm broke out at about 2 p.m. It was thundering and raining so we took shelter under the protruding ledge of a staircase on our housing estate. The storm abated after about 10 minutes. Then a thing happened that all the six of us remember till this day. First we heard a loud crack. We looked up and noticed an orange sphere of about 20 cm diameter at the level of the second floor of the building. It was slowly floating downwards. The building was L-shaped and we were in its corner. The sphere was descending slowly and then it stopped about 60 - 80 cm above the ground and about 3 m away from the house. Then it bumped into the wall and began moving horizontally, at that moment we heard a crackling sound as if empty paper-bag had been crushed. The sphere rebounded from the wall so we could discern it was rather pear-shaped. All of a sudden it began ascending again and hit a window on the first floor. The window broke with much rattling. It was a double-glazed window with a 1 cm wide gap between. There was only the grandmother at home in that flat but she ran to the window at once and began scolding us because she thought it was us who had broken the window. Later we were told that the fireball had done serious damage to the flat. There was a cupboard opposite the window in the room. It was full of trinkets and various knick-knacks. Lots of these fell onto the floor and broke. One of the glazed windows of the cupboard also broke.

Case 272. Keserő János, Nyírlugas (INTERVIEW)

a.) In the summer of 1935 I was going home from school at Nádudvar. There was a storm coming. Half of the sky had already been overcast by a dark cloud but otherwise it was still calm. The sun was shining, it was hot and rather sultry. I was walking along a deserted, short and narrow street which had no paving at all. I was watching the dark thunder-cloud which spread slowly over the whole sky. Distant thundering could already be heard but it was still calm. All of a sudden I noticed a fiery ball of about 15-20 cm diameter approximately 15-20 m away from me. It was moving towards the middle of the road. I had not been able to see it appear because I had been watching the sky. Its colour was mixed red and copper-yellow. I remember fairly well that it had a fog-like, loose, greyish aura round itself when I first caught sight of it. After a few seconds this aura disappeared and the ball became brighter and lighter than it had been before. It was not rolling on the ground, it was moving airily and lightly towards the opposite side of the street. Sometimes it rose slowly and softly up above the dusty road as if a soap-bubble had been dropped onto the table. It had been only 1.5 m away from the wooden fence of a house on the opposite side of the road when it vanished suddenly. I saw no smoke or anything else, it did not raise the dust. Though, to tell

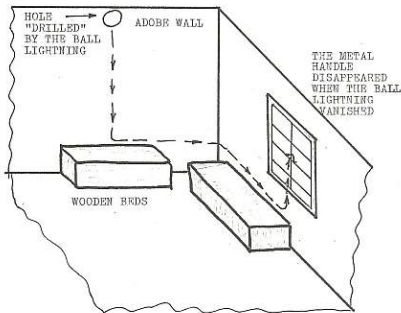
the truth, it was over the grass-covered patch beside the road when it vanished. Soon the wind of the storm began blowing. The whole event lasted about 40-50 seconds.

b.) I saw a ball-lightning for the second time in October, 1944, I was in the fields between Nádudvar and Hajdusoboszló. The front-line of the war was not far from us but it was very silent all around. It was a pleasant autumn day with much sunshine. It was about 5-6 p.m. Suddenly I noticed a bright sphere in the air in the South-West. It was moving slowly north-eastwards. It was only about 10-20 m high above the ground. Its diameter was about 10 cm or a bit more than that, perhaps. It was passing almost right above my head so I could see it quite well. Its material seemed to be more solid than that of the previous one. There was a row of acacias about 40 m away from me. The sphere was moving towards that. As soon as it reached the acacias it vanished silently there.

c.) For the 3-rd time I saw only the traces of a ball-lightning. I went to work to the State Farm at Nyírlugos in 1955. There was a building built of adobe which served as the farm's hostel for its workers. It was built North-South. I went to see somebody living in a room on the extreme northern side of the building. There was a hole of a man's head's size right below the ceiling. The people living there told me that a bright sphere had come into the room 2 days before piercing through the ceiling. It tossed the adobe with the plaster and the paint on it out of the wall. All these fell onto the bed. The ball descended along the wall onto the bed, too, then still passing along the wall moved to the wall facing east and disappeared at the window there. The window was shut and it disappeared at its middle. The metal handle of the window disappeared, too, but they could not perceive any smoke after it had vanished. It did not burn the wooden framework, not a brand could be seen anywhere. It did not explode. Maybe it simply went through the window somehow. The people in the room were not hurt. They were paralyzed with fear while the sphere was in the room so they did not dare to move at all. No burned brands or traces of melting could be seen round the hole in the wall or if there was any it must have been very small. No melted metal remained round the spot where the vanished window-handle had been originally fixed. The angle hinges of the window were not damaged. It was only the handle that disappeared. The window was an old-fashioned one with several panes of glass. The window itself was 150 x 80 cm.

d.) For the last time I saw a ball-lightning in the building of the State Farm of Nyírlugos in 1973. It was about the end of August, in the afternoon, half an hour after a storm had passed. It had already stopped raining, though there hadn't been much rainfall during the storm before either. The representative of the State Insurance Company and the chief agronomist of the farm, Glückman Pál and Dorka Kálmán, were coming along the corridor towards the room when I noticed a ball-lightning pass across the carpet in

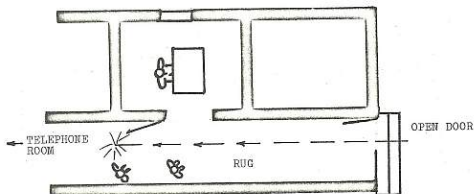
CASE 272/c NYIRIUGAS



front of the open door of the corridor. I stood up quickly and stepped to the door which was only 1.5 m away from me. While I was moving, a characteristic neither too sharp nor too hollow crack could be heard on the other side of the room. By the time I could have seen the ball-lightning again it had already vanished, exploded. Nothing caught fire, no smoke could be smelt, only a loose, bluish fog-like thing could be seen in the air, but it disappeared within a few moments after. I felt sort of stiffening for a short time then but it ceased soon. The insurance agent and the chief agronomist had already entered the room by that time. They told me they had seen the ball-lightning come in through the door of the corridor and move towards them on the carpet (the corridor was tiled with glazed tiles and covered with a carpet). They described it as a dim yellowish-red sphere of 10-12 cm diameter, too. The insurance agent who was coming in front did not know what it was and evaded it. As he had passed the sphere it exploded right behind him and 1 m in front of the chief agronomist. At that time I was about the same distance from the ball-lightning as they were but could not see it because of the door-post. No trace of the explosion could be seen on the carpet. Neither of them was hurt. After the explosion the girl working in the telephone-exchange room told us that a 70-80 cm long flame had leapt up the receiver. We went into the room to have a look at it. The telephone was seemingly unharmed, but a strange burned smell could be perceived in the room as well as in the whole building. The telephone cable burned down in the whole building and all the

telephones went completely wrong. The door of the telephone-exchange room was open. It was the 4<sup>th</sup> room from the spot of the explosion. The central plant of the farm is rather frequently struck by lightnings. Therefore a few years before lightning conductors had been fixed on all the buildings. The office also had one. There was also a radio-antenna right beside the office. The antenna also had a lightning conductor.

CASE 272/a NYIRLUGAS



Case 273. Kulcsárné Kovács Éva, Budapest

My parents told me the following story. I was still a baby and was asleep in a pram when suddenly a thunderstorm broke out. It was summertime. During the thunderstorm a glaring white ball-lightning came into the room. It headed for the leather-covered pram right away, went round the metal frame of the pram several times and then left through the open window. The metal frame was covered with leather all over. It left no burned brands behind, neither did it do any damage.

Case 274. Báres János, Budapest

(from "On the track of electrons" by József Üveges, Vol. 3.)

In 1953 I fled into our cellar because of a storm passing over our house and laid down on a sofa there. Suddenly a sizzling spark flashed accompanied with a crack in the middle of the cellar, far away from all the other objects, at about my chest's level. After 3-4 seconds a thunder could be heard. After another 30 minutes or so a spark, which was even larger than the previous one, appeared. It cracked as if a revolver had been fired.

Case 275. Dr. Szabó Gyula, Miskolc

The Library of the "Borsod Review" Geographical annual of Borsod,  
Vol. III-IV. 1962. Miskolc

Dr. Szabó Gyula: Ball-lightning over Diósgyőr, pp. 157-159.

On 15<sup>th</sup> July, 1961 at about 3 or 4 o'clock a.m. there was a heavy thunderstorm with much lightning. One could see the clouds clearly at them flashes of the frequent lightnings. After about ten minutes I caught sight of a blue-white ball-lightning descending slowly from a dark whirling and swirling cloud. It emitted such a strong blinding light that Diósgyőr could be seen for 4-5 minutes in a white light like that emitted at arc welding. Thus light was stronger than daylight. One could follow the route of the ball-lightning, it was slowly descending, sometimes it stopped for a moment and then it sparkled and hissed. It descended onto the tower of the church in Diósgyőr and there it exploded with a tremendous crash. The explosion was so great that its blast woke up sleeping people within 1 km distance.

Harmos Károly architect who was watching the events from much less distance could notice the whirling movement in its inside, it was approximately of moon's size, and perceived smoke on the spot of the explosion.

The thunderstorm lasted for 22 minutes, the rainfall was 22 mm at Diósgyőr and 11 mm at the airport of Miskolc.

Case 276. Radóczy Béla, Miskolc

I saw a ball-lightning on 29<sup>th</sup> December, 1966, in bright sunshine in the mounting shop of the Diósgyőr Machine Works. The shop is 40 x 6 m, it is packed with assembly lines. I worked as the shop-foreman of one of these lines at that time.

I noticed the ball-lightning quite a way off, it may have been about 20-40 m away from me, it changed its colour and zigzagged all around the workshop. I was watching it for quite a long time but did not tell anybody about it because the workers had to attend the machines. The ball-lightning was coming towards me and then I felt something strange somewhere around my chestbone. I felt sick and was taken to hospital. The diagnosis was nerve shock. It took me a long time to recover but the shock still has some strange effects. E.g. once when I was being examined with an electrocardiograph the doctor thought the machine had gone wrong because it drew such a strange and completely inexplicable diagram, a fact that could not have occurred theoretically.

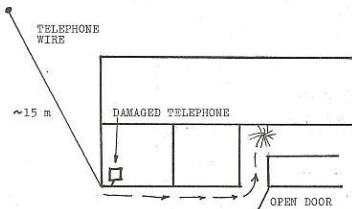
## Case 277. Ivanics István, Polgárdi

On 19<sup>th</sup> August, 1986 between 11 - 11<sup>30</sup> p.m. I saw two fireballs appear out of a dark, lightning cloud from the direction of Lake Balaton. First there was only one, then another appeared within a few seconds. They had a glaring light. They were moving towards Szabadbattyán and Székesfehérvár from the direction of Lake Balaton. The first one was of a man's head's size, the second one seemed to be a bit smaller. They had such a strong light that even the ants could be seen on the terrace. The whole event lasted only a few moments. I was a bit frightened because suddenly I remembered that a man had been burned and struck into two by a ball-lightning at Nagykanizsa in the sixties. I told this story to one of my colleagues and he answered he had also seen a ball-lightning from the window of his flat at Székesfehérvár at about the same time. Maybe it was one of those I saw. A woman, Pintér Györgyné saw two fireballs with glaring light rolling in the sky over Székesfehérvár.

## Case 278/a. Récsey Lajos, Balatonfenyves (INTERVIEW)

I stayed at Kápolnapusztá (Zala county) in 1961. There was a storm coming after lunch. I heard a loud crack. I knew at once a lightning had struck somewhere nearby so I got up and opened the door. I caught sight of a bright sphere of 15 - 18 cm diameter 3.0 - 3.50 m away from me. It was floating 230 - 240 cm above the floor along the corridor. It turned slightly towards me then exploded with a sharp crack. I was completely numbed with fear while watching the strange phenomenon which lasted no longer than 1 second. Having recovered my wits I went out and saw that the lightning had struck the pole of the telephone cables 15 m away from the window. The two cables burned down on that 15 m long section to the switch fixed onto the window. The pole was not damaged. The telephone stood in a room whose window was shut. The door of the corridor was open. A slight dark spot could be seen on that point of the ceiling of the corridor where the explosion happened. Approximately 1 minute passed between the two cracks.

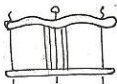
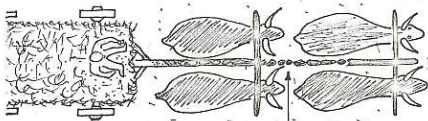
## CASE 278/a LOCATION: KÁPOLNAPUSZTA



278/b.

In the middle of the twenties an old farm labourer transported straw on an ox-cart pulled by 4 oxen at Terebezdpusztá near Taksóny. It was going to rain, it was already thundering heavily but it did not begin raining yet. Suddenly a large fiery ball descended from the sky and it exploded right above the oxen. The ball-lightning struck the oxbow of the front pair of oxen. As it exploded with a tremendous crack it killed all four of the oxen. The hide of them all was totally charred. The front pair of them fell asunder the back pair of them fell onto each other. The old farm labourer, uncle Ilisics who had been sitting on top of the pile of hay fell backwards onto the pile. He was not hurt, neither was the straw damaged. Both oxbows were unbroken in spite of being charred on their surface just like the pole of the cart to the bottom of the oxen. I clearly remember that neither the stock of the pole nor the straw was burned at all. The farm labourer was not hurt. Though he fainted he recovered after a short time. This case was investigated. The oxen were buried on the premises.

CASE 278/b LOCATION: TAPSONY



WOODEN YOKE  
IT HAD THREE 60 cm LONG IRON YOKE "NAILS".

THE WOODEN POLE HAS BEEN CHARRED EXTENSIVELY  
AND THE SKIN OF THE BULLS AS WELL.

THE BALL LIGHTNING APPEARED FROM ABOVE, EXPLODED AND THE CART DRIVER  
FELL ON THE HAY.

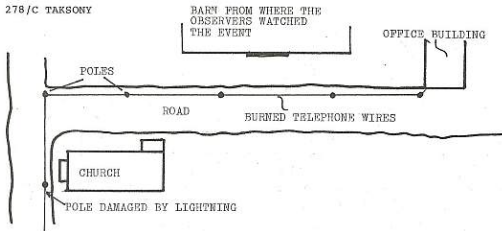
278/c.

In the summer of 1930, at 4 o'clock a.m. a lightning struck the telephon cable near the tower of the church. The pole was split by the lightning. Afterwards several people saw a bright ball passing slowly as high as the telephone cables. 12 cables, on a 400 m long section, burned down (from the pole to the central office). The telephones in the office were not damaged at all, by contrast the safe in the opposite corner was twisted and fell over. The banknotes in the safe, the papers on the filing-racks and all the



other equipment of the office remained unharmed. The ashes of the burned cables were lying in parallel lines on the ground just like in the first case at Kápolna. The cables were simple, uninsulated ones.

CASE 278/C TAKSONY



Case 279. Ellmann Károly, Veszprém

In the summer of 1960 I saw a ball-lightning appear from behind a house nearby. I was on a housing estate which consisted of one-story, semi-detached houses. The atmospherical conditions were absolute calm, no ordinary lightnings could be seen anywhere. The yellowish red sphere of about 20 diameter was floating about 3 m high above the ground. It changed its direction in a sharp angle and was coming right towards me as if I had been aimed by it. It was about 5 m away from me when it changed its direction again bumping against the edge of the partition wall of a building nearby (but not against that of the next building) it exploded. A crack could be heard and a puff of smoke appeared. No trace of the ball-lightning could be seen from 10 m distance on the spot where it struck the wall. The crack was so loud that several people came out of the neighbouring houses to see what had happened. I found the motion of the ball-lightning very interesting. Its velocity changed along its course, it seemed to stop for a moment at the break points (as no landmarks were there). No visible cause, e.g. obstacles of ground, can account for its changing direction.

Case 281. Anonymous, Legyesbénye

The sky was cloudy over Szentistvánbaka one day in 1940. My parents went away from home so I, at the age of 13, had to stay at home with my brother. We were just sitting on the doorstep of the room at 3 p.m. when we caught

sight of a bright sphere come into the room through the door and soon afterwards leave through the window. We were driven into the corner by this phenomenon and the furniture in the room fell down.

Mikes Kelemen

Letter L VIII

Rodostó, 13<sup>th</sup> December, 1724.

Would anybody believe at home what hot weather is prevailing here, most of all hot rains with heavy thundering ? You, at least, should believe it as I tell no lies. No louder or more frequent thundering has ever been heard during summertime than now. But that's a fine thing that lightnings strike rather rarely here. I know you have already heard of various and miraculous effects of lightnings but I wonder if you have ever heard of such a miraculous thing I have read about..I cannot help laughing whenever it comes to my mind - I want you to laugh, too.

In Rome, a French ambassador and his wife were at table with the windows being open all around, when a lightning crossed the hall - each was frightened but no damage was done - and as it was crossing the hall the wife of the ambassador felt warm - find it out, where ! - but being at table she could not slip her hand under her skirt but having finished the meal she herself could not help laughing when noticed that the lightning had singed her .... My sweet aunt, think of the spot it was rummaging about ! And who could help laughing at it ?

APPENDIX  
Statistics

Ball-lightning observations in good, sunny weather:

16, 20, 34, 35, 37, 42, 47, 49, 53, 56/a, 59/c, 61, 63, 67, 76, 82, 87,  
97, 103, 108, 114, 119, 132/b, 135, 141/a, 143, 151, 166, 167, 169, 185/b,  
185/c, 205/b, 212, 216, 222, 234, 235, 236, 237, 259, 266/a, 272/b, 276,  
279.

Ball-lightning observations in cloudy, windy or overcast weather, but without  
lightnings at the surroundings of the observation:

7, 8, 9, 26/a, 26/b, 32, 39, 46, 55, 59, 69, 71, 78, 83, 85, 86, 90, 99,  
102, 121, 123/a, 123/b, 129, 131/a, 132/a, 136, 139, 142, 144, 147, 155,  
163, 164, 177, 178/a, 178/b, 180, 182, 184, 185/a, 189, 200, 210, 213,  
220/a, 227, 230, 242, 249, 263, 265, 268, 270/b, 272/a, 272/d, 281.

Ball-lightning observations during storm with lightnings:

1, 2, 4, 5, 6, 10, 11/a, 12, 13, 14, 15, 18/a, 18/b, 19, 21, 22, 23, 25,  
28, 30/a, 30/b, 31, 33, 36, 38/a, 38/b, 38/c, 40, 41, 43, 44, 45, 56/b,  
58, 62, 64, 65, 66, 68, 72, 73, 74, 75, 80/a, 80/b, 81, 84, 89, 94, 95,  
96/a, 96/b, 98, 100, 101, 104, 105, 109, 110, 111, 112, 115, 116, 118,  
121/b, 124, 125, 126, 127/a, 127/b, 128, 130, 131/b, 133, 134, 138, 145,  
146, 148, 149, 150, 152, 153/a, 153/b, 156, 158, 159, 160, 161, 162, 165,  
170, 171, 173/a, 173/b, 174, 175/a, 175/b, 179, 181, 183, 186, 187, 188/a,  
188/b, 188/c, 190, 191, 192/a, 193, 194, 195, 196, 197, 198, 199, 201,  
202, 203, 204, 205/a, 206, 207, 208, 211, 214, 215, 217, 218, 220/b, 223,  
224, 225, 226, 228, 231, 232, 238, 239, 240, 241, 244, 246, 247, 248,  
250, 251, 253, 254, 255, 256/a, 256/b, 258, 260, 261, 264, 267, 269,  
270/a, 270/c, 271, 272/c, 273, 274, 275, 277, 278/a, 278/b, 278/c.

The rest of the observers did not describe the weather.

Cases where more than one observer witnessed simultaneously the ball light-  
ning:

2, 3, 4, 6, 8, 10, 11, 14, 18/a, 19, 20, 23, 26/a, 26/b, 26/c, 27, 28,  
29, 30/a, 30/b, 34, 35, 38/b, 38/c, 39, 40, 41, 44, 47, 48, 55, 56/a,  
56/b, 56/c, 57, 60, 61, 63, 64, 65, 68, 73, 74, 77, 80/a, 80/b, 81, 82,  
85, 92, 95, 96, 97, 98, 99, 100, 101, 102, 104, 105, 109, 110, 112, 117,  
118, 121/a, 121/b, 123/a, 124, 127, 129, 132/b, 134, 135, 137, 141/b,  
144, 145, 146, 147, 153/a, 153/b, 155, 157, 161, 163, 167, 170, 171,  
173/b, 174, 175/a, 175/b, 176, 178, 180, 185/b, 187, 188, 190, 191, 192/a,  
193, 196, 197, 199, 200, 201, 202, 205, 207, 209, 212, 215, 216, 217,  
220/b, 220/c, 220/d, 222, 223, 224, 226, 227, 234, 236, 237, 241, 242,  
248, 250, 253, 254, 255, 256/a, 258, 259, 260, 261, 266/a, 267, 268, 269,  
270/a, 270/c, 271, 272/c, 272/d, 273, 275, 277, 278/c, 281.

Cases where the presence of some odor was noted:

14, 56/b, 66, 79, 80, 89, 90, 136, 142, 151, 161, 162, 167, 174, 214, 222, 225, 264, 265.

Cases where more than one ball-lightning has been observed:

7, 26/c, 34, 49, 50, 55, 80/a, 83, 84, 86, 128, 141/b, 143, 165, 170, 173/a, 182, 184, 185/b, 187, 198, 217, 219, 257, 277.

Cases where the shape of ball-lightning has been elliptical or irregular:

7, 11, 26/c, 31, 54, 68, 72, 73, 75, 76, 84, 112, 123, 154, 157, 161, 164, 170, 172, 177, 183, 185/a, 185/c, 187, 206, 211, 246, 253, 256, 260, 270/b, 270/c.

Cases where some sound effect has been noted:

7, 9, 10, 11, 13, 14, 17, 18/a, 18/b, 19, 38/a, 43, 46, 55, 59, 60, 64, 68, 69, 72, 78, 79, 84, 114, 118, 120, 131, 134, 136, 144, 149, 159, 164, 174, 182, 192/a, 220/a, 220/b, 220/c, 222, 224, 225, 234, 236, 268, 269, 271.

Cases where heat has been detected by the observers:

121, 127, 165, 173, 225.

Cases where material damage, destruction has been observed (Underlined case numbers indicate large amount of energy release):

3/b, 4, 6, 10, 11, 13, 18/a, 21, 25, 26/b, 41, 42, 44, 46, 55, 56/b, 58, 62, 64, 66, 67, 68, 69, 71, 72, 74, 82, 84, 90, 92, 93, 96, 97, 100, 110, 123/b, 128, 131/a, 131/b, 132/a, 132/b, 138, 139, 140, 141, 147, 152, 153/b, 158, 159, 162, 163, 171, 173/a, 173/b, 173/c, 174, 175, 175/b, 179, 188/b, 189, 190, 197, 201, 205/a, 205/b, 208, 214, 216, 217, 219, 220/a, 220/b, 220/c, 220/d, 222, 231, 232, 248, 259, 260, 269, 270/a, 270/c, 271, 272/c, 278/a, 278/b, 278/c, 281.

Cases where biological effect, or personal injury has been observed:

26/b, 38/c, 39, 40, 41, 56/b, 57, 68, 71, 82, 89, 97, 100, 105, 124, 132/b, 141/a, 145, 153/b, 156, 166, 170, 171, 175/a, 175/b, 179, 180, 192/b, 197, 204, 259, 275, 278/b.

Cases where anomalous physical effects have been observed:

60, 61, 65, 69, 220/c, 230, 272/c.

Cases where the formation of the ball-lightning has been observed:

a) visually: 1, 5, 12, 32, 45, 47, 59, 63, 69, 145, 147, 157, 158, 160, 162, 173/b, 187, 188/c, 192/a, 193, 197, 201, 209, 218, 220/a, 220/b, 220/c, 220/d, 225, 226, 236, 249, 256/a, 256/b, 261, 268, 274.

- b) audially (loud bang). The underlining notes those cases, where the formation has been observed visually as well: 10, 13, 19, 41, 42, 44, 47, 55, 58, 66, 67, 68, 89, 98, 100, 110, 112, 115, 120, 124, 137, 147, 160, 162, 170, 173/b, 192/a, 193, 201, 205, 206, 207, 218, 220/a, 220/b, 220/c, 256/a, 278/a.

Cases where the disappearance of ball-lightning has been:

- a) silent: 8, 12, 16, 20, 26/a, 26/b, 28, 32, 33, 35, 36, 38/a, 38/b, 40, 61, 62, 63, 84, 104, 110, 117, 121, 126, 149, 156, 160, 193, 197, 198, 209, 225, 226, 231, 235, 239, 240, 244, 250, 261, 263, 272/a, 272/b, 272/c.
- b) explosive, by loud detonation: 2, 10, 18/a, 19, 41, 46, 47, 53, 54, 56, 58, 59, 64, 67, 68, 69, 73, 76, 78, 79, 80, 81, 83, 97, 98, 99, 114, 118, 123/b, 125, 127/b, 128, 130, 131/a, 131/b, 132/a, 132/b, 139/a, 145, 154, 155, 158, 162, 163, 165, 167, 169, 171, 173/a, 173/b, 181, 188/b, 188/c, 190/a, 191, 192/a, 202, 203, 204, 205, 208, 212, 214, 216, 218, 219, 220/a, 220/b, 220/c, 220/d, 222, 227, 234, 236, 241, 243, 265, 268, 269, 272/d, 275, 278/a, 278/b, 279.

Cases where the ball-lightning has been observed indoors:

3/b, 11, 12, 14, 16, 18/b, 22, 38/c, 39, 81, 84, 104, 105, 125, 126, 131/b, 157, 166, 171, 176, 192/a, 193, 197, 214, 218, 225, 236, 249, 250, 264, 270/b, 274, 276.

Note: in some of these cases the ball-lightning has been formed indoors, without previous streak lightning impact. Some of the indoor/outdoor observations contain such case also.

Cases where the ball-lightning has been observed outdoors:

3, 5, 7, 8, 9, 13, 15, 17, 18/a, 26/c, 30, 32, 33, 34, 35, 36, 38/b, 45, 46, 49, 50, 52, 53, 54, 61, 67, 69, 73, 80, 83, 85, 86, 99/a, 101, 102, 103, 111, 117, 118, 120, 121, 123/b, 127/b, 131/a, 132/a, 135, 136, 137, 139/a, 141, 143, 144, 149, 150, 152, 158, 160, 162, 163, 165, 167, 169, 172, 173/a, 174, 175/b, 177, 178/a, 178/b, 181, 182, 184, 185/b, 185/c, 187, 188/c, 189, 190, 198, 201, 203, 204, 205/b, 208, 213, 215, 216, 217, 220/a, 220/b, 220/c, 220/d, 222, 223, 224, 228, 229, 230, 234, 239, 241, 242, 252, 255, 261, 263, 265, 266/a, 270/c, 272/a, 272/b, 277, 278/b, 278/c, 279.

The rest of the cases were observed indoors and outdoors as well, usually the ball-lightning entered an apartment through an open door, or window.

Cases where electric effects have been observed:

11, 25, 26/b, 31, 38/a, 56/b, 60, 62, 66, 67, 68, 69, 72, 84, 89, 90, 139/a, 142, 146, 147, 158, 159, 186, 214, 260, 272/d, 278/a.

Cases where electric effect, material damage or personal injury has been observed simultaneously:

11, 25, 26/b, 56/b, 62?, 66, 67, 68, 69, 72, 84, 89, 139, 147, 159, 214, 260, 272/d, 278/a.

Cases where the electric effect has not been accompanied by material damage (apart from melting the fuse wire):

31, 38/a, 60, 62?, 142, 146, 186.

Cases where material damage and explosive ball-lightning termination has been observed together:

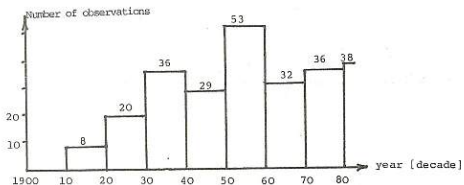
10, 18/a, 41, 46, 58, 64, 67, 68, 69, 97, 123/b, 128, 131/a, 131/b, 132/a, 132/b, 139/a, 158, 162, 163, 171, 173/a, 173/b, 188/b, 190/a, 205/a, 208, 214, 216, 219, 220/a, 220/b, 220/c, 220/d, 222, 234, 269, 272/c, 278/a, 278/b.

Cases where material damage has been observed without any noise effect. Case numbers are underlined when the ball-lightning vanished silently:

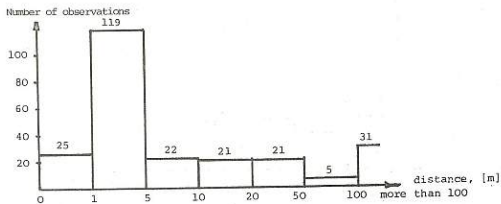
3/b, 4, 6, 13, 26/b, 62, 84, 110, 197, 231.

# FIGURES

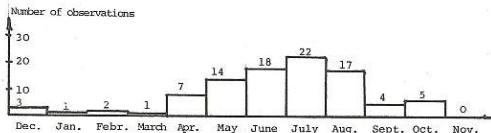
Distribution of the number of ball lightning reports as a function of the decade of the observation



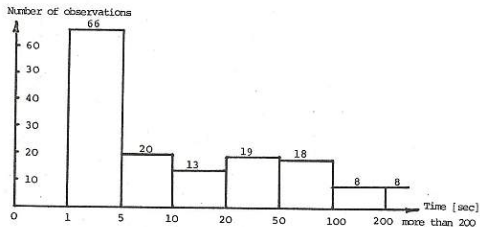
Distribution of the number of ball lightning reports as a function of the distance from the observer



Distribution of the number of ball lightning reports as a function of the month of the observation. Note: most of the observers noted only "summer", few of them specified the month

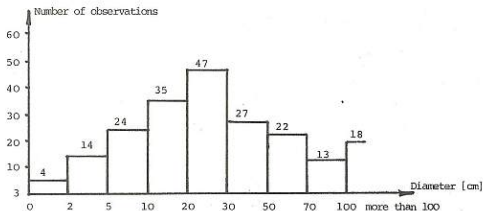


Distribution of the reports as a function of the estimated life time of the ball lightning. Note: some of the observers did not specify the ball-lightning life-time in seconds, only "short" or "long period". When a period has been specified, always the lower value was chosen.

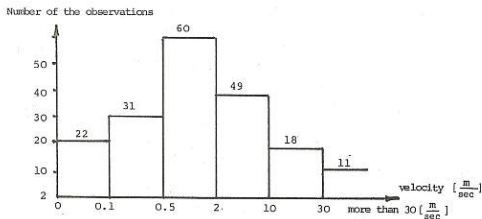




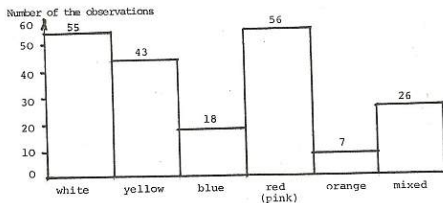
Distribution of the reports as a function of the diameter of the ball-lightning. The shorter diameter has been taken into account for the elliptical ones

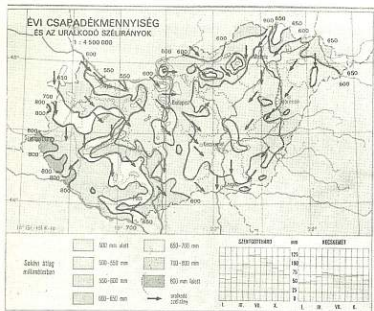


Distribution of the reports as a function of the velocity of the ball-lightning

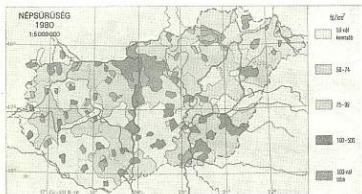


Distribution of the reports as a function of the colour of the ball-lightning

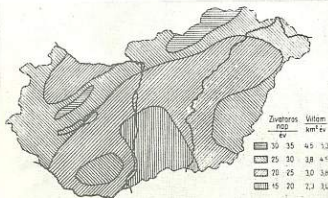




Distribution of the average precipitation and the reigning wind direction.



Distribution of the population density.  
Note: the area around Lake Balaton is densely populated during summer holiday reason.



Distribution of the number of stormy days (noted by the left-hand-side column) and the estimated lightning density distribution (right-hand-side column)

Source: Dr. Horváth Tibor: Lightning Protection, Műszaki, Budapest, 1965. (in Hungarian)

6. ábra. A zivataros napok számának és a villámsűrűségnek a területi eloszlása Magyarországon

Distribution of high energy ball lightnings. Western part of Hungary. Where the case number is indicated by thick number the material damage has been high, more than about 1000 J. Arrow, with small case number indicates cases where the work done by the BL is less than 1000 J. Cases of negligible destruction, or with no damage to the environment are not shown on the map.



Distribution of high energy ball-lightnings. Eastern part of Hungary. The classification of cases to "high energy" and "medium energy" is somewhat arbitrary, and it concerns only the damage done to the environment, and not to that of the energy content of the ball-lightning, which can not be properly determined only a lower minimum can be estimated.



Analysis of some selected interactions:

1.) Penetration through window pane.

There are three different penetration types, according to the type of the damage.

- A) Ball-lightning passes through the window pane without any damage (see case 224).
- B) The ball-lightning breaks the window pane (see case 271).
- C) The ball-lightning evaporates a hole on the window pane without breaking it (see case 4).

For each case the thermal stress - caused by the nonuniform heating of the glass - is the key factor. In case of harmless penetration (A) the thermal stress is less than that of the critical tensile stress of the window. When the glass is broken (case B) the thermal stress is exceeding the threshold tensile stress, while in case of the glass evaporation (case C) the heated region is too narrow to induce the critical tensile stress.

The analysis of these cases could help in the determination of the ball-lightning energy density, though only indirectly.

The temperature of the glass window pane is proportional to the heating time, so the speed of the ball-lightning is of crucial importance. The ratio of energy deposition in the calculations is an unknown factor, but it is possible to calculate or to estimate the glass temperature.

The glass temperature distribution is directly related to the stress distribution in the glass.

Assuming a simplified treatment, where the temperature is the function of the radius only (neglecting the effect of axial and azimuthal temperature distribution), the Hooke law has the following form:

$$\epsilon_r = \frac{1}{E} (\sigma_r - \mu \sigma_t) + \alpha T \quad [1]$$

$$\epsilon_t = \frac{1}{E} (\sigma_t - \mu \sigma_r) + \alpha T \quad [2]$$

where  $\epsilon$  is the relative expansion,  $\sigma$  is the mechanical stress,  $E$  is the Young modulus,  $\mu$  is the Poisson's ratio,  $\alpha$  is the thermal expansion coefficient,  $T$  is the temperature, and  $t, r$  indices note the tangential and radial stress. From Eq. 1, and 2 the stresses have the following form:

$$\sigma_r = \frac{E}{1-\mu^2} [\epsilon_r + \mu \epsilon_t - (1 + \mu) \alpha T(r)] \quad [3]$$

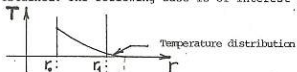
$$\sigma_t = \frac{E}{1-\mu^2} [\epsilon_t + \mu \epsilon_r - (1 + \mu) \alpha T(r)] \quad [4]$$

The condition of mechanical equilibrium for a ring shaped element will be the following:

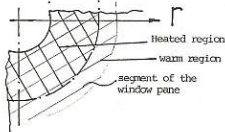
$$\frac{d\sigma_r}{dr} + \frac{\sigma_r - \sigma_t}{r} = 0 \quad [5]$$

where  $r$  is the radius.

Substituting Eq. 3 and 4 into Eq. 5, an Euler type differential equation is obtained. The following case is of interest for the penetration calculation



Hollow window pane. If  $r_0 \rightarrow 0$ ,  
intact window pane is simulated



The boundary conditions are as follows:  $\epsilon_r(r_0) = \epsilon_r(r_\infty) = 0$ ,

that is  $\frac{1-\mu^2}{E} \sigma_r(r_0) = 0$ , and

$$\frac{1-\mu^2}{E} \sigma_r(r) = 0.$$

When  $T = T(r) = \text{const}$ , and the unheated region is infinite, the above conditions yield:

$$\sigma_r(r) = \begin{cases} -\frac{E\alpha \Delta T}{2} \frac{r^2 - r_0^2}{r^2} & r \leq r_1 \text{ (heated region)} \\ -\frac{E\alpha \Delta T}{2} \frac{r_1^2 - r_0^2}{r^2} & r > r_1 \text{ (unheated region)} \end{cases} \quad [6]$$

$$\sigma_t(r) = \begin{cases} -\frac{E\alpha \Delta T}{2} \frac{r^2 + r_0^2}{r^2} & r \leq r_1 \\ -\frac{E\alpha \Delta T}{2} \frac{r_1^2 + r_0^2}{r^2} & r \geq r_1 \end{cases} \quad [8]$$

[9]

Note that only Eq. [9] yields tensile stress, the rest of them yields compressing stress. This is important, because the critical tensile stress of the glass is substantially less than that of the critical compressing stress.

If  $r_0 \rightarrow 0$ , the expressions are simplified to

$$\sigma_r(r) = \begin{cases} -\frac{E\alpha \Delta T}{2} & r \leq r_1 \\ -\frac{E\alpha \Delta T}{2} \frac{r_1^2}{r^2} & r \geq r_1 \end{cases} \quad [10]$$

$$\sigma_t(r) = \begin{cases} -\frac{E\alpha \Delta T}{2} & r \leq r_1 \\ -\frac{E\alpha \Delta T}{2} \frac{r_1^2}{r^2} & r \geq r_1 \end{cases} \quad [11]$$

$$\sigma_t(r) = \begin{cases} -\frac{E\alpha \Delta T}{2} & r \leq r_1 \\ -\frac{E\alpha \Delta T}{2} \frac{r_1^2}{r^2} & r \geq r_1 \end{cases} \quad [12]$$

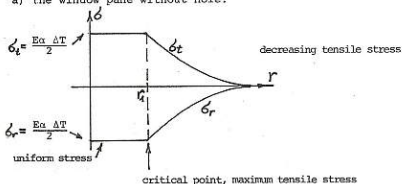
$$\sigma_t(r) = \begin{cases} -\frac{E\alpha \Delta T}{2} & r \leq r_1 \\ -\frac{E\alpha \Delta T}{2} \frac{r_1^2}{r^2} & r \geq r_1 \end{cases} \quad [13]$$

Eq. 10-13 are to be used for case A and B, while

Eq. 6-9 are to be used for case C.

Qualitatively the stress distribution will be the following for

a) the window pane without hole:



As the critical tensile stress of the commercial window pane is  $\sigma_{crit.} \approx 6000 \text{ p.s.i.} = 4.1 \cdot 10^7 \text{ N/m}^2$  (Source: CRC Handbook of tables for Appl. Eng. Sciences, Ed. 1973, pp 160),

$E \approx 10^7 \text{ p.s.i.} \approx 6.9 \cdot 10^{10} \text{ N/m}^2$ , and  $\alpha \approx 8.5 \cdot 10^{-6} \text{ } ^\circ\text{C}^{-1}$  (Source: Mantell: Engineering Material Handbook, Mc Graw Hill, 1958) the maximum temperature difference is

$$\Delta T_{max} = \frac{2\sigma_{crit}}{E\alpha} \approx 135 \text{ } ^\circ\text{C}, \text{ regardless to the radius.}$$

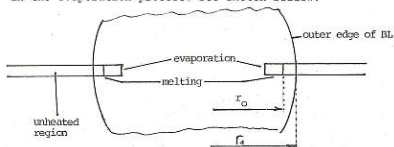


It has to be noted that the data is quite scattered regarding the critical tensile stress, the quality of the surface is of crucial importance. (Small grooves decrease it significantly.)

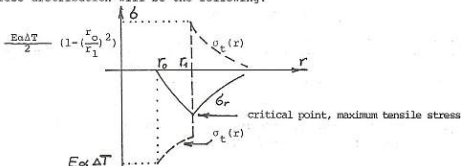
That is a ball-lightning of low energy, or high speed may pass through a window pane without damage (case A) if the glass is not heated above  $\approx 135^{\circ}\text{C}$ , but in the opposite case it will be broken (case B).

Case C, penetration with evaporation is quite interesting and important. Such a case has been used for the estimation of the energy content of a ball-lightning (D.A. Kolosovskij, Zh. Techn. Fiziki, Vol. 561, N<sup>o</sup>4, 1981, pp. 856, in Russian) it was assumed that the energy of ball-lightning is equal to that of the energy necessary to evaporate the given piece of glass.

This assumption is incorrect, on two accounts: On one hand it is by no means proven, that the energy of a ball-lightning is concentrated in the visible ball, on the other hand only a part of the ball-lightning takes part in the evaporation process. See sketch below:



Therefore the "energy density" is higher than the calculated value. The stress distribution will be the following:



Note that this distribution is different from the previous one, this allows higher temperature values than the previous, as here the ratio of  $r_0^2/r_1^2$  is taken into account as well. As the maximum of  $\Delta T \approx 400^{\circ}\text{C}$ , (at this temperature the glass tensile stress is changing drastically) using the previous data  $r_1 \approx 1.3 r_0$  is obtained.

Through this result is nothing but a crude estimation (as  $E$  and  $\alpha$  is temperature dependent) it points to the fact that only a part of the ball-lightning heats the glass.

In principle  $\sigma_t(T)_{\text{critical}} = \frac{E(T)\alpha(T) \cdot T(r,t)}{2} \left(1 - \frac{r_0^2}{r_1^2}\right)$  relation should be used, where  $t$  notes the time.

In case of evaporation of metal plates, the thermal stress is not important (except cast iron) but the same considerations are to be applied for "energy content" calculations.

2.) Penetration through adobe walls represents quite a different class of problems, as their tensile stress is negligible, and the penetration process is not based on melting and evaporation, but most probably on an electrostatic phenomenon.

The scattered beam electrons heat the wall just a little, the clay and sand particles of the wall are just blown out by the repelling Coulomb forces. The same mechanism is responsible for the holes on brick walls, though the hole is not so smooth, larger pieces are broken from the brick due to its higher tensile stress.

3.) Wooden objects behave according to their texture and water content. Wet wood explodes, it is shattered to small pieces, due to the high pressure of high temperature steam. It is apparant, that the heat generation is volumetric, because such an explosion requires sudden pressure increment in the whole volume. Old, dry, porous wood may just burn without explosion, then a regular hole is found an wooden objects.

Response Ratios for different Newspapers

Paper	NSZG	NSZ	MN	MH	VH	ML
Sold copies per response	5700	3400	6000	3700	20.000	10.000

NSZG-Népszabadság, NSZ-Népszava, MN-Magyar Nemzet, MH-Magyar Hirlap, VM-Vasárnapi Hírek, ML-Megyei Lapok.

TEXT TO PLATES

Plate 1-9 case 67 (Hegyeshalom)

Plate 1 the roof of the building after the ball-lightning explosion in the attic.

Plate 2 Roof of the same building (street side)

Plate 3 TV set blown up by the ball-lightning. The TV set was blown up from the inside, not because of an outside impact, it did not move from its original place, the table is unharmed under it. The electric wire of the power supply burned down. Note the broken part of the roller blind. Note the soot on the wall, near the electric plug. The plug is covered by the chair.

Plate 4 View of the whole building, street side, the arrow indicates the location of the electric meter, and its wires. Note the TV antenna and a metal pole on the roof. The latter held the electric wires, coming from the grid. There was no lightning rod on the building.

Plate 5 Part of the most damaged room. The owner slept in the bed. Note the damaged ceiling. The wardrobe in the corner was damaged, a coat burned partially in it. The electric wires were torn out of the wall. (On the other side of the wall the same phenomenon is shown on plate 4.) The arrow indicates spot-like injuries shown in the picture, caused by the fragments of the TV set.

Plate 6 The same room from another angle. The arrow indicates the location of an electric plug. Note the electric lamp is not broken, but torn out of its socket.

Plate 7 This cast iron bath-tube has been damaged during the explosion. It was in the closed bathroom (It is used as a water tank now in the garden)

Plate 8 The most injured corner is shown. The arrow indicates the place where the broken part is quite visible. The cast iron wall was about 8 mm thick at that point.

Plate 9 The legs of the bath-tube were broken during the accident.

Plate 10 - 14 Gyula, case 69

Plate 10. The location of the event. The arrow indicates the building of the observer. (The photo was taken with 37 mm wide angle lens.)

Plate 11 The electric pole where the ball-lightning moved (100 mm telephoto lens)

Plate 12 The arrow indicates the location of the damage, caused by the ball-lightning. The photo was taken after the damage had been mended, the broken insulator had been replaced.

Plate 13 The broken insulator found at the electric pole.

Plate 14 The broken surface of the insulator.

Plate 15-21. case 247 (Budapest)

- Plate 15 The electric box after mending  
The damaged wire was covered again by a new PVC insulator. It is slightly loose, because only about a 10 cm part was replaced. The arrow indicates the damaged wire.
- Plate 16 The neighbour's undamaged electric box. The arrow indicates the location of the most effected area. The three wires are the following. Upper: ground wire, middle: O phase, bottom: phase.
- Plate 17 The plastic lid of the damaged box. There was no permanent damages done to it.
- Plate 18-21 The damaged parts of the box. The small pieces in the middle are from the PVC insulation of the damaged wire.

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PLATE 1

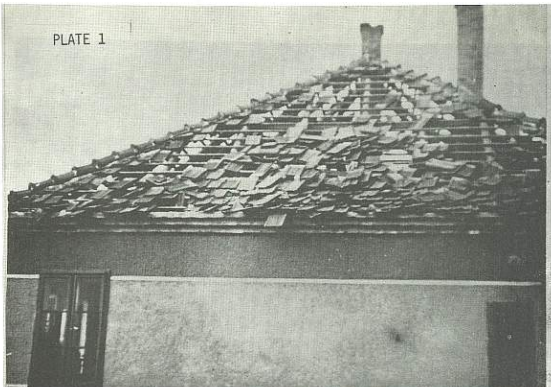


PLATE 2

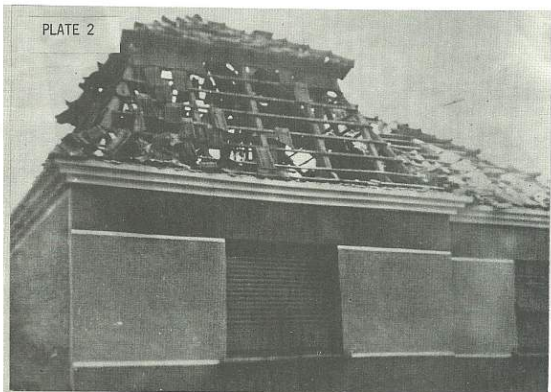


PLATE 3



PLATE 4



PLATE 6

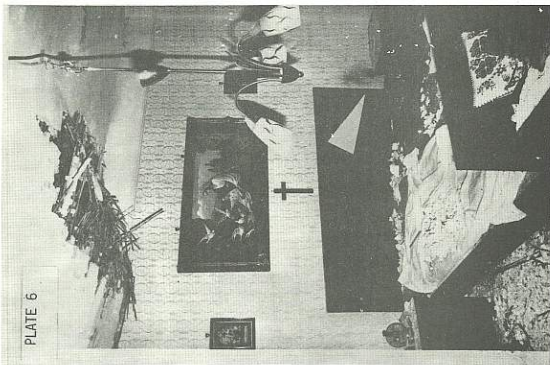
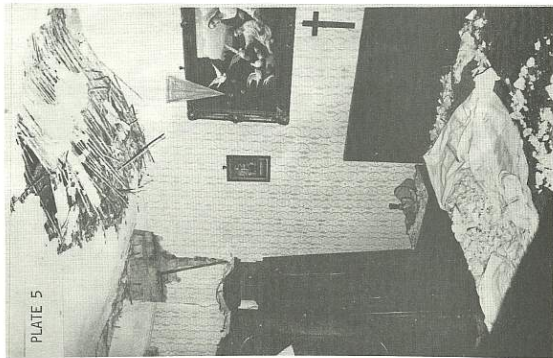


PLATE 5





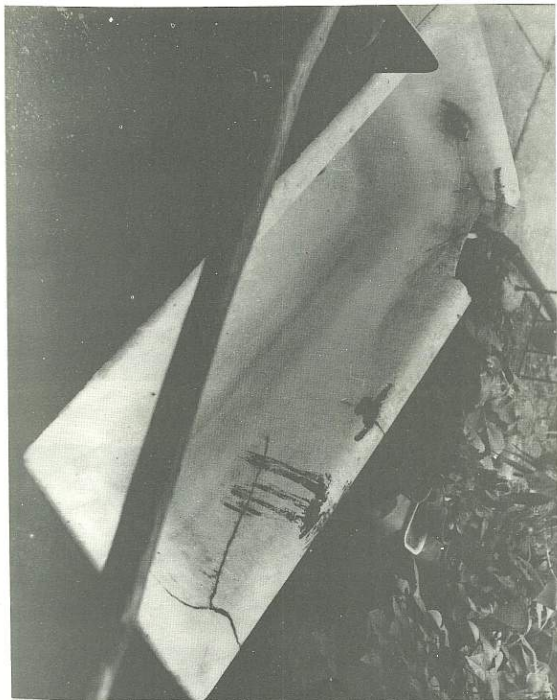


PLATE 7

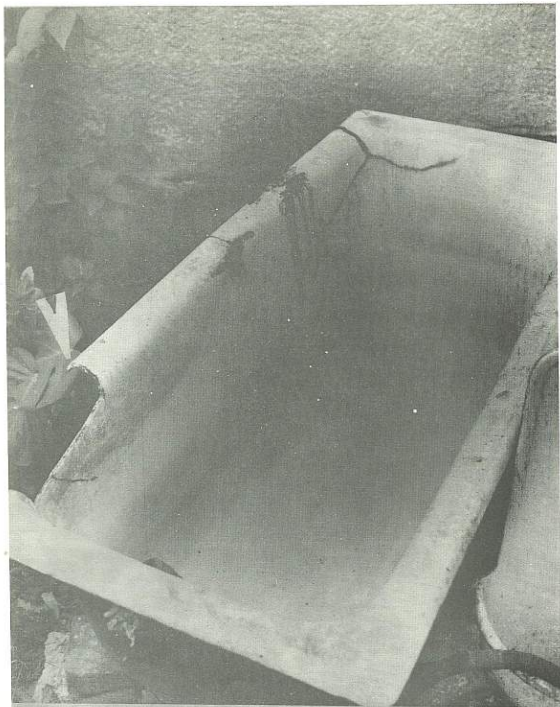


PLATE 8

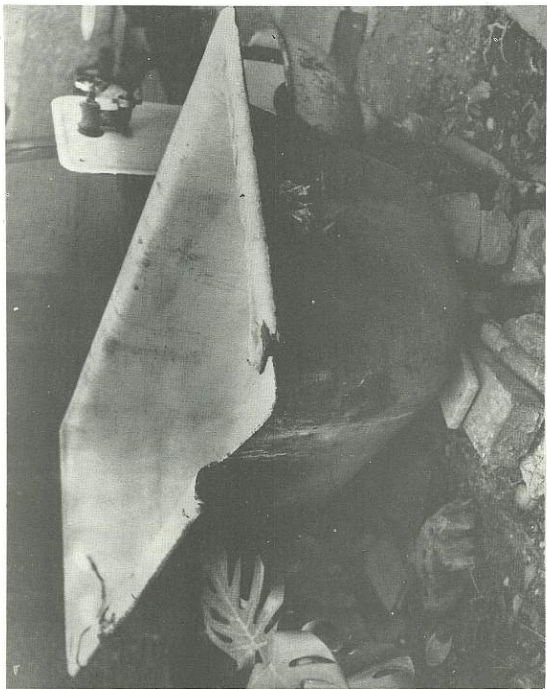
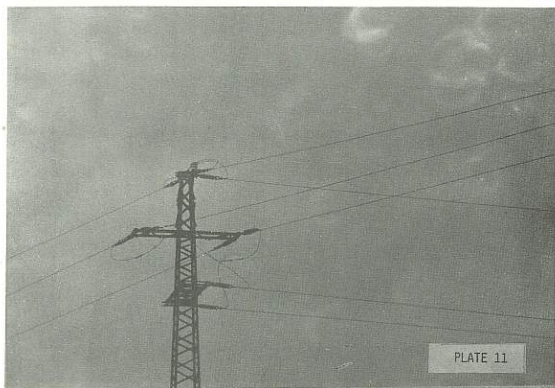
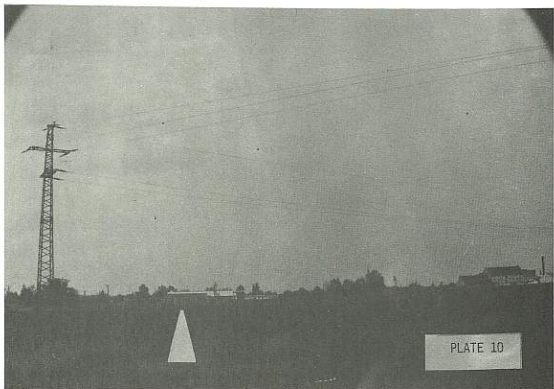
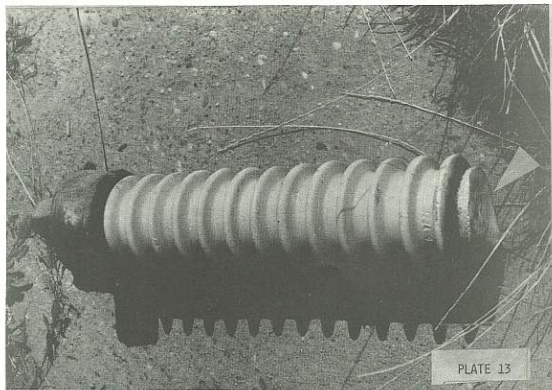
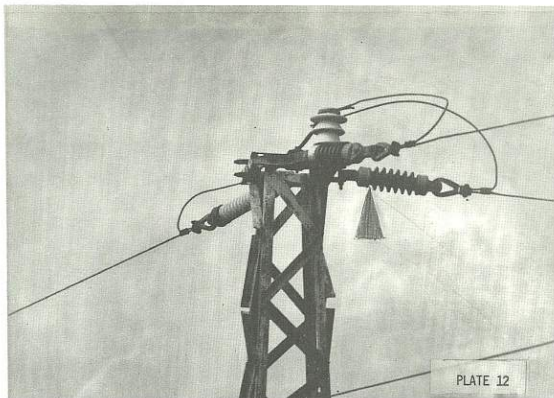


PLATE 9





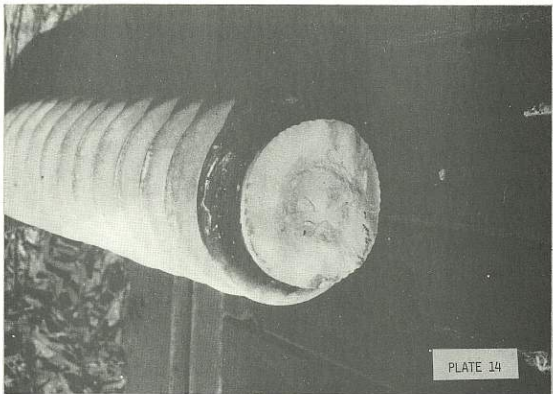


PLATE 14

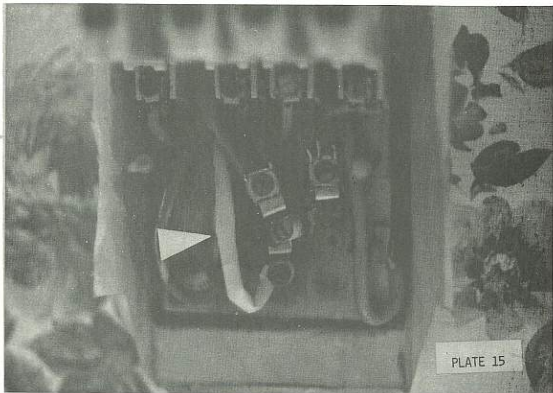
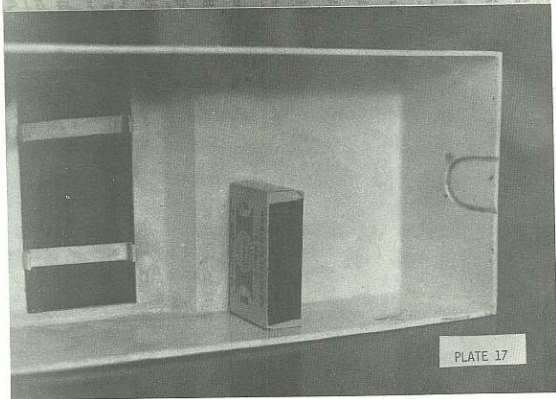
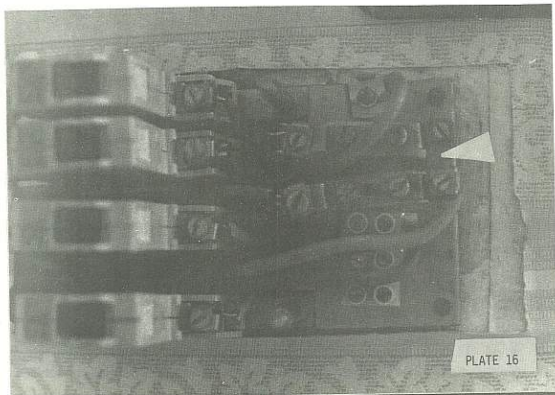


PLATE 15





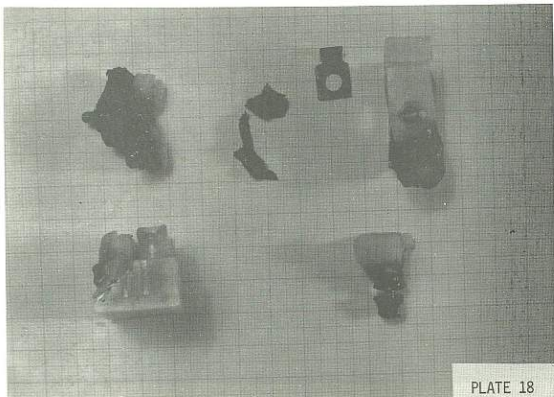


PLATE 18

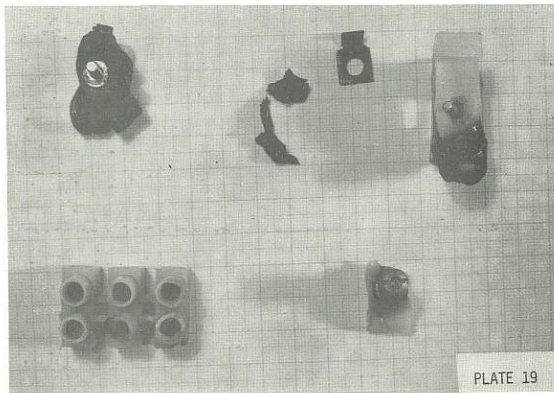


PLATE 19



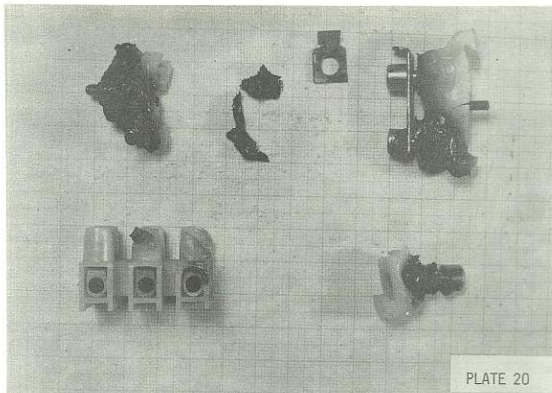


PLATE 20

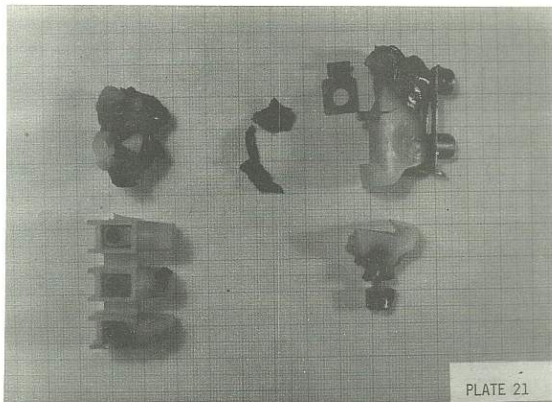


PLATE 21



Kiadja a Központi Fizikai Kutató Intézet  
Felelős kiadó: Gyimesi Zoltán  
Szakmai lektor: Perjés Zoltán  
Nyelvi lektor: Kutor Susan  
Példányszám: 440 Törzsszám: 87-111  
Készült a KFKI sokszorosító Üzemében  
Felelős vezető: Tőreki Bóláné  
Budapest, 1987. február hó